1245372 – [0069139H]

17-NWP-019 / WA7890008967

SECTION 2 OF 3

PUREX STORAGE TUNNELS
CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have a "**Last Modification Date**" which represents the last date the portion of the unit has been modified. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Last modification to PUREX **June 30, 2012**

Chapters	Last Modification Date	Modification Number
Unit-Specific Conditions	06/30/2012	
1.0 Part A Form	10/01/2008	
2.0 Reserved		
3.0 Waste Analysis Plan	10/2006	
4.0 Process Information	10/2006	
5.0 Reserved		
6.0 Reserved		
7.0 Reserved		
8.0 Reserved		
9.0 Reserved		
10.0 Reserved		
11.0 Closure and Financial Assurance	10/2006	
Addenda	**Last Modification Date**	**Modification Number**
A. Reserved		
B. Reserved		
C. Reserved		
D. Reserved		
E. Security	09/30/2010	
F. Preparedness and Prevention	09/30/2010	
G. Personnel Training	09/30/2012	
H. Reserved		
I. Inspection Requirements	09/30/2010	
J. Contingency Plan (OUO)	09/30/2010	

This page intentionally left blank.

PUREX STORAGE TUNNELS
PART III, OPERATING UNIT 2 PERMIT CONDITIONS
CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
06/30/2012	

This page intentionally left blank.

PART III, OPERATING UNIT 2 PERMIT CONDITIONS
PUREX STORAGE TUNNELS

This page intentionally left blank.

PART III, OPERATING UNIT 2 PERMIT CONDITIONS
PUREX STORAGE TUNNELS

UNIT DESCRIPTION

The Plutonium Uranium Extraction Facility (PUREX) Storage Tunnels are mixed waste storage units consisting of two underground railroad tunnels: Tunnel Number 1, designated 218-E-14, and Tunnel Number 2, designated 218-E-15. This Chapter sets forth the operating Conditions for this treatment, storage, and disposal (TSD) unit.

OPERATING UNIT 2

Chapter 1.0	Part A Form, dated October 1, 2008
Chapter 3.0	Waste Analysis Plan, dated October 2006
Chapter 4.0	Process Information, dated October 2006
Addendum E	Security, dated September 30, 2010
Addendum F	Preparedness and Prevention, dated September 30, 2010
Addendum G	Personnel Training, dated June 30, 2012
Addendum I	Inspection Requirements, dated September 30, 2010
Addendum J	Contingency Plan, dated September 30, 2010
Chapter 11.0	Closure and Financial Assurance, dated October 2006

III.2.A COMPLIANCE WITH UNIT SPECIFIC PERMIT CONDITIONS

III.2.A.1 The Permittees will comply with all conditions in this Chapter and its addenda and chapters with respect to storage of waste in the miscellaneous units, (PUREX Storage Tunnels), in addition to applicable requirements in Permit Parts I and II.

III.2.A.2 In the event that the Part III, Unit Specific Conditions for Operating Unit 2, PUREX Storage Tunnels conflict with the Part I, Standard Conditions and/or Part II, General Facility Conditions of the Permit, the unit specific conditions for Operating Unit 2, PUREX Storage Tunnels prevail.

III.2.B UNIT SPECIFIC CONDITIONS

III.2.B.1 Portions of Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02) that are not made enforceable by inclusion in the applicability matrix for that document are not made enforceable by reference in this document.

This page intentionally left blank.

LIQUID EFFLUENT RETENTION FACILITY & 200 AREA EFFLUENT TREATMENT FACILITY

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have a "**Last Modification Date**" which represents the last date the portion of the unit has been modified. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Last modification to Liquid Effluent Retention Facility & 200 Area Effluent Treatment Facility
August 25, 2016

Addenda	Last Modification Date	Modification Number
Unit-Specific Conditions	08/25/2016	8C.2016.Q2
A. Part A Form	08/25/2016	8C.2016.Q2
B. Waste Analysis Plan	08/25/2015	8C.2016.Q2
C. Process Information	08/25/2016	8C.2016.Q2
D. Groundwater Monitoring Plan	04/29/2014	
E. Security Requirements	06/30/2011	
F. Preparedness and Prevention	08/25/2016	8C.2016.Q2
G. Personnel Training	06/30/2015	
H. Closure Plan	08/25/2016	8C.2016.Q2
I. Inspection Requirements	08/25/2016	8C.2016.Q2
J. Contingency Plan	08/25/2016	8C.2016.Q2

This page intentionally left blank.

LIQUID EFFLUENT RETENTION FACILITY & 200 AREA EFFLUENT TREATMENT FACILITY PART III, OPERATING UNIT GROUP 3 PERMIT CONDITIONS

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
08/25/2016	8C.2016.Q2

This page intentionally left blank.

PART III, OPERATING UNIT GROUP 3 PERMIT CONDITIONS
LIQUID EFFLUENT RETENTION FACILITY &
200 AREA EFFLUENT TREATMENT FACILITY

This page intentionally left blank.

PART III, OPERATING UNIT GROUP 3 PERMIT CONDITIONS LIQUID EFFLUENT RETENTION FACILITY & 200 AREA EFFLUENT TREATMENT FACILITY

UNIT DESCRIPTION

The Liquid Effluent Retention Facility (LERF) and 200 Area Effluent Treatment Facility (200 Area ETF) consists of an aqueous waste treatment system that provides treatment, storage integral to the treatment process, and storage of secondary wastes from the treatment process for a variety of aqueous mixed waste. The 200 Area ETF is located in the 200 East Area. Aqueous wastes managed by the 200 Area ETF include process condensate from the LERF and 200 Area ETF and other aqueous waste generated from onsite remediation and waste management activities.

The LERF consists of three lined surface impoundments, or basins. Aqueous waste from LERF is pumped to the 200 Area ETF for treatment in a series of process units, or systems, that remove or destroy essentially all of the dangerous waste constituents. The treated effluent is discharged to a State-Approved Land Disposal Site (SALDS) north of the 200 West Area, under the authority of a Washington State Waste Discharge Permit Number ST0004500 (Ecology 2014) and 200 Area ETF Delisting (40 Code of Federal Regulations (CFR) 261, Appendix IX, Table 2). Construction of the LERF began in 1990. Waste management operations began at LERF in April 1994. Construction of the 200 Area ETF began in 1992. Waste management operations began at 200 Area ETF in November of 1995.

This Chapter provides unit-specific Permit conditions applicable to the dangerous waste management units for LERF and 200 Area ETF.

LIST OF ADDENDA SPECIFIC TO OPERATING UNIT GROUP 3

Addendum A	Part A Form, dated June 30, 2016
Addendum B	Waste Analysis Plan, dated June 30, 2016
Addendum C	Process Information, dated June 30, 2016
Addendum D	Groundwater Monitoring, approved April 29, 2014
Addendum E	Security Requirements, dated June 30, 2011
Addendum F	Preparedness and Prevention, dated June 30, 2016
Addendum G	Personnel Training, dated June 30, 2015
Addendum H	Closure Plan, dated June 30, 2016
Addendum I	Inspection Requirements, dated June 30, 2016
Addendum J	Contingency Plan, dated June 30, 2016

DEFINITIONS

State and federal delisting actions: The state delisting action pursuant to Washington Administrative Code (WAC) 173-303-910(3), August 8, 2005, and the federal delisting action appearing in 40 CFR 261, Appendix IX, Table 2 applicable to the United States, Department of Energy, Richland, Washington.

ACRONYMS

LERF and 200 Area ETF	200-Area Liquids Processing Facility

III.3.A COMPLIANCE WITH UNIT-SPECIFIC PERMIT CONDITIONS

III.3.A.1 The Permittees will comply with all Permit Conditions in this Chapter and its Addendums with respect to dangerous waste management and dangerous waste management units in LERF and 200 Area ETF, in addition to requirements in Permit Part I and Part II.

III.3.B GENERAL WASTE MANAGEMENT

III.3.B.1 The Permittees are authorized to accept dangerous and/or mixed waste for treatment in dangerous waste management units that satisfies the waste acceptance criteria in Permit Addendum B according to the waste acceptance procedures in Permit Addendum B. [WAC 173-303-300]

III.3.B.2 The Permittees are authorized to manage dangerous and/or mixed wastes physically present in the dangerous waste management units in LERF and 200 Area ETF as of the effective date of this Permit according to the requirements of Permit Condition III.3.B.1.

III.3.B.3 The Permittees are authorized to treat and/or store dangerous/mixed waste in the dangerous waste management units in LERF and 200 Area ETF according to the following requirements:

III.3.B.3.a The Permittees are authorized to treat, and store as necessary in support of treatment, dangerous waste in the 200 Area ETF tank systems identified in Permit Addendum C, Section C.2, and Section C.4 according to the Permit Conditions of this Chapter.

III.3.B.3.b The Permittees are authorized to store and treat those dangerous and/or mixed waste identified in Permit Addendum C, Section C.3, in containers according to the requirements of this Chapter. All container management activities pursuant to this Permit Condition will take place within the container storage areas or within the 200 Area ETF process area identified in Permit Addendum C, Figures C.2 and C.3.

III.3.B.3.c Treatment in containers authorized by Permit Condition III.3.B.3.b is limited to decanting of free liquids, and addition of sorbents to free liquids. The Permittees will ensure that sorbents are compatible with wastes and the containers. Sorbents will be compliant with the requirements of WAC 173-303-140(4)(b)(iv), incorporated by reference.

III.3.B.3.d The Permittees are authorized to treat aqueous waste in LERF Basins (Basins 42, 43 and 44) subject to the following requirements:

III.3.B.3.d.1 Following treatment in a LERF basin, aqueous wastes must be treated in 200 Area ETF according to Permit Conditions III.3.B.3.a through c.; [40 CFR 268.4(2)(iii), incorporated by reference by WAC 173-303-140]

III.3.B.3.d.2 The Permittees must ensure that for each basin, either supernatant is removed on a flow-through basis, to meet the requirement of 40 CFR 268.4(a)(2)(ii) incorporated by reference by WAC 173-303-140, or incoming waste is shown to not contain solids by either: (1) sampling results showing the waste does not contain detectable solids, or (2) filtering through a 10 micron filter;[WAC 173-303-815(2)(b)(ii)]

III.3.B.4 The Permittees will maintain the physical structure of the LERF and 200 Area ETF as documented in the applicable sections of Permit Addendum C, Section C.2. [WAC 173-303-630(7), WAC 173-303-640(3), WAC 173-303-640(4)]

III.3.B.5 The Permittees are authorized to use treated effluent for recycle/makeup water purposes at the 200 Area ETF as outlined in Permit Addendum C, Section C.2.5.5, and the letters

dated August 19, 2005, EPA Region 10 to Keith A. Klein; and August 8, 2005, Department of Ecology to Keith A. Klein. [WAC 173-303-815 (2)(b)(ii)]

III.3.B.6 The Permittees will maintain and operate systems for the 200 Area ETF documented in Permit Addendum C, Section C.2.5 as necessary for proper operation of the 200 Area ETF, compliance with the conditions of this Permit, and protection of human health and the environment. For purposes of this Permit Condition, the Monitor and Control System documented in Permit Addendum C, Section C.2.5.1, is considered to include all indicators, sensors, transducers, actuators and other control devices connected to but remote from the centralized monitor and control system (MCS) computer.

III.3.B.7 The Permittees must complete the following requirements prior to acceptance for treatment in 200 Area ETF aqueous waste streams with listed waste numbers subject to the requirements of the State and Federal delisting: [WAC 173-303-815(2)(b)(ii)]

III.3.B.7.a The Permittees will prepare a written waste processing strategy according to the requirements of the State and Federal Delisting Actions Conditions (1)(a)(ii) and (1)(b), incorporated by reference, and Permit Addendum B, Section B.2.2.2.

III.3.B.7.b The waste processing strategy required by Permit Condition III.3.B.7.a, must document the proposed processing configuration for the 200 Area ETF, operating conditions for each processing unit, and the expected treated effluent characteristics based on the process model and treatability envelope data required by State and Federal Delisting Conditions (1)(a)(ii) and (1)(b).

III.3.B.7.c The written waste processing strategy required by Permit Condition III.3.B.7.a must demonstrate that the projected treated effluent characteristics satisfy the delisting exclusion limits in State and Federal Delisting Condition (5) of the state and federal delisting actions, and the discharge limits of the Discharge Permit Number ST0004500 (Ecology 2014).

III.3.B.7.d The Permittees will place a copy of the written waste processing strategy required by Permit Condition III.3.B.7.a in the Hanford Facility Operating Record, LERF and 200 Area ETF file as part of the documentation of waste streams accepted for management at the 200 Area ETF.

III.3.B.8 Treatment of aqueous waste streams in the 200 Area ETF with listed waste numbers that are subject to the requirements of the state and federal delisting actions must comply with the requirements of State and Federal Delisting Condition (1)(c), incorporated by reference. [WAC 173-303-815 (2)(b)(ii)]

III.3.B.9 The Permittees will manage treated effluent in the final verification tanks according to the requirements of the State and Federal Delisting Conditions (3) and (5), incorporated by reference. [WAC 173-303-815 (2)(b)(ii)]

III.3.B.10 The Permittees will manage treated effluent from the 200 Area ETF according to the requirements of the Discharge Permit Number ST0004500 (Ecology 2014) and State and Federal Delisting Condition (7). [WAC 173-303-815(2)(b)(ii)]

III.3.B.11 The Permittees will ensure compliance with treatment standards (40 CFR 268, incorporated by reference by WAC 173-303-140) applicable to treated effluent prior to discharge to the State Authorized Land Disposal Site (SALDS), the delisting criteria at 40 CFR 261, Appendix IX, Table 2, and the corresponding state-approved delisting (dated August 8, 2005, all incorporated by reference). Sampling and analysis necessary for these demonstrations must meet the corresponding requirements in Permit Addendum B. [WAC 173-303-140, WAC 173-303-815 (2)(b)(ii)]

III.3.C WASTE ANALYSIS

III.3.C.1 The Permittees will comply with requirements in Permit Addendum B for sampling and analysis of all dangerous and/or mixed waste required by conditions in this Chapter. [WAC 173-303-300]

III.3.C.2 The Permittees will have an accurate and complete waste profile as described in Permit Addendum B, Section B.2.1.2, for every waste stream accepted for management in LERF and 200 Area ETF dangerous waste management units. [WAC 173-303-380 (1)(a), (b)]

III.3.C.3 The Permittees will place a copy of each waste profile required by Permit Condition III.3.C.2 in the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.1.j. [WAC 173-303-380 (1)(a), (b)]

III.3.C.4 The Permittees will make a copy of the waste profile required by Permit Condition III.3.C.2 available upon request. [WAC 173-303-380 (1)(a), (b)]

III.3.C.5 Records and results of waste analysis described in this Permit will be maintained in the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.1.b. [WAC 173-303-380 (1)(a), (b)]

III.3.D RECORDKEEPING AND REPORTING

III.3.D.1 The Permittees will place the following into the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.1:

III.3.D.1.a Records required by WAC 173-303-380 (1)(k), and -(o) incorporated by reference.

III.3.D.1.b Records and results of waste analysis, waste determinations (as required by Subpart CC) and trial tests required by WAC 173-303-300, General waste analysis, and by 40 CFR §264.1034,§264.1063, §264.1083, §265.1034, §265.1063, §265.1084, §268.4(a), and §268.7; [WAC 173-303-310(2)]

III.3.D.1.c An inspection log, summarizing inspections conducted pursuant to Permit Condition III.3.H.1; [WAC 173-303-380(1)(e)]

III.3.D.1.d Records required by the State and Federal Delisting Condition (6), incorporated by reference; [WAC 173-303-815 (2)(b)(ii)]

III.3.E SECURITY

III.3.E.1 The Permittees comply with the Security requirements specific to the LERF and 200 Area ETF in Addendum E and Permit Attachment 3 as required by Permit Condition II.M. [WAC 173-303-310(2)]

III.3.F PREPAREDNESS AND PREVENTION

III.3.F.1 The Permittees will comply with the Preparedness and Prevention requirements specific to LERF and 200 Area ETF in Addendum F. [WAC 173-303-340]

III.3.G CONTINGENCY PLAN

III.3.G.1 The Permittees will comply with Addendum J, Contingency Plan, in addition to the requirements of Permit Condition II.A when applicable. [WAC 173-303-350]

III.3.H INSPECTIONS

III.3.H.1 The Permittees will comply with Addendum I in addition to the requirements of Permit Condition II.X. [WAC 173-303-320]

III.3.I TRAINING PLAN

III.3.I.1 The Permittees will include the training requirements described in Addendum G of this Chapter specific to the dangerous waste management units and waste management activities at LERF and 200 Area ETF into the written training plan required by Permit Condition II.C.

III.3.J GENERAL REQUIREMENTS

III.3.J.1 The Permittees will comply with the requirements of WAC 173-303-395(1), incorporated by reference, for prevention of reaction of ignitable, reactive, or incompatible wastes.

III.3.K CLOSURE

III.3.K.1 The Permittees will close dangerous waste management units in the LERF and 200 Area ETF in accordance with Addendum H, Closure Plan, and Permit Condition II.J. [WAC 173-303-610(3)(a)]

III.3.L POST CLOSURE – RESERVED

III.3.M CRITICAL SYSTEMS – RESERVED

III.3.N RESERVED

III.3.O CONTAINERS

III.3.O.1 Container Storage and Treatment Unit Standards

III.3.O.1.a As part of or in addition to the requirements of Permit Condition III.3.B.2, the Permittees will ensure the integrity of container storage secondary containment and the chemically resistant coating described in Addendum C, Section C.3.4.1 as necessary to ensure any spills or releases to secondary containment do not migrate to the underlying concrete or soils.

III.3.O.1.a.1 Include documentation of any damage and subsequent repairs in the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.I.

III.3.O.2 Container Management Standards

III.3.O.2.a The Permittees will maintain and manage wastes in accordance with the requirements of Addendum C, Section C.3.2. [WAC 173-303-630(2)]

III.3.O.2.b The Permittees will label containers in accordance with the requirements of Addendum C, Section C.3.2, and Section C.3.3. [WAC 173-303-630(3)]

III.3.O.2.c The Permittees will comply with the requirements for managing wastes in containers in WAC 173-303-630(5), incorporated by reference.

III.3.O.2.d The Permittees will ensure wastes are compatible with containers and with other wastes stored or treated in containers within the 200 Area ETF according to the requirements of Addendum C, Section C.3.1 and C.3.4.6. [WAC 173-303-630(4), WAC 173-303-630(9)]

III.3.O.2.e The Permittees may treat wastes in containers via decanting of free liquids and addition of sorbents. The Permittees may not use addition of sorbents for purposes of changing the treatability group of a waste with respect to the land disposal restriction standards of 40 CFR 268, incorporated by reference by WAC 173-303-140.

III.3.O.2.f The Permittees will remove any accumulated liquids from container storage areas in 200 Area ETF according to the requirements of Addendum C, Section C.3.4.5, to ensure containers are not in contact with free liquids and to prevent overflow of the container storage area secondary containment.

III.3.O.2.g The Permittees will comply with the requirements for air emissions from containers in Addendum C, Section C.6.3.2. [WAC 173-303-692]

III.3.P TANK SYSTEMS

III.3.P.1 Tank System Requirements

III.3.P.1.a The Permittees will develop a schedule for conducting integrity assessments (IA). The schedule will meet the requirements of Addendum C, Section C.4.1.5, and consideration of the factors in WAC 173-303-640(2)(e) or WAC 173-303-640(3)(b) as applicable:

III.3.P.1.b The Permittees will maintain a copy of the schedule required by Permit Condition III.3.P.1.a, in the Hanford Facility Operating Record, LERF and 200 Area ETF file, and conduct periodic integrity assessments according to the schedule. The Permittees will document results of integrity assessments conducted according to the IA in the Hanford Facility Operating Record, LERF and 200 Area ETF file.

III.3.P.1.c For existing tank systems, if a tank system is found to be leaking, or is unfit for use, the Permittees must follow the requirements of WAC 173-303-640(7), incorporated by reference. [WAC 173-303-640(3)(b)]

III.3.P.2 Tank System Operating Requirements

III.3.P.2.a The Permittees will comply with the requirements of WAC 173-303-640(5)(a), incorporated by reference.

III.3.P.2.b The Permittees will comply with the requirements of Addendum C, Section C.4.4.2. [WAC 173-303-640(5)(b)]

III.3.P.2.c The Permittees will comply with the requirements of Addendum C, Section C.4.5. [WAC 173-303-640(5)(d)]

III.3.P.2.d The Permittees will comply with the requirements of WAC 173-303-640(7), incorporated by reference, in response to spills or leaks from tanks systems at 200 Area ETF. [WAC 173-303-640(5)(c)]

III.3.P.2.e The Permittees will ensure that the Waste Processing Strategy required by Permit Condition III.3.B.7.a, provides for the immediate treatment or blending of waste accepted for management at the 200 Area ETF such that the resulting waste or mixture is no longer reactive or ignitable when further managed in 200 Area ETF tank systems. [WAC 173-303-640(9)]

III.3.P.2.f The Permittees will comply with the requirements of WAC 173-303-640(10), incorporated by reference.

III.3.Q SURFACE IMPOUNDMENTS

III.3.Q.1 The Permittees will maintain the three LERF basins according to the requirements of WAC 173-303-650 (2)(f), incorporated by reference.

III.3.Q.2 The Permittees will operate the LERF basins according to the requirements of Addendum C, Section C.5.3, and Addendum I, Section I.1.2.3.1 to prevent over-topping. [WAC 173-303-650 (2)(c)]

III.3.Q.3 The Permittees will develop and maintain, and operate the LERF basins to ensure that any flow of waste into the impoundment can be immediately shut off in the event of overtopping or liner failure. [WAC 173-303-650 (2)(d)]

III.3.Q.4 The Permittees will comply with the requirements of WAC 173-303-650 (2)(g), incorporated by reference.

III.3.Q.5 The Permittees will comply with the requirements of WAC 173-303-650 (4)(b), incorporated by reference.

III.3.Q.6 The Permittees will comply with the requirements of WAC 173-303-650 (4)(c), incorporated by reference. The certification required by this Permit Condition must be provided to Ecology no later than seven calendar days after the date of the certification. A copy of the certification will be placed in the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.1. [WAC 173-303-650 (4)(c)]

III.3.Q.7 The Permittees will comply with the requirements of WAC 173-303-650(5)(b), incorporated by reference, in response to events in WAC 173-303-650(5)(a), incorporated by reference.

III.3.Q.8 The Permittees will comply with the requirements of WAC 173-303-650(5)(d) for any LERF basin that has been removed from service in accordance with Permit Condition III.3.Q.7 that the Permittees will restore to service. [WAC 173-303-650(5)(d)]

III.3.Q.9 The Permittees will close any LERF basin removed from service in accordance with the requirements of Permit Condition III.3.Q.7 or a basin that cannot be repaired or that the Permittees will not to return to service. [WAC 173-303-650(5)(e)]

III.3.Q.10 The Permittees will comply with the requirements of Addendum C, Section C.5.10 with respect to management of ignitable or reactive wastes in the LERF basins. [WAC 173-303-650(7)]

III.3.Q.11 The Permittees can place incompatible wastes and materials in the same LERF basin only if in compliance with the requirements of WAC 173-303-395(1)(b), (c). [WAC 173-303-650(8)]

III.3.Q.12 The Permittees will use the action leakage rate in Addendum C, Section C.5.8, for operation of LERF basins, and comply with the requirements of WAC 173-303-650(10)(b). [WAC 173-303-650(10)]

III.3.Q.13 The Permittees will comply with the requirements of WAC 173-303-650(11), incorporated by reference.

III.3.Q.14 The Permittees will comply with the requirements of 40 CFR 264, Subpart CC, incorporated by reference by WAC 173-303-692.

III.3.R **GROUNDWATER**

III.3.R.1 The Permittees will comply with the requirements of Addendum D, Groundwater Monitoring Plan. [WAC 173-303-645]

III.3.R.2 All wells constructed pursuant to this Permit will be constructed in compliance with Chapter 173-160 WAC incorporated by reference through WAC 173-303-645 (8)(c).

III.3.R.3 Update the Groundwater Monitoring Network

III.3.R.3.a The Permittees will install an additional downgradient monitoring well E-26-15 as identified in Addendum D, Groundwater Monitoring Plan by December, 2016.

III.3.R.3.b Within 60-days of the well installation, the Permittees will submit a Class 2 Permit modification [WAC 173-303-830 Appendix I, C.1.a] to update Addendum D and include the additional monitoring well into the groundwater monitoring network.

III.3.R.3.c Concurrently with the permit modification request, the Permittees will submit a revised "Liquid Effluent Retention Facility Characterization Report" for the additional monitoring well that includes:

1) Well construction in accordance with WAC 173-303-645(8)(c)
2) Well screen placement in the upper aquifer in accordance with WAC 173-303-645(8)(a)
3) Hydrogeologic conditions, stratigraphy and hydraulic conductivity, derived from geologist observations of borehole archive samples, down hole gamma logging, and aquifer slug tests in accordance with WAC 173-303-645(8)(a)(i)(A)
4) Drilling and sampling details in accordance with WAC 173-303-645(8)(d)
5) Borehole corrections (e.g., precision surveys, gyroscopic corrections, and barometric response corrections) to ensure adequate hydraulic understanding considering the very small gradient in accordance with WAC 173-303-645(8)(f)
6) Geochemical comparison of the water quality with other existing wells to ensure anticipated representative conditions in accordance with WAC 173-303-645(8)(a)(ii)
7) Document surface location as required by WAC 173-303-645(6)

III.3.R.3.c.1 Groundwater sample results from the new well (E-26-15) and the existing wells for all constituents in the Addendum D, Groundwater Monitoring Plan for the Liquid Effluent Retention Facility,

III.3.R.3.c.2 Results of evaluating final well development data and drilling logs,

III.3.R.3.c.2.a A well use designation (e.g., upgradient or downgradient).

LIQUID EFFLUENT RETENTION FACILITY (LERF) & 200 AREA EFFLUENT TREATMENT FACILITY (ETF) ADDENDUM B WASTE ANALYSIS PLAN

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
08/25/2015	8C.2016.Q2

This page intentionally left blank.

ADDENDUM B
WASTE ANALYSIS PLAN

This page intentionally left blank.

ADDENDUM B
WASTE ANALYSIS PLAN

TABLE OF CONTENTS

B. WASTE ANALYSIS PLAN 7
B.1 Introduction 7
B.1.1 Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility Description 8
B.1.2 Sources of Aqueous Waste 9
B.2 Influent Waste Acceptance Process 10
B.2.1 Waste Information 11
B.2.2 Waste Management Decision Process 12
B.2.3 Periodic Review Process 16
B.2.4 Record/Information and Decision 16
B.3 Special Management Requirements 18
B.3.1 Land Disposal Restriction Compliance at Liquid Effluent Retention Facility 19
B.4 Influent Aqueous Waste Sampling and Analysis 19
B.4.1 Sampling Procedures 19
B.4.2 Analytical Rationale 20
B.5 Treated Effluent Sampling and Analysis 21
B.5.1 Rationale for Effluent Analysis Parameter Selection 21
B.5.2 Effluent Sampling Strategy: Methods, Location, Analyses, and Frequency 22
B.6 Effluent Treatment Facility Generated Waste Sampling and Analysis 22
B.6.1 Secondary Waste Generated from Treatment Processes 23
B.6.2 Operations and Maintenance Waste Generated at the 200 Area Effluent Treatment Facility 26
B.6.3 Other Waste Generated at the 200 Area Effluent Treatment Facility 27
B.7 Quality Assurance/Quality Control 27
B.7.1 Project Management 27
B.7.2 Data Quality Parameters and Criteria 28
B.7.3 Data Generation and Acquisition 30
B.7.4 Assessment and Oversight 32
B.7.5 Verification and Validation of Analytical Data 32
B.8 Analytical Methods, Sample Containers, Preservative Methods, and Holding Times 33

TABLES

Table B.1. General Limits for Liner Compatibility 17
Table B.2. Waste Acceptance Criteria 18
Table B.3. Target Parameters for Influent Aqueous Waste Analyses 21
Table B.4. Rationale for Parameters to be Monitored in Treated Effluent 24
Table B.5. 200 Area Effluent Treatment Facility Generated Waste - Sampling and Analysis 27
Table B.6. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent 33
Table B.7. Sample Containers, Preservative Methods, and Holding Times for 200 Area ETF Generated Waste 38

Metric Conversion Chart

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			Length		
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
Area			Area		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
Mass (weight)			Mass (weight)		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			Volume		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76456	cubic meters	cubic meters	1.308	cubic yards
Temperature			Temperature		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Force			Force		
pounds per square inch	6.895	kilopascals	kilopascals	1.4504×10^{-4}	pounds per square inch

Source: *Engineering Unit Conversions*, M. R. Lindeburg, P.E., Second Ed., 1990, Professional Publications, Inc., Belmont, California.

This page intentionally left blank.

B. WASTE ANALYSIS PLAN

B.1 Introduction

In accordance with the regulations set forth in the Washington State Department of Ecology (Ecology) *Dangerous Waste Regulations*, Washington Administrative Code (WAC) 173-303-300, this waste analysis plan (WAP) has been prepared for operation of the Liquid Effluent Retention Facility (LERF) and the 200 Area Effluent Treatment Facility (200 Area ETF) located in the 200 East Area on the Hanford Site, Richland, Washington.

The purpose of this WAP is to ensure that adequate knowledge as defined in WAC 173-303-040, is obtained for dangerous and/or mixed waste accepted by and managed in LERF and 200 Area ETF. This WAP documents the sampling and analytical methods, and describes the procedures used to obtain this knowledge. This WAP also documents the requirements for generators sending aqueous waste to the LERF or 200 Area ETF for treatment. Throughout this WAP, the term generator includes any Hanford Site source, including treatment, storage, and disposal (TSD) units, whose process produces an aqueous waste.

LERF consists of three surface impoundments, which provide treatment and storage. The 200 Area ETF includes a tank system, which provides treatment and storage, and a container management area, which provides container storage and treatment. Additionally, this WAP discusses the sampling and analytical methods for the treated effluent (treated aqueous waste) that is discharged from 200 Area ETF as a non-dangerous, delisted waste to the State Approved Land Disposal Site (SALDS). Specifically, the WAP contains sampling and analysis requirements including quality assurance/quality control requirements, for the following:

- **Influent Waste Acceptance Process** - determines the acceptability of a particular aqueous waste at the LERF or 200 Area ETF pursuant to applicable Permit conditions, regulatory requirements, and operating capabilities prior to acceptance of the waste at the LERF or 200 Area ETF for treatment or storage. This includes documenting that wastes accepted for treatment at 200 Area ETF are within the treatability envelope required by the Final Delisting 200 Area ETF, Permit Condition 1.a.i. Refer to Section B.2.
- **Special Management Requirements** - identifies the special management requirements for aqueous wastes managed in the LERF or 200 Area ETF. Refer to Section B.3.
- **Influent Aqueous Waste Sampling and Analysis** - describes influent sampling and analyses used to characterize an influent aqueous waste to ensure proper management of the waste and for compliance with the special management requirements. Also includes rationale for analyses. Refer to Section B.4.
- **Treated Effluent Sampling and Analysis** - describes sampling and analyses of treated effluent (i.e., treated aqueous waste) for compliance with Discharge Permit Number ST0004500; and Final Delisting 200 Area ETF [40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3) and the corresponding State Final Delisting issued pursuant to WAC 173-303-910(3) limits]. Also includes rationale for analyses. Refer to Section B.5.
- **200 Area ETF Generated Waste Sampling and Analysis** - describes the sampling and analyses used to characterize the secondary waste streams generated from the treatment process and to characterize waste generated from maintenance and operations activities. Also includes rationale for analyses. Characterization and designation of wastes generated from maintenance and operations activities are conducted pursuant to WAC 173-303-170 and are not subject to the permit requirements of WAC 173-303-800. These descriptions are included in this WAP for purposes of completeness, but are not enforceable conditions of this WAP or the permit. Refer to Section B.6.
- **Quality Assurance and Quality Control** - ensures the accuracy and precision of sampling and analysis activities. Refer to Section B.7.

This WAP meets the specific requirements of the following:

- Land Disposal Restrictions Treatment Exemption for the LERF under 40 CFR 268.4, U.S. Environmental Protection Agency (EPA), December 6, 1994 (EPA 1994).
- Final Delisting 200 Area ETF [40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3)].
- Corresponding State Final Delisting issued pursuant to WAC 173-303-910(3).
- Discharge Permit Number ST0004500, as amended.
- Hanford Facility Dangerous Waste Permit (Permit) WA7890008967, as amended.

Some Permit requirements from Discharge Permit Number ST0004500 are included in this WAP for completeness. In addition, generator requirements for designation of wastes generated by LERF and 200 Area ETF from operation and maintenance activities are also included in this WAP for completeness. The Discharge Permit Number ST0004500 requirements are not within the scope of Resource Conservation and Recovery Act (RCRA) or WAC 173-303 or subject to the permit requirements of WAC 173-303-800. Therefore, revisions of this WAP that are not governed by the requirements of WAC 173-303 will not be considered as a modification subject to review or approval by Ecology. Any other revisions to this WAP will be incorporated through the Permit modification process as necessary to demonstrate compliance with requirements of this Permit, including Permit Conditions I.E.7 and I.E.8.

B.1.1 Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility Description

The LERF and 200 Area ETF comprise an aqueous waste treatment system located in the 200 East Area. Both LERF and 200 Area ETF may receive aqueous waste through several inlets. 200 Area ETF can receive aqueous waste through three inlets. First, 200 Area ETF can receive aqueous waste directly from the LERF. Second, aqueous waste can be transferred from the 2025-ED Load-In Station to 200 Area ETF. Third, aqueous waste can be transferred from containers (e.g., carboys, drums) to the 200 Area ETF through either the Secondary Waste Receiving Tanks or the Concentrate Tanks. The Load-In Station is located just east of building 2025-E and currently consists of three storage tanks and a pipeline that connects to either LERF or 200 Area ETF through fiberglass pipelines with secondary containment.

The LERF can receive aqueous waste through four inlets. First, aqueous waste can be transferred to LERF through a dedicated pipeline from the 200 West Area. Second, aqueous waste can be transferred through a pipeline that connects LERF with the 242-A Evaporator. Third, aqueous waste also can be transferred to LERF from a pipeline that connects LERF to the Load-In Station. Finally, aqueous waste can be transferred into LERF through a series of sample ports located at each basin.

The LERF consists of three lined surface impoundments with a nominal capacity of 29.5 million liters each. Aqueous waste from LERF is pumped to 200 Area ETF through a double walled fiberglass pipeline. The pipeline is equipped with leak detection located in the annulus between the inner and outer pipes. Each basin is equipped with six available sample risers constructed of 15.2-centimeter (6-inch)-perforated pipe. A seventh sample riser in each basin is dedicated to influent waste receipt piping, and an eighth riser in each basin contains liquid level instrumentation. Each riser extends along the sides of each basin from the top to the bottom of the basin. Detailed information on the construction and operation of the LERF is provided in Addendum C, Process Information.

200 Area ETF is designed to treat the contaminants anticipated in process condensate from the 242-A Evaporator and other aqueous wastes from the Hanford Site. Section B.1.2 provides more information on the sources of these wastes.

The capabilities of 200 Area ETF were confirmed through pilot plant testing. A pilot plant was used to test surrogate solutions that contained constituents of concern anticipated in aqueous wastes on the Hanford Site. The pilot plant testing served as the basis for a demonstration of the treatment capabilities of 200 Area ETF in the *200 Area Effluent Treatment Facility Delisting Petition* (DOE/RL-92-72).

200 Area ETF consists of a primary and a secondary treatment train (Figure C.4 and C.5). The primary treatment train removes or destroys dangerous and mixed waste components from the aqueous waste.

In the secondary treatment train, the waste components are concentrated and dried into a powder. This waste is containerized, and transferred to a waste treatment, storage, and/or disposal (TSD) unit.

Each treatment train consists of a series of operations. The primary treatment train includes the following:

- Surge tank
- Filtration
- Ultraviolet light oxidation (UV/OX)
- pH adjustment
- Hydrogen peroxide decomposition
- Degasification
- Reverse osmosis (RO)
- Ion exchange
- Final pH adjustment and verification

The secondary treatment train uses the following:

- Secondary waste receiving
- Evaporation (with mechanical vapor recompression)
- Concentrate staging
- Thin film drying
- Container handling
- Supporting systems

A dry powder waste is generated from the secondary treatment train, from the treatment of an aqueous waste. The secondary waste treatment system typically receives and processes by-products generated from the primary treatment train. However, in an alternate operating scenario, some aqueous wastes may be fed to the secondary treatment train before the primary treatment train.

The treated effluent is contained in verification tanks where the effluent is sampled to confirm that the effluent meets the delisting criteria. Under 40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3), the treated effluent from 200 Area ETF is considered a delisted waste; that is, the treated effluent is no longer a listed dangerous waste subject to the hazardous waste management requirements of RCRA provided that the delisting criteria are satisfied and the treated effluent does not exhibit a dangerous characteristic. The treated effluent is discharged under the Discharge Permit Number ST0004500 as a nondangerous, delisted waste to the SALDS, located in the 600 Area, north of the 200 West Area. A portion of the treated wastewater from the Verification Tanks is recycled as service water throughout the facility; for example, it is used to dilute bulk acid and caustic to meet processing needs, thereby reducing the demand for process water.

B.1.2 Sources of Aqueous Waste

200 Area ETF was intended and designed to treat a variety of mixed wastes. However, process condensate from the 242-A Evaporator was the only mixed waste initially identified for storage and treatment in the LERF and 200 Area ETF. As cleanup activities at Hanford progress, many of the aqueous wastes generated from site remediation and waste management activities are sent to the LERF and 200 Area ETF for treatment and storage. A brief discussion of waste streams that may be managed by LERF and 200 Area ETF in the future may be found in the 200 Area ETF Delisting Petition (DOE/RL-92-72). Prior to management of any new waste streams, it may be necessary to modify this WAP through

the permit modification process to ensure that adequate knowledge of such new waste streams is available prior to management of them in LERF and 200 Area ETF.

The 242-A process condensate is a dangerous waste because it is derived from a listed, dangerous waste stored in the Double-Shell Tank (DST) System. The DST waste is transferred to the 242-A Evaporator where the waste is concentrated through an evaporation process. The concentrated slurry waste is returned to the DST System, and the evaporated portion of the waste is recondensed, collected, and transferred as process condensate to the LERF.

Other aqueous wastes that are treated and stored at the LERF and 200 Area ETF include, but are not limited to the following Hanford wastes:

- Contaminated groundwater from pump-and-treat remediation activities such as groundwater from the 200-UP-1 Operable Unit.
- Purgewater from groundwater monitoring activities.
- Water from deactivation activities, such as water from the spent fuel storage basins at deactivated reactors (e.g., N Reactor).
- Laboratory aqueous waste from unused samples and sample analyses.
- Leachate from landfills, such as the Environmental Restoration Disposal Facility.
- Any dilute waste, which may be accepted for treatment and within the scope of wastewaters that maybe delisted under terms of the revised delisting (40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3)).

Most of these aqueous wastes are accumulated in batches in a LERF basin for interim storage and treatment through pH and flow equalization before final treatment in 200 Area ETF. However, some aqueous wastes, such as 200-UP-1 Groundwater, maybe treated on a flow through basis in LERF en route to 200 Area ETF for final treatment. The constituents in these aqueous wastes are common to the Hanford Site and were considered in pilot plant testing or in vendor tests, either as a constituent or as a family of constituents. According to the Final Delisting 200 Area ETF, and Permit Condition III.3.B.7, all wastes accepted for treatment at 200 Area ETF must be within a specified treatability envelope that ensures that wastes will be within the treatment capability of 200 Area ETF.

B.2 Influent Waste Acceptance Process

Throughout the acceptance process, there are specific criteria required for an influent waste (i.e., aqueous waste) to be accepted at the LERF and/or 200 Area ETF. These criteria are identified in the following sections and summarized in Table B.2. The process of accepting a waste into the LERF and 200 Area ETF systems involves a series of steps, as follows.

- **Waste information:** The generator of an aqueous waste works with LERF and 200 Area ETF personnel to provide characterization data of the waste stream (Section B.2.1).
- **Waste management decision process:** LERF and 200 Area ETF management decision is based on a case-by-case evaluation of whether an aqueous waste stream is acceptable for treatment or storage at LERF and the 200 Area ETF. The evaluation has two categories:
    - **Regulatory acceptability:** a review to determine if there are any, regulatory concerns that would prohibit the storage or treatment of an aqueous waste in the LERF or 200 Area ETF; e.g., treatment would meet permit conditions that would comply with applicable regulations.
    - **Operational acceptability:** an evaluation to determine if there are any operational concerns that would prohibit the storage or treatment of an aqueous waste in the LERF or 200 Area ETF and storage of treatment residuals; e.g., determine treatability and compatibility or safety considerations (Section B.2.2.2).

B.2.1 Waste Information

When an aqueous waste stream is identified for treatment or storage in the LERF or 200 Area ETF, the generator is required to characterize the waste stream according to the requirements in Section B.2.1.1 and document the results of characterization on an aqueous waste profile sheet. This requirement is the first waste acceptance criterion.

The LERF and 200 Area ETF personnel work with the generators to ensure that the necessary information is collected for the characterization of a waste stream (i.e., the appropriate analyses or adequate knowledge), and that the information provided on the waste profile sheet is complete. The completed waste profile sheet is maintained in the Hanford Facility Operating Record, LERF and 200 Area ETF File according to Permit Condition II.I.1.j.

B.2.1.1 Waste Characterization

Because the constituents in the individual aqueous waste streams vary, each waste stream is characterized and evaluated for acceptability on a case-by-case basis. The generator is required to designate an aqueous waste, which generally will be based on analytical data. However, a generator may use knowledge to substantiate the waste designation, or for general characterization information. Examples of acceptable knowledge include the following:

- Documented data or information on processes similar to that which generated the aqueous waste stream.
- Information/documentation that the waste stream is from specific, well documented processes, e.g., F-listed wastes.
- Information/documentation that sampling/analyzing a waste stream would pose health and safety risks to personnel.
- Information/documentation that the waste stream does not lend itself to collecting a laboratory sample for example, wastewater collected (e.g., sump, tank) where the source water characterization is documented. Typically, these circumstances occur at decommissioned buildings or locations, not at operating units.

When a generator performs characterization of a dangerous and/or mixed waste stream based on knowledge, LERF and 200 Area ETF personnel review the knowledge as part of the waste acceptance process to ensure the knowledge satisfies the definition of *knowledge* in WAC 173-303-040. Specifically, LERF and 200 Area ETF personnel review the generator's processes to verify the integrity of the knowledge, and determine whether the knowledge is current and consistent with requirements of this WAP. LERF and 200 Area ETF management or their designee determines the final decision on the adequacy of the knowledge. The persons reviewing generator process knowledge and those making decisions on the adequacy of knowledge are trained according to the requirements of Addendum G, Personnel Training.

The generator is also responsible for identifying Land Disposal Restrictions (LDRs) treatment standards applicable to the influent aqueous waste as part of the characterization, as required under 40 CFR 268.40 incorporated by reference by WAC 173-303-140. Because the 200 Area ETF main treatment train is a Clean Water Act, equivalent treatment unit [40 CFR 268.37(a)] incorporated by reference by WAC 173-303-140, generators are not required to identify underlying hazardous constituents for characteristic wastes pursuant to 40 CFR 268.9, incorporated by reference by WAC 173-303-140, for wastewaters (i.e., <1 percent total suspended solids and <1 percent total organic carbon). The 200 Area ETF secondary waste (e.g., powder) reflects a change in LDR treatability group (i.e., wastewater to non-wastewater) so there is a new LDR point of generation, at which point any characteristic and associated underlying hazardous constituents must be identified. Therefore, generators of a non-wastewater may be required to identify underlying hazardous constituents for characteristic wastes pursuant to 40 CFR 268.9, incorporated by reference by WAC 173-303-140.

When analyzing an aqueous waste stream for LERF and 200 Area ETF waste acceptance characterization, a generator is required to use the target list of parameters identified in Table B.3, of this WAP. This requirement is in addition to any analysis required for purposes of designation under WAC 173-303-070. These data are used by LERF and 200 Area ETF to verify the treatability of an aqueous waste stream, and to develop a treatment plan for the waste after acceptance. Refer to Table B.6, for the corresponding analytical methods. The generator may use knowledge in lieu of some analyses, as determined by LERF and 200 Area ETF management or their designee, if the knowledge satisfies the definition of *knowledge* in WAC 173-303-040. For example if a generator provides information that the process generating an aqueous waste does not include or involve organic chemicals, analyses for organic compounds likely would not be required. Additional analyses could be required if historical information and/or knowledge indicate that an aqueous waste contains constituents not included in the target list of parameters.

The characterization and historical information are documented in the waste profile sheet, which is discussed in the following section and is part of the Hanford Facility Operating Record, LERF and 200 Area ETF File according to Permit Condition II.I.

B.2.1.2 Aqueous Waste Profile Sheet

The waste profile sheet documents the characterization of each new aqueous waste stream. The profile includes a detailed description of the source, volume, waste designation and applicable LDR treatment standards, and physical nature (wastewater or non-wastewater) of the aqueous waste. For an aqueous waste to be accepted for treatment or storage in the LERF or 200 Area ETF, each new waste stream generator is required to complete and provide this form to LERF and 200 Area ETF management. Each generator also is required to provide the analytical data and/or knowledge used to designate the aqueous waste stream according to WAC 173-303-070 and to determine the chemical and physical nature of the waste.

The LERF and 200 Area ETF management determine whether the information on the waste profile sheet is sufficient according to the criteria above. The LERF and 200 Area ETF management use this information to evaluate the acceptability of the aqueous waste stream for storage and treatment in the LERF and 200 Area ETF, and to determine if the secondary waste generated from treatment is acceptable for storage at the 200 Area ETF and has a defined path forward to final disposal.

B.2.2 Waste Management Decision Process

All aqueous waste under consideration for acceptance must be characterized using analytical data and/or knowledge. This information is used to determine the acceptability of an aqueous waste stream. The LERF and 200 Area ETF Facility Manager or their designee is responsible for making the decision to accept or reject an aqueous waste stream. The management decision to accept any aqueous waste stream is based on an evaluation of regulatory acceptability and operational acceptability. Each evaluation uses acceptance criteria, which were developed to ensure that an aqueous waste is managed in a safe, environmentally sound, and in compliance with this Permit. The following sections provide detail on the acceptance evaluation and the acceptance criteria.

An aqueous waste stream could be rejected for one of the following reasons:

- The paperwork and/or laboratory analyses from the generator are insufficient.
- Discrepancies with the regulatory and operational acceptance criteria cannot be reconciled, including:
  - An aqueous waste, which is not allowed under the current Final Delisting 200 Area ETF, and LERF and 200 Area ETF management elect not to pursue an amendment, or the Final Delisting 200 Area ETF cannot be amended (Section B.2.2.1).
  - An aqueous waste is incompatible with LERF liner materials or with other aqueous waste in LERF and no other management method is available (Section B.2.2.3.1).
- Adequate storage or treatment capacity is not available.

B.2.2.1 Regulatory Acceptability

Each aqueous waste stream is evaluated on a case-by-case basis to determine if there are any regulatory concerns that would preclude the storage or treatment of a waste in the LERF or 200 Area ETF based on the criteria in Sections B.2.2.1.1. Before an aqueous waste can be stored or treated in either the LERF or 200 Area ETF, the waste designation must be determined. Information on the waste designation of an aqueous waste is documented in the waste profile sheet. This information is used to confirm that treating or storing the aqueous waste in the LERF or 200 Area ETF is allowed under and in compliance with WAC 173-303, Permit (WA7890008967), Final Delisting 200 Area ETF in 40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3), and the corresponding State-Issued Delisting for 200 Area ETF.

B.2.2.1.1 Dangerous Waste Regulations, State and Federal Delisting Actions, and Permits

Before an aqueous waste stream is sent to the LERF or 200 Area ETF, the generator will characterize and designate the stream with the appropriate dangerous/hazardous waste numbers according to WAC 173-303-070. Addendum A, the Final Delisting 200 Area ETF and the corresponding State-Issued Delisting identify the specific waste numbers for dangerous/mixed waste that can be managed in the LERF and 200 Area ETF. Dangerous waste designated with waste numbers not specified in these documents cannot be treated or stored in the LERF or 200 Area ETF, unless the documents are appropriately modified.

Additionally, aqueous wastes designated with listed waste numbers identified in the Final Delisting 200 Area ETF and the corresponding State-Issued Delisting will be managed in accordance with the conditions of the delisting, or an amended delisting.

B.2.2.2 Operational Acceptability

Because the operating configuration or operating parameters at the LERF and 200 Area ETF can be adjusted or modified, most aqueous waste streams generated on the Hanford Site can be effectively treated to below Delisting and Discharge Permit limits. Because of this flexibility, it would be impractical to define numerical acceptance or decision limits. Such limits would constrain the acceptance of appropriate aqueous waste streams for treatment at the LERF and 200 Area ETF. The versatility of the LERF and 200 Area ETF is better explained in the following examples:

- The typical operating configuration of 200 Area ETF is to process an aqueous waste through the UV/OX unit first, followed by the RO unit. However, high concentrations of nitrates may interfere with the performance of the UV/OX. In this case, 200 Area ETF could be configured to process the waste in the RO unit prior to the UV/OX unit.
- For a small volume aqueous waste with high concentrations of some anions and metals, the approach may be to first process the waste stream in the secondary treatment train. This approach would prevent premature fouling or scaling of the RO unit. The liquid portion (i.e., untreated overheads from 200 Area ETF evaporator and thin film dryer) would be sent to the primary treatment train.
- An aqueous waste with high concentrations of chlorides and fluorides may cause corrosion problems when concentrated in the secondary treatment train. One approach is to adjust the corrosion control measures in the secondary treatment train. An alternative may be to blend this aqueous waste in a LERF basin with another aqueous waste, which has sufficient dissolved solids, such that the concentration of the chlorides in the secondary treatment train would not pose a corrosion concern.
- Some metal salts (e.g., barium sulfate) tend to scale the RO membranes. In this situation, descalants used in the treatment process may be increased.
- Any effluent that does not meet these limits in one pass through 200 Area ETF treatment process is recycled to 200 Area ETF for re-processing.

There are some aqueous wastes, whose chemical and physical properties preclude that waste from being treated or stored at the LERF or 200 Area ETF. Accordingly, an aqueous waste is evaluated to determine if it is treatable, if it would impair the efficiency or integrity of the LERF or 200 Area ETF, and if it is compatible with materials in these units. This evaluation also determines if the aqueous waste is compatible with other aqueous wastes managed in the LERF.

The waste acceptance criteria in this category focus on determining treatability of an aqueous waste stream, and on determining any operational concerns that would prohibit the storage or treatment of an aqueous waste stream in the LERF or 200 Area ETF. The chemical and physical properties of an aqueous waste stream are determined as part of the waste characterization, and are documented on the waste profile sheet and compared to the design of the units to determine whether an aqueous waste stream is appropriate for storage and treatment in the LERF and 200 Area ETF. All decisions and supporting rationale and data will be documented in the Hanford Facility Operating Record, LERF and 200 Area ETF File according to Permit Condition II.I.

B.2.2.3 Special Requirements Pertaining to Land Disposal Restrictions

Containers of 200 Area ETF secondary waste are transferred to a storage or final disposal unit, as appropriate (e.g., the Central Waste Complex or to the Environmental Restoration Disposal Facility). 200 Area ETF personnel provide the analytical characterization data and necessary process knowledge for the waste to be managed by the receiving staff, and the appropriate LDR documentation.

The following information on the secondary waste is included on the LDR documentation provided to the receiving unit:

- Dangerous waste numbers (as applicable)
- Determination on whether the waste is restricted from land disposal according to the requirements of 40 CFR 268 incorporated by reference by WAC 173-303-140 (i.e., the LDR status of the waste)

The waste tracking information associated with the transfer of waste

- Waste analysis results

Generally, the operating parameters or operating configuration at the LERF or 200 Area ETF can be adjusted or modified to accommodate these properties. However, in those cases where a treatment process or operating configuration cannot be modified, the aqueous waste stream will be excluded from treatment or storage at the LERF or 200 Area ETF. Additionally, an aqueous waste stream is evaluated for the potential to deposit solids in a LERF basin (i.e., whether an aqueous waste contains sludge or could precipitate solids). This evaluation will also consider whether the blending or mixing of two or more aqueous waste streams will result in the formation of a precipitate. However, because the waste streams managed in the LERF and 200 Area ETF are generally dilute, the potential for mixing waste streams and forming a precipitate is low; no specific compatibility tests are performed. Filtration at the waste source could be required before acceptance into LERF. Waste streams with the potential to form precipitates in LERF or that cannot be blended with other waste streams to avoid precipitate formation are not accepted for treatment at LERF and 200 Area ETF. The 2025-ED Load-In Station has the ability to perform filtration on incoming waste streams going to both the LERF and 2025-ED Load In Station. See additional discussions of precipitate formation and compliance with LDR requirements in Section B.3. Similar filtration requirements could apply to aqueous waste fed directly to 200 Area ETF without interim treatment in LERF.

To determine if an aqueous waste meets the criterion of treatability, specific information is required. Treatability of a waste stream is evaluated from characterization data provided by the generator as verified through the waste acceptance process, the 200 Area waste acceptance criteria, and the treatability envelope for the 200 Area ETF as documented in Tables C.1 and C.2 of the November 29, 2001 delisting petition. Generators will also provide characterization data to identify those physical and chemical properties that would interfere with, or foul 200 Area ETF treatment process in consultation with LERF

and 200 Area ETF representatives. In some instances, knowledge that meets the definition of *knowledge* in WAC 173-303-040 is used for purposes of identifying a chemical or physical property that would be of concern. For example, the generator could provide knowledge that the stream has two phases (an oily phase and an aqueous phase). In this case, if the generator could not physically separate the two phases, the aqueous waste stream would be rejected because the oily phase could compromise some of the treatment equipment. Typically, analyses for the following parameters are required to evaluate treatability and operational concerns:

- total dissolved solids
- total organic carbon
- total suspended solids
- specific conductivity
- pH
- alkalinity
- ammonia
- barium
- calcium
- chloride
- fluoride
- iron
- magnesium
- nitrate
- nitrite
- phosphate
- potassium
- silicon
- sodium
- sulfate

These constituents are identified in Table B.2, which is the list of target analytes used for waste characterization and waste acceptance evaluation.

B.2.2.3.1 Compatibility

Corrosion Control. Because of the materials of construction used in 200 Area ETF, corrosion is generally not a concern with new aqueous waste streams. Additionally, these waste streams are managed in a manner that minimizes corrosion. To ensure that a waste will not compromise the integrity of 200 Area ETF tanks and process equipment, each waste stream is assessed for its corrosion potential as part of the compatibility evaluation. This assessment usually focuses on chloride and fluoride concentrations; however, the chemistry of each new waste also is evaluated for other parameters that could cause corrosion.

Compatibility with Liquid Effluent Retention Facility Liner and Piping. As part of the acceptance process, the criteria of compatibility with the LERF liner materials are evaluated for each aqueous waste stream. This evaluation is performed using knowledge (as defined by WAC 173-303-040) of constituent concentrations in the aqueous waste stream or using constituent concentrations obtained by analyzing the waste stream for the constituents identified in Table B.1 using the analytical methods for these constituents in Section B.8. Then, the constituent concentrations in the waste stream are compared to the decision criteria in Table B.1. If all constituent concentrations are below the decision criteria, then the waste stream is considered compatible with the LERF liner and may be accepted for treatment. Otherwise, the waste stream is considered incompatible with the LERF liner, and it cannot be accepted for treatment in the LERF basins. However, a waste stream may still be acceptable for treatment in 200 Area ETF if it is fed directly to 200 Area ETF, bypassing the LERF Basins. Results of this evaluation are documented in the Hanford Facility Operating Record, LERF and 200 Area ETF File according to Permit Condition II.I. The rational for establishing the liner compatibility constituents and decision criteria in Table B.1 is as follows: The high-density polyethylene liners in the LERF basins potentially are vulnerable to the presence of certain constituents that might be present in some aqueous waste. Using EPA SW-846, Method 9090, the liner materials were tested to evaluate compatibility between aqueous waste stored in the LERF and synthetic liner components. Based on the data from the compatibility test and vendor data on the liner materials, several constituents and parameters were identified as potentially harmful (at high concentrations) to the integrity of the liners. From these data and the application of safety factors, concentration limits in Table B.1 were established.

The strategy for protecting the integrity of a LERF liner is to establish upfront that an aqueous waste is compatible before the waste is accepted into LERF. Characterization data on each new aqueous waste

stream are compared to the limits outlined in Table B.1 to ensure compatibility with the LERF liner material before acceptance into the LERF.

Before a waste stream is processed at the 242-A Evaporator, the generator reviews DST analytical data and a process condensate profile is developed to ensure the process condensate is compatible with the LERF liner. For flow through aqueous wastes like the 200-UP-1 Groundwater, characterization data will be obtained and reviewed every two years to ensure that liner compatibility is maintained.

In some instances, knowledge may be adequate to determine that an aqueous waste is compatible with the LERF liner. When knowledge is used, it must satisfy the definition of *knowledge* in WAC 173-303-040. In those instances where knowledge is adequate, the waste characterization would likely not require analysis for these parameters and constituents. Storm water is an example where knowledge is adequate to determine that this aqueous waste is compatible with the LERF liner.

Compatibility with Other Waste. Some aqueous wastes, especially small volume streams, are accumulated in the LERF with other aqueous waste. Before acceptance into the LERF, the aqueous waste stream is evaluated for its compatibility with the resident aqueous waste(s). The evaluation focuses on the potential for an aqueous waste to react with another waste (40 CFR 264, Appendix V, *Examples of Potentially Incompatible Wastes*) including formation of any precipitate in the LERF basins.

However, the potential for problems associated with commingling aqueous wastes is very low due to the dilute nature of the wastes; this evaluation confirms the compatibility of two or more aqueous wastes from different sources. Compatibility is determined by evaluating parameters such as pH, ammonia, and chloride. No specific analytical test for compatibility is performed.

If it is determined that an aqueous waste stream is incompatible with other aqueous waste streams, alternate management scenarios are available. For example, another LERF basin that contains a compatible aqueous waste(s) might be used, or the aqueous waste stream might be fed directly into 200 Area ETF for treatment. In any case, potentially incompatible waste streams are not mixed, and all aqueous waste is managed in a way that precludes a reaction, degradation of the liner, or interference with 200 Area ETF treatment process.

B.2.3 Periodic Review Process

In accordance with WAC 173-303-300(4)(a), an influent aqueous waste will be periodically reviewed as necessary to ensure that the characterization is accurate and current. At a minimum, an aqueous waste stream will be reviewed in the following situations.

- The LERF and 200 Area ETF management have been notified, or have reason to believe that the process generating the waste has changed.
- The LERF and 200 Area ETF management note an increase or decrease in the concentration of a constituent in an aqueous waste stream, beyond the range of concentrations that was described or predicted in the waste characterization.
- Waste streams will be reviewed every two years.

In these situations, LERF and 200 Area ETF management will review the available information. If existing analytical information is not sufficient, the generator may be asked to review and update the current waste characterization, to supply a new WPS, or re-sample and re-analyze the aqueous waste, as necessary. Other situations that might require a re-evaluation of a waste stream are discussed in the following sections.

B.2.4 Record/Information and Decision

The information and data collected throughout the acceptance process, and the evaluation and decision on whether to accept an influent aqueous waste stream for treatment or storage in the LERF or 200 Area ETF are documented as part of Hanford Facility Operating Record, LERF and 200 Area ETF File pursuant to

Permit Condition II.I. Specifically, the Hanford Facility Operating Record, LERF and 200 Area ETF File contains the following components on a new influent aqueous waste stream:

- The signed WPS for each aqueous waste stream and analytical data.
- Knowledge used to characterize a dangerous/mixed waste (under WAC 173-303), and information supporting the adequacy of the knowledge.
- The evaluation on whether an aqueous waste stream meets the waste acceptance criteria, including:
  - The evaluation for regulatory acceptability including appropriate regulatory approvals.
  - The evaluation for LERF liner compatibility and for compatibility with other aqueous waste.

Table B.1. General Limits for Liner Compatibility

Chemical Family	Constituent(s) or Parameter(s)[1]	Limit[2] (sum of constituent concentrations)
Alcohol/glycol	1-butanol	500,000 mg/L 500,000 ppm
Alkanone[3]	acetone	200,000 mg/L 200,000 ppm
Alkenone[4]	none targeted	N/A
Aromatic/cyclic hydrocarbon	acetophenone, benzene, carbozole, chrysene, cresol, di-n-octyl phthalate, diphenylamine, isophorone, pyridine, tetrahydrofuran	2,000 mg/L 2,000 ppm
Halogenated hydrocarbon	arochlors, carbon tetrachloride, chloroform, hexachlorobenzene, lindane (gamma-BHC), hexachlorocyclopentadiene, methylene chloride, p-chloroaniline, tetrachloroethylene, 2,4,6-trichlorophenol	2,000 mg/L 2,000 ppm
Aliphatic hydrocarbon	none targeted	N/A
Ether	dichloroisopropyl ether	2,000 mg/L 2,000 ppm
Other hydrocarbons	acetontrile, carbon disulfide, n-nitrosodimethylamine, tributyl phosphate	2,000 mg/L 2,000 ppm
Oxidizers	none targeted	NA
Acids, Bases, Salts	ammonia, cyanide, anions, cations	100,000 mg/L 100,000 ppm
pH	pH	0.5 < pH < 13.0

[1]Analytical methods for the parameters and constituents are provided in Section B.8.

[2]Analytical data are evaluated using the following 'sum of the fraction' technique. The individual constituent concentration is evaluated against the compatibility limit for its chemical family. The sum of the evaluations must be less than 1. pH is not part of this evaluation.

$$\sum_{n=1}^{i}\left(\frac{\mathrm{Conc}_n}{\mathrm{LIMIT}_n}\right) \le 1$$

[3]Ketone containing saturated alkyl group(s)

[4]Ketone containing unsaturated alkyl group(s)

Where 'i' is the number of organic constituents detected

mg/L = milligrams per liter

ppm = parts per million

NA = not applicable

Table B.2. Waste Acceptance Criteria

General Criteria Category	Criteria Description
1. Characterization	A. Each generator must provide an aqueous waste profile.
	B. Each generator must designate the aqueous waste stream.
	C. Each generator must provide analytical data and/or knowledge.
2. Regulatory acceptability	A. The LERF and 200 Area ETF can store and treat influent aqueous wastes with waste numbers identified in Addendum A for the LERF and 200 Area ETF, and the Final Delisting 200 Area ETF, 40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3).
	B. The aqueous waste must comply with conditions of the Discharge Permit.
3. Operational acceptability	A. Determine whether an aqueous waste stream is treatable, considering: 1. Whether the removal and destruction efficiencies on the constituents of concern will be adequate to meet the Discharge Permit and Delisting levels 2. Other treatability concerns; analyses for this evaluation may include: total dissolved solids; total organic carbon; total suspended solids; specific conductivity; alkalinity; ammonia; barium; calcium; chloride; fluoride; iron; magnesium; nitrate; nitrite; phosphate; potassium; silicon; sodium; sulfate; pH
	B. Determine whether an aqueous waste stream is compatible, considering: 1. Whether an aqueous waste stream presents corrosion concerns with respect to 200 Area ETF; analysis may include chloride and fluoride. 2. Whether an aqueous waste stream is compatible with LERF liner materials, compare characterization data to the liner compatibility limits (Table B.1). 3. Whether an aqueous waste stream is compatible with other aqueous waste(s), 40 CFR 264, Appendix V, comparison will be used.

B.3 Special Management Requirements

Special management requirements for aqueous wastes that are managed in the LERF or 200 Area ETF are discussed in the following section.

B.3.1 Land Disposal Restriction Compliance at Liquid Effluent Retention Facility

Because LERF provides treatment through flow and pH equalization, a surface impoundment treatment exemption from the land disposal restrictions was granted in accordance with 40 CFR 268.4, and WAC 173-303-040. This treatment exemption is subject to several conditions, including a requirement that the WAP address the sampling and analysis of the treatment 'residue' [40 CFR 268.4(a)(2)(i) and WAC 173-303-300(5)(h)(i) and (ii)] to ensure the 'residue' meets applicable treatment standards. Though the term 'residue' is not specifically defined, this condition further requires that sampling must be designed to represent the "sludge and the supernatant" indicating that a residue may have a sludge (solid) and supernatant (liquid) component.

Solid residue is not anticipated to accumulate in a LERF basin for the following reasons:

- Aqueous waste streams containing sludge would not be accepted into LERF under the acceptance criteria of treatability (Section B.2.2.3.1).
- No solid residue was reported from process condensate discharged to LERF in 1995.
- The LERF basins are covered and all incoming air first passes through a breather filter.
- No precipitating or flocculating chemicals are used in flow and pH equalization.
- Multiple waste streams managed in a single LERF basin are evaluated for the formation of precipitates. Wastes that would form precipitates are not accepted for treatment at LERF.

Therefore, the residue component subject to this condition is the supernatant (liquid component). Additionally, an aqueous waste stream is evaluated for the potential to deposit solids in a LERF basin (i.e., an aqueous waste that contains suspended solids). If necessary, filtration at the waste source could be required before acceptance into LERF. Therefore, the residue component in LERF subject to this condition is the supernatant (liquid component). The contingency for removal of solids will be addressed during closure in Addendum H, Closure Plan.

The conditions of the treatment exemption also require that treatment residues (i.e., aqueous wastes), which do not meet the LDR treatment standards "must be removed at least annually" [40 CFR 268.4(a)(2)(ii) incorporated by reference by WAC 173-303-140]. To address the conditions of this exemption, an influent aqueous waste is sampled and analyzed and the LDR status of the aqueous waste is established as part of the acceptance process. The LERF basins are then managed such that any aqueous waste(s), which exceeds an LDR standard, is removed annually from a LERF basin, except for a heel of approximately 1 meter (3 feet). A heel is required to stabilize the LERF liner. The volume of the heel is approximately 2,082,000 liters (550,006 gallons).

B.4 Influent Aqueous Waste Sampling and Analysis

The following sections provide a summary of the sampling procedures, frequencies, and analytical parameters for characterization of influent aqueous waste (Section B.2) and in support of the special management requirements for aqueous waste in the LERF (Section B.3).

B.4.1 Sampling Procedures

With a few exceptions, generators are responsible for the characterization, including sampling and analysis, of an influent aqueous waste. Process condensate is either sampled at the 242-A Evaporator or accumulated in a LERF basin following a 242-A Evaporator campaign and sampled. Other exceptions will be handled on a case-by-case basis and the Hanford Facility Operating Record, LERF and 200 Area ETF File will be maintained at the unit for inspection by Ecology. The following section discusses the sampling locations, methodologies, and frequencies for these aqueous wastes. For samples collected at the LERF and 200 Area ETF, unit-specific sampling protocol is followed. The sample containers, preservation materials, and holding times for each analysis are listed in Section B.8.

B.4.1.1 Batch Samples

In those cases where an aqueous waste is sampled in a LERF basin, samples are collected from four of the six available sample risers located in each basin, i.e., four separate samples. When LERF levels are low, fewer than four samples can be taken if the sampling approach is still representative. Though there are eight sample risers at each basin, one is dedicated to liquid level instrumentation and another is dedicated as an influent port. Operating experience indicates that four samples adequately capture the spatial variability of an aqueous waste stream in the LERF basin. Specifically, sections of stainless steel (or other compatible material) tubing are inserted into the sample riser to an appropriate depth. Using a portable pump, the sample line is flushed with the aqueous waste and the sample collected. The grab sample containers typically are filled for volatile organic compounds (VOC) analysis first, followed by the remainder of the containers for the other parameters.

Several sample ports are also located at 200 Area ETF, including a valve on the recirculation line at 200 Area ETF surge tank, and a sample valve on a tank discharge pump line at the 2025-ED Load-In Station. All samples are obtained at the LERF or 200 Area ETF are collected in a manner consistent with SW-846 procedures (EPA as amended).

B.4.2 Analytical Rationale

As stated previously, each generator is responsible for designating and characterizing an aqueous waste stream. Accordingly, each generator samples and analyzes an influent waste stream using the target list of parameters (Table B.3) for the waste acceptance process. At the discretion of the LERF and 200 Area ETF management, a generator may provide knowledge in lieu of some analyses as discussed in Section B.2.1.1. The LERF and 200 Area ETF personnel will work with the generator to determine which parameters are appropriate for the characterization.

The analytical methods for these parameters are provided in Section B.8. All methods are EPA methods satisfying the requirements of WAC 173-303-110(3). Additional analyses may be required if historical information and knowledge indicate that an influent aqueous waste contains constituents not included in the target list of parameters. For example, if knowledge indicates that an aqueous waste contains a parameter that is regulated by the Groundwater Quality Criteria (WAC 173-200), that parameter(s) would be added to the suite of analyses required for that aqueous waste stream.

The analytical data for the parameters presented in Table B.3, including VOC, Semi-volatile Organic Compound (SVOC), metals, anions, and general chemistry parameters are used to define the physical and chemical properties of the aqueous waste for the following:

- Set operating conditions in the LERF and 200 Area ETF (e.g., to determine operating configuration, refer to Section B.2.2.2).
- Identify concentrations of some constituents which may also interfere with, or foul 200 Area ETF treatment process (e.g., fouling of the RO membranes, refer to Section B.2.2.2).
- Evaluate LERF liner and piping material compatibility.
- Determine treatability to evaluate if applicable constituents in the treated effluent will meet Discharge Permit and Delisting limits.
- Estimate concentrations of some constituents in the waste generated in the secondary treatment train (i.e., dry powder waste).

Table B.3. Target Parameters for Influent Aqueous Waste Analyses

VOLATILE ORGANIC COMPOUNDS		SEMIVOLATILE ORGANIC COMPOUNDS
Acetone		Acetophenone
Acetonitrile		Cresol (o, p, m)
Benzene		Dichloroisopropyl ether (bis(2-chloropropyl)ether)
1-Butanol		Di-n-octyl phthalate
Carbon disulfide		Diphenylamine
Carbon tetrachloride		Hexachlorobenzene
Chloroform		Hexachlorocyclopentadiene
Methylenechloride		Iosophorone
Tetrachloroethylene		Lindane (gamma-BHC)
Tetrahydrofuran		N-nitrosodimethylamine
		Pyridine
		Tributyl phosphate
		2,4,6-Trichlorophenol
TOTAL METALS		**ANIONS**
Arsenic	Magnesium	Chloride
Barium	Mercury	Fluoride
Beryllium	Nickel	Nitrate
Cadmium	Potassium	Nitrite
Calcium	Selenium	Phosphate
Chromium	Silicon	Sulfate
Copper	Silver	**GENERAL CHEMISTRY PARAMETERS**
Iron	Sodium	Ammonia
Lead	Vanadium	Cyanide
	Zinc	pH
		Total suspended solids
		Total dissolved solids
		Total organic carbon
		Specific conductivity

B.5 Treated Effluent Sampling and Analysis

The treated aqueous waste, or effluent, from 200 Area ETF is collected in three 3,025,739-liter (799,316-gallons) verification tanks before discharge to the SALDS. To determine whether the discharge limits, and the Final Delisting 200 Area ETF criteria are met, the effluent routinely is sampled at the verification tanks. The sampling and analyses performed are described in the following sections.

B.5.1 Rationale for Effluent Analysis Parameter Selection

The parameters measured in the treated effluent are required by the following regulatory documents:

- Delisting criteria from the Final Delisting 200 Area ETF (40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3)).
- Corresponding State Final Delisting issued pursuant to WAC 173-303-910(3).
- Effluent limits from the Discharge Permit Number ST0004500.

- The Final Delisting 200 Area ETF provides two testing regimes for the treated effluent. Initial verification testing is performed when a new influent waste stream is processed through the 200 Area ETF. For each 200 Area ETF influent waste stream, the first generated verification tank must be sampled and analyzed for all delisting constituents and conductivity. Subsequent verification sampling and analysis of all delisting parameters is performed on every 15th tank of that 200 Area ETF influent waste stream. If the concentration of any analyte is found to exceed a Discharge Permit Number ST0004500, enforcement limit or a Delisting criterion, the contents of the verification tank are reprocessed and/or re-analyzed. The next verification tank generated is also sampled for all delisting constituents.

B.5.2 Effluent Sampling Strategy: Methods, Location, Analyses, and Frequency

Effluent sampling methods and locations, the analyses performed, and frequency of sampling are discussed in the following sections.

B.5.2.1 Effluent Sampling Method and Location

Samples of treated effluent are collected and analyzed to verify the treatment process using 200 Area ETF specific sampling protocol. These verification samples are collected at a sampling port on the verification tank recirculation line. Section B.8 presents the sample containers, preservatives, and holding times for each parameter monitored in the effluent.

B.5.2.2 Analyses of Effluent

The parameters required by the current Discharge Permit Number ST0004500, and Final Delisting 200 Area ETF, conditions are presented in Table B.4. The analytical methods and PQLs associated with each parameter are provided in Section B.8. The methods and PQLs are equivalent to those used in the analysis of influent aqueous waste.

B.5.2.3 Frequency of Sampling

Treated effluent is tested for all parameters listed in Table B.4 on a frequency satisfying the permit conditions of the Discharge Permit Number ST0004500, and the Final Delisting 200 Area ETF. This effluent must meet the Discharge Permit Number ST0004500, and Final Delisting 200 Area ETF limits associated with these parameters. Grab samples are collected from each verification tank.

During operation of 200 Area ETF, if one or more of the constituents exceeds a Delisting criterion, the Delisting conditions require:

- The characterization data and processing strategy of the influent waste stream be reviewed and changed accordingly to ensure the contents of subsequent tanks do not exceed the Delisting criteria
- The contents of the verification tank are recycled for additional treatment. The contents that are recycled are resampled after treatment to ensure no constituents exceed a Delisting criteria
- The contents of the following verification tank are sampled for compliance with the Delisting criteria.
- Treated effluent that does not meet Discharge Permit Number ST0004500 is not discharged to the SALDS until the tank has been retreated and/or reanalyzed.

B.6 Effluent Treatment Facility Generated Waste Sampling and Analysis

The wastes discussed in this section include the wastes generated at 200 Area ETF and are managed in the container storage areas of 200 Area ETF. This section describes the characterization of the following secondary waste streams generated within 200 Area ETF:

- Secondary waste generated from the treatment process, including the following waste forms:
  - dry powder waste
  - concentrate tanks slurry

  - sludge removed from process tanks
- Waste generated by operations and maintenance activities
- Miscellaneous waste generated within 200 Area ETF.

For each waste stream described, a characterization methodology and rationale are provided, and sampling requirements are addressed.

B.6.1 Secondary Waste Generated from Treatment Processes

The following terms used in this Section, including powder, dry powder, waste powder, and dry waste powder, are equivalent to the term 'dry powder waste'.

A dry powder waste is generated from the secondary treatment train, from the treatment of an aqueous waste. Waste is received in the secondary treatment train in waste receiving tanks where it is fed into an evaporator. Concentrate waste from the evaporator is then fed to a concentrate tank. From these tanks, the waste is fed to a thin film dryer and dried into a powder, and collected into containers. The containers are filled via a remotely controlled system. The condensed overheads from the evaporator and thin film dryer are returned to the surge tank to be fed to the primary treatment train.

Occasionally, salts from the treatment process (e.g., calcium sulfate and magnesium hydroxide) accumulate in process tanks as sludge. Because processing these salts could cause fouling in the thin film dryer, and to allow uninterrupted operation of the treatment process, the sludge is removed and placed in containers. The sludge is dewatered and the supernate is pumped back to 200 Area ETF for treatment.

The secondary treatment system typically receives and processes the following by-products generated from the primary treatment train:

- Concentrate from the first RO stage.
- Backwash from the rough and fine filters.
- Regeneration waste from the ion exchange system.
- Spillage or overflow collected in the process sumps.

In an alternate operating scenario, some aqueous wastes may be fed to the secondary treatment train before the primary treatment train.

B.6.1.1 Special Requirements Pertaining to Land Disposal Restrictions

Containers of 200 Area ETF secondary waste are transferred to a storage or final disposal unit, as appropriate (e.g., the Central Waste Complex or to the Environmental Restoration Disposal Facility). 200 Area ETF personnel provide the analytical characterization data and necessary knowledge for the waste to be managed by the receiving staff, and for the appropriate LDR documentation.

The following information on the secondary waste is included on the LDR documentation provided to the receiving unit:

- Dangerous waste numbers (as applicable).
- Determination on whether the waste is restricted from land disposal according to the requirements of 40 CFR 268 incorporated by reference by WAC 173-303-140 (i.e., the LDR status of the waste).

The waste tracking information associated with the transfer of waste

- Waste analysis results.

B.6.1.2 Sampling Methods

The dry powder waste and containerized sludge are sampled from containers using the principles presented in SW-846 (EPA as amended) and ASTM Methods (American Society for Testing Materials), as referenced in WAC 173-303-110(2). The sample container requirements, sample preservation

requirements, and maximum holding times for each of the parameters analyzed in either matrix are presented in Section B.8.

Concentrate tank waste samples are collected from recirculation lines, which provide mixing in the tank during pH adjustment and prevent caking. The protocol for concentrate tank sampling prescribes opening a sample port in the recirculation line to collect samples directly into sample containers. The sample port line is flushed before collecting a grab sample. The VOC sampling typically is performed first for grab samples. Each VOC sample container will be filled such that cavitation at the sample valve is minimized and the container has no headspace. The remainder of the containers for the other parameters will be filled next.

Table B.4. Rationale for Parameters to be Monitored in Treated Effluent

Parameter	(Cas No.)	Final Delisting 200 Area ETF Delisting[1]	ST0004500 Discharge Permit[2] Effluent Limit
VOLATILE ORGANIC COMPOUNDS			
Acetone	(67-64-1)	X	X
Acetonitrile	(75-05-8)	X	
Benzene	(71-43-2)	X	X
1-Butanol	(71-36-3)	X	
Carbon disulfide	(75-15-0)	X	
Carbon tetrachloride	(56-23-5)	X	X
Chloroform	(67-66-3)		X
Methylene Chloride	(75-09-2)		M
Tetrachloroethylene	(127-18-4)		X
Tetrahydrofuran	(109-99-9)	X	X
SEMIVOLATILE ORGANIC COMPOUNDS			
Acetophenone	(98-86-2)		X
Carbazole	(86-74-8)	X	
p-Chloroaniline	(106-47-8)	X	
Chrysene	(218-01-9)	X	
Cresol (total)	(1319-77-3)	X	
Dichloroisopropyl ether (bis(2-chloroisopropyl)ether)	(108-60-1)	X	
Di-n-octyl phthalate	(117-84-0)	X	
Diphenylamine	(122-39-4)	X	
Hexachlorobenzene	(118-74-1)	X	
Hexachlorocyclopentadiene	(77-47-4)	X	
Isophorone	(78-59-1)	X	
Lindane (gamma-BHC)	(58-89-9)	X	
N-nitrosodimethylamine	(62-75-9)	X	X
Pyridine	(110-86-1)	X	
Tributyl phosphate	(126-73-8)	X	
2,4,6-Trichlorophenol	(88-06-2)	X	
PCBs			
Aroclor 1016	(12674-11-2)	X	

Table B.4. Rationale for Parameters to be Monitored in Treated Effluent			
Parameter	**(Cas No.)**	**Final Delisting 200 Area ETF Delisting[1]**	**ST0004500 Discharge Permit[2]**
			Effluent Limit
Aroclor 1221	(11104-28-2)	X	
Aroclor 1232	(11141-16-5)	X	
Aroclor 1242	(53469-21-9)	X	
Aroclor 1248	(12672-29-6)	X	
Aroclor 1254	(11097-69-1)	X	
Aroclor 1260	(11096-82-5)	X	
TOTAL METALS[3]			
Arsenic	(7440-38-2)	X	X
Barium	(7440-39-3)	X	
Beryllium	(7740-41-7)	X	X
Cadmium	(7440-43-9)	X	X
Chromium	(7440-47-3)	X	X
Copper	(7440-50-8)		X
Lead	(7439-92-1)	X	X
Mercury	(7439-97-6)	X	X
Nickel	(7440-02-0)	X	
Selenium	(7782-49-2)	X	
Silver	(7440-22-4)	X	
Vanadium	(7440-62-2)	X	
Zinc	(7440-66-6)	X	
ANIONS			
Chloride	(16887-00-6)		X
Fluoride	(16984-48-8)	X	
Nitrate (as N)	(14797-55-8)		X
Nitrite (as N)	(1479765-0)		X
Sulfate	(14808-79-8)		X
OTHER ANALYSES			
Ammonia	(7664-41-7)	X	X
Cyanide	(57-12-5)	X	
Total dissolved solids			X
Total organic carbon			X
Total suspended solids			X
Specific conductivity			M

[1]Parameters required by the current conditions of the Final Delisting 200 Area ETF, 40 CFR 261, Appendix IX, Table 2 incorporated by reference by WAC 173-303-910(3),70 FR 44496 (EPA 2005)

[2]Parameters required by the current conditions of the Discharge Permit Number ST0004500

[3]Metals reported as total concentrations

X = Rationale for measuring this parameter in treated effluent

M = Monitor only; no limit defined

PCBs = polychlorinated biphenyls

B.6.1.3 Sampling Frequency

When designation or identification of applicable LDR treatment standards of the 200 Area ETF secondary waste cannot be based on influent characterization data or knowledge as described in Section B.6.1.1, 200 Area ETF secondary waste is sampled on a batch basis. A batch is defined as any volume of aqueous waste that is being treated under consistent and constant process conditions.

When personnel exposures are of concern, one representative sample will be collected from the concentrate tank, if waste from the concentrate tank. The sample will be analyzed for the appropriate parameters identified in Table B.5 based on the needs identified from evaluating influent waste analysis data. If sampling of the concentrate tank is not technically practicable for purposes of designating the powder, direct sampling of the dry powder will be used to make determinations on the dry powder. The dry powder or concentrate tanks will be resampled in the following situations:

- Change in influent characterization.
- Change in process chemistry, as indicated by in-line monitoring of conductivity and pH.
- The LERF and 200 Area ETF management have been notified, or have reason to believe that the process generating the waste has changed (for example, a source change such as a change in the well-head for groundwater that significantly changes the aqueous waste characterization).
- The LERF and 200 Area ETF management note an increase or decrease in the concentration of a constituent in an aqueous waste stream, beyond the range of concentrations that was described or predicted in the waste characterization.

B.6.2 Operations and Maintenance Waste Generated at the 200 Area Effluent Treatment Facility

Operation and maintenance of process and ancillary equipment generates additional routine waste. These waste materials are segregated to ensure proper handling and disposition, and to minimize the commingling of potentially dangerous waste with nondangerous waste. The following waste streams are anticipated to be generated during routine operation and maintenance of 200 Area ETF. This waste might or might not be dangerous waste, depending on the nature of the material and its exposure to a dangerous waste.

- Spent lubricating oils and paint waste from pumps, the dryer rotor, compressors, blowers, and general maintenance activities.
- Spent filter media and process filters.
- Spent ion exchange resin.
- High Efficiency Particulate Air (HEPA) filters.
- UV light tubes.
- RO membranes.
- Equipment that cannot be returned to service.
- Other miscellaneous waste that might contact a dangerous waste (e.g., plastic sheeting, glass, rags, paper, waste solvent, or aerosol cans).

These waste streams are stored at 200 Area ETF before being transferred for final treatment, storage, or disposal as appropriate.

This waste is characterized and designated using knowledge (from previously determined influent aqueous waste composition information); analytical data; and material safety data sheets (MSDS) of the chemical products present in the waste or used (the data sheets are maintained at 200 Area ETF). Sampling of these waste streams is not anticipated; however, if an unidentified or unlabeled waste is discovered, that waste is sampled. This 'unknown' waste is sampled and analyzed for the parameters in

Table B.5 as appropriate, and will be designated according to Washington state regulatory requirements. The specific analytical methods for these analyses are provided in Section B.8.

B.6.3 Other Waste Generated at the 200 Area Effluent Treatment Facility

There are two other potential sources of waste at 200 Area ETF: spills and/or overflows, and discarded chemical products. Spills may be subject to the requirements of Permit Condition II.E. Spilled material that potentially might be dangerous waste generally is either containerized or routed to 200 Area ETF sumps where the material is transferred either to the surge tank for treatment or to the secondary treatment train. In most cases, knowledge and the use of MSDSs are sufficient to designate the waste material. If the source of the spilled material is unknown and the material cannot be routed to 200 Area ETF sumps, a sample of the waste is collected and analyzed according to Table B.5, as necessary, for appropriate characterization of the waste. Unknown wastes will be designated according to Washington State regulatory requirements at WAC 173-303-070. The specific analytical methods for these analyses are provided in Section B.8.

A discarded chemical product waste stream could be generated if process chemicals, cleaning agents, or maintenance products become contaminated or are otherwise rendered unusable. In all cases, these materials are appropriately containerized and designated. Sampling is performed, as appropriate, for waste designation.

Table B.5. 200 Area Effluent Treatment Facility Generated Waste - Sampling and Analysis

Parameter[1]	Rationale
• Total solids or percent water[2]	• Calculate dry weight concentrations
• Volatile organic compounds[3]	• LDR - verify treatment standards
• Semi-volatile organic compounds[3]	• LDR - verify treatment standards
• Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver)	• Waste designation • LDR - verify treatment standards
• Cation and anions of concern	• Address receiving TSD unit waste acceptance requirements
• pH	• Waste designation

[1]For influent and concentrate tank samples, the total sample (solid plus liquid) is analyzed and the analytical result is expressed on a dry weight basis. The result for toxicity characteristic metal and organic is divided by a factor of 20 and compared to the toxicity characteristic (TC) constituent limits [WAC 173-303-090(8)]. If the TC limit is met or exceeded, the waste is designated accordingly. All measured parameters are compared against the corresponding treatment standards.

[2]Total solids or percent water are not determined for unknown waste and dry powder waste samples and are analyzed in maintenance waste and sludge samples, as appropriate (i.e., percent water might not be required for such routine maintenance waste as aerosol cans, fluorescent tubes, waste oils, batteries, etc., or sludge that has dried).

[3]VOC and/or SVOC analysis of secondary waste is required unless influent characterization data and knowledge indicate that the constituent will not be in the final secondary waste at or above the LDR.

LDR = land disposal restrictions

TSD = treatment, storage, and/or disposal

B.7 Quality Assurance/Quality Control

The following quality assurance/quality control (QA/QC) plan for LERF and 200 Area ETF is provided as required by WAC 173-303-810(6) and follows the guidelines of EPA QA/G-5.

B.7.1 Project Management

The following sections address project administrative functions and approaches.

B.7.1.1.1 Project Organization

Overall management of the LERF and 200 Area ETF is performed by the Facility Manager, who is responsible for safe operation of the facility, including implementation of this QA/QC plan and compliance with applicable permits and regulations. The Facility Manager also provides retention of project records in accordance with this plan. Assisting the Facility Manager is an Environmental Field Representative that monitors compliance, reviews new requirements and regulations, and interfaces with EPA and Ecology. Also assisting the Facility Manager is a QA representative who is responsible for implementing the QA program at the facility.

Reporting to the Facility Manager are several support groups. The Operations group consists of trained personnel who operate the plant, including operators performing sampling activities such as collection, packaging, and transportation of samples to the laboratory. The Maintenance group is responsible for performing calibrations and preventative maintenance on facility equipment, including pH, conductivity, and flow meters required by environmental permits. The Engineering group monitors the process with online instruments and sampling for process control. The Engineering group also performs waste acceptance, and environmental compliance activities, including scheduling sampling, generating data forms, and reviewing data.

B.7.1.2 Special Training

Individuals involved in sampling, analysis, and data review will be trained and qualified to implement safely the activities addressed in this WAP and QA/QC plan. Training will conform to the training requirements specified in WAC 173-303-330 and Addendum F, Personnel Training. Training records will be maintained in accordance with Section B.7.1.3.

B.7.1.3 Documentation and Records

Sample records are documented as part of the Hanford Facility Operating Record, LERF and 200 Area ETF File pursuant to Permit Condition II.I. These documents and records include the following:

- Training
- Chains of Custody for all regulatory sampling performed by LERF and 200 Area ETF
- Data Summary Reports
- QA/QC reports
- Assessment reports
- Instrument inspection, maintenance, and calibration logs

B.7.2 Data Quality Parameters and Criteria

Data quality parameters are listed by EPA QA/G-5S, *Guidance for Choosing a Sampling Design for Environmental Data Collection* as:

- Purpose of Data Collection (e.g. determining if a parameter exceeds a threshold level).
- Spatial and Temporal Boundaries of Study.
- Preliminary Estimation of Sample Support (volume that each sample represents).
- Statistical Parameter of Interest (e.g. mean, percentile, percentage).
- Limits on Decision Error/Precision (e.g. false acceptance error, false rejection error).

The parameters for the first four bullets (limits, sample points, frequency of samples, etc.) are already established in the permits, delisting petition, and this WAP. The focus of this QA/QC plan is on limits on decision error/precision.

The data quality parameters were chosen to ensure Limits on Decision Error/Precision are appropriate for purposes of using the data to demonstrate compliance with permits, delisting exclusion limits, and this WAP. The principal quality parameters are precision, accuracy, representativeness, comparability, and

completeness. Secondary data parameters of importance include sensitivity and detection levels. The data quality parameters and the data acceptance criteria are discussed below.

B.7.2.1 Precision

Precision is a measure of agreement among replicate measurements of the same property, under prescribed similar conditions. Precision is expressed in terms of the relative percent difference (RPD) for duplicate measurements. QA/QC sample types that test precision include field and laboratory duplicates and spike duplicates. The RPDs for laboratory duplicates and/or matrix spike duplicates will be routinely calculated.

$$\text{RPD} = (100)\textit{absolute value of}\left(\frac{\text{sample result} - \text{duplicate sample result}}{\text{average of sample result} + \text{duplicate sample result}}\right)$$

Matrix spike duplicates are replicates of matrix spike samples that are analyzed with every analytical batch that contains a 200 Area ETF treated effluent sample. The precision of the analytical methods are estimated from the results of the matrix spike (MS) and the matrix spike duplicate (MSD) for selected analytes. Matrix spike analyses cannot be performed for certain analytical methods, including conductivity, pH, and total dissolved solids. Duplicate analyses are used to determine the RPD for these methods. The precision acceptance criteria are specified in Table B.6.

B.7.2.2 Accuracy

Accuracy assesses the closeness of the measured value to an accepted reference value. Accuracy of analytical results is typically assessed using matrix spikes. A matrix spike is the addition of a known amount of the analyte to the sample matrix being analyzed. Accuracy is expressed as a percent recovery of the spiked samples.

$$\text{Percent Recovery} = 100\left(\frac{\text{matrix spike sample result} - \text{sample result}}{\text{spiked amount}}\right)$$

Matrix spike analyses cannot be performed on certain analytical methods, including conductivity, pH, and total dissolved solids. The percent recovery for the laboratory control standard samples demonstrates that these methods are working properly and gives an estimate of the method's accuracy. The percent recovery will be routinely calculated.

Accuracy criteria are established to provide confidence that the result is below the action level. Therefore the closer the result is to the action level the higher the degree of accuracy needed. The upper and lower accuracy acceptance criteria are specified in Table B.6. The criteria are reasonable values based on previous analysis of constituents in the delisting exclusion, or similar constituents.

B.7.2.3 Representativeness

Representativeness expresses the degree to which data accurately and precisely represent selected characteristics of a parameter at a sampling point or process condition. Because of the matrix being analyzed, dilute aqueous solution, it is not expected that representativeness will be of concern, except when there are potential for changes to process conditions such as the facility influent concentrations or waste processing strategy. Sampling due to these changes in process conditions is addressed in Section B.6.1.3.

The representativeness of a sample may be compromised by the presence of contaminants introduced in the field or the laboratory. To determine if contamination may be present, a blank sample of reagent water is analyzed. A method blank is performed by the laboratory on every batch of 20 samples being analyzed at the same time. The presence of a constituent in the sample and the blank sample indicates contamination has occurred.

B.7.2.4 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system, expressed as a percentage of the number of valid measurements that were planned to be collected. Lack of completeness is sometimes caused by loss of a sample, loss of data, or inability to collect the planned number of samples. Incompleteness also occurs when data are discarded because they are of unknown or unacceptable quality. Since most regulatory sampling events performed by LERF and 200 Area ETF involve a single sample, all analysis must be complete and valid.

B.7.2.5 Comparability

Comparability is the confidence with which one data set can be compared to another. Comparability is achieved by using sampling and analytical techniques, which provide for measurements that are consistent and representative of the media and conditions measured. In laboratory analysis, the term comparability focuses on method type, holding times, stability issues, and aspects of overall analytical quantitation.

B.7.2.6 Sensitivity and Detection Levels

Sensitivity is the measure of the concentration at which an analytical method can positively identify and report analytical results. Sensitivity represents the maximum value for a detection level that will reasonably assure the results are below the established limits. The analytical method selected by LERF and 200 Area ETF should have a detection level for each constituent that is below the sensitivity. The preferred detection level is the practical quantitation limit (PQL), which is lowest concentration that can be reliably measured during routine laboratory conditions. If the method PQL cannot meet the sensitivity for some constituents, the minimum concentration or attribute that can be measured by a method (method detection limit) or by an instrument (instrument detection limit) may be used. The sensitivity levels, specified in Table B.6, are derived from the delisting limits, water discharge limits, and uncertainty values, which are based on the required precision and accuracy for each constituent.

B.7.3 Data Generation and Acquisition

The following section addresses QA requirements for data generation and acquisition.

B.7.3.1 Sampling Method

LERF and 200 Area ETF samples required by the permits and delisting are collected as grab samples. Sampling for the purpose of waste designation of secondary waste is performed using grab, composite, thief, scoop, or composite liquid waste sampler (COLIWASA). The selection of the sample collection device depends on the type of sample, the sample container, the sampling location, and the nature and distribution of the waste components. In general, the methodologies used for specific materials correspond to those referenced to WAC 173-303-110(2). The selection and use of the sampling device is supervised or performed by a person thoroughly familiar with the sampling requirements.

The following protocol applies to all sampling methods:

- All containers will be filled within as short a time period as reasonably achievable.
- Volatile Organic Analysis (VOA) sample containers will be filled first, and prior to any subdividing of a composited sample.
- VOA samples consisting of a set of two or more sample containers will be filled sequentially. The sample containers are considered equivalent and given identical sampling times.
- All VOA sample containers must have no headspace and be free of trapped air bubbles.

- Grab sample protocol includes:
  - Sample lines should be as short as reasonably achievable and free of traps and pockets in which solids might settle.
  - The sample line should be flushed before sampling with a minimum volume equivalent to three times the sample line volume.
  - Contamination to the sample from contact with the internal and external surfaces of the tap should be minimized.

Thief and COLIWASA samplers are used to sample liquid waste containers such as drums. Scoop samplers are used to sample powder waste generated in the thin-film dryer. Sample requirements for these samples include:

- Thief or COLIWASA sampler, the sampler should be lowered into the liquid slowly so the level of the liquid inside and outside the sampler tube remain about the same.
- When lifting the thief or COLIWASA sampler from the solution, the outside should be wiped down, or the excess water allowed to drip off, before filling the sample container.

B.7.3.2 Sample Handling, Custody, and Shipping

The proper handling of sample bottles after sampling is important to ensure the samples are free of contamination and to demonstrate the samples have not been tampered with.

B.7.3.2.1 Chain-of-Custody

Evidence of collection, shipment, receipt at the laboratory, and laboratory custody until disposal will be documented using a chain-of-custody form. The chain-of-custody form will, as a minimum identify sample identification number, sampling date and time, sampling location, sample bottle type and number, analyses to be performed, and preservation method.

The operations person who signs as the collector on the chain of custody is the first custodian of the samples. A custodian must maintain continuous custody of sample containers at all times from the time the sample is taken until delivery to the laboratory or until delivery to a common carrier for shipment to an off-site location. Custody is maintained by any of the following:

- The custodian has the samples in view, or has placed the samples in locked storage, or keeps the samples within a secured area (e.g., controlled by authorized personnel only), or has applied a tamper-indicating device, such as evidence tape, to the sample containers or shipping containers.
- The custodian has taken physical possession of the samples or the shipping containers sealed with an intact tamper-indicating device, such as evidence tape.

B.7.3.2.2 Sample Preservation, Containers, and Holding Time

Table B.6 lists the sample container, preservation method, and holding time requirements for different types of analyses. These parameters are based on the requirements of 40 CFR 136, Table II.

B.7.3.3 Instrument Calibration and Preventive Maintenance

LERF and 200 Area ETF uses instruments to monitor operations and meet regulatory requirements. This includes continuous pH and conductivity monitors required by facility permits and delisting. All instruments are calibrated according to frequencies and tolerances established by the LERF and 200 Area ETF engineering group. Calibrations and other maintenance actions are scheduled and tracked by LERF and 200 Area ETF maintenance group using a preventive maintenance database. Measuring and test equipment used for instrument calibration is controlled, calibrated at specified intervals, and maintained to establish accuracy limits.

B.7.4 Assessment and Oversight

Quality programs can only be effective if meaningful assessments are performed to monitor and respond to issues associated with program performance. Routine assessment of data is performed as part of the validation process discussed in Section B.7.5.1.

B.7.4.1 Assessments and Response

Management assessments are conducted by first line management and subject matter experts, focusing on procedural adequacy, compliance, and overall effectiveness of the program. Management assessments of the sample program typically include the LERF and 200 Area ETF QA representative. Each management assessment has a performance objective or lines of inquiry. Examples may include personnel training, proper performance of sample custody, or completeness of sampling records.

B.7.4.2 Reports to Management

Results of performance assessments, including any issues identified, are provided to the LERF and 200 Area ETF Facility Manager in a written report. The Facility Manager is responsible to correct all findings from the report.

B.7.5 Verification and Validation of Analytical Data

The data verification and validation processes will ensure that the data resulting from the selected analytical method are consistent with requirements specified in this QA/QC plan.

B.7.5.1 Data Verification

The primary data reporting will be by electronic data systems. Data verification will be performed on laboratory data packages that support environmental compliance to ensure that their content is complete and in order. A review of the data package will be performed to ensure that:

- The data package contains the required technical information.
- Deficiencies are identified and documented.
- Identified deficiencies are corrected by the laboratory and the appropriate revisions are made.
- Deficient pages are replaced with the laboratory corrections.
- A copy of the completed verification report is placed in the data file.

B.7.5.2 Data Validation

Data validation ensures that the data resulting from analytical measurements meet the quality requirements specified in the QA/QC plan. Data validation will be performed on data packages that support environmental compliance.

The following are included in data validation:

- Chain-of-Custody (COC) – Verify the COC shows unbroken custody from sampling through receipt at the laboratory.
- Request analysis – Review the sample results to verify the requested analysis was performed. If an alternate method was used, verify permit-required detection limits were met.
- Holding times – Review the sample results to verify the analyses were performed within required holing times and where applicable, extraction times.
- Blank – Review the results of trip, field, and equipment blank samples to verify the sample results are not compromised by contamination.
- Laboratory QC – Verify the laboratory QC was completed and there are no outstanding problems.

B.8 Analytical Methods, Sample Containers, Preservative Methods, and Holding Times

Table B.6. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent

Parameter	Analytical Method[1]	Method PQL Sensitivity[2]	Accuracy/ Precision for Method[3] (percent)	Sample container[4]/ Preservative[4]/ Holding time[5]
VOLATILE ORGANIC COMPOUNDS				
Acetone	SW-846 8260 or EPA-600 624	40	60-120 / 20	Sample container 3 x 40-mL amber glass with septum Preservative HCl to pH<2; 4°C Holding time 14 days
Acetonitrile		820	60-120 / 20	
Benzene		5	60-120 / 20	
1-Butanol		1600	60-120 / 20	
Carbon Disulfide		1500	60-120 / 20	
Carbon tetrachloride		5	60-120 / 20	
Chloroform		5	50-130 / 20	
Methylene chloride		5	50-150 / 20	
Tetrachloroethylene		5	65-140 / 20	
Tetrahydrofuran		100	60-120 / 20	
SEMIVOLATILE ORGANIC COMPOUNDS				
Acetophenone	SW-846 8270 or EPA-600 625	10	70-110 / 25	Sample container 4 x 1-liter amber glass Preservative 4°C Holding time 7 days for extraction; 40 days for analysis after extraction
Carbazole		110	50-120 / 25	
p-Chloroaniline		76	50-120 / 25	
Chrysene		350	50-120 / 25	
Cresol (o, p, m)		760	50-120 / 25	
Di-n-octyl phthalate		300	50-120 / 25	
Diphenylamine		350	50-120 / 25	
Hexachlorobenzene		2	50-120 / 25	
Hexachlorocyclopentadiene		110	50-120 / 25	

Table B.6. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent				
Parameter	**Analytical Method[1]**	**Method PQL Sensitivity[2]**	**Accuracy/ Precision for Method[3] (percent)**	**Sample container[4]/ Preservative[4]/ Holding time[5]**
Isophorone		2600	50-120 / 25	
Lindane (gamma-BHC)		1.9	50-120 / 25	
N-nitrosodimethylamine		12	50-120 / 25	
Pyridine		15	50-120 / 25	
Tributyl phosphate		76	50-120 / 25	
2.4.6-Trichlorophenol		230	50-120 / 25	
POLYCHLORINATED BIPHENYLs (PCBs)				
Aroclor-1016	SW-846 8082	0.4	50-110 / 25	Sample container 4 x 1-liter amber glass Preservative 4ºC Holding time 1 year for extraction; 1 year for analysis after extraction
Aroclor-1221		0.4	50-110 / 25	
Aroclor-1232		0.4	50-110 / 25	
Aroclor-1242		0.4	50-110 / 25	
Aroclor-1248		0.4	50-110 / 25	
Aroclor-1254		0.4	50-110 / 25	
Aroclor-1260		0.4	50-110 / 25	
TOTAL METALS				
Arsenic	EPA-600 200.8	11	70-130 / 20	Sample container 1 x 0.5-liter plastic/glass Preservative 1:1 HNO_3 to pH<2 Holding time 180 days; mercury 28 days
Beryllium		34	75 - 125 / 20	
Cadmium		5	70-130 / 20	
Chromium		20	70-130 / 20	
Copper		70	70-130 / 20	
Lead		10	70-130 / 20	

Table B.6. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent

Parameter	Analytical Method[1]	Method PQL Sensitivity[2]	Accuracy/ Precision for Method[3] (percent)	Sample container[4]/ Preservative[4]/ Holding time[5]
Selenium		20	70-130 / 20	
Barium	SW-846 6010/ EPA-600 200.7	1200	75 - 125 / 20	
Calcium		200	75 - 125 / 20	
Iron		100	75 - 125 / 20	
Magnesium		400	75 - 125 / 20	
Nickel		340	75 - 125 / 20	
Potassium		10,000	75 - 125 / 20	
Silicon		580	75 - 125 / 20	
Silver		83	75 - 125 / 20	
Sodium		2500	75 - 125 / 20	
Vanadium		120	75 - 125 / 20	
Zinc		5100	75 - 125 / 20	
Mercury	SW-846 7470, or EPA-600 245 .1	2	70-130 / 20	
GENERAL CHEMISTRY				
Chloride	EPA-600 300.0	1000	70-130 / 20	Sample container 1 x 60-mL plastic/glass Preservative 4°C Holding time 28 days; nitrate and nitrite 48 hours
Fluoride		880	70-130 / 20	
Formate		1250	70-130	
Nitrate (as N)		100	70-130 / 20	
Nitrite (as N)		100	70-130 / 20	
Phosphate		1500	70-130 / 20	
Sulfate		10,000	70-130 / 20	
Ammonia (as N)	EPA-600, 300.7, or EPA-600 350 .1	40	70-130 / 20	Sample container 1 x 50-mL glass or plastic Preservative H_2SO_4 to pH<2; 4°C Holding time 28 days

Table B.6. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent				
Parameter	**Analytical Method[1]**	**Method PQL Sensitivity[2]**	**Accuracy/ Precision for Method[3] (percent)**	**Sample container[4]/ Preservative[4]/ Holding time[5]**
Cyanide	EPA-600 335.2/335.3	350	70-130 / 20	Sample container 1 x 250-mL glass or plastic Preservative NaOH to pH>12; 4°C Holding time 14 days
Alkalinity	EPA-600 310.1/310.2	ND	ND	Sample container 1 x 50-mL glass or plastic Preservative 4°C Holding time 14 days
Total dissolved solids	EPA-600 160.1 or SM2540C	ND	ND	Sample container 1 x 500-mL glass or plastic Preservative 4ºC Holding time 7 days
Total suspended solids	EPA-600 160.2 or SM2540D	ND	ND	Sample container 1 x 1-L glass or plastic Preservative 4ºC Holding time 7 days
Specific conductivity	EPA-600 120.1 (in lab) or SM2510B	ND	ND	Sample container 1 x 50-mL glass or plastic Preservative 4ºC Holding time 28 days

Table B.6. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent				
Parameter	**Analytical Method[1]**	**Method PQL Sensitivity[2]**	**Accuracy/ Precision for Method[3] (percent)**	**Sample container[4]/ Preservative[4]/ Holding time[5]**
pH[7]	EPA-600 150.1 or SM4500-H^+B	ND	ND	Sample container 1 x 60-mL glass or plastic Preservative None Holding time Analyze immediately
Total organic carbon	SW-846 9060 or SMC5310	ND	ND	Sample container 1 x 250-mL amber glass Preservative H_2SO_4 to pH<2; 4°C Holding time 28 days

[1]SW-846 or EPA-600 methods are presented unless otherwise noted. Other methods might be substituted if the applicable PQL can be met.

[2] ST00045000 required method PQL or Delisting Exclusion condition 2 report sensitivity/detection level, whichever is lower. Units are parts per billion unless otherwise noted.

[3]Accuracy/precision used to confirm or re-establish MDL

[4]Sample bottle, volumes, and preservatives could be adjusted, as applicable, for safety reasons

[5]Holding time = time between sampling and analysis

[7]pH monitored in influent aqueous waste only

0°C = Celsius = 32°Fahrenheit
L = liter = 0.26 gallons
mL = milliliter = 0.03 ounces
NA = not applicable
ND = not determined
MDL = method detection level
PQL = practical quantitation limit
RL = reporting limit

Table B.7. Sample Containers, Preservative Methods, and Holding Times for 200 Area ETF Generated Waste

Parameter	Analytical Method[1]	Method PQL	Accuracy/ Precision for Method (percent)	Sample container[2]/ Preservative[2]/ Holding time[3]
Liquid Matrix				
For methods other than total solids, analyze using the methods and QA/QC in Table B.6. For each method, analyze the target compound list				
Total solids	EPA-600 160.3	ND	ND	Sample container 1 x 500-mL glass or plastic Preservative – 4°C Holding time –7 days
Solid Matrix				
Volatile organic compounds (combined method target compound lists)	SW-846 8260	Refer to Table B.6	Refer to Table B.6	Sample container 1 x 40-mL amber glass with septum Preservative –4°C Holding time –14 days
Semi-volatile organic compounds (method target compound list)	SW-846 8270	Refer to Table B.6	Refer to Table B.6	Sample container 1 x 125-mL amber glass Preservative –4°C Holding time –14 days for extraction; 40 days for analysis after extraction
PCBs (method target compound list)	SW-846 8082	Refer to Table B.6	Refer to Table B.6	Sample container Amber glass – 50 g of sample Preservative –4°C Holding time –1 year for extraction; 1 year for analysis after extraction
RCRA Metals (method target compound list)	EPA-600 200.8	Refer to Table B.6	Refer to Table B.6	Sample container glass or plastic – 10 g of sample Preservative –none, mercury 4°C Holding time –180 days; mercury 28 days
Total Metals (method target compound list)	SW-846 6010	Refer to Table B.6	Refer to Table B.6	
Anions (method target compound list)	EPA-600 300.0	Refer to Table B.6	Refer to Table B.6	Sample container glass or plastic –25 g of sample Preservative –none Holding time –6 months for extraction; 28 days for analysis after extraction, nitrate and nitrite 48 hours for analysis after extraction

Table B.7. Sample Containers, Preservative Methods, and Holding Times for 200 Area ETF Generated Waste

Parameter	Analytical Method[1]	Method PQL	Accuracy/ Precision for Method (percent)	Sample container[2]/ Preservative[2]/ Holding time[3]
Ammonia	EPA-600 300.7	Refer to Table B.6	Refer to Table B.6	Sample container glass or plastic – 25 g of sample Preservative –none Holding time –6 months for extraction; 28 days for analysis after extraction
pH	SW-846 9045	ND	ND	Sample container glass or plastic – 50 g of sample Preservative –none Holding time –none
Toxicity Characteristic Leaching Procedure[4]	SW-846 1311	NA	NA	Sample container Refer to specific method being performed after TCLP – 125 g of sample Preservative –None (after TCLP, preserve extract per method being performed) Holding time –Metals: 180 days for TCLP extraction, mercury 28 days for TCLP extraction SVOA: 14 days for TCLP extraction (after TCLP, refer to specific methods for time for analysis after extraction)

[1]SW 846 or EPA-600 methods are presented unless otherwise noted. Other methods might be substituted if the applicable PQL can be met.

[2]Sample bottle, volumes, and preservatives could be adjusted, as applicable, for safety reasons

[3]Holding time equals time between sampling and analysis

[4]Extraction procedure, as applicable; extract analyzed by referenced methods [WAC 173-303-110(3)(c)]

0°C = Celsius = 32°Fahrenheit
g = grams = 0.0352 ounces
mL = milliliter = 0.03 ounces
NA = not applicable
PQL = practical quantitation limit
ND = not determined
TCLP = toxicity characteristic leaching procedure

This page intentionally left blank.

LIQUID EFFLUENT RETENTION FACILITY (LERF) & 200 AREA EFFLUENT TREATMENT FACILITY (ETF) ADDENDUM C PROCESS INFORMATION

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
08/25/2016	8C.2016.Q2

This page intentionally left blank.

ADDENDUM C
PROCESS INFORMATION

This page intentionally left blank.

ADDENDUM C
PROCESS INFORMATION

TABLE OF CONTENTS

C. PROCESS INFORMATION 5
C.1 Liquid Effluent Retention Facility Process Description 5
C.2 200 Area Effluent Treatment Facility Process Description 6
C.2.1 Load-In Station 7
C.2.2 200 Area Effluent Treatment Facility Operating Configuration 7
C.2.3 Primary Treatment Train 7
C.2.4 Secondary Treatment Train 10
C.2.5 Other 200 Area Effluent Treatment Facility Systems 11
C.3 Containers 13
C.3.1 Description of Containers 14
C.3.2 Container Management Practices 14
C.3.3 Container Labeling 15
C.3.4 Containment Requirements for Managing Containers 15
C.4 Tank Systems 17
C.4.1 Design Requirements 17
C.4.2 Additional Requirements for New Tanks 22
C.4.3 Secondary Containment and Release Detection for Tank Systems 22
C.4.4 Tank Management Practices 27
C.4.5 Labels or Signs 30
C.4.6 Air Emissions 30
C.4.7 Management of Ignitable or Reactive Wastes in Tanks Systems 30
C.4.8 Management of Incompatible Wastes in Tanks Systems 30
C.5 Surface Impoundments 31
C.5.1 List of Dangerous Waste 31
C.5.2 Construction, Operation, and Maintenance of Liner System 31
C.5.3 Prevention of Overtopping 39
C.5.4 Structural Integrity of Dikes 39
C.5.5 Piping Systems 41
C.5.6 Double Liner and Leak Detection, Collection, and Removal System 42
C.5.7 Construction Quality Assurance 43
C.5.8 Proposed Action Leakage Rate and Response Action Plan 44
C.5.9 Dike Structural Integrity Engineering Certification 44
C.5.10 Management of Ignitable, Reactive, or Incompatible Wastes 44
C.6 Air Emissions Control 44
C.6.1 Applicability of Subpart AA Standards 44
C.6.2 Process Vents - Demonstrating Compliance 45

C.6.3 Applicability of Subpart CC Standards 46
C.7 Engineering Drawings 47
C.7.1 Liquid Effluent Retention Facility 47
C.7.2 200 Area Effluent Treatment Facility 48

FIGURES

Figure C.1. Liquid Effluent Retention Facility Layout 57
Figure C.2. Plan View of the 200 Area Effluent Treatment Facility 58
Figure C.3. Building 2025-E Ground Floor Plan 59
Figure C.4. Example - 200 Area Effluent Treatment Facility Configuration 1 60
Figure C.5. Example - 200 Area Effluent Treatment Facility Configuration 2 61
Figure C.6. Surge Tank 62
Figure C.7. Ultraviolet Light/Oxidation Unit 63
Figure C.8. Reverse Osmosis Unit 64
Figure C.9. Ion Exchange Unit 65
Figure C.10. Verification Tanks 66
Figure C.11. 200 Area Effluent Treatment Facility Evaporator 67
Figure C.12. Thin Film Dryer 68
Figure C.13. Container Handling System 69
Figure C.14. 200 Area Effluent Treatment Facility Sump Tanks 70
Figure C.15. Liner Anchor Wall and Cover Tension System 71
Figure C.16. Liner System Schematic 72
Figure C.17. Detail of Leachate Collection Sump 73

TABLES

Table C.1. Liquid Effluent Retention Facility Containment System 47
Table C.2. Liquid Effluent Retention Facility Piping and Instrumentation 47
Table C.3. Building 2025-E and Load-In Station Secondary Containment Systems 48
Table C.4. Major Process Units and Tanks at Building 2025-E and Load-In Station 48
Table C.5. 200 Area Effluent Treatment Facility Tank Systems Information 49
Table C.6. 200 Area Effluent Treatment Facility Additional Tank System Information 51
Table C.7. Ancillary Equipment and Material Data 53
Table C.8. Concrete and Masonry Coatings 54
Table C.9. Geomembrane Material Specifications 55
Table C.10. Drainage Gravel Specifications 56

C. PROCESS INFORMATION

This addendum provides a detailed discussion of the Liquid Effluent Retention Facility (LERF) and 200 Area Effluent Treatment Facility (200 Area ETF) processes and equipment. The LERF and 200 Area ETF comprise an aqueous waste treatment system located in the 200 East Area that provides storage and treatment for a variety of aqueous mixed waste. This aqueous waste includes process condensate from the 242-A Evaporator and other aqueous waste generated from onsite remediation and waste management activities.

The LERF consists of three lined surface impoundments, or basins. Aqueous waste from LERF is pumped to the 200 Area ETF for treatment in a series of process units, or systems, that remove or destroy essentially all of the dangerous waste constituents. The treated effluent is discharged to a State-Approved Land Disposal Site (SALDS) north of the 200 West Area, under the authority of a Washington State Waste Discharge Permit ST0004500 and the Final Delisting 200 Area ETF (40 CFR 261, Appendix IX, Table 2).

Both LERF and 200 Area ETF waste processing operations are controlled in a central Control Room located in the 2025-E building. The 200 Area ETF Control Room is staffed continuously during 200 Area ETF processing operations. Processing operations are defined as when liquid transfers of any sort are occurring to/from/within the LERF and 200 Area ETF or when wastes are being treated at 200 Area ETF[1]. Examples of processing operations include, but are not limited to, when liquid waste are transferred to/from the LERF basins [see section C.1], during active liquid waste treatment/processing at the 200 Area ETF (e.g., liquid waste treatment in tanks and liquid waste movement between primary and secondary treatment train processes and/or other 200 Area ETF tanks [see Section C.2], and liquid waste receipts at the Load-In Station [see Section C.2.1]). Section C.2.5.1 describes the centralized computer system (i.e., monitor and control system or MCS) that is located at the 200 Area ETF Control Room and other locations at the 200 Area ETF. The MCS monitors the performance of the 200 Area ETF operations and records alarms from various equipment as described in this Addendum C and Addendum I, Inspection Requirements. At times when processing operations are not occurring, the 200 Area ETF Control Room is not manned continuously, and alarms are monitored daily as specified in Addendum I.

C.1 Liquid Effluent Retention Facility Process Description

Each of the three LERF basins has an operating capacity of 29.5-million liters (7.8 million gallons). The LERF receives aqueous waste through several inlets including the following:

- A pipeline that connects LERF with the 242-A Evaporator.
- A pipeline from the 200 West Area.
- A pipeline that connects LERF to the Load-In Station (2025-ED).
- A series of sample ports located at each basin.

Figure C.1 presents a general layout of LERF and associated pipelines. Aqueous waste from LERF is pumped to the 200 Area ETF through one of two double-walled fiberglass transfer pipelines. Effluent from the 200 Area ETF also can be transferred back to the LERF through one of these transfer pipelines. These pipelines are equipped with leak detection located in the annulus between the inner and outer pipes. In the event that these leak detectors are not in service, the pipelines are visually inspected during transfers for leakage by opening the secondary containment drain lines located at the 200 Area ETF end of the transfer pipelines.

Each basin is equipped with six available sample risers constructed of 15.2-centimeter (6-inch) perforated pipe. A seventh sample riser in each basin is dedicated to influent aqueous waste receipt piping (except for aqueous waste received from the 242-A Evaporator), and an eighth riser in each basin contains liquid level instrumentation.

[1] *Liquid transfers does not include standard facility operations of liquid recirculation (e.g. for pump seals), sanitary water and cooling water, and outdoor rainwater management activities.*

Each riser extends along the sides of each basin from the top to the bottom of the basin and allows samples to be collected from any depth. Personnel access to these sample ports is from the perimeter area of the basins. A catch basin is provided at the northwest corner of each LERF basin for aboveground piping and manifolds for transfer pumps. Aqueous waste from the 242-A Evaporator is transferred through piping which ties into piping at the catch basins. Under routine operations, a submersible pump is used to transfer aqueous waste from a LERF basin to the 200 Area ETF for processing or for basin-to-basin transfers. This pump is connected to a fixed manifold on one of four available risers.

Each basin consists of a multilayer liner system supported by a concrete anchor wall around the basin perimeter and a soil-bentonite clay underlayment. The multilayer liner system consists of a primary liner in contact with the aqueous waste, a layer of bentonite carpet, a geonet, a geotextile, a gravel layer, and a secondary liner that rests on the bentonite underlayment. Any aqueous waste leakage through the primary liner flows through the geonet and gravel to a leachate collection system. The leachate flows to a sump at the northwest corner of each basin, where the leachate is pumped up the side slope and back into the basin above the primary liner. Each liner is constructed of high-density polyethylene. A floating cover made of very low-density polyethylene is stretched over each basin above the primary liner. These covers serve to keep unwanted material from entering the basins, and to minimize evaporation of the liquid contents.

C.2 200 Area Effluent Treatment Facility Process Description

The 200 Area ETF is designed as a flexible treatment system that provides treatment for contaminants anticipated in process condensate and other onsite aqueous waste. The design influent flow rate into the 200 Area ETF is approximately 570 liters (150 gallons) per minute, with planned outages for activities such as maintenance on the 200 Area ETF systems. Maintenance outages typically are scheduled between treating a batch of aqueous waste, referred to as treatment campaigns. The effluent flow (or volume) is equivalent to the influent flow (or volume).

The 200 Area ETF generally receives aqueous waste directly from the LERF. However, aqueous waste also can be transferred from tanker trucks at the Load-In Station (2025-ED) and from containers (e.g., carboys, drums) directly to building 2025-E. Aqueous waste is treated and stored in 2025-E Process Areas in a series of tank systems, referred to as process units. Within building 2025-E, waste also is managed in containers through treatment and/or storage. Figures C.2 and C.3 provide the relative locations of the process and container storage areas within the 200 Area ETF.

The process units are grouped in either the primary or the secondary treatment train. The primary treatment train provides for the removal or destruction of contaminants. Typically, the secondary treatment train processes the waste by-products from the primary treatment train by reducing the volume of waste. In the secondary treatment train, contaminants are concentrated and dried to a powder. The liquid fraction is routed to the primary treatment train. Figure C.2 provides an overview of the layout of the 2025-E building and the Load-In Station). Figure C.3 presents the Building 2025-E Ground Floor Plan, which includes the relative locations of the individual process units and associated tanks, and the location of the Load-In Station.

The dry powder waste and maintenance and operations waste are containerized and stored or treated in the container storage areas or in collection or treatment areas within the 2025-E Process Area. Secondary containment is discussed in Section C.3.4, for containers and in Section C.4.3 for tank systems (including ancillary equipment) housed within building 2025-E. The trenches and floor of building 2025-E comprise the secondary containment system. The floor includes approximately a 15.2-centimeter (6-inch) rise (berm) along the containing walls of the 2025-E Process Area and 2025-E Container Storage Area. Any spilled or leaked material from within the 2025-E Process Area or 2025-E Container Storage Area is collected into trenches that feed into either Sump Tank 1 or Sump Tank 2. From these sump tanks, the spilled or leaked material (i.e., waste) is fed to either the surge tank and processed in the primary treatment train or the secondary waste receiving tanks and processed in the secondary treatment train. All tank systems outside of building 2025-E are provided with a secondary containment system.

In the following sections, several figures are provided that present general illustrations of the treatment units and the relation to the process.

C.2.1 Load-In Station

The 200 Area ETF receives aqueous waste from LERF or the Load-In Station (2025-ED). The Load-In Station, located due east of the surge tank and outside of the perimeter fence (Figure C.2), was designed and constructed to provide the capability to unload, store, and transfer aqueous waste to the LERF or 200 Area ETF from tanker trucks and other containers (such as drums). The Load-In Station consists of two truck bays equipped with Load-In Station tanks, transfer pumps, filtration system, level instrumentation for tanker trucks, leak detection capabilities for the containment basin and transfer line, and an underground transfer line that connects to lines in the surge tank berm, allowing transfers to either the surge tank or LERF. The Load-In Station is covered with a steel building for weather protection. Tanker trucks and other containers are used to unload aqueous waste at the Load-In Station. To perform unloading, the tanker truck is positioned on a truck pad, a 'load-in' transfer line is connected to the truck, and the tanker contents are pumped into one of the Load-In Station tanks, the surge tank, or directly to the LERF. For container unloading, the container is placed on the truck pad and the container contents are pumped into one of the Load-In Station tanks, the surge tank, or directly to the LERF.

During unloading operations, solids may be removed from the waste by pumping the contents of the tanker truck or container through a filtration system. If solids removal is not needed, the filtration system is not used and the solution is transferred directly to the Load-In Station tanks, surge tank, or to LERF.

Any leaks at the Load-In Station drain to the sump. A leak detector in the sump alarms locally and in the 200 Area ETF Control Room. Alarms are monitored continuously in the 200 Area ETF Control Room during Load-In Station transfers and at least daily at times when waste is not being received at the Load-In Station. Alternatively, leaks can be visually detected.

C.2.2 200 Area Effluent Treatment Facility Operating Configuration

Because the operating configuration of the 200 Area ETF can be adjusted or modified, most aqueous waste streams can be effectively treated to below permitting limits. The operating configuration of the 200 Area ETF depends on the unique chemistry of an aqueous waste stream(s). Before an aqueous waste stream is accepted for treatment, the waste is characterized and evaluated. Information from the characterization is used to adjust the treatment process or change the configuration of the 200 Area ETF process units, as necessary, to optimize the treatment process for a particular aqueous waste stream.

Typically, an aqueous waste is processed first in the primary treatment train, where the 200 Area ETF is configured to process an aqueous waste through the UV/OX unit first, followed by the RO unit. However, under an alternate configuration, an aqueous waste could be processed in the RO unit first. For example, high concentrations of nitrates in an aqueous waste might interfere with the performance of the UV/OX. In this case, the 200 Area ETF could be configured to process the waste in the RO unit before the UV/OX unit.

The flexibility of the 200 Area ETF also allows some aqueous waste to be processed in the secondary treatment train first. For example, for small volume aqueous waste with high concentrations of some anions and metals, the approach could be to first process the waste stream in the secondary treatment train. This approach would prevent premature fouling or scaling of the RO unit. The liquid portion (i.e., untreated overheads from the Evaporator Vapor Body Vessel (60IEV-1) and thin film dryer) would be sent to the primary treatment train.

Figures C.4 and C.5 provide example process flow diagrams for two different operating configurations.

C.2.3 Primary Treatment Train

The primary treatment train consists of the following processes:

- Influent Receipt/Surge tank - inlet, surge capacity.

- Filtration - for suspended solids removal.
- UV/OX - organic destruction.
- pH adjustment - waste neutralization.
- Hydrogen peroxide decomposition - removal of excess hydrogen peroxide.
- Degasification - removal of carbon dioxide.
- RO - removal of dissolved solids.
- IX - removal of dissolved solids.
- Verification - holding tanks during verification.

Influent Receipt/Surge Tank. Depending on the configuration of the 200 Area ETF, the surge tank is one inlet used to feed an aqueous waste into the 200 Area ETF for treatment. In Configuration 1 (Figure C.4), the surge tank is the first component downstream of the LERF. The surge tank provides a storage/surge volume for chemical pretreatment and controls feed flow rates from the LERF to the 200 Area ETF. However, in Configuration 2 (Figure C.5), aqueous waste from LERF is fed directly into the treatment units. In this configuration, the surge tank receives aqueous waste, which has been processed in the RO units, and provides the feed stream to the remaining downstream process units. In yet another configuration, some small volume aqueous waste could be received into the secondary treatment train first for processing. In this case, the aqueous waste would be received directly into the secondary waste receiving tanks. Finally, the surge tank also receives waste extracted from various systems within the primary and secondary treatment train while in operation.

The surge tank is located outside building 2025-E on the south side. In the surge tank (Figure C.6), the pH of an aqueous waste is adjusted using the metered addition of sulfuric acid and sodium hydroxide, as necessary, to prepare the waste for treatment in downstream processes. In addition, hydrogen peroxide or biocides could be added to control biological growth in the surge tank. A pump recirculates the contents in the surge tank, mixing the chemical reagents with the waste to a uniform pH.

Filtration. Two primary filter systems remove suspended particles in an aqueous waste: a rough filter removes the larger particulates, while a fine filter removes the smaller particulates. The location of these filters depends on the configuration of the primary treatment train. However, the filters normally are located upstream of the RO units.

The solids accumulating on these filter elements are backwashed to the secondary waste receiving tanks with pulses of compressed air and water, forcing water back through the filter. The backwash operation is initiated either automatically by a rise in differential pressure across the filter or manually by an operator. The filters are cleaned chemically when the backwashing process does not facilitate acceptable filter performance.

Auxiliary fine and rough filters (e.g., disposable filters) have been installed to provide additional filtration capabilities. Depending on the configuration of the 200 Area ETF, the auxiliary filters are operated either in series with the primary filters to provide additional filtration or in parallel, instead of the primary fine and rough filters, to allow cleaning/maintenance of the primary fine and rough filters while the primary treatment train is in operation.

Ultraviolet Light/Oxidation (UV/OX). Organic compounds contained in an aqueous waste stream are destroyed in the UV/OX system (Figure C.7). Hydrogen peroxide is mixed with the waste. The UV/OX system uses the photochemical reaction of UV light on hydrogen peroxide to form hydroxyl radicals and other reactive species that oxidize the organic compounds. The final products of the complete reaction are carbon dioxide, water, and inorganic ions.

Organic destruction is accomplished in two UV/OX units operating in parallel. During the UV/OX process, the aqueous waste passes through reaction chambers where hydrogen peroxide is added. While in the UV/OX system, the temperature of an aqueous waste is monitored. Heat exchangers are used to

reduce the temperature of the waste should the temperature of the waste approach the upper limits for the UV/OX or RO systems.

pH Adjustment. The pH of a waste stream is monitored and controlled at different points throughout the treatment process. Within the primary treatment train, the pH of a waste can be adjusted with sulfuric acid or sodium hydroxide to optimize operation of downstream treatment processes or adjusted before final discharge. For example, the pH of an aqueous waste would be adjusted in the pH adjustment tank after the UV/OX process and before the RO process. In this example, pH is adjusted to cause certain chemical species such as ammonia to form ammonium sulfate, thereby increasing the rejection rate of the RO.

Hydrogen Peroxide Decomposition. Typically, hydrogen peroxide added into the UV/OX system is not consumed completely by the system. Because hydrogen peroxide is a strong oxidizer, the residual hydrogen peroxide from the UV/OX system is removed to protect the downstream equipment. The hydrogen peroxide decomposer uses a catalyst to break down the hydrogen peroxide that is not consumed completely in the process of organic destruction. The aqueous waste is sent through a column that breaks down the hydrogen peroxide into water and oxygen. The gas generated by the decomposition of the hydrogen peroxide is vented to the vessel off gas system.

Degasification. The degasification column is used to purge dissolved carbon dioxide from the aqueous waste to reduce the carbonate loading to downstream dissolved solids removal processes within the 200 Area ETF primary treatment train. The purged carbon dioxide is vented to the vessel off gas system.

Reverse Osmosis (RO). The RO system (Figure C.8) uses pressure to force clean water molecules through semi-permeable membranes while keeping the larger molecule contaminants, such as dissolved solids, and large molecular weight organic materials, in the membrane. The RO process uses a staged configuration to maximize water recovery. The process produces two separate streams, including a clean 'permeate' and a concentrate (or retentate), which are concentrated as much as possible to minimize the amount of secondary waste produced.

The RO process is divided into first and second stages. Aqueous waste is fed to the first RO stage from the RO feed tank. The secondary waste receiving tanks of the secondary treatment train receive the retentate removed from the first RO stage, while the second RO stage receives the permeate (i.e., 'treated' aqueous waste from the first RO stage). In the second RO stage, the retentate is sent to the first stage RO feed tank while the permeate is sent to the IX system or to the surge tank, depending on the configuration of the 200 Area ETF.

Two support systems facilitate this process. An anti-scale system injects scale inhibitors as needed into the feed waste to prevent scale from forming on the membrane surface. A clean-in-place system using cleaning agents, such as descalants and surfactants, cleans the membrane pores of surface and subsurface deposits that have fouled the membranes.

Ion Exchange. Because the RO process removes most of the dissolved solids in an aqueous waste, the IX process (Figure C.9) acts as a polishing unit. The IX system consists of three columns containing beds of cation and/or anion resins. This system is designed to allow for regeneration of resins and maintenance of one column while the other two are in operation. Though the two columns generally are operated in series, the two columns also can be operated in parallel or individually.

Typically, the two columns in operation are arranged in a primary/secondary (lead/lag) configuration, and the third (regenerated) column is maintained in standby.

When dissolved solids breakthrough the first IX column and are detected by a conductivity sensor, this column is removed from service for regeneration, and the second column replaces the first column and the third column is placed into service. The column normally is regenerated using sulfuric acid and sodium hydroxide. The resulting regeneration waste is collected in the secondary waste receiving tanks.

Spent resins are transferred into a disposal container should regeneration of the IX resins become inefficient Free water is removed from the container and returned to the surge tank. Dewatered resins are transferred to a final storage/disposal point.

Verification. The three verification tanks (Figure C.10) are used to hold the treated effluent while a determination is made that the effluent meets discharge limits. The effluent can be returned to the primary treatment train for additional treatment, or to the LERF, should a treated effluent not meet Waste Discharge Permit ST0004500 requirements.

The three verification tanks alternate between three operating modes: receiving treated effluent, holding treated effluent during laboratory analysis and verification, or discharging verified effluent. Treated effluent may also be returned to the 200 Area ETF to provide 'clean' service water for operational and maintenance functions, e.g., for boiler water and for backwashing the filters. This recycling keeps the quantity of fresh water used to a minimum.

C.2.4 Secondary Treatment Train

The secondary treatment system typically receives and processes the following by-products generated from the primary treatment train: concentrate from the first RO stage, filter backwash, regeneration waste from the ion exchange system, and spillage or overflow received into the process sumps. Depending on the operating configuration, however, some aqueous waste could be processed in the secondary treatment train before the primary treatment train (refer to Figures C.4 and C.5 for example operating configurations).

The secondary treatment train provides the following processes:

- Secondary waste receiving - tank receiving and chemical addition.
- Evaporation - concentrates secondary waste streams.
- Concentrate staging - concentrate receipt, pH adjustment, and chemical addition.
- Thin film drying - dewatering of secondary waste streams.
- Container handling - packaging of dewatered secondary waste.

Secondary Waste Receiving. Waste to be processed in the secondary treatment train is received into two secondary waste receiving tanks, where the pH can be adjusted with sulfuric acid or sodium hydroxide for optimum evaporator performance. Chemicals, such as reducing agents, may be added to waste in the secondary waste receiving tanks to reduce the toxicity or mobility of constituents in the powder.

Evaporation. The Evaporator Vapor Body Vessel (60IEV-1) is fed alternately by the two secondary waste receiving tanks. One tank serves as a waste receiver while the other tank is operated as the feed tank. The Evaporator Vapor Body Vessel (also referred to as the vapor body) is the principal component of the evaporation process (Figure C.11).

Feed from the secondary waste receiving tanks is pumped through a heater to the recirculation loop of the 200 Area ETF Evaporator. In this loop, concentrated waste is recirculated from the Evaporator Vapor Body Vessel, to a heater, and back into the evaporator where vaporization occurs. As water leaves the evaporator system in the vapor phase, the concentration of the waste in the evaporator increases. When the concentration of the waste reaches the appropriate density, a portion of the concentrate is pumped to one of the concentrate tanks.

The vapor that is released from the Evaporator Vapor Body Vessel is routed to the entrainment separator, where water droplets and/or particulates are separated from the vapor. The 'cleaned' vapor is routed to the vapor compressor and converted to steam.

The steam from the vapor compressor is sent to the heater (reboiler) and used to heat the recirculating concentrate in the Evaporator Vapor Body Vessel. From the heater, the steam is condensed and fed to the distillate flash tank, where the saturated condensate received from the heater drops to atmospheric pressure and cools to the normal boiling point through partial flashing (rapid vaporization caused by a

pressure reduction). The resulting distillate is routed to the surge tank. The non-condensable vapors, such as air, are vented through a vent gas cooler to the vessel off gas system.

Concentrate Staging. The concentrate tanks make up the head end of the thin film drying process. From the Evaporator Vapor Body Vessel, concentrate is pumped into two concentrate tanks, and pH adjusted chemicals, such as reducing agents, may be added to reduce the toxicity or mobility of constituents when converted to powder. Waste is transferred from the concentrate tanks to the thin film dryer for conversion to a powder. The concentrate tanks function alternately between concentrate receiver and feed tank for the thin film dryer. However, one tank may serve as both concentrate receiver and feed tank.

Because low solubility solids (i.e., calcium and magnesium sulfate) tend to settle in the concentrate tanks, these solids must be removed to prevent fouling and to protect the thin film dryer, and to maintain concentrate tank capacity.

Thin Film Drying. From the concentrate tanks, feed is pumped to the thin film dryer (Figure C.12) that is heated by steam. As the concentrated waste flows down the length of the dryer, the waste is dried. The dried film, or powder, is scraped off the dryer cylinder by blades attached to a rotating shaft. The powder is funneled through a cone-shaped powder hopper at the bottom of the dryer and into the Container Handling System.

Overhead vapor released by the drying of the concentrate is condensed in the distillate condenser. Excess heat is removed from the distillate by a water-cooled heat exchanger. Part of the distillate is circulated back to the condenser spray nozzles. The remaining distillate is pumped to the surge tank. Any noncondensable vapors and particulates from the spray condenser are exhausted to the vessel off gas system.

Container Handling. Before an empty container is moved into the Container Handling System (Figure C.13), the lid is removed and the container is placed on a conveyor. The containers are moved into the container filling area after passing through an air lock. The empty container is located under the thin film dryer, and raised into position. The container is sealed to the thin film dryer and a rotary valve begins the transfer of powder to the empty container. Air displaced from the container is vented to the distillate condenser attached to the Evaporator Vapor Body Vessel that exhausts to the vessel off gas system.

The container is filled to a predetermined level, then lowered from the thin film dryer and moved along a conveyor. The filled container is manually recapped, and moved along the conveyor to the airlock. At the airlock, the container is moved onto the conveyor by remote control. The airlock is opened, the smear sample (surface wipe) is taken, and the contamination level counted. A 'C' ring is installed to secure the container lid. If the container has contaminated material on the outside, the container is wiped down and retested. Filled containers that pass the smear test are labeled, placed on pallets, and moved by forklift to the filled container storage area. Section C.3 provides a more detailed discussion of container handling.

C.2.5 Other 200 Area Effluent Treatment Facility Systems

The 200 Area ETF is provided with support systems that facilitate treatment in the primary and secondary treatment trains and that provide for worker safety and environmental protection. An overview of the following systems is provided:

- Monitor and control system
- Vessel off gas system
- Sump collection system
- Chemical injection feed system
- Verification tank recycle system
- Utilities

C.2.5.1 Monitor and Control System

The operation of the 200 Area ETF is monitored and controlled by a centralized computer system (i.e., monitor and control system or MCS). The MCS continuously monitors data from various field indicators, such as pH, flow, tank level, temperature, pressure, conductivity, alarm status, and valve switch positions. Data gathered by the MCS enable operations and engineering personnel to document and adjust the operation of the 200 Area ETF.

Emergency communications equipment and warning systems (e.g. fire alarms and evacuation alarms) are included in Addendum J, Contingency Plan. These emergency response notification alarms are monitored continuously at central Hanford Facility locations (e.g. Hanford Fire Station) and do not rely on staff being present in the 200 Area ETF Control Room for notification and response.

C.2.5.2 Vessel Off Gas System

Ventilation for various tanks and vessels is provided through the vessel off gas system. The system includes a moisture separator, duct heater, pre-filter, high-efficiency particulate air filters, carbon absorber (when required to reduce organic emissions), exhaust fans, and ductwork. Gasses ventilated from the tanks and vessels enter the exhaust system through the connected ductwork. The vessel off gas system draws vapors and gasses off the following tanks and treatment systems:

- Surge tank (60A-TK-1)
- Vent gas cooler (off the Evaporator Vapor Body Vessel (60I-EV-1)/distillate flash tank) (60I-TK-2)
- pH adjustment tank (60C-TK-1)
- Concentrate tanks (2025E-60J-TK-1A/ 2025E-60J-TK-1B)
- Degasification system
- First and second RO stages
- Dry powder hopper
- Effluent pH adjustment tank (60C-TK-2)
- Drum capping station
- Secondary waste receiving tanks (60I-TK-1A /60I-TK-1B)
- Distillate condenser (off the thin film dryer)
- Sump tanks 1 and 2

The vessel off gas system maintains a negative pressure with respect to the atmosphere, which produces a slight vacuum within tanks, vessels, and ancillary equipment for the containment of gas vapor. This system also provides for the collection, monitoring, and treatment of confined airborne in-vessel contaminants to preclude over-pressurization. The high-efficiency particulate air filters remove particulates and condensate from the air stream before these are discharged to the heating, ventilation, and air conditioning system.

C.2.5.3 Sump Collection System

Sump Tanks 1 and 2 compose the sump collection system that provides containment of waste streams and liquid overflow associated with the 200 Area ETF processes. The 2025-E Process Area floor is sloped to two separate trenches that each drain to a sump tank located under the floor of building 2025-E (Figure C.14). One trench runs the length of the primary treatment train and drains to Sump Tank 2, located underneath the verification tank pump floor. The second trench collects spillage primarily from the secondary treatment train and flows to Sump Tank 1, located near the Evaporator Vapor Body Vessel. Sump Tanks 1 and 2 are located below floor level (Figure C.14). An eductor in these tanks prevents sludge from accumulating.

C.2.5.4 Chemical Injection Feed System

At several points within the primary and secondary treatment trains, sulfuric acid and sodium hydroxide (or dilute solutions of these reagents) are metered into specific process units to adjust the pH. For example, a dilute solution of 4 percent sulfuric acid and 4 percent sodium hydroxide could be added to the secondary waste receiving tanks to optimize the evaporation process.

C.2.5.5 Verification Tank Recycle System

To reduce the amount of water added to the process, verification tank water (i.e., verified effluent) is recycled throughout the 200 Area ETF process. Tanks and ancillary equipment that use verification tank water include:

- 4 percent H_2SO4 solution tank and ancillary equipment.
- 4 percent NaOH solution tank and ancillary equipment.
- Clean-in-place tank and ancillary equipment.
- IX columns (during resin regeneration).
- Evaporator Vapor Body Vessel boiler and ancillary equipment.
- Thin film dryer boiler and ancillary equipment.
- Seal water system.

In addition, verification tank water is used extensively during maintenance activities. For example, it may be used to flush piping systems or to confirm the integrity of piping, a process tank, or tank truck.

C.2.5.6 Utilities

The 200 Area ETF maintains the following utility supply systems required for the operation:

- Cooling water system - removes heat from process water via heat exchangers and a cooling tower.
- Compressed air system - provides air to process equipment and instrumentation.
- Seal water system - provides cool, clean, pressurized water to process equipment for pump seal cooling and pump seal lubrication, and provides protection against failure and fluid leakage.
- Demineralized water system - removes solids from raw water system to produce high quality, low ion-content, water for steam boilers, and for the hydrogen peroxide feed system.
- Heating, ventilation, and air conditioning system - provides continuous heating, cooling, and air humidity control throughout building 2025-E.

The following utilities support 200 Area ETF activities:

- Electrical power
- Sanitary water
- Communication systems
- Raw water

C.3 Containers

This section provides specific information on container storage and treatment operations at the 200 Area ETF, including descriptions of containers, labeling, and secondary containment structures.

Per Addendum A, Part A Form the maximum volume of dangerous and/or mixed waste that can be stored in containers is 147,630 liters (39,000 gallons). A list of dangerous and/or mixed waste managed in containers at the 200 Area ETF is also provided in Addendum A, Part A Form. The types of dangerous and/or mixed waste managed in containers in the 200 Area ETF could include:

- Secondary waste powder generated from the treatment process.
- Aqueous waste received from other Hanford site sources awaiting treatment.
- Miscellaneous waste generated by operations and maintenance activities.

The secondary treatment train processes the waste by-products from the primary treatment train, which are concentrated and dried into a powder. Containers are filled with dry powder waste from the thin film dryer via a remotely controlled system. Containers of aqueous waste received from other Hanford site sources are stored at 200 Area ETF until their contents can be transferred to the process for treatment. The waste is usually transferred to the secondary waste receiving or concentration tanks. Containers at the Load-In Station are transferred into one of the Load-In Station tanks, surge tank, or directly to the LERF. Miscellaneous waste generated from maintenance and operations activities are stored at the 2025-E building. The waste could include process waste, such as used filter elements; spent RO membranes; damaged equipment, and decontamination and maintenance waste, such as contaminated rags, gloves, and other personal protective equipment. Containers of miscellaneous waste that have free liquids generally are packaged with absorbents.

Several container collection areas could be located within the 200 Area ETF process and container handling areas. These collection areas are used only to accumulate waste in containers. Once a container is filled, the container is transferred to a container storage area (Figure C.2 and Figure C.3), to another TSD unit, or to a less-than-90-day storage pad. Containers stored in the additional storage area (Figure C.3) are elevated or otherwise protected from contact with accumulated liquids. The 2025-E Container Storage Area is a 22.9 x 8.5-meter (75 x 27.9-foot) room located adjacent to the 2025-E Process Area. Containers are clearly labeled, and access to these containers is limited by barriers and by administrative controls. The 2025-E floor provides secondary containment, and the roof and walls protect all containers from exposure to the elements.

Waste also could be placed in containers for treatment as indicated in Addendum A. For example, sludge that accumulates in the bottoms of the process tanks is removed periodically and placed into containers. In this example, the waste is solidified by decanting the supernatant from the container and the remainder of the waste is allowed to evaporate, or absorbents are added, as necessary, to address remaining liquids. Following treatment, this waste either is stored at the 200 Area ETF or transferred to another treatment, storage, and disposal (TSD) unit.

C.3.1 Description of Containers

The containers used to collect and store dry powder waste are 208-liter (55-gallon) steel containers. Most of the aqueous waste received at 200 Area ETF, and maintenance and operation waste generated, are stored in 208-liter (55-gallon) steel or plastic containers; however, in a few cases, the size of the container could vary to accommodate the size of a particular waste. For example, some process waste, such as spent filters, might not fit into a 208-liter (55-gallon) container. In the case of spent resin from the IX columns, the resin is dewatered, and could be packaged in a special disposal container. In these few cases, specially sized containers could be required. In all cases, however, only approved containers are used and are compatible with the associated waste. Typically, 208-liter (55-gallon) containers are used for treatment.

Current operating practices indicate the use of new 208-liter (55-gallon) containers that have either a polyethylene liner or a protective coating. Any reused or reconditioned container is inspected for container integrity before use. Overpack containers are available for use with damaged containers. Overpack containers typically are unlined steel or polyethylene.

C.3.2 Container Management Practices

Before use, each container is checked for signs of damage such as dents, distortion, corrosion, or scratched coating. For dry powder loading, empty containers on pallets are raised by a forklift and manually placed on the conveyor that transports the containers to the automatic filling station in the container handling room (Figure C.13). The container lids are removed and replaced manually following

the filling sequence. After filling, containers exit the container handling room via the filled drum conveyor. Locking rings are installed, the container label is affixed, and the container is moved by dolly or forklift to the 2025-E Container Storage Area.

Before receipt at 200 Area ETF, each container from other Hanford site sources is inspected for leaks, signs of damage, and a loose lid. The identification number on each container is checked to ensure the proper container is received. The containers are typically placed on pallets and moved by dolly or forklift to the container storage area. These containers are later moved to the 2025-E Process Area and the contents transferred to the process for treatment.

Containers used for storing maintenance and operations secondary waste are labeled before being placed in the container storage area or in a collection area. Lids are secured on these containers when not being filled. When the containers in a collection area are full, the containers are transferred by dolly or forklift to the container storage area or to an appropriate TSD unit. Containers used for treating waste also are labeled. The lids on these containers are removed as required to allow for treatment. During treatment, access to these containers is controlled through physical barriers and/or administrative controls.

The filled containers in the container storage areas are inventoried, checked for proper labeling, and placed on pallets or in a separate containment device as necessary. Each pallet is moved by forklift. Within the container storage areas, palletized containers are stacked no more than three pallets high and in rows no more than two containers wide. Unobstructed aisles with a minimum of 76-centimeter (30-inch) aisle space separate rows.

C.3.3 Container Labeling

Labels are affixed on containers used to store dry powder when the containers leave the container handling room. Labels are affixed on other waste containers before use. Every container is labeled with the date that the container was filled. Appropriate major risk labels, such as "corrosive", "toxic", or "F-listed", also are added. Each container also has a label with an identification number for tracking purposes.

C.3.4 Containment Requirements for Managing Containers

Secondary containment is provided in the container management areas within building 2025-E. The secondary containment provided for the tank systems also serves the container management areas. This section describes the design and operation of the secondary containment structure for these areas. Section C.2.1, and Section C.4.3.1.2 discuss secondary containment at the Load-In Station.

C.3.4.1 Container Secondary Containment System Design

For the container management areas, in building 2025-E, secondary containment is provided by the trenches, reinforced concrete floor, and a 15.2-centimeter (6-inch) rise (berm) along the walls of the 2025-E Process Area and 2025-E Container Storage Area. The engineering assessment required for tanks (*Final RCRA Information Needs Report*, Mausshardt 1995) also describes the design and construction of the secondary containment provided for building 2025-E container management areas. All systems were designed to national codes and standards (e.g., American Society for Testing Materials, American Concrete Institute standards). The floor is composed of cast-in-place, pre-formed concrete slabs, and has a minimum thickness of 15.2 centimeters (6-inch). All slab joints and floor and wall joints have water stops installed at the mid-depth of the slab. In addition, filler was applied to each joint. The floor and berms are coated with a chemically resistant; high-solids epoxy coating system consisting of primer and top coating. This coating material is compatible with the waste managed in containers and is an integral part of the secondary containment system for containers.

The floor is sloped to drain any solution in the 2025-E Container Storage Area to floor drains along the west wall. Each floor drain consists of a grating over a 20.3-centimeter (8-inch) diameter drain port connected to a 10.2-centimeter (4-inch) polyvinyl chloride transfer pipe. The pipe passes under this wall and connects to a trench running along the east wall of the adjacent 2025-E Process Area. This trench drains solution to Sump Tank 1.

The 2025-E Container Storage Area is separated from the 2025-E Process Area by a common wall and a door for access to the two areas (Figure C.2). These two areas also share a common floor and trenches that, with the 15.2-centimeter (6-inch) rise of the containing walls, form the secondary containment system for the 2025-E Process Area and the 2025-E Container Storage Area.

C.3.4.2 Structural Integrity of Base

Engineering calculations were performed showing the floor of the 2025-E Container Storage Area is capable of supporting the weight of containers. These calculations were reviewed and certified by a professional engineer (*Final RCRA Information Needs Report*, Mausshardt 1995). The concrete was inspected for damage during construction. Cracks were identified and repaired to the satisfaction of the professional engineer. Documentation of these certifications is included in the engineering assessment (*Final RCRA Information Needs Report*, Mausshardt 1995).

C.3.4.3 Containment System Capacity

The 2025-E Container Storage Area is primarily used to store dry powder, aqueous waste awaiting treatment, and maintenance and operation waste. Where appropriate, absorbents are added to fix any trace liquids present. Large volumes of liquid are not stored in the 2025-E Container Storage Area. However, liquids might be present in those containers that are in the treatment process.

Because they are interconnected by floor drains, both the 2025-E Process Area and the 2025-E Container Storage Area are considered in the containment system capacity. The volume available for secondary containment in the 2025-E Process Area is approximately 68,000 liters (18,000 gallons), as discussed in the engineering assessment (*Final RCRA Information Needs Report*, Mausshardt 1995). Using the dimensions of the 2025-E Container Storage Area (23.6 by 8.5 by 0.15 meters [77 by 28 by 0.5 feet]), and assuming that 50 percent of the floor area is occupied by containers, the volume of the 2025-E Container Storage Area is 15,300 liters (4,040 gallons). The 2025-E Truck Bay loading area (see Figures C.2 and C.3) also provide 10,500 liters (2,700 gallons) of containment as it is connected to the 2025-E Process Area and 2025-E Container Storage Area. The combined volume of the 2025-E Truck Bay loading area, 2025-E Process Area, (including, the Container Handling Room) available for secondary containment, is 93,800 liters (24,810 gallons). This volume is greater than 10 percent of the maximum total volume of containers allowed for storage in the building 2025-E, as discussed previously.

C.3.4.4 Control of Run-on

The container management areas are located within building 2025-E, which serves to prevent run-on of precipitation.

C.3.4.5 Removal of Liquids from Containment Systems

The 2025-E Container Storage Area is equipped with drains that route solution to a trench in the 2025-E Process Area, which drains to Sump Tank 1. The sump tanks are equipped with alarms that notify operating personnel that a leak is occurring. The sump tanks also are equipped with pumps to transfer waste to the surge tank or the secondary treatment train. Additional information on removal of liquids is provided in Section C.2, and Section C.4.3.1.2.

C.3.4.6 Prevention of Ignitable, Reactive, and Incompatible Wastes in Containers

Individual waste types (i.e., ignitable, corrosive, and reactive) are stored in separate containers. A waste that could be incompatible with other wastes is separated and protected from the incompatible waste. Incompatible wastes are evaluated using the methodology documented in 40 CFR 264, Appendix V. For example, acidic and caustic wastes are stored in separate containers. Free liquids are absorbed in miscellaneous waste containers that hold incompatible waste. Additionally, 200 Area ETF-specific packaging requirements for these types of waste provide extra containment with each individual container. For example, each item of acidic waste is individually bagged and sealed within a lined container.

C.4 Tank Systems

This section provides specific information on tank systems and process units. This section also includes a discussion on the types of waste to be managed in the tanks, tank design information, integrity assessments, and additional information on the 200 Area ETF tanks that treat and store dangerous and/or mixed waste. The 200 Area ETF dangerous waste tanks are identified in Section C.4.1.1. Table C.5, *200 Area ETF Tank Systems Information*, Table C.6, *200 Area ETF Additional Tank System Information*, and Table C.7, *Ancillary Equipment and Material Data* provides individual tank volumes, dimensions, and construction materials. The relative locations of the tanks and process units are presented in Figures C.2 and C.3.

C.4.1 Design Requirements

The following sections provide an overview of the design specifications for the tanks within the 200 Area ETF. A separate discussion on the design of the process units also is provided. In accordance with the new tank system requirements of WAC 173-303-640(3), the following tank components and specifications were assessed:

- Dimensions, capacities, wall thicknesses, and pipe connections.
- Materials of construction and linings and compatibility of materials with the waste being processed.
- Materials of construction of foundations and structural supports.
- Review of design codes and standards used in construction.
- Review of structural design calculations, including seismic design basis.
- Waste characteristics and the effects of waste on corrosion.

This assessment was documented in the *Final RCRA Information Needs Report* (*Final RCRA Information Needs Report*, Mausshardt 1995; the engineering assessment performed for the 200 Area ETF tank systems by an independent professional engineer. A similar assessment of design requirements was performed for Load-In Station tanks 59A-TK-109 and 59A-TK-117 and is documented in *200 Area Effluent BAT/AKART Implementation, ETF Truck Load-in Facility, Project W-291H Integrity Assessment Report* (W-291H-IAR, KEH 1995). An assessment was also performed when Load-In Station tank 59A-TK-1 was placed into service for receipt of dangerous and mixed wastes. The assessment is documented in the *200 Area Effluent Treatment Facility Purgewater Unloading Facility Tank System Integrity Assessment* (HNF-41604, 2009).

The specifications for the preparation, design, and construction of the tank systems at the 200 Area ETF are documented in the *Design Construction Specification, Project C-018H, 242-A Evaporator/PUREX Plant Process Condensate Treatment Facility* (V-C018HC1-001, WHC 1992). The preparation, design, and construction of Load-In Station tanks 59A-TK-109 and 59A-TK-117 are provided in the construction specifications in *Project W-291, 200 Area Effluent BAT/AKART Implementation ETF Truck Load-in Facility, Construction Specifications* (*W-291H-C2*, KEH 1994). The preparation, design, and construction of Load-In Station tank 59A-TK-1 are documented in *Purgewater Unloading Facility Project Documentation* (HNF-39966, 2009).

Most of the tanks in the 200 Area ETF are constructed of stainless steel. According to the design of the 200 Area ETF, it was determined stainless steel would provide adequate corrosion protection for these tanks. Exceptions include Load-In Station tank 59A-TK-1, which is constructed of fiberglass-reinforced plastic and the verification tanks, which are constructed of carbon steel with an epoxy coating. The Evaporator Vapor Body Vessel (and the internal surfaces of the thin film dryer) is constructed of a corrosion resistant alloy, known as alloy 625, to address the specific corrosion concerns in the secondary treatment train. Finally, the hydrogen peroxide decomposer vessels are constructed of carbon steel and coated with a vinyl ester lining.

The shell thicknesses of the tanks identified in Table C.5 represent a nominal thickness of a new tank when placed into operation. The tank capacities identified in this table represent the maximum volumes. Nominal tank volumes discussed below represent the maximum volume in a tank unit during normal operations.

C.4.1.1 Codes and Standards for Tank System Construction

Specific standards for the manufacture of tanks and process systems installed in the 200 Area ETF are briefly discussed in the following sections. In addition to these codes and industrial standards, a seismic analysis for each tank and process system is required [WAC 173-303-806(4)(a)(xi)]. The seismic analysis was performed in accordance with UCRL-15910 *Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena Hazards*, Section 4 (UCRL 1987). The results of the seismic analyses are summarized in the engineering assessment of the 200 Area ETF tank systems (*Final RCRA Information Needs Report*, Mausshardt 1995).

Storage and Treatment Tanks. The following tanks store and/or treat dangerous waste at the 200 Area ETF.

Tank name	Tank number
Surge tank	2025E-60A-TK-1
pH adjustment tank	2025E-60C-TK-1
Effluent pH adjustment tank	2025E-60C-TK-2
First RO feed tank	2025E-60F-TK-1
Second RO feed tank	2025E-60F-TK-2
Verification tanks (three)	2025E-60H-TK-1A/1B/1C
Secondary waste receiving tanks (two)	2025E-60I-TK-1A/1B
Evaporator Vapor Body Vessel	2025E-601-EV-1
Concentrate tanks (two)	2025E-60J-TK-1A/2025E-60J-TK-1B
Sump tanks (two)	2025E-20B-TK-1/2
Distillate flash tank	2025E-60I-TK-2
Load-In Station tanks	2025ED-59A-TK-1/109/117

The relative location of these tanks is presented in Figure C.3. These tanks are maintained at or near atmospheric pressure. The codes and standards applicable to the design, construction, and testing of the above tanks and ancillary piping systems are as follows:

ASME - B31.3	Chemical Plant and Petroleum Refinery Piping (ASME 1990)
ASME Sect. VIII, Division I	Pressure Vessels (*Boiler and Pressure Vessel Code*, ASME 1992)
AWS - D1.1	Structural Welding Code - Steel (AWS 1992)
ANSI - B16.5	Pipe Flanges and Flanged Fittings (ANSI 1992)
ASME Sect. IX	Welding and Brazing Qualifications (*Boiler and Pressure Vessel Code*, ASME 1992)
API 620	Design and Construction of Large Welded Low Pressure Storage Tanks (API 1990)
AWWA - D100	Welded Steel Tanks for Water Storage (AWWA 1989)
AWWA - D103	Factory-Coated Bolted Steel Tanks for Water Storage (AWWA 1987)
AWWA - D120	Thermosetting Fiberglass-Reinforced Plastic Tanks (AWWA 1984)
ASTM-D3299	Filament Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion Resistant Tanks.

The application of these standards to the construction of 200 Area ETF tanks and independent verification of completed systems ensured that the tank and tank supports had sufficient structural strength and that seams and connections were adequate to ensure tank integrity. In addition, each tank met strict quality assurance requirements. Each tank, constructed offsite was tested for integrity and leak tightness before shipment to the Hanford Facility. Following installation, the systems were inspected for damage to ensure against leakage and to verify proper operation. If a tank was damaged during shipment or installation, leak tightness testing was repeated onsite.

C.4.1.2 Design Information for Tanks Located Outside of Building 2025-E

The load-In Station tanks, surge tank, and verification tanks are located outside building 2025-E. These tanks are located within concrete structures that provide secondary containment. Table C.5, 200 Area ETF Tank Systems Information, provides individual tank volumes, dimensions, and construction materials for tanks located outside building 2025-E.

Load-In Station Tanks (59A-TK-1/ 59A-TK-109/ 59A-TK-117) and Ancillary Equipment. Load-In Station tanks 59A-TK-109 and 59A-TK-117 are located outside of the Load-In Station building while Load-In Station tank 59A-TK-1 is located inside the Load-In Station building. Load-In Station tanks 59A-TK-109 and 59A-TK-117 are heated. Ancillary equipment includes transfer pumps, filtration systems, a double encased, fiberglass transfer pipeline, level instruments for tanker trucks, and leak detection equipment. From the Load-In Station, aqueous waste can be routed to the surge tank or to the LERF through a double-encased line. Secondary containment for the Load-In Station tanks is discussed in Section C.4.3.1.2.

Surge Tank (60A-TK-1) and Ancillary Equipment. The surge tank is located outside on the south side of building 2025-E. Ancillary equipment to the surge tank includes two underground double encased (i.e., pipe-within-a-pipe) transfer lines connecting to LERF and three pumps for transferring aqueous waste to the primary treatment train. The surge tank is located at the south end of building 2025-E. The surge tank is insulated and the contents heated to prevent freezing. Eductors in the tank provide mixing.

Verification Tanks (60H-TK-1A/ 60H-TK-1B/ 60H-TK-1C) and Ancillary Equipment. The verification tanks are located outside and north of building 2025-E. For support, the tanks have a center post with a webbing of beams that extend from the center post to the sides of the tank. The roof is constructed of epoxy covered carbon steel that is attached to the cross beams of the webbing. The tank floor also is constructed of epoxy covered carbon steel and is sloped. Eductors are installed in each tank to provide mixing.

Ancillary equipment includes a return pump that provides circulation of treated effluent through the eductors. The return pump also recycles effluent back to the 200 Area ETF for retreatment and can provide service water for 200 Area ETF functions. Two transfer pumps are used to discharge treated effluent to SALDS or back to the LERF.

C.4.1.3 Design Information for Tanks Located Inside Building 2025-E

Most of the tanks and ancillary equipment that store or treat dangerous and/or mixed waste are located within building 2025-E. The structure serves as secondary containment for the tank systems. Table C.5, 200 Area ETF Tank Systems Information, provides individual tank volumes, dimensions, and construction materials for tanks located outside building 2025-E.

pH Adjustment Tank (60C-TK-1) and Ancillary Equipment. Ancillary equipment for the pH adjustment tank includes overflow lines to a sump tank and pumps to transfer waste to other units in the main treatment train.

Effluent pH Adjustment Tank (60C-TK-2) and Ancillary Equipment. Ancillary equipment for the effluent pH adjustment tank includes overflow lines to a sump tank and pumps to transfer waste to the verification tanks.

First and Second RO Feed Tanks and Ancillary Equipment. The first RO feed tank is a vertical, stainless steel tank with a round bottom. Conversely, the second RO feed tank is a rectangular vessel with the bottom of the tank sloping sharply to a single outlet in the bottom center. Each RO tank has a pump to transfer waste to the RO arrays. Overflow lines are routed to a sump tank.

Secondary Waste Receiving Tanks (60I-TK-1A/30I-TK-1B) and Ancillary Equipment. Two secondary waste receiving tanks collect waste from the units in the main treatment train, such as concentrate solution (retentate) from the RO units and regeneration solution from the IX columns. These are vertical, cylindrical tanks with a semi-elliptical bottom and a flat top. Ancillary equipment includes overflow lines to a sump tank and pumps to transfer aqueous waste to the Evaporator Vapor Body Vessel.

Evaporator Vapor Body Vessel (2025E-60I-EV-1) and Ancillary Equipment. The Evaporator Vapor Body Vessel, the principal component of the evaporation process, is a cylindrical pressure vessel with a conical bottom. Aqueous waste is fed into the lower portion of the vessel. The top of the vessel is domed and the vapor outlet is configured to prevent carryover of liquid during the foaming or bumping (violent boiling) at the liquid surface.

The Evaporator Vapor Body Vessel includes the following ancillary equipment:

- Preheater
- Recirculation pump
- Waste heater with steam level control tank
- Concentrate transfer pump
- Entrainment separator
- Vapor compressor with silencers
- Silencer drain pump

Distillate Flash Tank (60I-TK-2) and Ancillary Equipment. The distillate flash tank is a horizontal tank. Ancillary equipment includes a pump to transfer the distillate to the surge tank for reprocessing.

Concentrate Tanks (2025E-60J-TK-1A and 2025E-60J-TK-1B) and Ancillary Equipment. Ancillary equipment for the two concentrate tanks includes overflow lines to a sump tank and pumps for recirculation and transfer.

Sump Tanks. Sump Tanks 1 and 2 are located below floor level. Both sump tanks are double-walled, rectangular tanks, placed inside concrete vaults. The sump tanks are located in pits below grade to allow gravity drain of solutions to the tanks. Each sump tank has two vertical pumps for transfer of waste to the secondary waste receiving tanks or to the surge tank for reprocessing.

C.4.1.4 Design Information for 200 Area Effluent Treatment Facility Process Units

As with the 200 Area ETF tanks, process units that treat and/or store dangerous and/or mixed waste are maintained at or near atmospheric pressure. These units were constructed to meet a series of design standards, as discussed in the following sections. Table C.6 presents the materials of construction and the ancillary equipment associated with these process units. All piping systems are designed to withstand the effects of internal pressure, weight, thermal expansion and contraction, and any pulsating flow. The design and integrity of these units are presented in the engineering assessment (*Final RCRA Information Needs Report*, Mausshardt 1995).

Filters. The Load-In Station fine and rough filter vessels (including the influent and auxiliary filters) are designed to comply with the ASME Section VIII, Division I, Pressure Vessels (*Boiler and Pressure Vessel Code*, ASME 1992). The application of these standards to the construction of the 200 Area ETF filter system and independent inspection ensure that the filter and filter supports have sufficient structural strength and that the seams and connections are adequate to ensure the integrity of the filter vessels.

Ultraviolet Oxidation (UV/OX) System. The UV/OX reaction chamber is designed to comply with manufacturers standards.

Degasification System. The codes and standards applicable to the design, fabrication, and testing of the degasification column are identified as follows:

- ASME - B31.3, Chemical Plant and Petroleum Refinery Piping (ASME 1990)
- AWS - D1.1, Structural Welding Code - Steel (AWS 1992)
- ANSI - B16.5, Pipe Flanges and Flanged Fittings (ANSI 1992)

RO System. The pressure vessels in the RO unit are designed to comply with ASME Section VIII, Division I, Pressure Vessels (*Boiler and Pressure Vessel Code,* ASME 1992), and applicable codes and standards.

Ion Exchange (Polishers). The IX columns are designed in accordance with ASME Section VIII, Division I, Pressure Vessels (*Boiler and Pressure Vessel Code,* ASME 1992), and applicable codes and standards. Polisher piping is fabricated of type 304 stainless steel or polyvinyl chloride (PVC) and meets the requirements of ASME B31.3, *Chemical Plant and Petroleum Refinery Piping* (ASME 1990).

Evaporator Vapor Body Vessel. The Evaporator Vapor Body Vessel is designed to meet the requirements of ASME Section VIII, Division I, Pressure Vessels (*Boiler and Pressure Vessel Code,* ASME 1992), and applicable codes and standards. The Evaporator Vapor Body Vessel piping meets the requirements of ASME B31.3, *Chemical Plant and Petroleum Refinery Piping* (ASME 1990).

Thin Film Dryer System. The thin film dryer is designed to meet the requirements of ASME Section VIII, Division I, *Boiler and Pressure Vessel Code* (Pressure Vessels, ASME 1992), and applicable codes and standards. The piping meets the requirements of ASME B31.3, *Chemical Plant and Petroleum Refinery Piping* (ASME 1990).

C.4.1.5 Integrity Assessments

The integrity assessment for 200 Area ETF (*Final RCRA Information Needs Report,* Mausshardt 1995) attests to the adequacy of design and integrity of the tanks and ancillary equipment to ensure that the tanks and ancillary equipment will not collapse, rupture, or fail over the intended life considering intended uses. For the Load-In Station tanks, a similar integrity assessment was performed (*200 Area Effluent BAT/AKART Implementation, ETF Truck Load-In Facility, Project W-291H, Integrity Assessment Report* [W-291H-IAR, KEH 1995], and *200 Area Effluent Treatment Facility Purgewater Unloading Facility Tank System Integrity Assessment* [HNF-41604,2009]). Specifically, the assessment documents the following considerations:

- Adequacy of the standards used during design and construction of the facility.
- Characteristics of the solution in each tank.
- Adequacy of the materials of construction to provide corrosion protection from the solution in each tank.
- Results of the leak tests and visual inspections.

The results of these assessments demonstrate that tanks and ancillary equipment have sufficient structural integrity and are acceptable for storing and treating dangerous and/or mixed waste. The assessments also state that the tanks and building were designed and constructed to withstand a design-basis earthquake. Independent, qualified registered professional engineers certified these tank assessments.

The scope of the 200 Area ETF tank integrity assessment was based on characterization data from process condensate. To assess the effect that other aqueous waste might have on the integrity of the 200 Area ETF tanks, the chemistry of an aqueous waste will be evaluated for its potential to corrode a tank (e.g., chloride concentrations will be evaluated). The tank integrity assessment for the Load-In Station tanks (59A-TK-109/59A-TK-117) was based on characterization data from several aqueous waste

streams. The chemistry of an aqueous waste stream not considered in the Load-In Station tank integrity assessment also will be evaluated for the potential to corrode a Load-In Station tank.

Consistent with the recommendations of the integrity assessment, a corrosion inspection program was developed. Periodic integrity assessments are scheduled for those tanks predicted to have the highest potential for corrosion. These inspections are scheduled annually or longer, based on age of the tank system, materials of construction, characteristics of the waste, operating experience, and recommendations of the initial integrity assessment. These 'indicator tanks' include the concentrate tanks, secondary waste receiving tanks, and verification tanks. One of each of these tanks will be inspected yearly to determine if corrosion or coating failure has occurred. Should significant corrosion or coating failure be found, an additional tank of the same type would be inspected during the same year.

In the case of the verification tanks, if corrosion or coating failure is found in the second tank, the third tank also will be inspected. If significant corrosion were observed in all three sets of tanks, the balance of the 200 Area ETF tanks would be considered for inspection. For tanks predicted to have lower potential for corrosion, inspections also are performed nonroutinely as part of the corrective maintenance program.

C.4.2 Additional Requirements for New Tanks

Procedures for proper installation of tanks, tank supports, piping, concrete, etc., are included in *Construction Specification, Project C-018H, 242-A Evaporator/PUREX Plant Process Condensate Treatment Facility* (V-C018HC1-001, WHC 1992). For the Load-In Station tanks (59A-TK-109/ 59A-TK-117), procedures are included in the construction specifications in *Project W-291, 200 Area Effluent BAT/AKART Implementation ETF Truck Load-in Facility, Construction Specifications* (*W-291H-C2*, KEH 1994) and *Purgewater Unloading Facility Project Documentation* (HNF-39966, 2009). Following installation, an independent, qualified, registered professional engineer inspected the tanks and secondary containment. Deficiencies identified included damage to the surge tank, damage to the verification tank liners, and 200 Area ETF secondary containment concrete surface cracking. All deficiencies were repaired to the satisfaction of the engineer. The tanks and ancillary equipment were leak tested as part of acceptance of the system from the construction contractor. Information on the inspections and leak tests are included in the engineering assessment (*Final RCRA Information Needs Report*, Mausshardt 1995). No deficiencies were identified during installation of the Load-In Station tanks and ancillary equipment.

C.4.3 Secondary Containment and Release Detection for Tank Systems

This section describes the design and operation of secondary containment and leak detection systems at the 200 Area ETF.

C.4.3.1 Secondary Containment Requirements for All Tank Systems

The specifications for the preparation, design, and construction of the secondary containment systems at the 200 Area ETF are documented in *Design Construction Specification, Project C-018H, 242-A Evaporator/PUREX Plant Process Condensate Treatment Facility* (V-C018HC1-001, (WHC 1992). The preparation, design, and construction of the secondary containment for the Load-In Station tanks (59A-TK-109/59A-TK-117) are provided in the construction specifications *200 Area Effluent BAT/AKART Implementation ETF Truck Load-In Facility, Construction Specifications*, [*W-291H-C2*, (KEH 1994], and *Purgewater Unloading Facility Project Documentation* [HNF-39966, 2009]). All systems were designed to national codes and standards. Constructing the 200 Area ETF per these specifications ensured that foundations are capable of supporting tank and secondary containment systems and that uneven settling and failures from pressure gradients should not occur.

C.4.3.1.1 Common Elements

The following text describes elements of secondary containment that are common to all 200 Area ETF tank systems. Details on the secondary containment for specific tanks, including leak detection systems and liquids removal, are provided in Section C.4.3.1.2.

Foundation and Construction. For the tanks within the 2025-E building, except for the sump tanks, secondary containment is provided by a coated concrete floor and a 15.2-centimeter (6-inch) rise (berm) along the containing walls. The double-wall construction of the sump tanks provides secondary containment. Additionally, trenches are provided in the floor that also provides containment and drainage of any liquid to a sump pit. For tanks outside building 2025-E, secondary containment also is provided with coated concrete floors in a containment pit (Load-In Station tanks) or surrounded by concrete dikes (the surge tank and verification tanks).

The transfer piping that carries aqueous waste into the 200 Area ETF is pipe-within-a-pipe construction, and is buried approximately 1.2 meters (4 feet) below ground surface. The pipes between the verification tanks and the verification tank pumps within building 2025-E are located in a concrete pipe trench.

For this discussion, there are five discrete secondary containment systems associated with the following tanks and ancillary equipment that treat or store dangerous waste:

- Load-In Station tanks
- Surge tank
- 2025-E Process Area
- Sump Tanks
- Verification tanks
- Transfer piping and pipe trenches

All of the secondary containment systems are designed with reinforcing steel and base and berm thickness to minimize failure caused by pressure gradients, physical contact with the waste, and climatic conditions. Classical theories of structural analysis, soil mechanics, and concrete and structural steel design were used in the design calculations for the foundations and structures. These calculations are maintained at the 200 Area ETF. In each of the analyses, the major design criteria from the following documents were included:

V-C018HC1-001, WHC 1992	*Design Construction Specification, Project C-018H, 242A Evaporator/PUREX Plant Process Condensate Treatment Facility*
DOE Order 6430.1A	General Design Criteria
HPS-SDC-4.1, Revision 11	"Design Load for Structures," *Hanford Plant Standards*
UCRL-15910 LLNL 1987	*Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena Hazards*, Lawrence Livermore National Laboratory, Livermore, California
UBC-91 UBC-97	Uniform Building Code, 1991 Edition (ICBO 1991) Uniform Building Code, 1997 Edition (ICC 1997, for Load-In Station tank 59A-TK-1)

The design and structural analysis calculations substantiate the structural designs in the referenced drawings. The conclusions drawn from these calculations indicate that the designs are sound and that the specified structural design criteria were met. This conclusion is verified in the independent design review that was part of the engineering assessment (*Final RCRA Information Needs Report* [Mausshardt 1995]; *200 Area Effluent BAT/AKART Implementation ETF Truck Load-In Facility, Construction Specifications,* [*W-291H-C2*, KEH 1994]; and *200 Area Effluent Treatment Facility Purgewater Unloading Facility Tank System Integrity Assessment* [HNF-41604, 2009]).

Containment Materials. The concrete floor consists of cast-in-place and preformed concrete slabs. All slab joints and floor and wall joints have water stops installed at the mid-depth of the slab. In addition, filler was applied to each joint.

Except for the sump tank vaults, all of the concrete surfaces in the secondary containment system, including berms, trenches, and pits, are coated with a chemical-resistant, high-solids, epoxy coating that consists of a primer and a top coating. This coating material is compatible with the waste being treated, and with the sulfuric acid, sodium hydroxide, and hydrogen peroxide additives to the process. The coating protects the concrete from contact with any chemical materials that might be harmful to concrete and prevents the concrete from being in contact with waste material. Table C.8 summarizes the specific types of primer and top coats specified for the concrete and masonry surfaces in the 200 Area ETF. The epoxy coating is considered integral to the secondary containment system for the tanks and ancillary equipment.

The concrete containment systems are maintained such that any cracks, gaps, holes, and other imperfections are repaired in a timely manner. Thus, the concrete containment systems do not allow spilled liquid to reach soil or groundwater. There are a number of personnel doorways and vehicle access points into the 2025-E Process Area. Releases of any spilled or leaked material to the environment from these access points are prevented by 15.2-centimeter (6-inch) concrete curbs, sloped areas of the floor (e.g., truck ramp), or trenches.

Containment Capacity and Maintenance. Each of these containment areas is designed to contain more than 100 percent of the volume of the largest tank in each respective system. Secondary containment systems for the surge tank, and the verification tanks, which are outside building 2025-E, also are large enough to include the additional volume from a 25-year, 24-hour storm event; i.e., 5.3 centimeters (2 inches) of precipitation.

Sprinkler System. The sprinkler system within the building 2025- E supplies firewater protection to the 2025-E Process Area and the 2025-E Container Storage Area. This system is connected to a site wide water supply system and has the capacity to supply sufficient water to suppress a fire. However, in the event of failure, the sprinkler system can be hooked up to another water source (e.g., tanker truck).

C.4.3.1.2 Specific Containment Systems

The following discussion presents a description of the individual containment systems associated with specific tank systems.

Load-In Station Tank Secondary Containment. The Load-In Station tanks 59A-TK-109 and 59A-TK-117 are mounted on a 46-centimeter (18-inch)-thick reinforced concrete slab (Drawing H-2-817970) outside of the Load-In Station building. Secondary containment is provided by a pit with 30.5-centimeter (12-inch)-thick walls and a floor constructed of reinforced concrete. The Load-In Station tank pit is sloped to drain solution to a sump. The depth of the pit varies with the slope of the floor, with an average thickness of about 1.1 meters (3.5 feet). The volume of the secondary containment is about 73,000 liters (19,300 gallons), which is capable of containing the volume of at least one Load-In Station tank. Leaks are detected by a leak detector that alarms locally, in the 200 Area ETF Control Room, and by visual inspection of the secondary containment. Alarms are monitored continuously in the 200 Area ETF Control Room during Load-In Station transfers and at least daily when there are no Load-In Station transfers occurring.

Adjacent to the pit is a 25.4-centimeter (10-inch)-thick reinforced concrete pad that serves as secondary containment for the Load-In Station tanker trucks, containers, transfer pumps, and filter system that serve as the first tanker truck unloading bay. The pad is inside the Load-In Station building 2025-ED and is 15.2 centimeters (6 inches) below grade with north and south walls gently sloped to allow truck access. The pad has a (7.6-centimeter (3-inch) drain-pipe to route waste solution to the adjacent Load-In Station tank pit. The bay in the Load-In Station building is sloped to channel spills or leaks from containers to the Load-In Station pit. Table C.8 provides additional information on the protective coating for the concrete pad.

Load-In Station tank 59A-TK-1 is located on a 25.4-centimeter (10-inch)-thick reinforced concrete slab (Drawing H-2-817970) inside the Load-In Station building. The tank has a flat bottom that sits on a

concrete slab in the secondary containment. Secondary containment for the tank, filter system, and unloading pumps and piping is provided by an epoxy coated catch basin with a capacity of about 3,400 liters (900 gallons). The catch basin is sloped to route leaks and spills from the catch basin through a 15.2-centimeter (6-inch)-wide by 22.9-centimeter (9-inch)-deep trench to the adjacent truck unloading pad. This pad drains to the Load-In Station pit discussed above. The volume of the combined secondary containment of these two systems is greater than 76,400 liters, which is capable of holding the volume of tank 59A-TK-1.

Adjacent to tank 59A-TK-1 catch basin is a 25.4-centimeter (10-inch)-thick reinforced concrete pad that serves as the second tanker truck unloading bay. The pad is inside the metal Load-In Station building and has a 2.4 by 4-meter (8 by 13-feet) shallow, sloping pit to catch leaks during tanker truck unloading. The pit has a maximum depth of 6 centimeters and a 15.2-centimeter (6-inch)-wide by 6-centimeter (2.4-inch)-deep trench to route leaks to the adjacent tank 59A-TK-1 catch basin. The bay in the Load-In Station building is sloped to channel spills or leaks from containers to the Load-In Station pit. Coated concrete surfaces are provided for storage and unloading locations where spills and leaks could potentially occur.

Surge Tank Secondary Containment. The surge tank is mounted on a reinforced concrete ringwall. Inside the ringwall, the flat-bottomed tank is supported by a bed of compacted sand and gravel with a high-density polyethylene liner bonded to the ringwall. The liner prevents galvanic corrosion between the soil and the tank. The secondary containment is reinforced concrete with a 15.2-centimeter (6-inch) thick floor and a 20.3-centimeter (8-inch) thick dike. The secondary containment area shares part of the southern wall of the main 2025-E Process Area. The dike is 2.9 meters (9.5 feet) tall and provides 856,298 liters (226,210 gallons) of secondary containment.

The floor of the secondary containment slopes to a sump in the northwest corner of the containment area. Leaks into the secondary containment are detected by level instrumentation in the sump, which alarms in the 200 Area ETF Control Room and/or by routine visual inspections. Sump alarms are monitored continuously in the 200 Area ETF Control Room during 200 Area ETF processing operations and at least daily when 200 Area ETF is not processing waste. A sump pump is used to transfer solution in the secondary containment to a sump tank.

2025-E Process Area Secondary Containment. The 2025-E Process Area contains the tanks and ancillary equipment of the primary and secondary treatment trains, and has a jointed, reinforced concrete slab floor. The concrete floor of the 2025-E Process Area and sump tanks provide the secondary containment. This floor is a minimum of 15.2 centimeters (6 inches) thick. With doorsills 15.2 centimeter (6 inches) high, the 2025-E Process Area (including the 2025-E Truck Bay loading area and 2025-E Container Storage Area) has a containment volume of approximately 93,800 liters (24,810 gallons) (see Section C.3.4.3).

The floor of the 2025-E Process Area is sloped to drain liquids to two trenches that drain to sumps. Each trench is approximately 38.1 centimeters (15 inches) wide with a sloped trough varying from 39.4 to 76.2 centimeters (15.5 to 30 inches) deep. Leaks into the secondary containment are detected by routine visual inspections of the floor area near the tanks, ancillary equipment, and in the trenches.

A small dam was placed in the trench that comes from the thin film dryer room to contain minor liquid spills originating in the dryer room to minimize the spread of contamination into the 2025-E Process Area. The dryer room is inspected for leaks in accordance with the inspection schedule in Addendum I, Inspection Requirements. Operators clean up these minor spills by removing the liquid waste and decontaminating the spill area.

A small dam was also placed in the trench adjacent to the chemical feed skid when the chemical berm area was expanded to accommodate acid and caustic pumps, which were moved indoors from the top of the surge tank to resolve a safety concern. This dam was designed to contain minor spills originating in the chemical berm area and prevent them from entering the process sump.

The northwest corner of the 2025-E Process Area consists of a pump pit containing the pumps and piping for transferring treated effluent from the verification tanks to SALDS. The pit is built 1.37 meters (4.5 feet) below the 2025-E Process Area floor level and is sloped to drain to a trench built along its north wall that routes liquid to Sump Tank 2. Leaks into the secondary containment of the pump pit are detected by routine visual inspections.

Sump Tanks. The sump tanks support the secondary containment system, and collect waste from several sources, including:

- 2025-E Process Area drain trenches.
- Tank overflows and drains.
- Container washing water.
- Resin dewatering solution.
- Steam boiler blow down.
- Sampler system drains.

These double-contained tanks are located within unlined, concrete vaults. The sump tank levels are monitored by remote level indicators or through visual inspections from the sump covers. These indicators are connected to high- and low-level alarms that are monitored in the 200 Area ETF Control Room during ETF processing operations and at least daily when 200 Area ETF is not processing liquid waste. When a high-level alarm is activated, a pump is activated and the sump tank contents usually are routed to the secondary treatment train for processing. The contents also could be routed to the surge tank for treatment in the primary treatment train. In the event of an abnormally high inflow rate, a second sump pump is initiated automatically.

Verification Tanks Secondary Containment. The three verification tanks (60H-TK-1A /60H-TK-1B/ 60H-TK-1C) are each mounted on ringwalls with high-density polyethylene liners similar to the surge tank. The secondary containment for the three tanks is reinforced concrete with a 15.2-centimeter (6-inch) thick floor and a 20.3-centimeter (8-inch) thick dike. The dike extends up 2.4 meters (8 feet) to provide a containment of approximately 3,390,000 liters (896,000 gallons) exceeding the capacity of a single verification tank (See Table C.5).

The floor of the secondary containment slopes to a sump along the southern wall of the dike. Leaks into the secondary containment are detected by level instrumentation in the sump and/or by routine visual inspections. Sump alarms are monitored continuously in the 200 Area ETF Control Room during 200 Area ETF processing operations and at least daily when 200 Area ETF is not processing waste. A sump pump is used to transfer solution in the secondary containment to a sump tank.

C.4.3.2 Additional Requirements for Specific Types of Systems

This section addresses additional requirements in WAC 173-303-640 for double-walled tanks like the sump tanks and secondary containment for ancillary equipment and piping associated with the tank systems.

C.4.3.2.1 Double-Walled Tanks

The sump tanks are the only tanks in the 200 Area ETF classified as 'double-walled' tanks. These tanks are located in unlined concrete vaults and support the secondary containment system for the 2025-E Process Area. The sump tanks are equipped with a leak detector between the walls of the tanks that provide continuous monitoring for leaks. The leak detector alarms are monitored in the 200 Area ETF Control Room. These sump tank alarms are monitored continuously during 200 Area ETF processing operations and at least daily when 200 Area ETF is not processing waste. The inner tanks are contained completely within the outer shells. The tanks are contained completely within the concrete structure of building 2025-E so corrosion protection from external galvanic corrosion is not necessary.

C.4.3.2.2 Ancillary Equipment

The secondary containment provided for the tanks and process systems also serves as secondary containment for the ancillary equipment associated with these systems.

Ancillary Equipment. Section C.4.3.1.2 describes the secondary containment systems that also serve most of the ancillary equipment within the 200 Area ETF. Between building 2025-E and the verification tanks, a pipeline trench provides secondary containment for four pipelines connecting the transfer pumps (i.e., discharge and return pumps) in the 200 Area ETF with the verification tanks (Figure C.2, Table C.6, and Table C.7). This concrete trench crosses under the road and extends from the verification tank pumps to the verification tanks. Treated effluent flows through these pipelines from the verification tank pumps to the verification tanks. The return pump is used to return effluent to the 200 Area ETF for use as service water or for reprocessing.

For all of the ancillary equipment housed within building 2025-E, the concrete floor, trenches, and berms form the secondary containment system. For the ancillary equipment of the surge tank and the verification tanks, secondary containment is provided by the concrete floors and dikes associated with these tanks. The concrete floor and pit provide secondary containment for the ancillary equipment of the Load-In Station tanks.

Transfer Piping and Pipe Trenches. The two buried transfer lines between LERF and the surge tank have secondary containment in a pipe-within-a-pipe arrangement. The 10.2-centimeter (4-inch) transfer line has a 20.3-centimeter (8-inch) outer pipe, while the 7.6-centimeter (3-inch) transfer, line has a 15.2-centimeter (6-inch) outer pipe. The pipes are fiberglass and are sloped towards the surge tank. The outer piping ends with a drain valve in the surge tank secondary containment.

These pipelines are equipped with leak detection located in the annulus between the inner and outer pipes; the leak detection equipment can continuously 'inspect' the pipelines during aqueous waste transfers. The alarms on the leak detection system are monitored in the 200 Area ETF Control Room. The 200 Area Control Room alarms are monitored continuously during aqueous waste transfers between LERF and the 200 Area ETF surge tank, and at least daily when no transfers are occurring. A low-volume air purge of the annulus is provided to prevent condensation buildup and minimize false alarms by the leak detection system. In the event that these leak detectors are not in service, the pipelines are inspected during transfers by opening a drain valve to check for solution in the annular space between the inner and outer pipe.

The 7.6-centimeter (3-inch) transfer line between the Load-In Station tanks and the surge tank has a 15.2 centimeter (6-inch) outer pipe in a pipe-within-a-pipe arrangement. The piping is made of fiberglass-reinforced plastic and slopes towards the Load-In Station tank secondary containment pit. The drain valve and leak detection system for the Load-In Station tank pipelines are operated similarly to the leak detection system for the LERF to 200 Area ETF pipelines.

As previously indicated, a reinforced concrete pipe trench provides secondary containment for piping under the roadway between the 200 Area ETF and the verification tanks (60H-TK-1A/60H-TK-1B/ 60H-TK-1C). Three 15.2 centimeter (6-inch) thick reinforced concrete partitions divide the trench into four portions and support metal gratings over the trench. Each portion of the trench is 1.2 meters (4 feet) wide, 0.76 meter (2.5 feet) deep, and slopes to route any solution present to 10.2-centimeter (4-inch) drain lines through the north wall of building 2025-E. These drain lines route solution to Sump Tank 2 in building 2025-E. The floor of the pipe trench is 30.5 centimeters (12 inches) thick and the sides are 15.2 centimeters (6 inches) thick. The concrete trenches are coated with water sealant and covered with metal gratings at ground level to allow vehicle traffic on the roadway.

C.4.4 Tank Management Practices

When an aqueous waste stream is identified for treatment or storage at 200 Area ETF, the generating unit is required to characterize the waste. Based on characterization data, the waste stream is evaluated to

determine if the stream is acceptable for treatment or storage. Specific tank management practices are discussed in the following sections.

C.4.4.1.1 Rupture, Leakage, Corrosion Prevention

Most aqueous waste streams can be managed such that corrosion would not be a concern. For example, an aqueous waste stream with high concentrations of chloride might cause corrosion problems when concentrated in the secondary treatment train. One approach is to adjust the corrosion control measures in the secondary treatment train. An alternative might be to blend this aqueous waste in a LERF basin with another aqueous waste that has sufficient dissolved solids, such that the concentration of the chlorides in the secondary treatment train would not pose a corrosion concern.

Additionally, the materials of construction used in the tanks systems (Table C.5) make it unlikely that an aqueous waste would corrode a tank. For more information on corrosion prevention, refer to Addendum B, Waste Analysis Plan.

If operating experience suggests that most aqueous waste streams can be managed such that corrosion would not be a concern, operating practices and integrity assessment schedules and requirements will be reviewed and modified as appropriate.

When a leak in a tank system is discovered, the leak is immediately contained or stopped by isolating the leaking component. Following containment, the requirements of WAC 173-303-640(7), incorporated by reference, are followed. These requirements include repair or closure of the tank/tank system component, and certification of any major repairs.

C.4.4.2 Overfilling Prevention

Operating practices and administrative controls used at the 200 Area ETF to prevent overfilling a tank are discussed in the following paragraphs. The 200 Area ETF process is controlled by the MCS. The MCS monitors liquid levels in the 200 Area ETF tanks and has alarms that annunciate on high-liquid level to notify operators that actions must be taken to prevent overfilling of these vessels. As an additional precaution to prevent spills, many tanks are equipped with overflow lines that route solutions to Sump Tanks 1 and 2 to prevent the tank from overflowing into the secondary containment. These tanks include the pH adjustment tank; RO feed tanks, effluent pH adjustment tank, secondary waste receiving tanks, and concentrate tanks.

The following section discusses feed systems, safety cutoff devices, bypass systems, and pressure controls for specific tanks and process systems.

Tanks. All tanks are equipped with liquid level sensors that give a reading of the tank liquid volume. All of the tanks are equipped further with liquid level alarms that are actuated if the liquid volume is near the tank overflow capacity. In the actuation of the surge tank alarm, a liquid level switch trips, sending a signal to the valve actuator on the tank influent lines, and causing the influent valves to close. To prevent tank overflows when liquid level monitors are out of service, the tank system is placed in a safe configuration by isolating the tank from influent flow until the liquid level monitoring is restored to service or daily sump level readings may be taken for tanks that overflow to Sump Tanks 1 and 2.

The operating mode for each verification tank, i.e., receiving, holding, or discharging, can be designated through the MCS; modes also switch automatically. When the high-level set point on the receiving verification tank is reached, the flow to this tank is diverted and another tank becomes the receiver. The full tank is switched into verification mode. The third tank is reserved for discharge mode.

The liquid levels in the pH adjustment, first and second RO feed, and effluent pH adjustment tanks are maintained within predetermined operating ranges. Should any of the tanks overflow, the excess waste is piped along with any leakage from the feed pumps to a sump tank.

When waste in a secondary waste-receiving tank reaches the high-level set point, the influent flow of waste is redirected to the second tank. In a similar fashion, the concentrate tanks switch receipt modes when the high-level set point of one tank is reached.

Filter Systems. All filters at 200 Area ETF (i.e., the Load-In Station, rough, fine, and auxiliary filter systems) are in leak-tight steel casings. For the rough and fine filters, a high differential pressure, which could damage the filter element, activates a valve that shuts off liquid flow to protect the filter element from possible damage. To prevent a high-pressure situation, the filters are cleaned routinely with pulses of compressed air that force water back through the filter. Cleaning is terminated automatically by shutting off the compressed air supply if high pressure develops. The differential pressure across the auxiliary filters also is monitored. A high differential pressure in these filters would result in a system shutdown to allow the filters to be changed out.

The Load-In Station filtration system has pressure gauges for monitoring the differential pressure across each filter. A high differential pressure would result in discontinuing filter operation until the filter is replaced.

Ultraviolet Light/Oxidation System and Decomposers. A rupture disk on the inlet piping to each of the UV/OX reaction vessels relieves to the pH adjustment tank in the event of excessive pressure developing in the piping system. Should the rupture disk fail, the aqueous waste would trip the moisture sensor, shut down the UV lamps, and close the surge tank feed valve. Also provided is a level sensor to protect UV lamps against the risk of exposure to air. Should those sensors be actuated, the UV lamps would be shut down immediately.

The piping and valving for the hydrogen peroxide decomposers are configured to split the waste flow: half flows to one decomposer and half flows to the other decomposer. Alternatively, the total flow of waste can be treated in one decomposer or both decomposers can be bypassed. A safety relief valve on each decomposer vessel can relieve excess system pressure to a sump tank.

Degasification System. The degasification column is typically supplied aqueous waste feed by the pH adjustment tank feed pump. This pump transfers waste solution through the hydrogen peroxide decomposer, the fine filter, and the degasification column to the first RO feed tank.

The degasification column is designed for operation at a partial vacuum. A pressure sensor in the outlet of the column detects the column pressure. The vacuum in the degasification column is maintained by a blower connected to the vessel off gas system. The column is protected from extremely low pressure developed by the column blower by the use of an intake vent that is maintained in the open position during operation. The column liquid level is regulated by a flow control system with a high- and low-level alarm. Plate-type heat exchanger cools the waste solution fed to the degasification column.

RO System. The flow through the first and second RO stages is controlled to maintain constant liquid levels in the first and second stage RO feed tanks.

Polisher. Typically, two of the three columns are in operation (lead/lag) and the third (regenerated) column is in standby. When the capacity of the resin in the first column is exceeded, as detected by an increase in the conductivity of the column effluent, the third column, containing freshly regenerated IX resin, is brought online. The first column is taken offline, and the waste is rerouted to the second column, and to the third. Liquid level instrumentation and automatically operated valves are provided in the IX system to prevent overfilling.

Evaporator Vapor Body Vessel. Liquid level instrumentation in the secondary waste receiving tanks is designed to preclude a tank overflow. A liquid level switch actuated by a high-tank liquid level causes the valves to reposition, closing off flow to the secondary waste receiving tanks. Secondary containment for these tanks routes liquids to a sump tank.

Valves in the Evaporator Vapor Body Vessel feed line can be positioned to bypass the secondary waste around the Evaporator Vapor Body Vessel and to transfer the secondary waste to the concentrate tanks (2025E-60J-TK-1A/2025E-60J-TK-1B).

Thin Film Dryer. The two concentrate tanks alternately feed the thin film dryer. Typically, one tank serves as a concentrate waste receiver while the other tank serves as the dryer feed tank. One tank may serve as both concentrate waste receiver and dryer feed tank. Liquid level instrumentation prevents tank

overflow by diverting the concentrate flow from the full concentrate tank to the other concentrate tank. Secondary containment for these tanks routes liquids to a sump tank.

An alternate route is provided from the concentrate receiver tank to the secondary waste receiving tanks. Dilute concentrate in the concentrate receiver tank can be reprocessed through the Evaporator Vapor Body Vessel by transferring the concentrate back to a secondary waste-receiving tank.

C.4.5 Labels or Signs

Each tank or process unit in the 200 Area ETF is identified by a nameplate attached in a readily visible location. Included on the nameplate are the equipment number and the equipment title. Those tanks that store or treat dangerous waste at the 200 Area ETF (Section C.4.1.1) are identified with a label, which reads *PROCESS WATER/WASTE*. The labels are legible at a distance of at least fifty feet or as appropriate for legibility within the 200 Area ETF. Additionally, these tanks bear a legend that identifies the waste in a manner, which adequately warns employees, emergency personnel, and the public of the major risk(s) associated with the waste being stored or treated in the tank system(s).

Caution plates are used to show possible hazards and warn that precautions are necessary. Caution signs have a yellow background and black panel with yellow letters and bear the word *CAUTION*. Danger signs show immediate danger and signify that special precautions are necessary. These signs are red, black, and white and bear the word *DANGER*.

Tanks and vessels containing corrosive chemicals are posted with black and white signs bearing the word *CORROSIVE*. *DANGER - UNAUTHORIZED PERSONNEL KEEP OUT* signs are posted on all exterior doors of building 2025-E, and on each interior door leading into the 2025-E Process Area. Tank ancillary piping is also labeled *PROCESS WATER* or *PROCESS LIQUID* to alert personnel which pipes in the 2025-E Process Area contains dangerous and/or mixed waste.

All tank systems holding dangerous waste are marked with labels or signs to identify the waste contained in the tanks. The labels or signs are legible at a distance of at least 15-meters (50-feet) and bear a legend that identifies the waste in a manner that adequately warns employees, emergency response personnel, and the public, of the major risk(s) associated with the waste being stored or treated in the tank system(s).

C.4.6 Air Emissions

Tank systems that contain extremely hazardous waste that is acutely toxic by inhalation must be designed to prevent the escape of such vapors. To date, no extremely hazardous waste has been managed in 200 Area ETF tanks and is not anticipated. However, the 200 Area ETF tanks have forced ventilation that draws air from the tank vapor spaces to prevent exposure of operating personnel to any toxic vapors that might be present. The vapor passes through a charcoal filter and two sets of high-efficiency particulate air filters before discharge to the environment. The Load-In Station tanks and verification tanks are vented to the atmosphere.

C.4.7 Management of Ignitable or Reactive Wastes in Tanks Systems

Although the 200 Area ETF is permitted to accept waste that is designated ignitable or reactive, such waste would be treated or blended immediately after placement in the tank system so that the resulting waste mixture is no longer ignitable or reactive. Aqueous waste received does not meet the definition of a combustible or flammable liquid given in National Fire Protection Association (NFPA) code number 30 (NFPA 1996).

The buffer zone requirements in NFPA-30, which require tanks containing combustible or flammable solutions be a safe distance from each other and from public way, are not applicable.

C.4.8 Management of Incompatible Wastes in Tanks Systems

The 200 Area ETF manages dilute solutions that can be mixed without compatibility issues. The 200 Area ETF is equipped with several systems that can adjust the pH of the waste for treatment

activities. Sulfuric acid and sodium hydroxide are added to the process through the MCS for pH adjustment to ensure there will be no large pH fluctuations and adverse reactions in the tank systems.

C.5 Surface Impoundments

This section provides specific information on surface impoundment operations at the LERF, including descriptions of the liners and secondary containment structures, as required by WAC 173-303-650 and WAC 173-303-806(4)(d).

The LERF consists of three lined surface impoundments (basins) with a design capacity of 29.5 million liters (7.8 million gallons) each. Each basin would overflow when the basin's volume reaches 34 million liters (9 million gallons). The dimensions of each basin at the anchor wall are approximately 103 by 85 meters (338 by 278 feet). The typical top dimensions of the wetted area are approximately 89 by 71 meters (292 by 233 feet), while the bottom dimensions are approximately 57 by 38 meters (188 by 124 feet). Total depth from the top of the dike to the bottom of the basin is approximately 8 meters (26.4 feet) at the deepest point. The typical finished basin bottoms lie at about 4.5 meters (15 feet) below the initial grade and 181 meters (593 feet) above sea level. The dikes separating the basins have a typical height of 3 meters (10 feet) and typical top width of 11.6 meters (38 feet) around the perimeter of the impoundments.

C.5.1 List of Dangerous Waste

A list of dangerous and/or mixed aqueous waste that can be stored in LERF is presented in Addendum A. Addendum B, Waste Analysis Plan also provides a discussion of the types of waste that are managed in the LERF.

C.5.2 Construction, Operation, and Maintenance of Liner System

General information concerning the liner system is presented in the following sections. Information regarding loads on the liner, liner coverage, UV light exposure prevention, and location relative to the water table are discussed.

C.5.2.1 Liner Construction Materials

The LERF employs a double-composite liner system with a leachate detection, collection, and removal system between the primary and secondary liners. Each basin is constructed with an upper or primary liner consisting of a high-density polyethylene geomembrane laid over a bentonite carpet liner. The lower or secondary liner in each basin is a composite of a geomembrane laid over a layer of soil/bentonite admixture with a hydraulic conductivity less than 1.0E-07 centimeters (3.9E-08 inches) per second. The synthetic liners extend up the dike wall to a concrete anchor wall that surrounds the basin at the top of the dike. A batten system bolts the layers in place to the anchor wall (Figure C.15).

Figure C.16 is a schematic cross-section of the liner system. The liner components, listed from the top to the bottom of the liner system, are the following:

- Primary 60-mil (1.5-millimeter [0.06 inch]) high-density polyethylene geomembrane
- Bentonite carpet liner
- Geotextile
- Drainage gravel (bottom) and geonet (sides)
- Geotextile
- Secondary 60-mil (1.5-millimeter [0.06 inch]) high-density polyethylene geomembrane
- Soil/bentonite admixture (91 centimeters [36 inches] on the bottom, 107 centimeters [42 inches] on the sides)
- Geotextile

The primary geomembrane, made of 60-mil (1.5-millimeter [0.06 inch]) high-density polyethylene, forms the basin surface that holds the aqueous waste. The secondary geomembrane, also 60-mil (1.5-millimeter [0.06 inch]) high-density polyethylene, forms a barrier surface for leachate that might penetrate the primary liner. The high-density polyethylene chemically is resistant to constituents in the aqueous waste and has a relatively high strength compared to other lining materials. The high-density polyethylene resin specified for the LERF contains carbon black, antioxidants, and heat stabilizers to enhance its resistance to the degrading effects of UV light. The approach to ensuring the compatibility of aqueous waste streams with the LERF liner materials and piping is discussed in Addendum B, Waste Analysis Plan.

Three geotextile layers are used in the LERF liner system. The layers are thin, nonwoven polypropylene fabric that chemically is resistant, highly permeable, and resistant to microbiological growth. The first two layers prevent fine soil particles from infiltrating and clogging the drainage layer. The second geotextile also provides limited protection for the secondary geomembrane from the drainage rock. The third geotextile layer prevents the mixing of the soil/bentonite admixture with the much more porous and granular foundation material.

A 30.5-centimeter (12-inch)-thick gravel drainage layer on the bottom of the basins between the primary and secondary liners provides a flow path for liquid to the leachate detection, collection, and removal system. A geonet (or drainage net) is located immediately above the secondary geomembrane on the basin sidewalls. The geonet functions as a preferential flow path for liquid between the liners, carrying liquid down to the gravel drainage layer and subsequently to the leachate sump. The geonet is a mesh made of high-density polyethylene, with approximately 13-millimeter (0.5-inch) openings.

The soil/bentonite layer is 91 centimeters (36 inches) thick on the bottom of the basins and 107 centimeters (42 inches) thick on the basin sidewalls; its permeability is less than 1.0E-07 centimeters (3.9E-08 inches) per second. This composite liner design, consisting of a geomembrane laid over essentially impermeable soil/bentonite, is considered best available technology for solid waste landfills and surface impoundments. The combination of synthetic and clay liners is reported in the literature to provide the maximum protection from waste migration (*Flexible Membrane Liners for Solid and Hazardous Waste Landfills - A State of the Art Review*, Forseth and Kmet 1983).

A number of laboratory tests were conducted to measure the engineering properties of the soil/bentonite admixture, in addition to extensive field tests performed on three test fills constructed near the LERF site. For establishing an optimum ratio of bentonite to soil for the soil/bentonite admixture, mixtures of various ratios were tested to determine permeability and shear strength. A mixture of 12 percent bentonite was selected for the soil/bentonite liner and tests described in the following paragraphs demonstrated that the admixture meets the desired permeability of less than 1.0E-07 centimeters (3.9E-08 inches) per second. Detailed discussion of test procedures and results is provided in *Report of Geotechnical Investigation, 242-A Evaporation and PUREX Interim Storage Basins, W-105, Project Number 90-1901* (Chen-Northern 1990).

Direct shear tests were performed according to ASTM D3080 test procedures (*Standard Test Method for Direct Shear Test of Soils Under Consolidation Drained Conditions,* ASTM 1990) on soil/bentonite samples of various ratios. Based on these results, the conservative minimum Mohr-Coulomb shear strength value of 30 degrees was estimated for a soil/bentonite admixture containing 12 percent bentonite.

The high degree of compaction of the soil/bentonite layer [92 percent per ASTM D1557 (*Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 feet-pound/feet)*, ASTM 1991)] was expected to maximize the bonding forces between the clay particles, thereby minimizing moisture transport through the liner. With respect to particle movement ('piping'), estimated fluid velocities in this low-permeability material are too low to move the soil particles. Therefore, piping is not considered a problem.

For the soil/bentonite layer, three test fills were constructed to demonstrate that materials, methods, and procedures used would produce a soil/bentonite liner that meets the EPA permeability requirement of less than 1.0E-07 centimeters (3.9E-08 inches) per second. All test fills met the EPA requirements.

A thorough discussion of construction procedures, testing, and results is provided in *Report of Permeability Testing, Soil-bentonite Test Fill, KEH W-105, Project No 86-19005* (Chen-Northern 1991).

The aqueous waste stored in the LERF is typically a dilute mixture of organic and inorganic constituents. Though isolated instances of soil liner incompatibility have been documented in the literature (*Flexible Membrane Liners for Solid and Hazardous Waste Landfills - A State of the Art Review*, Forseth and Kmet 1983), these instances have occurred with concentrated solutions that were incompatible with the geomembrane liners in which the solutions were contained. Considering the dilute nature of the aqueous waste that is and will be stored in LERF and the moderate pH, and test results demonstrating the compatibility of the high-density polyethylene liners with the aqueous waste (9090 Test Results [WHC-SD-Wl05-TD-001, 1991]), gross failure of the soil/bentonite layer is not probable.

Each basin also is equipped with a floating very low-density polyethylene cover. The cover is anchored and tensioned at the concrete wall at the top of the dikes, using a patented mechanical tensioning system. Figure C.15 depict the tension mechanism and the anchor wall at the perimeter of each basin. Additional information on the cover system is provided in Section C.5.2.5.

C.5.2.1.1 Material Specifications

Material specifications for the liner system and leachate collection system, including liners, drainage gravel, and drainage net are discussed in the following sections. Material specifications are documented in the *Final Specifications 242-A Evaporator and PUREX Interim Retention Basins* (W-105/83360/ER-0156, KEH 1990) and *Construction Specifications for 242-A Evaporator and PUREX Interim Retention Basins* (W-105, KEH 1990).

Geomembrane Liners. The high-density polyethylene resin for geomembranes for the LERF meets the material specifications listed in Table C.9. Key physical properties include thickness (60-mil [1.5-millimeters] [0.06-inch]) and impermeability (hydrostatic resistance of over 316,000 kilogram per square meter [450 pounds per square inch]). Physical properties meet National Sanitation Foundation Standard 54 (*Flexible Membrane Liners*, NSF 1985). Testing to determine if the liner material is compatible with typical dilute waste solutions was performed and documented in *9090 Test Results* (WHC-SD-Wl05-TD-001, 1991).

Soil/Bentonite Liner. The soil/bentonite admixture consists of 11.5 to 14.5 percent bentonite mixed into well-graded silty sand with a maximum particle size of 4.75 millimeters (0.187 inch) (No. 4 sieve). Test fills were performed to confirm the soil/bentonite admixture applied at LERF has hydraulic conductivity less than 1.0E-07 centimeters (3.9E-08 inches) per second, as required by WAC 173-303-650(2)(j) for new surface impoundments.

Bentonite Carpet Liner. The bentonite carpet liner consists of bentonite (90 percent sodium montmorillonite clay) in a primary backing of woven polypropylene with nylon filler fiber, and a cover fabric of open weave spunlace polyester. The montmorillonite is anticipated to retard migration of solution through the liner, exhibiting a favorable cation exchange for adsorption of some constituents (such as ammonium). Based on composition of the bentonite carpet and of the type of aqueous waste stored at LERF, no chemical attack, dissolution, or degradation of the bentonite carpet liner is anticipated.

Geotextile. The nonwoven geotextile layers consist of long-chain polypropylene polymers containing stabilizers and inhibitors to make the filaments resistant to deterioration from UV light and heat exposure. The geotextile layers consist of continuous geotextile sheets held together by needle punching. Edges of the fabric are sealed or otherwise finished to prevent outer material from pulling away from the fabric or raveling.

Drainage Gravel. The drainage layer consists of thoroughly washed and screened, naturally occurring rock meeting the size specifications for Grading Number 5 in Washington State Department of Transportation construction specifications (*Standard Specification* for *Road, Bridge, and Municipal Construction*, WSDOT 1988). The specifications for the drainage layer are given in Table C.10. Hydraulic conductivity tests (*Tests of Drainage Rock for the V797 Project, Hanford, Washington; Tests*

of Drainage Rock for the W105 Project, Hanford, Washington; Tests of Drainage Rock for the W105 Project, Hanford, Washington, CNI Word Order No. 2527, Chen-Northern 1992) showed the drainage rock used at LERF met the sieve requirements and had a hydraulic conductivity of at least 1 centimeter (0.4 inches) per second, which exceeded the minimum of at least 0.1 centimeters (0.04 inches) per second required by WAC 173-303-650(2)(j) for new surface impoundments.

Geonet. The geonet is fabricated from two sets of parallel high-density polyethylene strands, spaced 1.3 centimeters (0.5 inches) center-to-center maximum to form a mesh with minimum two strands per 2.54 centimeter (1 inch) in each direction. The geonet is located between the liners on the sloping sidewalls to provide a preferential flow path for leachate to the drainage gravel and subsequently to the leachate sump.

Leachate Collection Sump. Materials used to line the 3 by 1.8 by 0.30-meter (10 by 6 by 1-feet)-deep leachate sump, at the bottom of each basin in the northwest corner, include [from top to bottom (Figure C.17)]:

- 25 millimeter (1 inch) high-density polyethylene flat stock (supporting the leachate riser pipe)
- Geotextile
- 60-mil (1.5-millimeter [0.06 inch]) high-density polyethylene rub sheet
- Secondary composite liner:
  - 60-mil (1.5-millimeter [0.06 inch]) high-density polyethylene geomembrane
  - 91 centimeters (36 inches) of soil/bentonite admixture
  - Geotextile

Specifications for these materials are identical to those discussed previously.

Leachate System Risers. Risers for the leachate system consist of 25.4-centimeter (10-inch) and 10.2-centimeter (4-inch) pipes from the leachate collection sump to the catch basin northwest of each basin (Figure C.17). The risers lay below the primary liner in a gravel-filled trench that also extends from the sump to the concrete catch basin (Figure C.17).

The risers are high-density polyethylene pipes fabricated to meet the requirements in ASTM D1248 (ASTM 1989). The 25.4-centimeter (10-inch) riser pipe is perforated every 20.3 centimeters (8 inches) with 1.3-centimeter (0.5-inch) holes around the diameter. Level sensors and leachate pump are inserted in the 25.4-centimeter (10-inch) riser pipe to monitor and remove leachate from the sump. To prevent clogging of the pump and piping with fine particulate, the end of the riser is encased in a gravel-filled box constructed of high-density polyethylene geonet and wrapped in geotextile. The 10.2-centimeter (4-inch) riser pipe is perforated every 10.2 centimeters (4 inches) with 0.64-centimeter (1/4-inch) holes around the diameter. A level detector is inserted in the 10.2-centimeter (4-inch) riser pipe.

Leachate Pump. A deep-well submersible pump, designed to deliver approximately19 liters (5 gallons) per minute, is installed in the 25.4-centimeter (10-inch) leachate riser in each basin. Wetted parts of the leachate pump are made of 316L stainless steel, providing both corrosion resistance and durability.

C.5.2.1.2 Loads on Liner System

The LERF liner system is subjected to the following types of stresses.

Stresses from Installation or Construction Operations. Contractors were required to submit construction quality control plans that included procedures, techniques, tools, and equipment used for the construction and care of liner and leachate system. Methods for installation of all components were screened to ensure that the stresses on the liner system were kept to a minimum.

Calculations were performed to estimate the risk of damage to the secondary high-density polyethylene liner during construction (*Calculations for Liquid Effluent Retention Facility Part B Permit Application* [HNF-SD-LEF-TI-005, 1997]). The greatest risk expected was from spreading the gravel layer over the

geotextile layer and secondary geomembrane. The results of the calculations show that the strength of the geotextile was sufficiently high to withstand the stress of a small gravel spreader driving on a minimum of 15 centimeters (6 inches) of gravel over the geotextile and geomembrane. The likelihood of damage to the geomembrane lying under the geotextile was considered low.

To avoid driving heavy machinery directly on the secondary liner, a 28-meter (90-foot) conveyer was used to deliver the drainage gravel into the basins. The gravel was spread and consolidated by hand tools and a bulldozer. The bulldozer traveled on a minimum thickness of 30.5 centimeters (12 inches) of gravel. Where the conveyer assembly was placed on top of the liner, cribbing was placed to distribute the conveyer weight. No heavy equipment was allowed for use directly in contact with the geomembranes.

Additional calculations were performed to estimate the ability of the leachate riser pipe to withstand the static and dynamic loading imposed by lightweight construction equipment riding on the gravel layer (*Calculations for Liquid Effluent Retention Facility Part B Permit Application*, HNF-SD-LEF-TI-005, 1997). Those calculations demonstrated that the pipe could buckle under the dynamic loading of small construction equipment; therefore, the pipe was avoided by equipment during spreading of the drainage gravel.

Installation of synthetic lining materials proceeded only when winds were less than 24 kilometers (15 miles) per hour, and not during precipitation. The minimum ambient air temperature for unfolding or unrolling the high-density polyethylene sheets was -10 Celsius (C) (14°Fahrenheit [F]), and a minimum temperature of 0 C (32°F) was required for seaming the high-density polyethylene sheets. Between shifts, geomembranes and geotextile were anchored with sandbags to prevent lifting by wind. Calculations were performed to determine the appropriate spacing of sandbags on the geomembrane to resist lifting caused by 130-kilometer (80-mile) per hour winds (*Calculations for Liquid Effluent Retention Facility Part B Permit Application*, HNF-SD-LEF-TI-005, 1997). All of the synthetic components contain UV light inhibitors and no impairment of performance is anticipated from the short-term UV light exposure during construction. Section C.5.2.4 provides further detail on exposure prevention.

During the laying of the soil/bentonite layer and the overlying geomembrane, moisture content of the admixture was monitored and adjusted to ensure optimum compaction and to avoid development of cracks.

C.5.2.1.3 Static and Dynamic Loads and Stresses from the Maximum Quantity of Waste

When a LERF basin is full, liquid depth is approximately6.8 meters (22.2 feet). Static load on the primary liner is roughly 6,400 kilograms per square meter (9.1 pounds per square inch). Load on the secondary liner is slightly higher because of the weight of the gravel drainage layer. Assuming a density of 805 kilograms per cubic meter (50 pounds per cubic foot) for the drainage gravel [conservative estimate based on specific gravity of 2.65 (*Simplified Design of Building Foundations*, Ambrose 1988)], the secondary high-density polyethylene liner carries approximately 7,200 kilograms per square meter (10.2 pounds per square inch) of load when a basin is full.

Side slope liner stresses were calculated for each of the layers in the basin sidewalls and for the pipe trench on the northwest corner of each basin (*Calculations for Liquid Effluent Retention Facility Part B Permit Application*, HNF-SD-LEF-TI-005, 1997). Results of these calculations indicate factors of safety against shear were 1.5 or greater for the primary geomembrane, geotextile, geonet, and secondary geomembrane.

Because the LERF is not located in an area of seismic concern, as identified in Appendix VI of 40 CFR 264 and WAC 173-303-282(6)(a)(I), discussion and calculation of potential seismic events are not required.

C.5.2.1.4 Stresses Resulting from Settlement, Subsidence, or Uplift

Uplift stresses from natural sources are expected to have negligible impact on the liner. Groundwater lies approximately 62 meters (200 feet) below the LERF, average annual precipitation is only 16 centimeters (6.3 inches), and the average unsaturated permeability of the soils near the basin bottoms is high, ranging

from about 5.5E-04 centimeters (2.2E-04 inches) per second to about 1 centimeter (0.4 inches) per second (*Additional Information for Project W-105, Part B Permit Application*, Chen-Northern 1991). Therefore, no hydrostatic uplift forces are expected to develop in the soil underneath the basins. In addition, the soil under the basins consists primarily of gravel and sand, and contains few or no organic constituents. Therefore, uplift caused by gas production from organic degradation is not anticipated.

Based on the design of the soil-bentonite liner, no structural uplift stresses are present within the lining system (*Additional Information for Project W-105, Part B Permit Application*, Chen-Northern 1991).

Regional subsidence is not anticipated because neither petroleum nor extractable economic minerals are present in the strata underlying the LERF basins, nor is karst (erosive limestone) topography present.

Dike soils and soil/bentonite layers were compacted thoroughly and proof-rolled during construction. Calculation of settlement potential showed that combined settlement for the foundation and soil/bentonite layer is expected to be about 2.7 centimeters (1.1 inches). Settlement impact on the liner and basin stability is expected to be minimal (*Additional Information for Project W-105, Part B Permit Application*, Chen-Northern 1991).

C.5.2.1.5 Internal and External Pressure Gradients

Pressure gradients across the liner system from groundwater are anticipated to be negligible. The LERF is about 62 meters (200 feet) above the seasonal high water table, which prevents buildup of water pressure below the liner. The native gravel foundation materials of the LERF are relatively permeable and free draining. The 2 percent slope of the secondary liner prevents the pooling of liquids on top of the secondary liner. Finally, the fill rate of the basins is slow enough (average 190 liters [50 gallons] per minute) that the load of the liquid waste on the primary liner is gradually and evenly distributed.

To prevent the buildup of gas between the liners, each basin is equipped with 21 vents in the primary geomembrane located above the maximum water level that allow the reduction of any excess gas pressure. Gas passing through these vents exit through a single pipe that penetrates the anchor wall into a carbon adsorption filter. This filter extracts nearly all of the organic compounds, ensuring that emissions to the air from the basins are not toxic.

C.5.2.2 Liner System Location Relative to High-Water Table

The lowest point of each LERF basin is the northwest corner of the sump, where the typical subgrade elevation is 175 meters (574 feet) above mean sea level. Based on data collected from the groundwater monitoring wells at the LERF site, the seasonal high-water table is located approximately 62 meters (200 feet) or more below the lowest point of the basins. This substantial thickness of unsaturated strata beneath the LERF provides ample protection to the liner from hydrostatic pressure because of groundwater intrusion into the soil/bentonite layer. Further discussion of the unsaturated zone and site hydrogeology is provided in Addendum D, Groundwater Monitoring Plan.

C.5.2.3 Liner System Foundation

Foundation materials are primarily gravels and cobbles with some sand and silt. The native soils onsite are derived from unconsolidated Holocene sediments. These sediments are fluvial and glaciofluvial sands and gravels deposited during the most recent glacial and postglacial event. Grain-size distributions and shape analyses of the sediments indicate that deposition occurred in a high-energy environment (*Report of Geotechnical Investigation, 242-A Evaporator and PUREX Interim Storage Basins, Hanford Federal Reservation*, W-105, Project No 90-1901, Chen-Northern 1990).

Analysis of five soil borings from the LERF site was conducted to characterize the natural foundation materials and to determine the suitability of onsite soils for construction of the impoundment dikes and determine optimal design factors. Well-graded gravel containing varying amounts of silt, sand, and cobbles comprises the layer in which the basins were excavated. This gravel layer extends to depths of 10 to 11 meters (33 to 36 feet) below land surface (*Report of Geotechnical Investigation, 242-A Evaporator and PUREX Interim Storage Basins, Hanford Federal Reservation*, W-105, Project No

90-1901, Chen-Northern 1990). The basins are constructed directly on the subgrade. Excavated soils were screened to remove oversize cobbles (greater than 15 centimeters [6 inches] in the largest dimension) and used to construct the dikes.

Settlement potential of the foundation material and soil/bentonite layer was found to be low. The foundation is comprised of undisturbed native soils. The bottom of the basin excavation lies within the well-graded gravel layer, and is dense to very dense. Below the gravel is a layer of dense to very dense poorly graded and well-graded sand. Settlement was calculated for the gravel foundation soils and for the soil/bentonite layer, under the condition of hydrostatic loading from 6.8 meters (22.2 feet) of fluid depth. The combined settlement for the soils and the soil/bentonite layer is estimated to be about 2.7 centimeters (1.1 inches). This amount of settlement is expected to have minimal impact on overall liner or basin stability (*Additional Information for Project W-105, Part B Permit Application,* Chen-Northern 1991). Settlement calculations are provided in *Calculations for Liquid Effluent Retention Facility Part B Permit Application* (HNF-SD-LEF-TI-005, 1997).

The load bearing capacity of the foundation material, based on the soil analysis discussed previously, is estimated at about 48,800 kilograms per square meter (69 pounds per square inch) [maximum advisable presumptive bearing capacity (*Basic Soils Engineering,* Hough 1969)]. Anticipated static and dynamic loading from a full basin is estimated to be less than 9,000 kilograms per square meter (13 pounds per square inch) (Section C.5.2.1.3), which provides an ample factor of safety.

When the basins are empty, excess hydrostatic pressure in the foundation materials under the liner system theoretically could result in uplift and damage. However, because the native soil forming the foundations is unsaturated and relatively permeable, and because the water table is located at a considerable depth beneath the basins, any infiltration of surface water at the edge of the basin is expected to travel predominantly downward and away from the basins, rather than collecting under the excavation itself. No gas is expected in the foundation because gas-generating organic materials are not present.

Subsidence of undisturbed foundation materials is generally the result of fluid extraction (water or petroleum), mining, or karst topography. Neither petroleum, mineral resources, nor karst are believed to be present in the sediments overlying the Columbia River basalts. Potential groundwater resources do exist below the LERF. Even if these sediments were to consolidate from fluid withdrawal, their depth most likely would produce a broad, gently sloping area of subsidence that would not cause significant strains in the LERF liner system. Consequently, the potential for subsidence related failures are expected to be negligible.

Borings at the LERF site, and extensive additional borings in the 200 East Area, have not identified any significant quantities of soluble materials in the foundation soil or underlying sediments (*Hydrogeology of the 200 Are Low-Level Burial Grounds - An Interim* Report, PNL-6820, 1989). Consequently, the potential for sinkholes is considered negligible.

C.5.2.4 Liner System Exposure Prevention

Both primary and secondary geomembranes and the floating cover are stabilized with carbon black to prevent degradation from UV light. Furthermore, none of the liner layers experience long-term exposure to the elements. During construction, thin polyethylene sheeting was used to maintain optimum moisture content and provide protection from the wind for the soil/bentonite layer until the secondary geomembrane was laid in place. The secondary geomembrane was covered by the geonet and geotextile as soon as quality control testing was complete. Once the geotextile layer was completed, drainage material immediately was placed over the geotextile. The final (upper) geotextile layer was placed over the drainage gravel and immediately covered by the bentonite carpet liner. This was covered immediately, in turn, by the primary high-density polyethylene liner.

Both high-density polyethylene liners, geotextile layers, and geonet are anchored permanently to a concrete wall at the top of the basin berm. During construction, liners were held in place with many sandbags on both the basin bottoms and side slopes to prevent wind from lifting and damaging the

materials. Calculations were performed to determine the amount of fluid needed in a basin to prevent wind lift damage to the primary geomembrane. Approximately 15 to 20 centimeters (6 to 8 inches) of solution are kept in each basin to minimize the potential for uplifting the primary liner (*Calculations for Liquid Effluent Retention Facility Part B Permit Application,* HNF-SD-LEF-TI-005, 1997).

The entire lining system is covered by a very low-density polyethylene floating cover that is bolted to the concrete anchor wall. The floating cover prevents evaporation and intrusion from dust, precipitation, vegetation, animals, and birds. A patented tensioning system is employed to prevent wind from lifting the cover and automatically accommodate changes in liquid level in the basins. The cover tension mechanism consists of a cable running from the flexible geosynthetic cover over a pulley on the tension tower (located on the concrete anchor wall) to a dead man anchor. These anchors (blocks) simply hang from the cables on the exterior side of the tension towers. The anchor wall also provides for solid attachment of the liner layers and the cover, using a 6.4-millimeter (1/4-inch) batten and neoprene gasket to bolt the layers to the concrete wall, effectively sealing the basin from the intrusion of light, precipitation, and airborne dust (Figure C.15).

The floating cover, made of very low-density polyethylene with UV light inhibitors, is not anticipated to experience unacceptable degradation during the service life of the LERF. The very low-density polyethylene material contains carbon black for UV light protection, anti-oxidants to prevent heat degradation, and seaming enhancers to improve its ability to be welded. A typical manufacturer's limited warranty for weathering of very low-density polyethylene products is 20 years (Poly America, undated). This provides a margin of safety for the anticipated medium-term use of the LERF for aqueous waste storage.

The upper 3.4 to 4.6 meters (11 to 15 feet) of the sidewall liner also could experience stresses in response to temperature changes. Accommodation of thermal influences for the LERF geosynthetic layers is affected by inclusion of sufficient slack as the liners were installed. Calculations demonstrate that approximately 67 centimeters (2.2 feet) of slack is required in the long basin bottom dimension, 46 centimeters (1.5 feet) across the basin, and 34 centimeters (1.1 feet) from the bottom of the basin to the top of the basin wall (*Calculations for Liquid Effluent Retention Facility Part B Permit Application,* HNF-SD-LEF-TI-005, 1997).

Thermal stresses also are experienced by the floating cover. As with the geomembranes, sufficient slack was included in the design to accommodate thermal contraction and expansion.

C.5.2.4.1 Liner Repairs During Operations

Should repair of a basin liner be required while the basin is in operation, a sufficient quantity of the basin contents will be transferred to the 200 Area ETF or another available basin to allow access for the repair activities. After the liner around the leaking or damaged section is cleaned, repairs to the geomembrane will be made as recommended by the liner vendor or others knowledgeable in liner repair; such as a professional engineer that has adequate knowledge and experience to make recommendations in liner repairs. The criteria for selecting a person or company to make liner repair recommendations is determined by the Permittees for the LERF basins. Selection criteria could include educational background, related experience, and professional qualifications.

C.5.2.4.2 Control of Air Emissions

The floating covers limit evaporation of aqueous waste and releases of volatile organic compounds into the atmosphere. To accommodate volumetric changes in the air between the fluid in the basin and the cover, and to avoid problems related to 'sealing' the basins too tightly, each basin is equipped with a carbon filter breather vent system. Any air escaping from the basins must pass through this vent, consisting of a pipe that penetrates the anchor wall and extends into a carbon adsorption filter unit.

C.5.2.5 Liner Coverage

The liner system covers the entire ground surface that underlies the retention basins. The primary liner extends up the side slopes to a concrete anchor wall at the top of the dike encircling the entire basin (Figure C.15).

C.5.3 Prevention of Overtopping

Overtopping prevention is accomplished through administrative controls and liquid-level instrumentation installed in each basin. The instrumentation includes local liquid-level indication as well as remote indication at the 200 Area ETF. Before an aqueous waste is transferred into a basin, administrative controls are implemented to ensure overtopping will not occur during the transfer. The volume of feed to be transferred is compared to the available volume in the receiving basin. The transfer is not initiated unless there is sufficient volume available in the receiving basin or a cut-off level is established. The transfer into the basin would be stopped when this cut-off level is reached.

In the event of a 25-year, 24-hour storm event, precipitation would accumulate on the basin covers. Through the self-tensioning design of the basin covers and maintenance of adequate freeboard, all accumulated precipitation would be contained on the covers and none would flow over the dikes or anchor walls. The 25-year, 24-hour storm is expected to deliver 5.3 centimeters (2.1 inches) of rain or approximately 0.61 meter (2 feet) of snow. Cover specifications include the requirement that the covers be able to withstand the load from this amount of precipitation. Because the cover floats on the surface of the fluid in the basin, the fluid itself provides the primary support for the weight of the accumulated precipitation. Through the cover self-tensioning mechanism, there is ample 'give' to accommodate the overlying load without overstressing the anchor and attachment points.

Rainwater and snow evaporate readily from the cover, particularly in the arid Hanford Facility climate, where evaporation rates exceed precipitation rates for most months of the year. The black color of the cover further enhances evaporation. Thus, the floating cover prevents the intrusion of precipitation into the basin and provides for evaporation of accumulated rain or snow.

C.5.3.1 Freeboard

Under current operating conditions, 0.61 meter (2 feet) of freeboard is maintained at each LERF basin, which corresponds to an operating level of 6.8 meters (22.2 feet), or operating capacity 29.5 million liters (7.8 million gallons).

C.5.3.2 Immediate Flow Shutoff

The mechanism for transferring aqueous waste is either through pump transfers with on/off switches or through gravity transfers with isolation valves. These methods provide positive ability to shut off transfers immediately in the event of overtopping. Overtopping a basin during a transfer is very unlikely because the low flow rate into the basin provides long response times. At a flow rate of 284 liters (75 gallons) per minute, approximately 11 days would be required to fill a LERF basin from the maximum operating level to overflow level.

C.5.3.3 Outflow Destination

Aqueous waste in the LERF is transferred routinely to 200 Area ETF for treatment. However, should it be necessary to immediately empty a basin, the aqueous waste either would be transferred to the 200 Area ETF for treatment or transferred to another basin (or basins), whichever is faster. If necessary, a temporary pumping system may be installed to increase the transfer rate.

C.5.4 Structural Integrity of Dikes

The structural integrity of the dikes was certified attesting to the structural integrity of the dikes, signed by a qualified, registered professional engineer.

C.5.4.1 Dike Design, Construction, and Maintenance

The dikes of the LERF are constructed of onsite native soils, generally consisting of cobbles and gravels. Well-graded mixtures were specified, with cobbles up to 15 centimeters (6 inches) in the largest dimension, but not constituting more than 20 percent of the volume of the fill. The dikes are designed with a 3:1 (3 units horizontal to 1 unit vertical) slope on the basin side, and 2.25:1 on the exterior side. The dikes are approximately 8.2 meters (26.9 feet) high from the bottom of the basin, and 3 meters above (10 feet) grade.

Calculations were performed to verify the structural integrity of the dikes (*Calculations for Liquid Effluent Retention Facility Part B Permit Application*, HNF-SD-LEF-TI-005, 1997). The calculations demonstrate that the structural strength of the dikes is such that, without dependence on any lining system, the sides of the basins can withstand the pressure exerted by the maximum allowable quantity of fluid in the impoundment. The dikes have a factor of safety greater than 2.5 against failure by sliding.

C.5.4.2 Dike Stability and Protection

In the following paragraphs, various aspects of stability for the LERF dikes and the concrete anchor wall are presented, including slope failure, hydrostatic pressure, and protection from the environment.

Failure in Dike/Impoundment Cut Slopes. A slope stability analysis was performed to determine the factor of safety against slope failure. The computer program 'PCSTABL5' from Purdue University, using the modified Janbu Method, was employed to evaluate slope stability under both static and seismic loading cases. One hundred surfaces per run were generated and analyzed. The assumptions used were as follows (*Additional Information for Project W-105, Part B Permit Application*, Chen-Northern 1991):

- Weight of gravel: 2,160 kilograms per cubic meter (135 pounds per cubic foot).
- Maximum dry density of gravel: 2,315 kilograms per cubic meter (144.5 pounds per cubic foot).
- Mohr-Coulomb shear strength angle for gravel: minimum 33 degrees.
- Weight of soil/bentonite: 1,600 kilograms per cubic meter (100 pounds per cubic foot).
- Mohr-Coulomb shear strength angle for soil/bentonite: minimum 30 degrees.
- Slope: 3 horizontal: 1 vertical.
- No fluid in impoundment (worst case for stability).
- Soils at in-place moisture (not saturated conditions).

Results of the static stability analysis showed that the dike slopes were stable with a minimum factor of safety of 1.77 (*Additional Information for Project W-105, Part B Permit Application*, Chen-Northern 1991).

The standard horizontal acceleration required in the *Hanford Plant Standards*, "Standard Architectural-Civil Design Criteria, Design Loads for Facilities" (HPS-SDC-4.1, DOE-RL 1988), for structures on the Hanford Site is 0.12 g-force. Adequate factors of safety for cut slopes in units of this type generally are considered 1.5 for static conditions and 1.1 for dynamic stability (Site *Investigation Report, Non-Drag-Off Landfill* Site *Low-Level Burial Area No. 5, 200 West Area*, Golder 1989). Results of the stability analysis showed that the LERF basin slopes were stable under horizontal accelerations of 0.10 and 0.15 g-force, with minimum factors of safety of 1.32 and 1.17, respectively (*Additional Information for Project W-105, Part B Permit Application*, Chen-Northern 1991). Printouts from the PCSTABL5 program are provided in *Calculations for Liquid Effluent Retention Facility Part B Permit Application* (HNF-SD-LEF-TI-005, 1997).

Hydrostatic Pressure. Failure of the dikes due to buildup of hydrostatic pressure, caused by failure of the leachate system or liners, is very unlikely. The liner system is constructed with two essentially impermeable layers consisting of a synthetic layer overlying a soil layer with low-hydraulic conductivity. It would require a catastrophic failure of both liners to cause hydrostatic pressures that could endanger dike integrity. Routine inspections of the leachate detection system, indicating quantities of leachate

removed from the basins, provide an early warning of leakage or operational problems that could lead to excessive hydrostatic pressure. A significant precipitation event (e.g., a 25-year, 24-hour storm) will not create a hydrostatic problem because the interior sidewalls of the basins are covered completely by the liners. The covers can accommodate this volume of precipitation without overtopping the dike (Section C.5.3), and the coarse nature of the dike and foundation materials on the exterior walls provides for rapid drainage of precipitation away from the basins.

Protection from Root Systems. Risk to structural integrity of the dikes because of penetrating root systems is minimal. Excavation and construction removed all vegetation on and around the impoundments, and native plants (such as sagebrush) grow very slowly. The large grain size of the cobbles and gravel used as dike construction material do not provide an advantageous germination medium for native plants. Should plants with extending roots become apparent on the dike walls, the plants will be controlled with appropriate herbicide application.

Protection from Burrowing Mammals. The cobble size materials that make up the dike construction material and the exposed nature of the dike sidewalls do not offer an advantageous habitat for burrowing mammals. Lack of vegetation on the LERF site discourages foraging. The risk to structural integrity of the dikes from burrowing mammals is therefore minimal. Periodic visual inspections of the dikes provide observations of any animals present. Should burrowing mammals be noted onsite, appropriate pest control methods such as trapping or application of rodenticides will be employed.

Protective Cover. Approximately 7.6 centimeters (3 inches) of crushed gravel serve as the cover of the exterior dike walls. This coarse material is inherently resistant to the effect of wind because of its large grain size. Total annual precipitation is low (16 centimeters [6.3 inches]) and a significant storm event (e.g., a 25-year, 24-hour storm) could result in about 5.3 centimeters (2.1 inches) of precipitation in a 24-hour period. The absorbent capacity of the soil exceeds this precipitation rate; therefore, the impact of wind and precipitation run-on to the exterior dike walls will be minimal.

C.5.5 Piping Systems

Aqueous waste from the 242-A Evaporator is transferred to the LERF using a pump located in the 242-A Evaporator and approximately 1,500 meters (5,000 feet) of pipe, consisting of a 7.6-centimeter (3-inch) carrier pipe within a 15.2-centimeter (6-inch) outer containment pipeline. Flow through the pump is controlled by a valve, at flow rates from 150 to 300 liters (40 to 80 gallons) per minute. The pipeline exits the 242-A Evaporator below grade and remains below grade at a minimum 1.2-meter (4-feet) depth for freeze protection, until the pipeline emerges at the LERF catch basin, at the corner of each basin. All piping at the catch basin that is less than 1.2 meters (4 feet) below grade is wrapped with electric heat tracing tape and insulated for protection from freezing.

The transfer line from the 242-A Evaporator is centrifugally cast, fiberglass-reinforced epoxy thermoset resin pressure pipe fabricated to meet the requirements of ASME D2997, *Standard Specification for Centrifigally Cast Reinforced Thermosetting Resin Pipe* (ASME 1984). The 7.6-centimeter (3-inch) carrier piping is centered and supported within 15.2-centimeter (6-inch) containment piping. Pipe supports are fabricated of the same material as the pipe, and meet the strength requirements of ANSI B31.3, *Process Piping Guide* (ANSI 1987) for dead weight, thermal, and seismic loads. A catch basin is provided at the northwest corner of each basin where piping extends from the basin to allow for basin-to-basin and basin-to-200 Area ETF liquid transfers. Drawing H-2-88766, Sheets 1 through 4, provide schematic diagrams of the piping system at LERF. Drawing H-2-79604 provides details of the piping from the 242-A Evaporator to LERF.

C.5.5.1 Secondary Containment System for Piping

The 15.2-centimeter (6-inch) containment piping encases the 7.6-centimeter (3-inch) carrier pipe from the 242-A Evaporator to the LERF. All of the piping and fittings that are not directly over a catch basin or a basin liner are of this pipe-within-a-pipe construction. A catch basin is provided at the northwest corner of each basin where the inlet pipes, leachate risers, and transfer pipe risers emerge from the basin.

The catch basin consists of a 20-centimeter (8-inch)-thick concrete pad at the top of the dike. The perimeter of the catch basin has a 20-centimeter (8-inch)-high curb and the concrete is coated with a chemical resistant epoxy sealant. The concrete pad is sloped so that any leaks or spills from the piping or pipe connections will drain into the basin. The catch basin provides an access point for inspecting, servicing, and operating various systems such as transfer valving, leachate level instrumentation and leachate pump. Drawing H-2-79593 provides a schematic diagram of the catch basins.

C.5.5.2 Leak Detection System

During operation, the 242-A Evaporator receives dilute tank waste directly from the Tank Farms, treats waste by evaporation, and returns the concentrated waste to Tank Farms. The process condensate that is generated is transferred to LERF. Single-point electronic leak detection elements are installed along the transfer line at 305-meter (1,000-feet) intervals. The leak detection elements are located in the bottom of specially designed test risers. Each sensor element employs a conductivity sensor, which is connected to a cable leading back to the 242-A Evaporator Control Room. If a leak develops in the carrier pipe, fluid will travel down the exterior surface of the carrier pipe or the interior of the containment pipe. As moisture contacts a sensor unit, an alarm sounds in the 200 Area ETF Control Room, which is monitored continuously when the 242-A Evaporator is transferring liquids to LERF. If the alarm sounds, 200 Area ETF Operations staff troubleshoots the alarm and, upon verification of a leak, requests that the pump located in the 242-A Evaporator be shut down to stop the flow of process condensate through the transfer line. The 242-A Evaporator has limited surge capacity, and its operation is closely tied to supporting Tank Farm operations. The flow of process condensate to LERF is not stopped automatically by indication of a possible leak in the primary transfer line. A low-volume air purge of the annulus between the carrier pipe and the containment pipe is provided to prevent condensation buildup and minimize false alarms by the leak detection elements.

The catch basins have conductivity leak detectors that alarm in the 200 Area ETF Control Room. Leak detector alarms are monitored in the 200 Area Control Room continuously during aqueous waste transfers and at least daily when no transfers are occurring. Leaks into the catch basins drain back to the basin through a 5.1-centimeter (2-inch) drain on the floor of the catch basin.

C.5.5.3 Certification

Although an integrity assessment is not required for piping associated with surface impoundments, an assessment of the transfer liner was performed, including a hydrostatic leak/pressure test at 10.5 kilograms per square centimeter (150 pounds per square inch) gauge. A statement by an independent, qualified, registered professional engineer attesting to the integrity of the piping system is included in *Integrity Assessment Report for the 242-A Evaporator/LERF Waste Transfer Piping, Project W105* (WHC-SD-WM-ER-112, 1993), along with the results of the leak/pressure test.

C.5.6 Double Liner and Leak Detection, Collection, and Removal System

The double-liner system for LERF is discussed in Section C.5.2. The leachate detection, collection, and removal system (Figures C.16 and C.17) as designed and constructed to remove leachate that might permeate the primary liner. System components for each basin include:

- 30.5-centimeter (12-inch) layer of drainage gravel below the primary liner at the bottom of the basin.
- Geonet below the primary liner on the sidewalls to direct leachate to the gravel layer.
- 3 by 1.8 by 0.30-meter (10 by 6 by 1-feet)-deep leachate collection sump consisting of a 25 millimeter (1-inch) high-density polyethylene flat stock, geotextile to trap large particles in the leachate, and 60-mil (1.5-millimeter [0.06 inch]) high-density polyethylene rub sheet set on the secondary liner.
- 25.4-centimeter (10-inch) and 10.2-centimeter (4-inch) perforated leachate high-density polyethylene riser pipes from the leachate collection sump to the catch basin northwest of the basin.

- Leachate collection sump level instrumentation installed in the 10.2-centimeter (4-inch) riser pipe.
- Level sensors, submersible leachate pump, and 3.8-centimeter (1.5-inch) fiberglass-reinforced epoxy thermoset resin pressure piping installed in the 25.4-centimeter (10-inch) riser pipe.
- Piping at the catch basin to route the leachate through 3.8-centimeter (1.5-inch) high-density polyethylene pipe back to the basins.

The bottom of the basins has a two percent slope to allow gravity flow of leachate to the leachate collection sump. This exceeds the minimum of 1 percent slope required by WAC 173-303-650(j) for new surface impoundments. Material specifications for the leachate collection system are given in Section C.5.2.1.1.

Calculations demonstrate that fluid from a small hole (2 millimeter [0.08 inch]) (*Requirements for Hazardous Waste Landfill Design, Construction, and Closure*, EPA/625/4-89/022, 1989, p. 122) at the furthest end of the basin, under a low head situation, would travel to the sump in less than 24 hours (*Calculations for Liquid Effluent Retention Facility Part B Permit Application*, HNF-SD-LEF-TI-005, 1997). Additional calculations indicate the capacity of the pump to remove leachate is sufficient to allow time to readily identify a leak and activate emergency procedures (HNF-SD-LEF-TI-005, 1997).

The fluid level in each leachate sump is required to be maintained below 33 centimeters (13 inches) to prevent significant liquid backup into the drainage layer. The leachate pump is activated when the liquid level in the sump reaches about 28 centimeters (11 inches), and is shut off when the sump liquid level reaches about 18 centimeters (7 inches). This operation may be done either manually or automatically. Liquid level control is accomplished with conductivity probes that trigger relays selected specifically for application to submersible pumps and leachate fluids. A flow meter/totalizer on the leachate return pipe measures fluid volumes pumped and pumping rate from the leachate collection sumps, and indicates volume and flow rate on local readouts. In addition, a timer on the leachate pump tracks the cumulative pump operating time. Other instrumentation provided is real-time continuous level monitoring with readout at the catch basin. Leachate levels are monitored at least weekly. A sampling port is provided in the leachate piping system at the catch basin. The leak rate through the primary liner can be calculated using two methods: 1) measured as the leachate flow meter/totalizer readings (flow meters/totalizers are located on the outflow line from the collection sumps in the bottom of the LERF basins), and 2) calculated using the pump operating time readings multiplied by the pump flow rate (the pump runs at a constant flow rate). Calculations using either method are sufficient for compliance. For more information on inspections, refer to Addendum I.

The stainless steel leachate pump delivers 19 liters (5 gallons) per minute. The leachate pump returns draw liquid from the sump via 3.8-centimeter (1.5-inch) pipe and discharges into the basin through 3.8-centimeter (1.5-inch) high-density polyethylene pipe.

C.5.7 Construction Quality Assurance

The construction quality assurance plan and complete report of construction quality assurance inspection and testing results are provided in *242-A Evaporator Interim Retention Basin Construction Quality Assurance Plan* (CQAPLN2.QS.1149, Rev. 4, KEH 1991). A general description of construction quality assurance procedures is outlined in the following paragraphs.

For excavation of the basins and construction of the dikes, regular inspections were conducted to ensure compliance with procedures and drawings, and compaction tests were performed on the dike soils.

For the soil/bentonite layer, test fills were first conducted in accordance with EPA guidance to demonstrate compaction procedures and to confirm compaction and permeability requirements can be met. The ratio of bentonite to soil and moisture content was monitored; lifts did not exceed 15 centimeters (6 inches) before compaction, and specific compaction procedures were followed. Laboratory and field tests of soil properties were performed for each lift and for the completed test fill.

The same suite of tests was conducted for each lift during the laying of the soil/bentonite admixture in the basins.

Geotextiles and geomembranes were laid in accordance with detailed procedures and quality assurance programs provided by the manufacturers and installers. These included destructive and nondestructive tests on the geomembrane seams, and documentation of field test results and repairs.

C.5.8 Proposed Action Leakage Rate and Response Action Plan

An action leakage rate limit is established where action must be taken due to excessive leakage from the primary liner. The action leak rate is based on the maximum design flow rate the leak detection system can remove without the fluid head on the bottom liner exceeding 30 centimeters (12 inches). The limiting factor in the leachate removal rate is the hydraulic conductivity of the drainage gravel. An action leakage rate (also called the rapid or large leak rate) of 20,000 liters per hectare (2,100 gallons per acre) per day was calculated for each basin (*Calculation of the Rapid or Large Leak Rate for LERF Basins in the 200 East Area*, WHC-SD-EN-TI-009, 1992).

When it is determined that the action leakage rate has been exceeded, the response action plan will follow the actions in WAC 173-303-650(11)(b) and (c), which includes notification of Ecology in writing within 7 days, assessing possible causes of the leak, and determining whether waste receipt should be curtailed and/or the basin emptied.

C.5.9 Dike Structural Integrity Engineering Certification

The structural integrity of the dikes was certified attesting to the structural integrity of the dikes, signed by a qualified, registered professional engineer.

C.5.10 Management of Ignitable, Reactive, or Incompatible Wastes

Although ignitable or reactive aqueous waste might be received in small quantities at LERF, such aqueous waste is mixed with dilute solutions in the basins, removing the ignitable or reactive characteristics. For compatibility requirements with the LERF liner, refer to Addendum B, Waste Analysis Plan.

C.6 Air Emissions Control

This section addresses the 200 Area ETF requirements of Air Emission Standards for Process Vents, under 40 CFR 264, Subpart AA (WAC 173-303-690 incorporated by reference) and Subpart CC. The requirements of 40 CFR 264, Subpart BB (WAC 173-303-691) is not applicable because aqueous waste with 10 percent or greater organic concentration would not be acceptable for processing at the ETF.

C.6.1 Applicability of Subpart AA Standards

The Evaporator Vapor Body Vessel and thin film dryer perform operations that specifically require evaluation for applicability of WAC 173-303-690. Aqueous waste in these units routinely contains greater than 10 parts per million concentrations of organic compounds and are, therefore, subject to air emission requirements under WAC 173-303-690. Organic emissions from all affected process vents on the Hanford Facility must be less than 1.4 kilograms (3 pounds) per hour and 2.8 mega grams (3.1 tons) per year, or control devices must be installed to reduce organic emissions by 95 percent.

The vessel off gas system provides a process vent system. This system provides a slight vacuum on the 200 Area ETF process vessels and tanks (see Section C.2.5.2). Two vessel vent header pipes combine and enter the vessel off gas system filter unit consisting of a demister, electric heater, prefilter, high-efficiency particulate air filters, activated carbon absorber, and two exhaust fans (one fan in service while the other is backup). The vessel off gas system filter unit is located in the high-efficiency particulate air filter room west of the 2025-E Process Area. The vessel off gas system exhaust discharges into the larger building ventilation system, with the exhaust fans and stack located outside and immediately west of the ETF. The exhaust stack discharge point is 15.5 meters (51 feet) above ground level.

The annual average flow rate for the 200 Area ETF stack (which is the combined vessel off gas and building exhaust flow rates) is 1600 cubic meters (56,000 cubic feet) per minute with a total annual flow of approximately 8.4 E+08 cubic meters (2.9E+10 cubic feet). During waste processing, the airflow through just the vessel off gas system is about 23 standard cubic meters (800 standard cubic feet) per minute.

Organic emissions occur during waste processing, which occurs less than 310 days each year (i.e., 85 percent operating efficiency). This operating efficiency represents the maximum annual operating time for the ETF, as shutdowns are required during the year for planned maintenance outages and for reconfiguring the 200 Area ETF to accommodate different aqueous waste.

C.6.2 Process Vents - Demonstrating Compliance

This section outlines how the 200 Area ETF complies with the requirements and includes a discussion of the basis for meeting the organic emissions limits, calculations demonstrating compliance, and conditions for reevaluation.

C.6.2.1 Basis for Meeting Limits/Reductions

The 242-A Evaporator and the 200 Area ETF are currently the only operating TSD units that contribute to the Hanford Facility volatile organic emissions under 40 CFR 264, Subpart AA. The combined release rate is currently well below the threshold of 1.4 kilograms (3 pounds) per hour and 2.8 mega grams (3.1 tons) per year of volatile organic compounds. As a result, the 200 Area ETF meets these standards without the use of air pollution control devices.

The amount of organic emissions could change as waste streams are changed, or TSD units are brought online or are deactivated. The organic air emissions summation will be re-evaluated periodically as condition warrants. Operations of the TSD units operating under 40 CFR 264, Subpart AA, will be controlled to maintain Hanford Facility emissions below the threshold limits or pollution control device(s) will be added, as necessary, to achieve the reduction standards specified under 40 CFR 264, Subpart AA.

C.6.2.2 Demonstrating Compliance

Calculations to determine organic emissions are performed using the following assumptions:

- Maximum flow rate from LERF to 200 Area ETF is 568 liters (150 gallons) per minute.
- Emissions of organics from tanks and vessels upstream of the UV/OX process are determined from flow and transfer rates given in *Clean Air Act Requirements, WAC 173-400, and As-built Documentation, Project C-018H, 242-A Evaporator/PUREX Plant Process Condensate Treatment Facility* (Adtechs 1995).
- UV/OX reaction rate constants and residence times are used to determine the amount of organics, which are destroyed in the UV/OX process. These constants are given in *200 Area Effluent Treatment Facility Delisting Petition* (DOE/RL-92-72 1993).
- All organic compounds that are not destroyed in the UV/OX process are assumed to be emitted from the tanks and vessels into the vessel off gas system.
- No credit for removal of organic compounds in the vessel off gas system carbon absorber unit is taken. The activated carbon absorbers are used if required to reduce organic emissions.

The calculation to determine organic emissions consists of the following steps:

1. Determine the quantity of organics emitted from the tanks or vessels upstream of the UV/OX process, using transfer rate values.
2. Determine the concentration of organics in the waste after the UV/OX process using UV/OX reaction rates and residence times. If the 200 Area ETF is configured such that the UV/OX process is not used, a residence time of zero is used in the calculations (i.e., none of the organics are destroyed).

3. Assuming all the remaining organics are emitted, determine the rate which the organics are emitted using the feed flow rate and the concentrations of organics after the UV/OX process.
4. The amount of organics emitted from the vessel off gas system is the sum of the amount calculated in steps 1 and 3.

The organic emission rates and quantity of organics emitted during processing are determined using these calculations and are included in the Hanford Facility Operating Record, LERF and 200 Area ETF file.

C.6.2.3 Reevaluating Compliance with Subpart AA Standards

Calculations to determine compliance with Subpart AA will be reviewed when any of the following conditions occur at the 200 Area ETF:

- Changes in the maximum feed rate to the 200 Area ETF (i.e., greater than the 568 liters (150 gallons) per minute flow rate).
- Changes in the configuration or operation of the 200 Area ETF that would modify the assumptions given in Section C.6.2.2 (e.g., taking credit for the carbon absorbers as a control device).
- Annual operating time exceeds 310 days.

C.6.3 Applicability of Subpart CC Standards

The air emission standards of 40 CFR 264, Subpart CC apply to tank, surface impoundment, and container storage units that manage wastes with average volatile organic concentrations equal to or exceeding 500 parts per million by weight, based on the hazardous waste composition at the point of origination (61 FR 59972). However, TSD units that are used solely for management of mixed waste are exempt. Mixed waste is managed at the LERF and 200 Area ETF and dangerous waste could be treated and stored at these TSD units.

TSD owner/operators are not required to determine the concentration of volatile organic compounds in a hazardous waste if the wastes are placed in waste management units that employ air emission controls that comply with the Subpart CC standards. Therefore, the approach to Subpart CC compliance at the LERF and 200 Area ETF is to demonstrate that the LERF and 200 Area ETF meet the Subpart CC control standards (40 CFR 264.1084 – 40 CFR 264.1086).

C.6.3.1 Demonstrating Compliance with Subpart CC for Tanks

Since the 200 Area ETF tanks already have process vents regulated under 40 CFR 264, Subpart AA (WAC 173-303-690), they are exempt from Subpart CC [40 CFR 264.1080(b)(8)].

C.6.3.2 Demonstrating Compliance with Subpart CC for Containers

Container Level 1 and Level 2 standards are met at the 200 Area ETF by managing all dangerous and/or mixed wastes in U.S. Department of Transportation containers [40 CFR 264.1086(f)]. Level 1 containers are those that store more than 0.1 cubic meters (3.5 cubic feet) and less than or equal to 0.46 cubic meters (16 cubic feet). Level 2 containers are used to store more than 0.46 cubic meters (16 cubic feet) of waste, which are in 'light material service'. Light material service is defined where a waste in the container has one or more organic constituents with a vapor pressure greater than 0.3 kilograms per square meter (0.04 pounds per square inch) at 20˚C (68˚F), and the total concentration of such constituents is greater than or equal to 20 percent by weight.

The monitoring requirements for Level 1 and Level 2 containers must include a visual inspection when the container is received at the 200 Area ETF, when waste is initially placed in the container, and at least once every 12 months when stored onsite for 1 year or more.

If compliant containers are not used at the 200 Area ETF, alternate container management practices are used that comply with the Level 1 standards. Specifically, the Level 1 standards allow for a "container equipped with a cover and closure devices that form a continuous barrier over the container openings such

that when the cover and closure devices are secured in the closed position there are no visible holes, gaps, or other open spaces into the interior of the container. The cover may be a separate cover installed on the container...or may be an integral part of the container structural design…" [40 CFR 264.1086(c)(1)(ii)]. An organic-vapor-suppressing barrier, such as foam, may also be used [40 CFR 264.1086(c)(1)(iii)]. Section C.3 provides detail on container management practices at the 200 Area ETF.

Container Level 3 standards apply when a container is used for the "treatment of a hazardous waste by a waste stabilization process" [40 CFR 264.1086(2)]. Because treatment in containers using the stabilization process is not provided at the 200 Area ETF, these standards do not apply.

C.6.3.3 Demonstrating Compliance with Subpart CC for Surface Impoundments

The Subpart CC emission standards are met at LERF using a floating membrane cover that is constructed of very-low-density polyethylene that forms a continuous barrier over the entire surface area [40 CFR 264.1085(c)]. This membrane has both organic permeability properties equivalent to a high-density polyethylene cover and chemical/physical properties that maintain the material integrity for the intended service life of the material. The additional requirements for the floating cover at the LERF have been met (Section C.5.2.4).

C.7 Engineering Drawings

C.7.1 Liquid Effluent Retention Facility

Drawings of the containment systems at the LERF are summarized in Table C.1. Because the failure of these containment systems at LERF could lead to the release of dangerous waste into the environment, modifications that affect these containment systems will be submitted to the Washington State Department of Ecology, as a Class 1, 2, or 3 Permit modification, as required by WAC 173-303-830.

Table C.1. Liquid Effluent Retention Facility Containment System

LERF System	Drawing Number	Drawing Title
Bottom Liner	H-2-79590, Sheet 1	Civil Plan, Sections & Det; Cell Basin Bottom Liner
Top Liner	H-2-79591, Sheet 1	Civil Plan, Sections & Det; Cell Basin Top Liner
Catch Basin	H-2-79593, Sheet 1, 3-5	Civil Plan, Sections & Det; Catch Basin

The drawings identified in Table C.2 illustrate the piping and instrumentation configuration within LERF, and of the transfer piping systems between the LERF and the 242-A Evaporator. These drawings are provided for general information, and to demonstrate the adequacy of the design of the LERF as a surface impoundment.

Table C.2. Liquid Effluent Retention Facility Piping and Instrumentation

LERF System	Drawing Number	Drawing Title
Transfer Piping to 242-A Evaporator	H-2-79604, Sheet 1	Piping Plot & Key Plans; 242-A Evap Cond Stream
LERF Piping and Instrumentation	H-2-88766, Sheet 1	P&ID; LERF Basin & ETF Influent Evaporator
	H-2-88766, Sheet 2	P&ID; LERF Basin & ETF Influent
	H-2-88766, Sheet 3	P&ID; LERF Basin & ETF Influent
	H-2-88766, Sheet 4	P&ID; LERF Basin & ETF Influent
Legend	H-2-89351, Sheet 1	Piping & Instrumentation Diagram - Legend

C.7.2 200 Area Effluent Treatment Facility

Drawings of the secondary containment systems for the 200 Area ETF containers, and tanks and process units, and for the Load-In Station tanks are summarized in Table C.3. Because the failure of the secondary containment systems could lead to the release of dangerous waste into the environment, modifications, which affect the secondary containment systems, will be submitted to the Washington State Department of Ecology, as a Class 1, 2, or 3 Permit modification, as required by WAC 173-303-830.

Table C.3. Building 2025-E and Load-In Station Secondary Containment Systems

200 Area ETF Process Unit	Drawing Number	Drawing Title
Surge Tank, Process/2025-E Container Storage Areas and Trenches - Foundation and Containment	H-2-89063, Sheet 1	Structural Foundation & Grade Beam Plan
Sump Tank Containment	H-2-89065, Sheet 1	Structural Foundation, Sections & Details
Verification Tank Foundation and Containment	H-2-89068, Sheet 1	Structural Verification Tank Foundations
Load-In Station Foundation and Containment	H-2-817970, Sheet 1	Structural ETF Truck Load-in Facility Plans and Sections
Load-In Station Foundation and Containment	H-2-817970, Sheet 2	Structural ETF Truck Load-in Facility Plans and Sections

The drawings identified in Table C.4 provide an illustration of the piping and instrumentation configuration for the major process units and tanks at the 200 Area ETF, and the Load-In Station tanks. Drawings of the transfer piping systems between the LERF and 200 Area ETF, and between the Load-In Station and the 200 Area ETF also are presented in this table. These drawings are provided for general information, and to demonstrate the adequacy of the design of the tank systems.

Table C.4. Major Process Units and Tanks at Building 2025-E and Load-In Station

200 Area ETF Process Unit	Drawing Number	Drawing Title
Load-In Station	H-2-817974, Sheet 1	P&ID – ETF Truck Load-In Facility
Load-In Station	H-2-817974, Sheet 2	P&ID – ETF Truck Load-In Facility
Surge Tank	H-2-89337, Sheet 1	P&ID – Surge Tank System
UV/Oxidation	H-2-88976, Sheet 1	P&ID – UV Oxidizer Part 1
UV/Oxidation	H-2-89342, Sheet 1	P&ID – UV Oxidizer Part 2
Reverse Osmosis	H-2-88980, Sheet 1	P&ID – 1st RO Stage
Reverse Osmosis	H-2-88982, Sheet 1	P&ID – 2nd RO Stage
IX/Polishers	H-2-88983, Sheet 1	P&ID – Polisher
Verification Tanks	H-2-88985, Sheet 1	P&ID – Verification Tank System
Evaporator Vapor Body Vessel	H-2-89335, Sheet 1	P&ID – Evaporator
Thin Film Dryer	H-2-88989, Sheet 1	P&ID – Thin Film Dryer
Transfer Piping from LERF to building 2025-E	H-2-88768, Sheet 1	Piping Plan/Profile 4"– 60M-002-M17 and 3"-60M-001-M17
Transfer Piping from Load-In Station to building 2025-E	H-2-817969, Sheet 1	Civil – ETF Truck Load-In Facility Site Plan

Table C.5. 200 Area Effluent Treatment Facility Tank Systems Information

Tank Description	Material of Construction[1]	Unit of Measure	Maximum Tank Capacity[2] liter/gallon	Inner diameter meter/feet	Height meter/feet	Shell Thickness[3] centimeter/inch
Load-In Station tanks 2025ED-59A-TK-109 2025ED-59A TK-117	304 SS	Metric	34,350	3.6	4.7	0.64
		Standard	9,100	12	15.4	1/4
Load-In Station tank 2025ED-59A-TK-1	FRP	Metric	26,000	3.0	3.8	0.48 (dome) 0.63 (walls & bottom)
		Standard	6,900	10	11.5	3/16 1/4
Surge tank 2025E-60A TK 1	304 SS	Metric	462,000	7.9	9.2	0.48
		Standard	122, 000	26	30	3/16
pH adjustment tank 2025E-60C-TK-1	304 SS	Metric	16,700	3.0	2.5	0.64
		Standard	4,400	10	8	1/4
First RO feed tank 2025E-60F-TK-l	304 SS	Metric	20,600	3.0	3.2	0.64
		Standard	5,400	10	10.5	1/4
Second RO feed tank 2025E-60F-TK-2	304 SS	Metric	9,000	3.0 x 1.5	1.5	0.48 w/rib stiffeners
		Standard	2,400	10 X 5	5	3/16
Effluent pH adjustment tank 2025E-60C-TK-2	304 SS	Metric	14,400	2.4	3.6	0.64
		Standard	3,800	8	12	1/4
Verification tanks 2025E-60H-TK-1A 2025E-60H-TK-1B 2025E-60H-TK-1C	Carbon steel with epoxy lining	Metric	3,025,739	18.3	11.4	0.79
		Standard	799,316	60	37	5/16
Secondary waste receiving tanks 2025E-60I-TK-1A 2025E-60I-TK-1B	304 SS	Metric	73,800	4.3	5.7	0.64
		Standard	19,500	14	18.7	1/4

Tank Description	Material of Construction[1]	Unit of Measure	Maximum Tank Capacity[2] liter/gallon	Inner diameter meter/feet	Height meter/feet	Shell Thickness[3] centimeter/inch
Concentrate tanks 2025E-60J-TK-1A 2025E-60J-TK-1B	316L SS	Metric	24,900	3.0	3.8	0.64
		Standard	6580	10	11.5	1/4
Evaporator Vapor Body Vessel 2025E-60I EV 1	Alloy 625	Metric	20,000	2.4	6.8	variable
		Standard	5300	8	22	
Distillate flash tank 2025E-60I-TK-2	304 SS	Metric	950	0.76	Length 2.2	0.7
		Standard	250	2.5	7	9/32
Sump Tank 1 2025E-20B-TK-l	304 SS	Metric	6,900	1.5 x 1.5	3.4	0.48
		Standard	1,800	5 X 5	11	3/16
Sump Tank 2 2025E-20B-TK-2	304 SS	Metric	6,700	1.5 x 1.5	3.4	0.48
		Standard	1,770	5 X 5	11	3/16

[1]Type 304 SS, 304L, 316 SS and alloy 625 provide corrosion protection.

[2]The maximum tank capacity is identified in CHPRC-01900, Revision 2

[3]The nominal thickness of 200 Area ETF tanks is represented.

304 SS = stainless steel type 304 or 304L.

316L SS = stainless steel type 316L

FRP = Fiberglass-reinforced plastic.

Table C.6. 200 Area Effluent Treatment Facility Additional Tank System Information

Tank Description	Liner Materials	Pressure Controls	Foundation Materials	Structural Support	Seams	Connections
Load-In Station tanks 2025ED-59A-TK-109 2025ED-59A-TK-117	None	vent to atmosphere	concrete slab	SS skirt bolted to concrete	welded	flanged
Load-In Station tank 2025ED-59A-TK-1	None	vent to atmosphere	concrete slab	bolted to concrete	none	flanged
Surge tank 2025E-60A-TK-1	None	vacuum breaker valve/vent to VOG	reinforced concrete ring plus concrete slab	structural steel on concrete base	welded	flanged
pH adjustment tank 2025E-60C-TK-1	None	vent to VOG	concrete slab	carbon steel skirt	welded	flanged
First RO feed tank 2025E-60F-TK-l	None	vent to VOG	concrete slab	carbon steel skirt	welded	flanged
Second RO feed tank 2025E-60F-TK-2	None	vent to VOG	concrete slab	carbon steel frame	welded	flanged
Effluent pH adjustment tank 2025E-60C-TK-2	None	vent to VOG	concrete slab	carbon steel skirt	welded	flanged
Verification tanks 2025E-60H-TK-lA 2025E-60H-TK-1B 2025E-60H-TK-1C	Epoxy	filtered vent to atmosphere	reinforced concrete ring plus concrete slab	structural steel on concrete base	welded	flanged
Secondary waste receiving tanks 2025E-60I-TK-1A 2025E-60I-TK-1B	None	vent to VOG	concrete slab	carbon steel skirt	welded	flanged
Concentrate tanks 2025E-60J-TK-1A	None	vent to VOG	concrete slab	carbon steel skirt	welded	flanged

Tank Description	Liner Materials	Pressure Controls	Foundation Materials	Structural Support	Seams	Connections
2025E-60J-TK-1B						
Evaporator Vapor Body Vessel (2025E 60I EV 1)	None	pressure indicator/pressure relief valve vapor vent to DFT/VOG	concrete slab	carbon steel frame	welded	flanged
Distillate flash tank 2025E-60I-TK-2	None	Pressure relief valve/vent to vent gas cooler/VOG	concrete slab	carbon steel I-beam and cradle	welded	flanged
Sump Tank 1 2025E-20B-TK-l	None	vent to VOG	concrete containment	reinforced concrete containment basin	welded	flanged
Sump Tank 2 2025E-20B-TK-2	None	vent to VOG	concrete containment	reinforced concrete containment basin	welded	flanged

DFT = distillate flash tank

VOG = vessel off gas system

Table C.7. Ancillary Equipment and Material Data

System	Ancillary Equipment	Number	Material
Load-In Station tanks	Load-In Station/transfer pumps (2)	2025ED-P-103A/-103B	316 SS
		2025ED-P-001A/-001B	Cast iron
	Load-In Station filters (6)	59A-FL-001/-002/-003/ -004/-005/-006	304 SS
Surge tank	Surge tank pumps (3)	2025E-60A-P-1A/-1B/-1C	304 SS
Rough filter	Rough filter	2025E-60B-FL-1	304 SS
UV/OX	UV oxidation inlet cooler	2025E-60B-E-1	316 SS
	UV oxidizers (4)	2025E-60D-UV-1A/-1B/-2A/-2B	316 SS
pH adjustment	pH adjustment pumps (2)	2025E-60C-P-1A/-1B	304 SS
Peroxide decomposer	H2O2 decomposers (2)	2025E-60D-CO-1A/-1B	CS with epoxy coating
Fine filter	Fine filter	2025E-60B-FL-2	304 SS
Degasification	Degasification column inlet cooler	2025E-60E-E-1	316 SS
	Degasification column	2025E-60E-CO-1	FRP
	Degasification pumps (2)	2025E-60E-P-1A/-1B	316 SS
RO	Feed/booster pumps (6)	2025E-60F-P-1A/-1B/-2A/-2B/-3A/-3B	304 SS
	Reverse osmosis arrays (21)	2025E-60F-RO-01 through -21	Membranes: polyamide Outer piping: 304 SS
IX/Polishers	Polishers (3)	2025E-60G-IX-1A/-1B-1C	CS with epoxy coating
	Resins strainers (3)	2025E-60G-S-1A/-1B/-1C	304 SS
Effluent pH adjustment	Recirculation/transfer pumps (2)	2025E-60C-P-2A/-2B	304 SS/PVC
Verification tanks	Return pump	2025E-60H-P-1	304 SS
	Transfer pumps (2)	2025E-60H-P-2A/-2B	
Secondary waste receiving tanks	Secondary waste feed pumps (2)	2025E-60I-P-1A/-1B	304 SS
Evaporator Vapor Body Vessel system	Feed/distillate heat exchanger	2025E-60I-E-02	Tubes: 316 SS Shell: 304 SS
	Heater (reboiler)	2025E-60I-E-01	Tubes: alloy 625 Shell: 304 SS
	Recirculation pump	2025E-60I-P-02	316 SS
	Concentrate transfer pump	2025E-60I-P-04	316 SS
	Entrainment separator	2025E-60I-DE-01	Top section: 316 SS Bottom section: alloy 625

System	Ancillary Equipment	Number	Material
	Vapor compressor (incl. silencers)	2025E-60I-C-01	304 SS
	Silencer drain pump	2025E-60I-P-06	316 SS
	Level control tank	2025E-60I-TK-5	304 SS
	Distillate flash tank pump	2025E-60I-P-03	316 SS
Concentrate tanks	Concentrate circulation pumps (2)	2025E-60J-P-1A/-1B	316 SS
Thin film dryer	Concentrate feed pump	2025E-60J-P-2	316 SS
	Thin film dryer	2025E-60J-D-1	Interior surfaces: alloy 625 Rotor and blades: 316 SS
	Powder hopper	2025E-60J-H-1	316 SS
	Spray condenser	2025E-60J-DE-01	316 SS
	Distillate condenser	2025E-60J-CND-01	Tubes: 304 SS Shell: CS
	Dryer distillate pump	2025E-60J-P-3	316 SS
Resin dewatering	Dewatering pump	2025E-80E-P-1	

Table C.8. Concrete and Masonry Coatings

Location	Product Name	Applied Film Thickness, Estimated	
		Mils	Inches
2025-E Process Area, Truck Bay, and Container Storage Areas			
Floor: Topcoat	Chemproof PermaCoat 4000[1]	2 coats at 12-16 mils	0.012 0.016 inches
Walls to 7 feet, Doors & Jambs	Chemproof PermaCoat 4000 Vertical[1]	2 coats at 12-16 mils	0.012-0.016 inches
Load-In Station Tank Pit			
Floor and Walls Topcoat	Elasti Liner I/II[2,3]	80 mils	0.08 inches
Floor and Walls: Primer	Techni-Plus E[2]	5-7 mils	0.005-0.007 inches
Surge Tank and Verification Tank Berms			
Floors (and Walls at Surge Tank): Topcoat	Elasti-Liner I[2]	80 mils	0.08 inches
Floors (and Walls at Surge Tank): Primer	Techni-Plus E3[2]	5.0-7.0 mils	0.005 0.007 inches

[1]PermaCoat is a trademark of Chemproof Polymers, Inc.

[2]Elasti-Liner and Techni-Plus are trademarks of KCC Corrosion Control, Inc.

[3]Elasti-Liner I or a combination of Elasti-liner I and Elasti-liner II

Table C.9. Geomembrane Material Specifications

Property	Value
Specific gravity	0.932 to 0.950
Melt flow index	gram/10 minutes, maximum (0.04 ounce/10 minute, maximum)
Thickness (thickness of flow marks shall not exceed 200 percent of the nominal liner thickness)	60 mil ±10% (1.5 millimeter [0.06 inches] ± 10%)
Carbon black content	1.8 to 3%, bottom liner 2 to 3% top liner
Tensile properties (each direction)	
Tensile strength at yield	21.5 kgf/centimeter width, minimum 120 pounds/inch width, minimum
Tensile strength at break	32.2 kgf/centimeter width, minimum 180 pounds/inch width, minimum
Elongation at yield	10%, minimum
Elongation at break	500%, minimum
Tear resistance	13.6 kgf, minimum 30 pounds, minimum
Puncture resistance	31.3 kgf, minimum 69 pounds, minimum
Low temperature/brittleness	-400 C (-688°F), maximum
Dimensional percent change each direction)	±2%, maximum
Environmental stress crack	750 hour, minimum
Water absorption	0.1% maximum and weight change
Hydrostatic resistance	316,000 kgf/meter^2 450 pounds/inch^2
Oxidation induction time (200 C/l atm. O_2)	90 minutes

Reference: *Construction Specifications for 242-A Evaporator and PUREX Interim Retention Basins* (W 105, KEH 1990). Format uses NSF 54 table for high-density polyethylene as a guide (NSF 1985). However, RCRA values for dimensional stability and environmental stress crack have been added.

kgf = kilograms force

Table C.10. Drainage Gravel Specifications

Property	Value
Sieve Size	
25 millimeters (1 inches)	100 wt.% passing
19 millimeters (0.75 inches)	80 – 100 wt.% passing
9.5 millimeters (0.375 inches)	10 – 40 wt.% passing
4.75 millimeters (0.187 inches)	0 – 4 wt.% passing
Permeability	0.1 centimeters (0.04 inches)/second, minimum

Reference: Sieve size is from WSDOT M41-10-88, Section 9.03.1(3)C for Grading No. 5 (WSDOT 1988). Permeability requirement is from WAC 173-303-650(2)(j) for new surface impoundments.

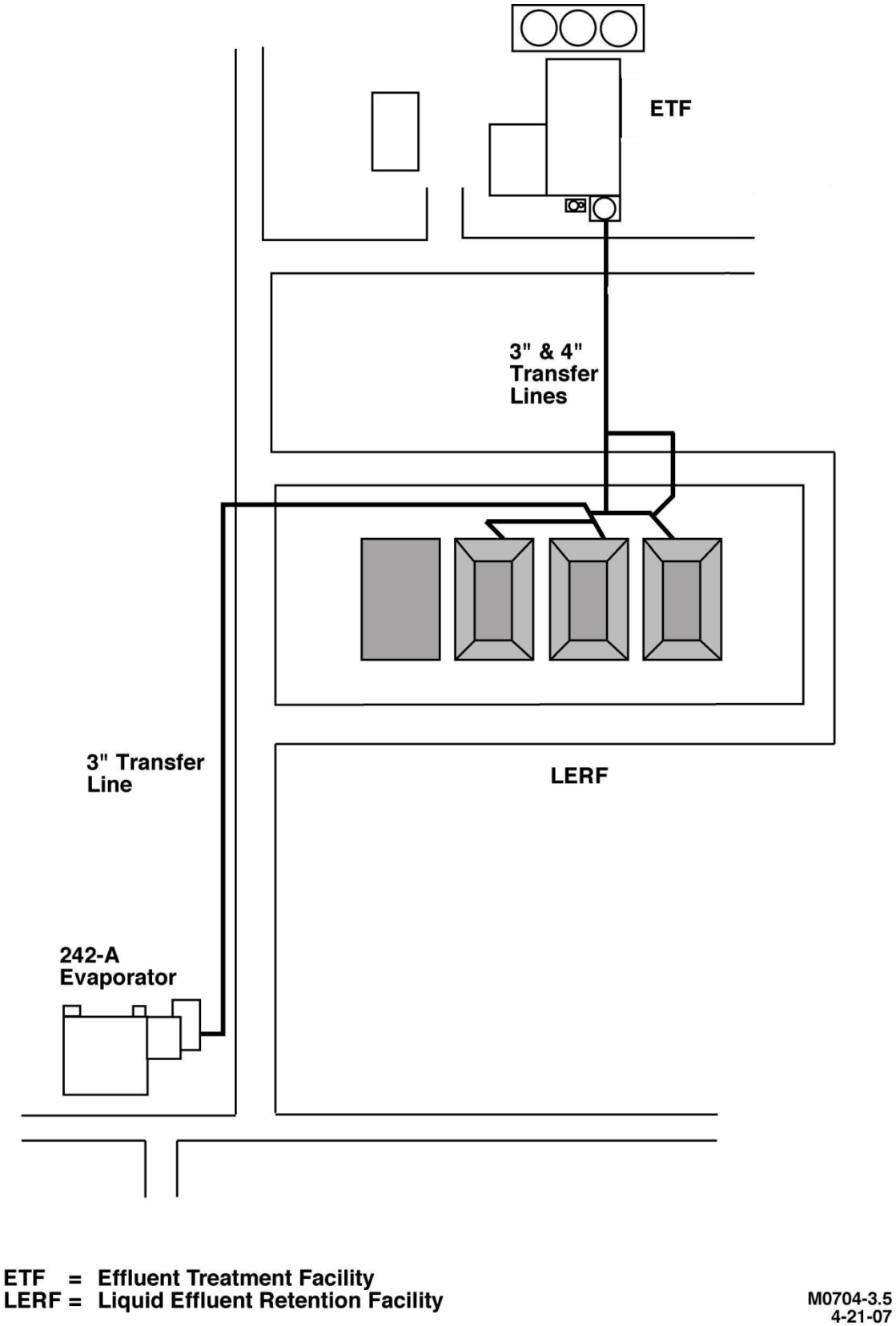


Figure C.1. Liquid Effluent Retention Facility Layout

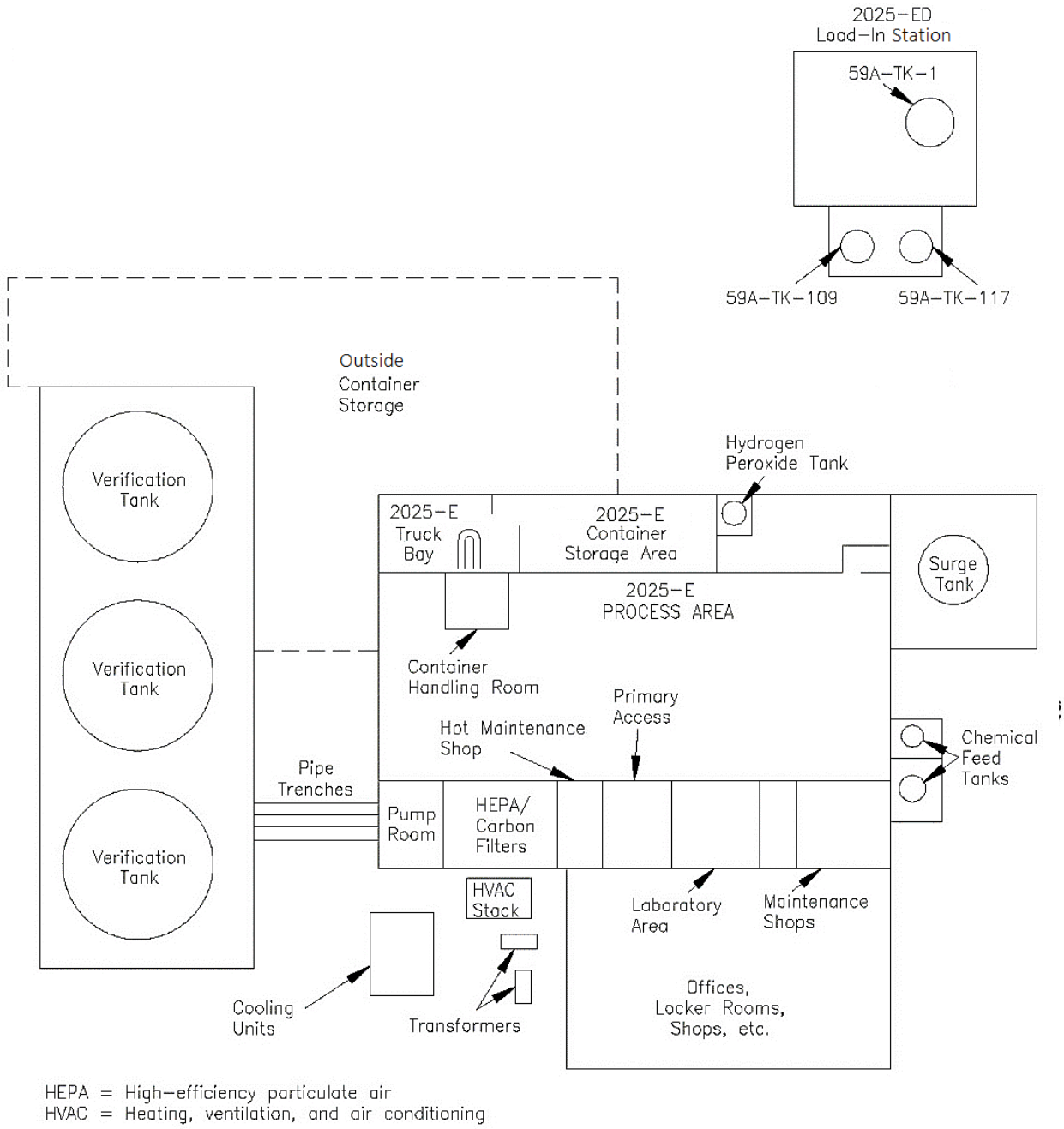


Figure C.2. Plan View of the 200 Area Effluent Treatment Facility

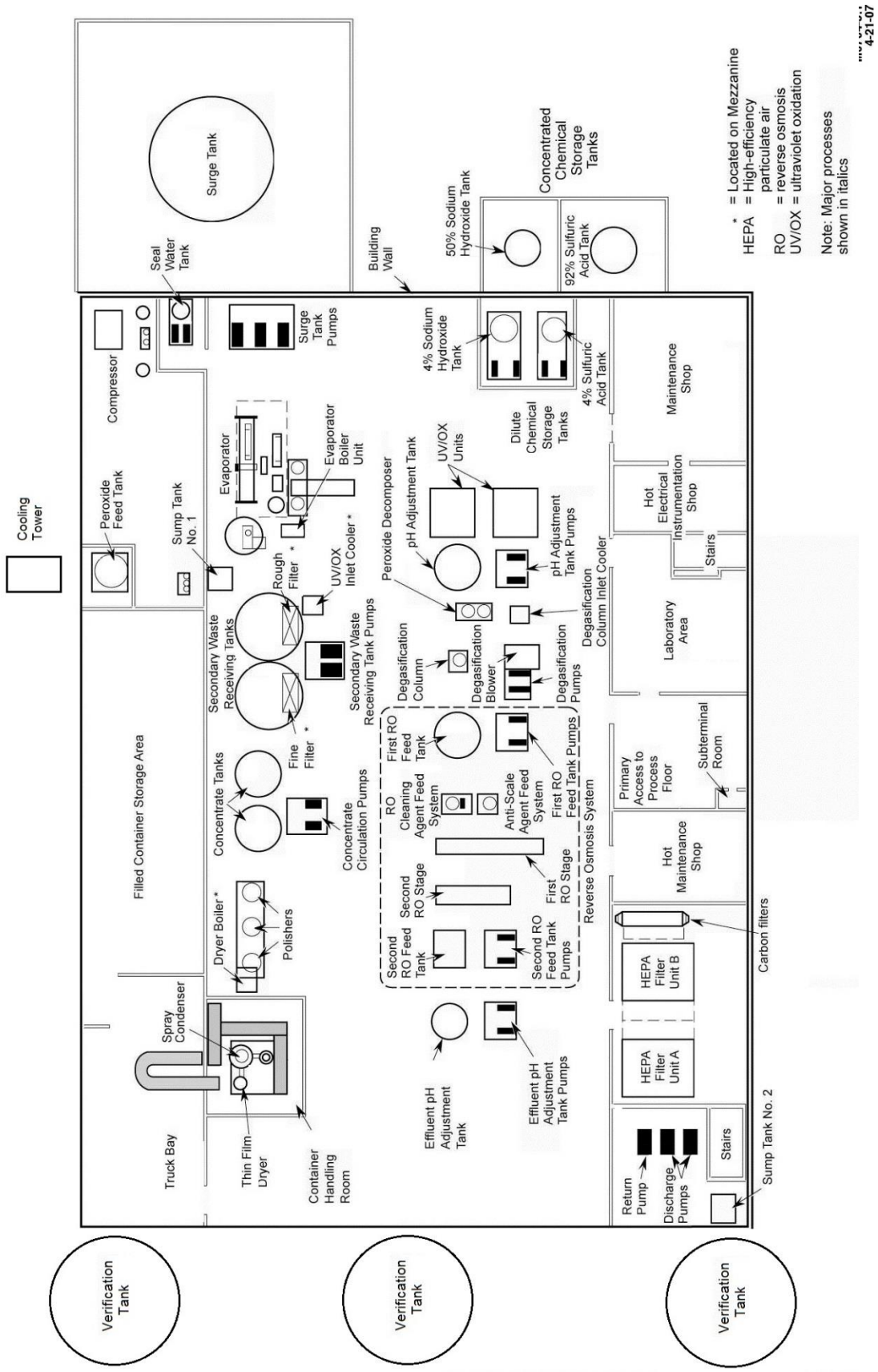


Figure C.3. Building 2025-E Ground Floor Plan

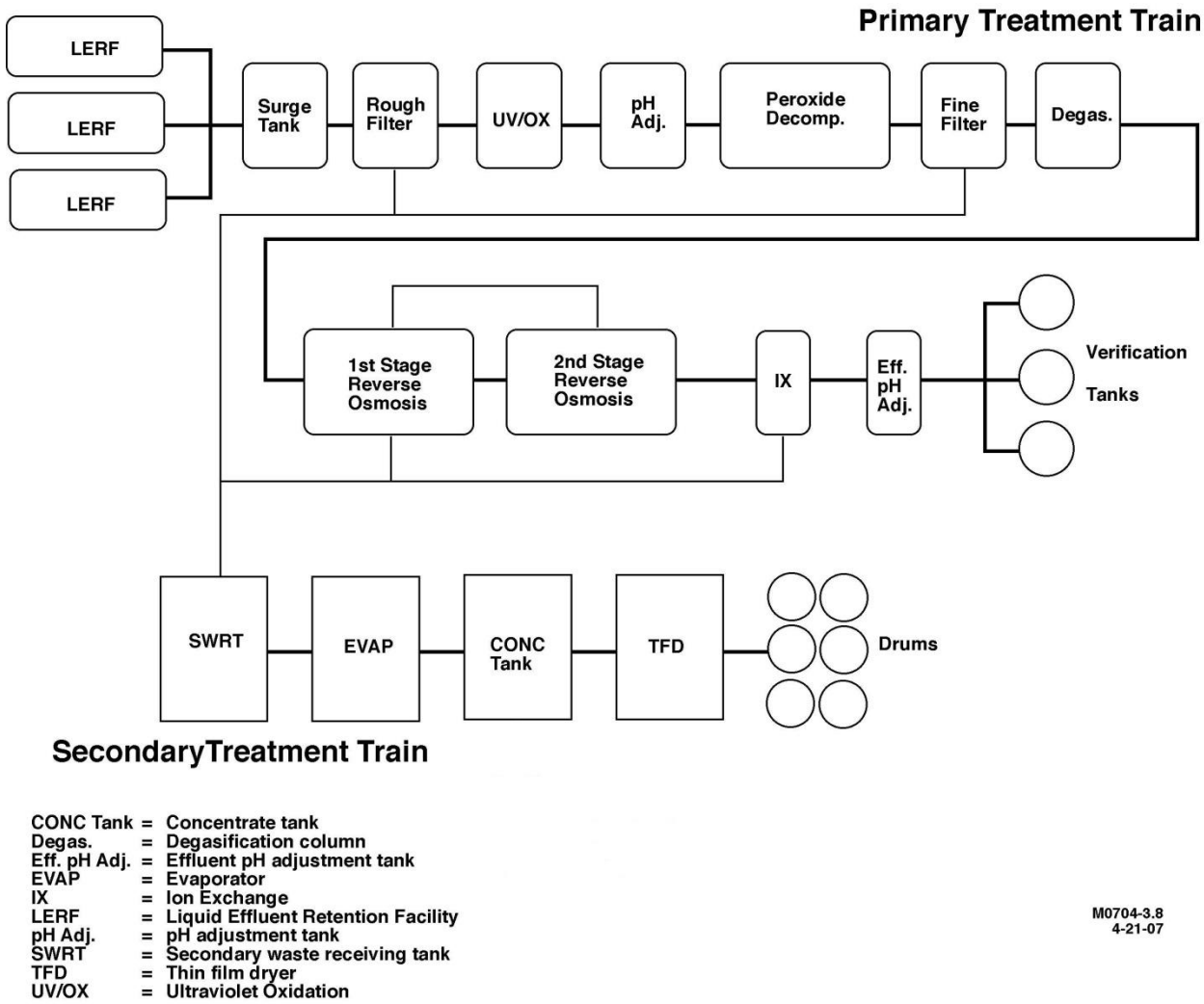


Figure C.4. Example - 200 Area Effluent Treatment Facility Configuration 1

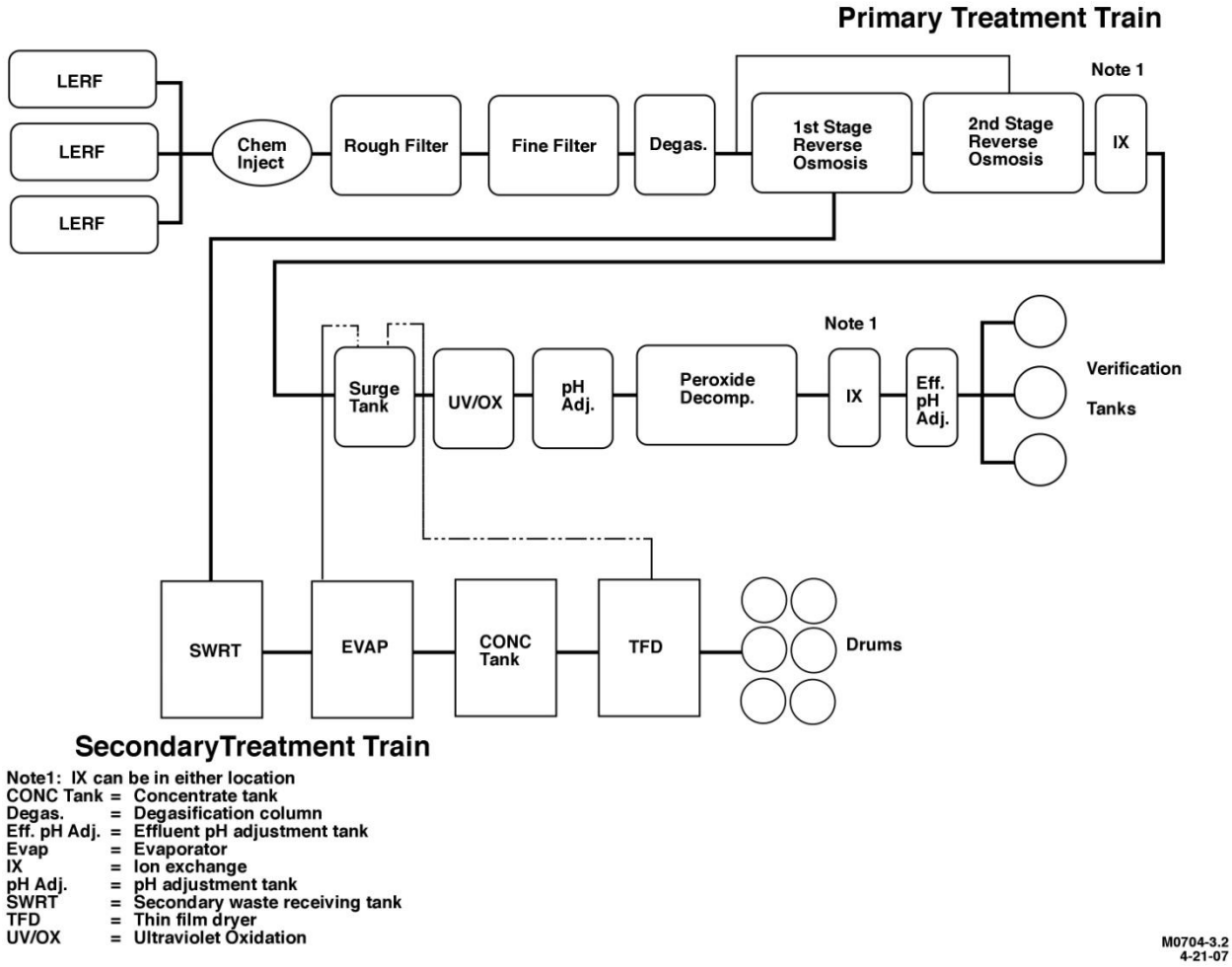


Figure C.5. Example - 200 Area Effluent Treatment Facility Configuration 2

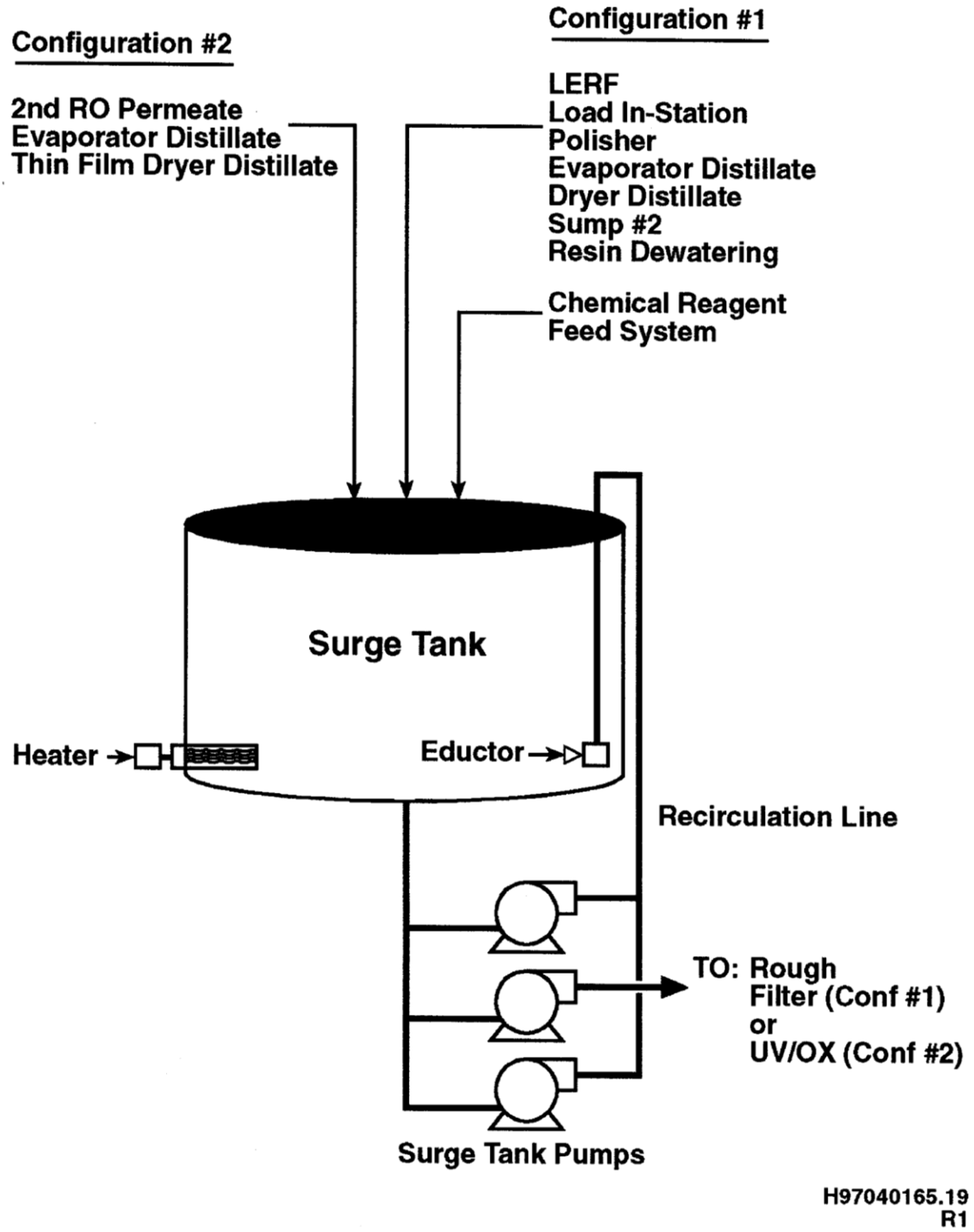


Figure C.6. Surge Tank

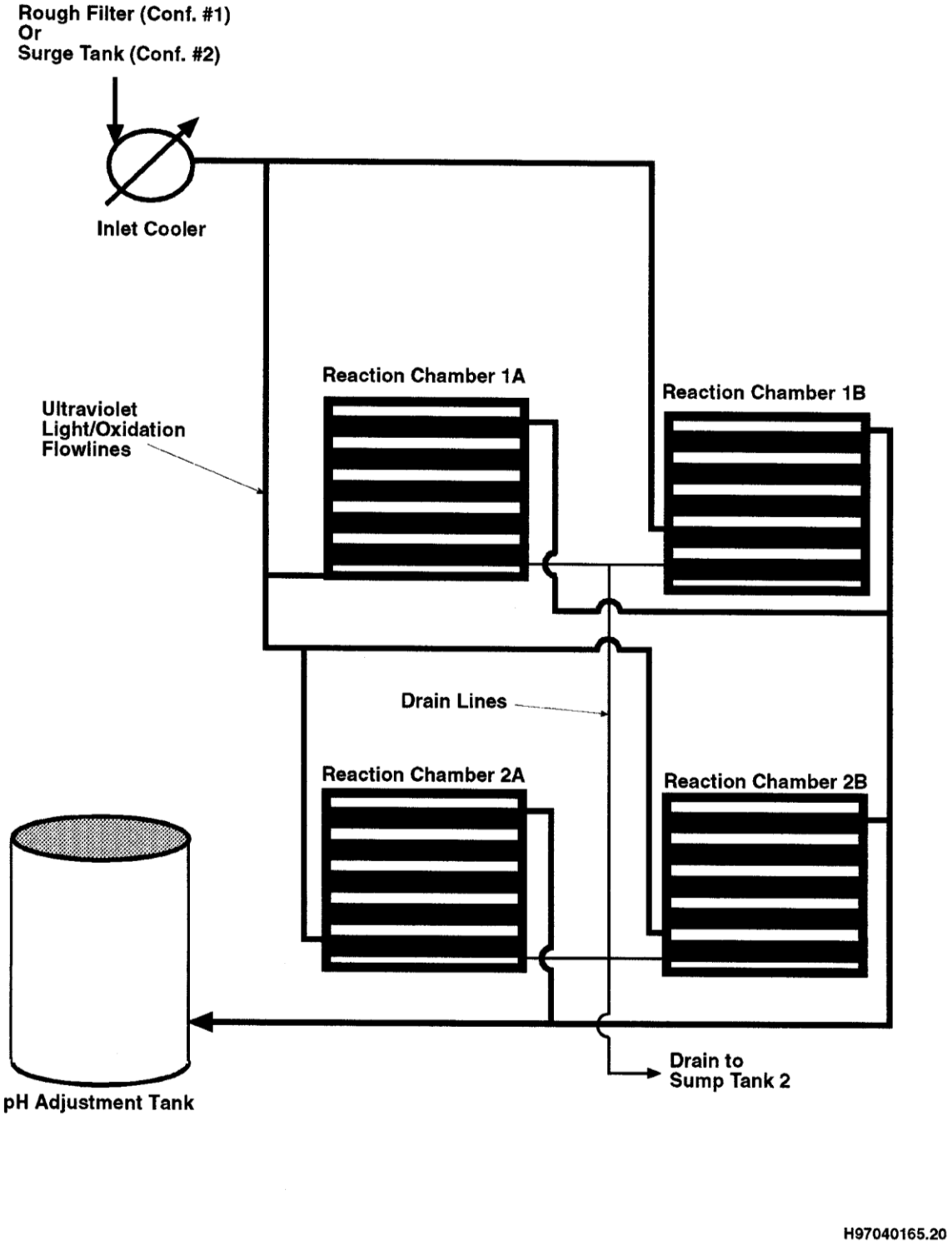


Figure C.7. Ultraviolet Light/Oxidation Unit

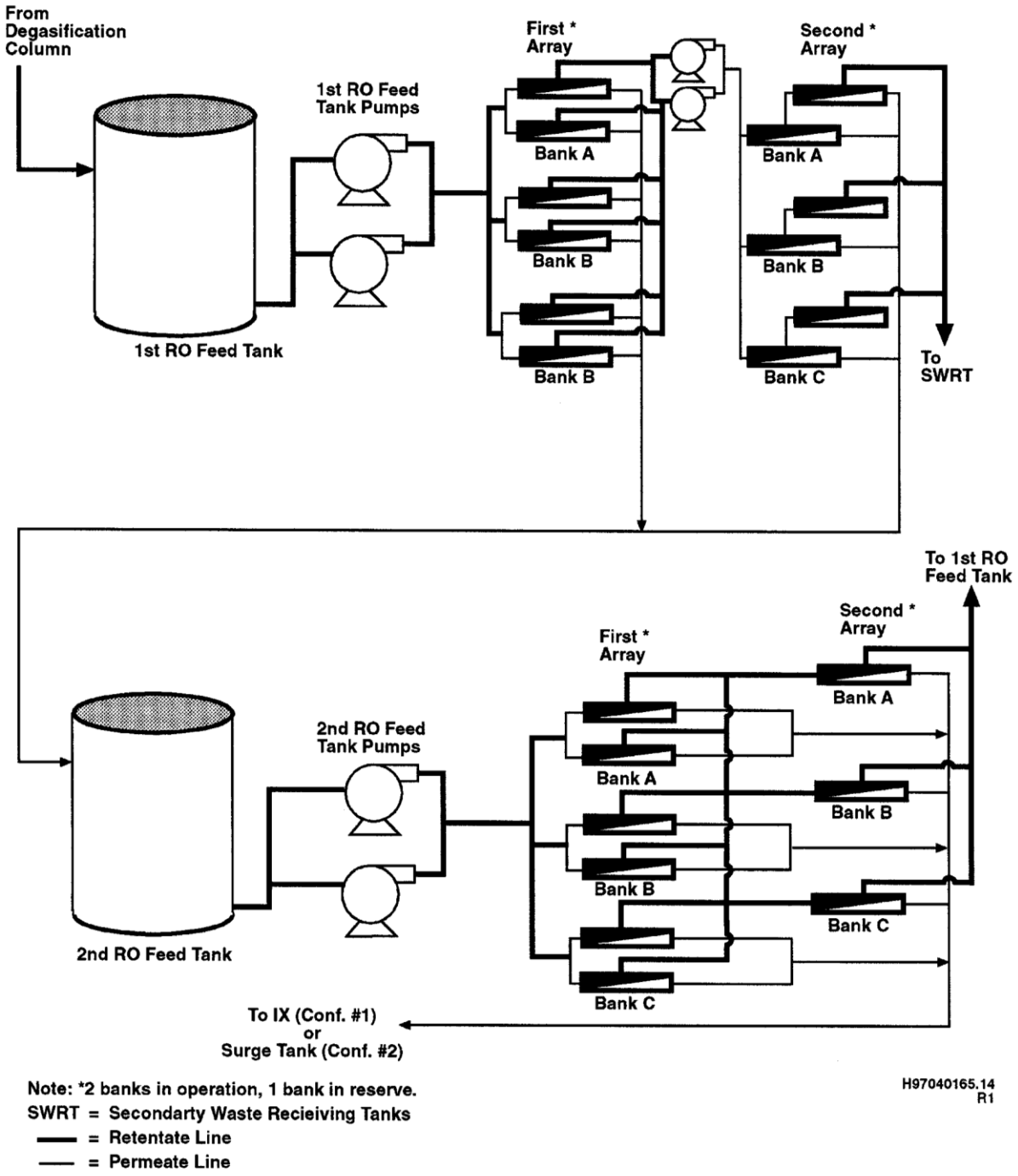


Figure C.8. Reverse Osmosis Unit

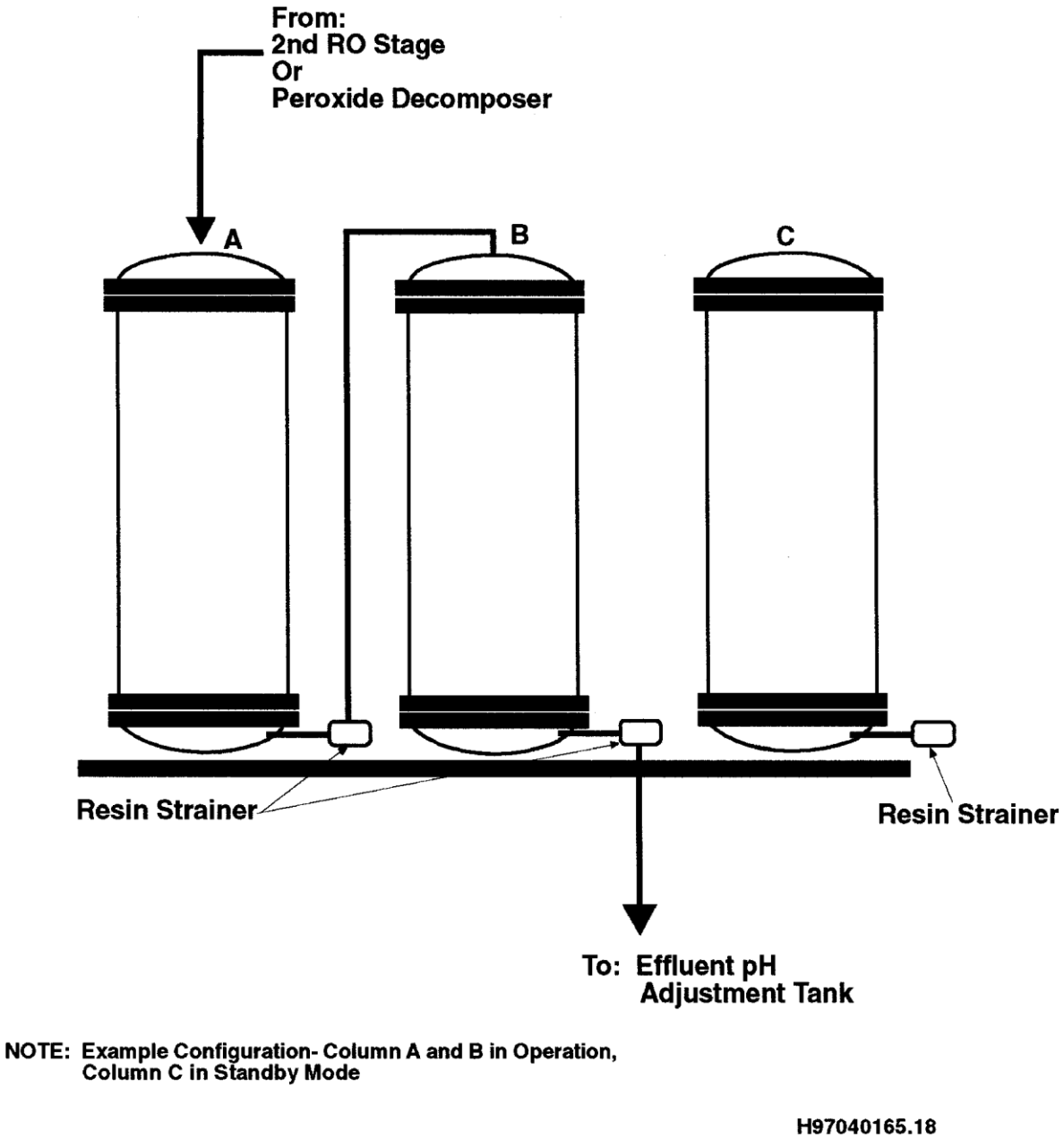


Figure C.9. Ion Exchange Unit

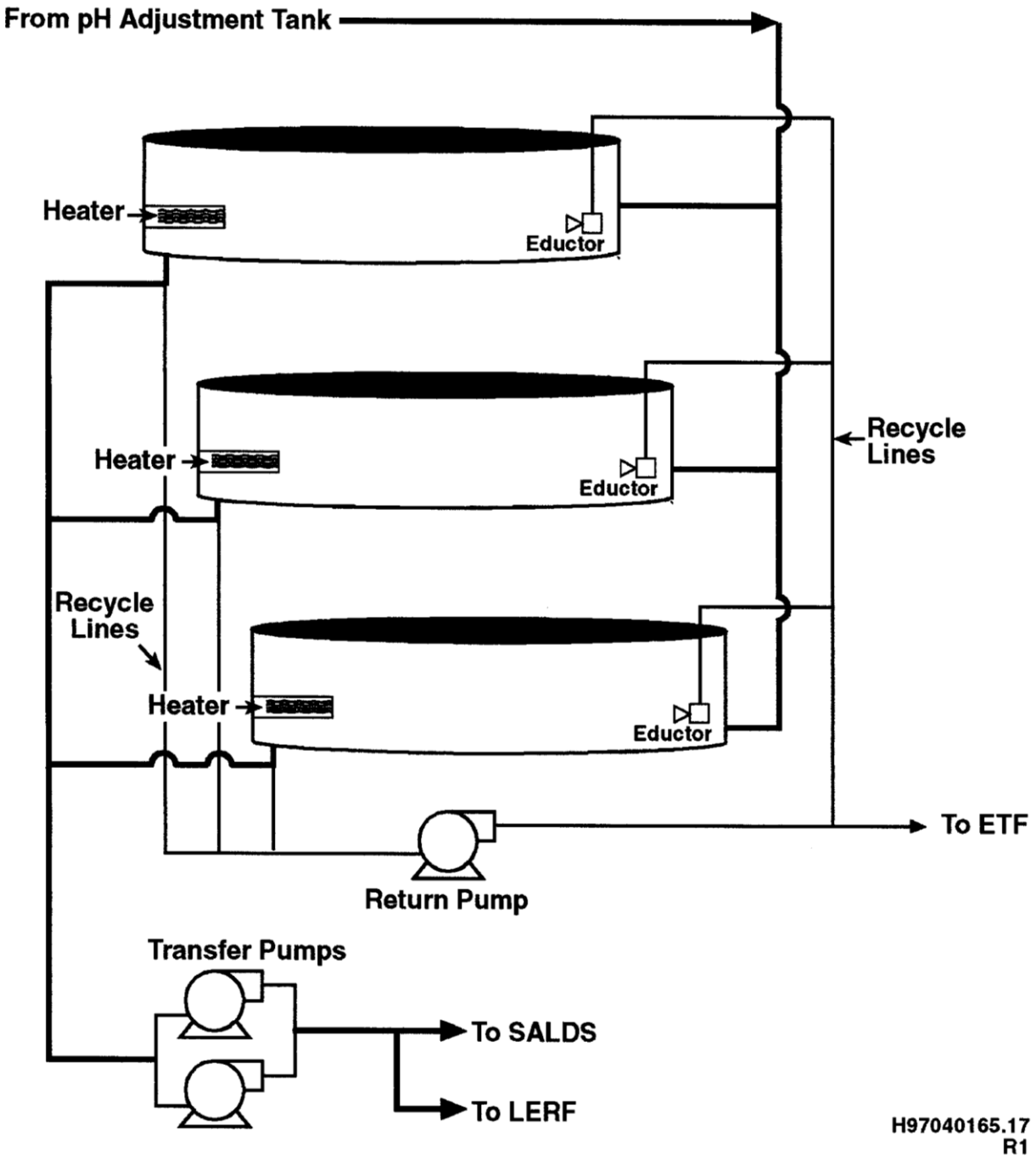


Figure C.10. Verification Tanks

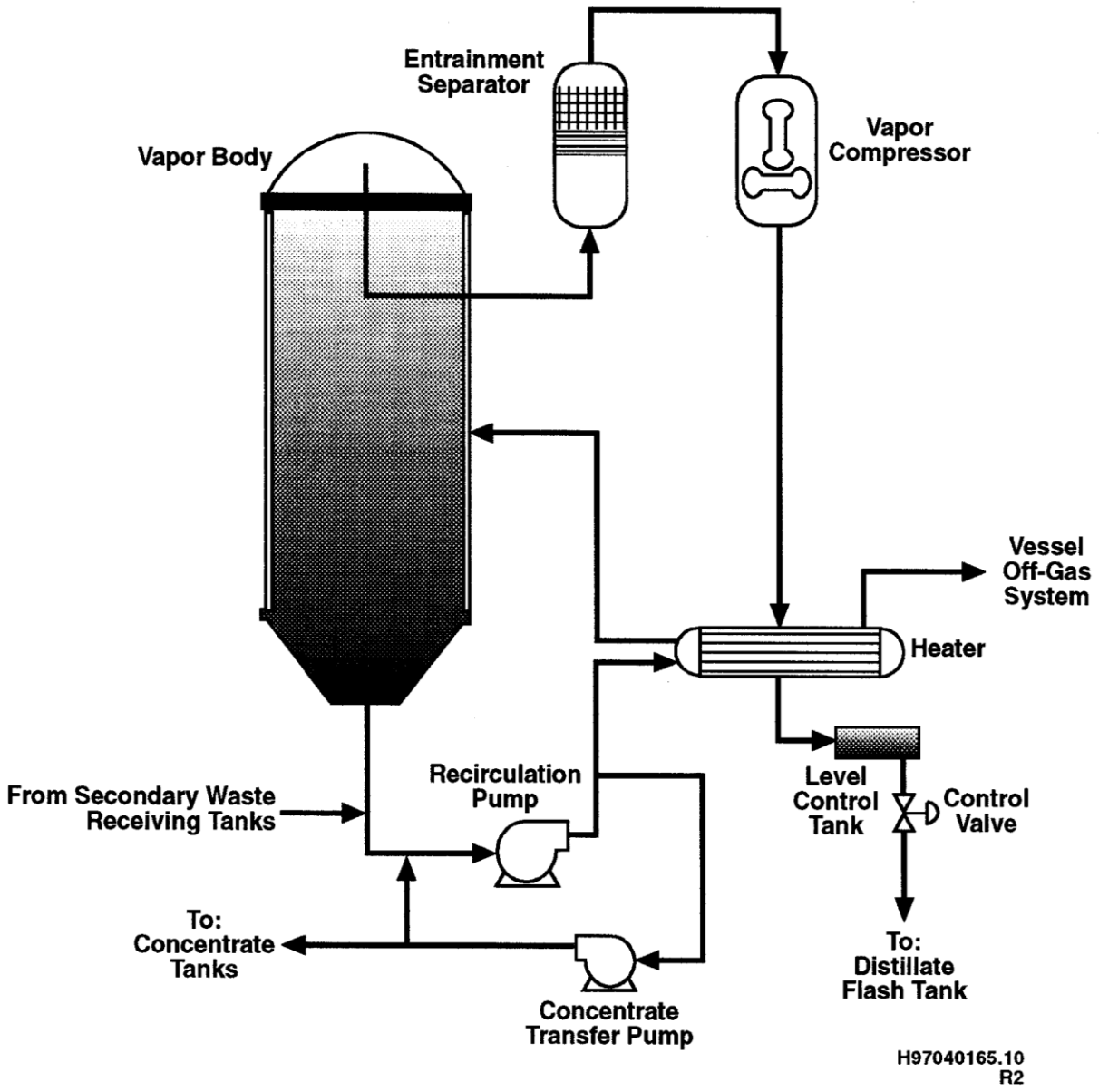


Figure C.11. 200 Area Effluent Treatment Facility Evaporator

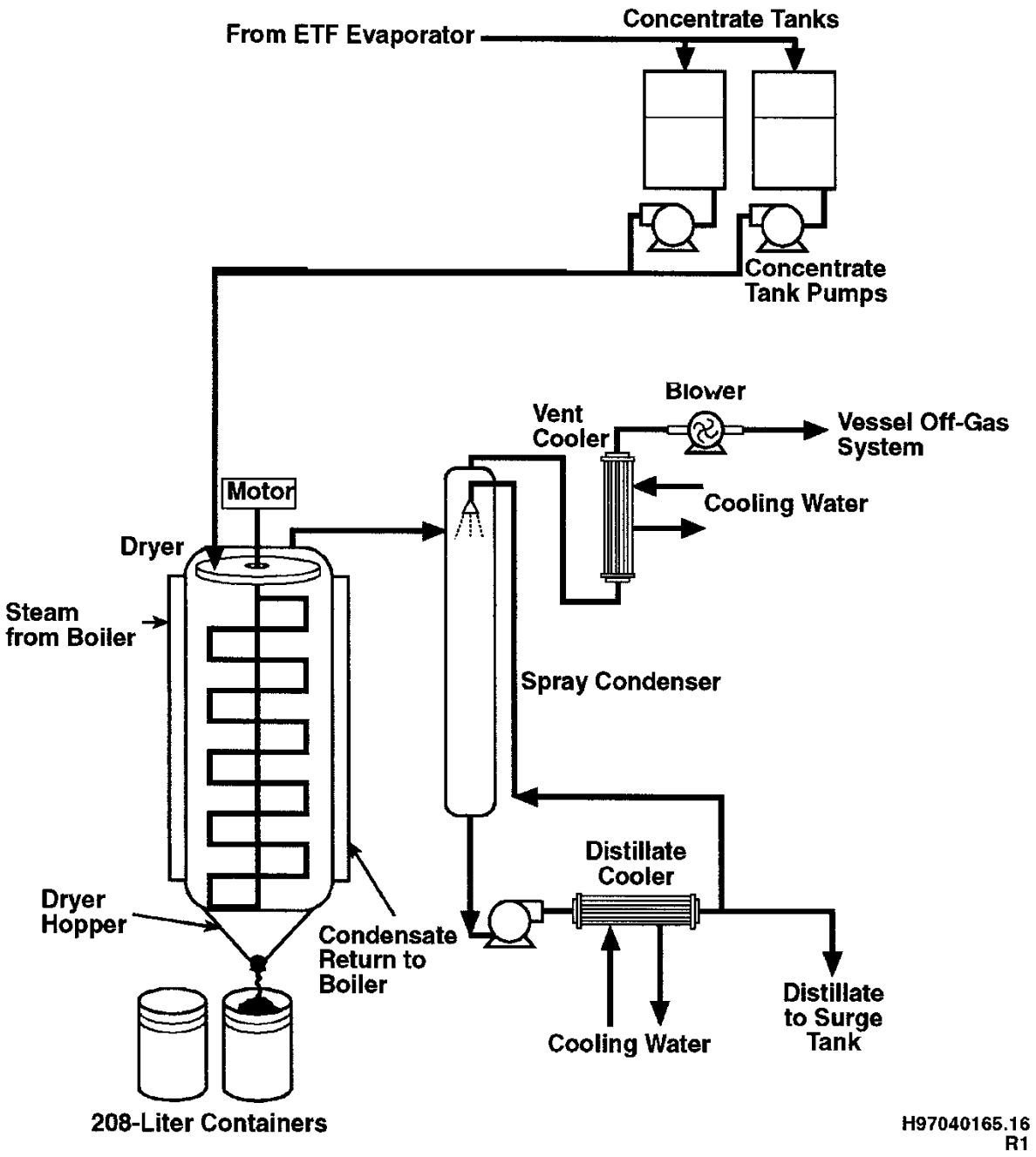


Figure C.12. Thin Film Dryer

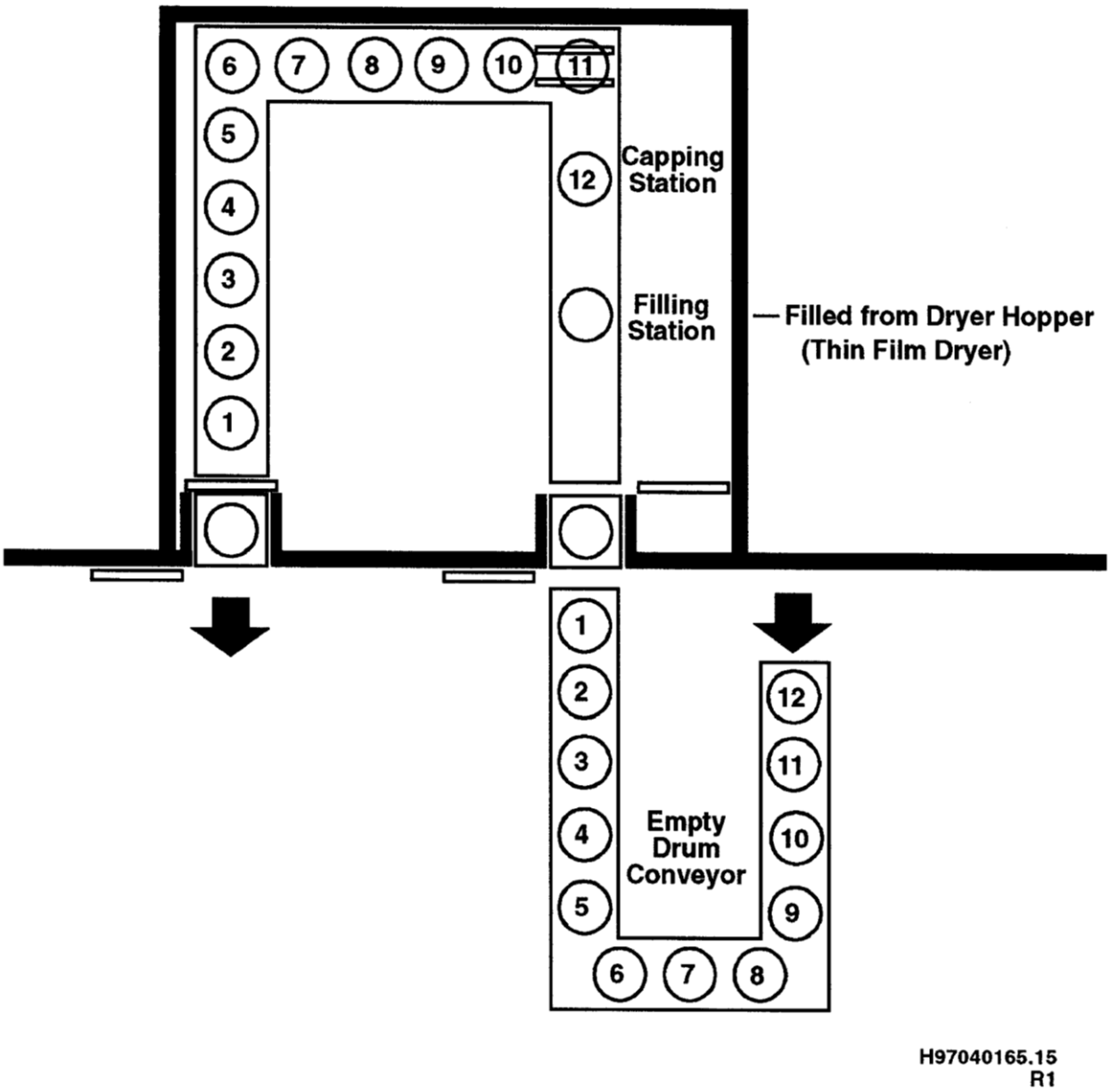


Figure C.13. Container Handling System

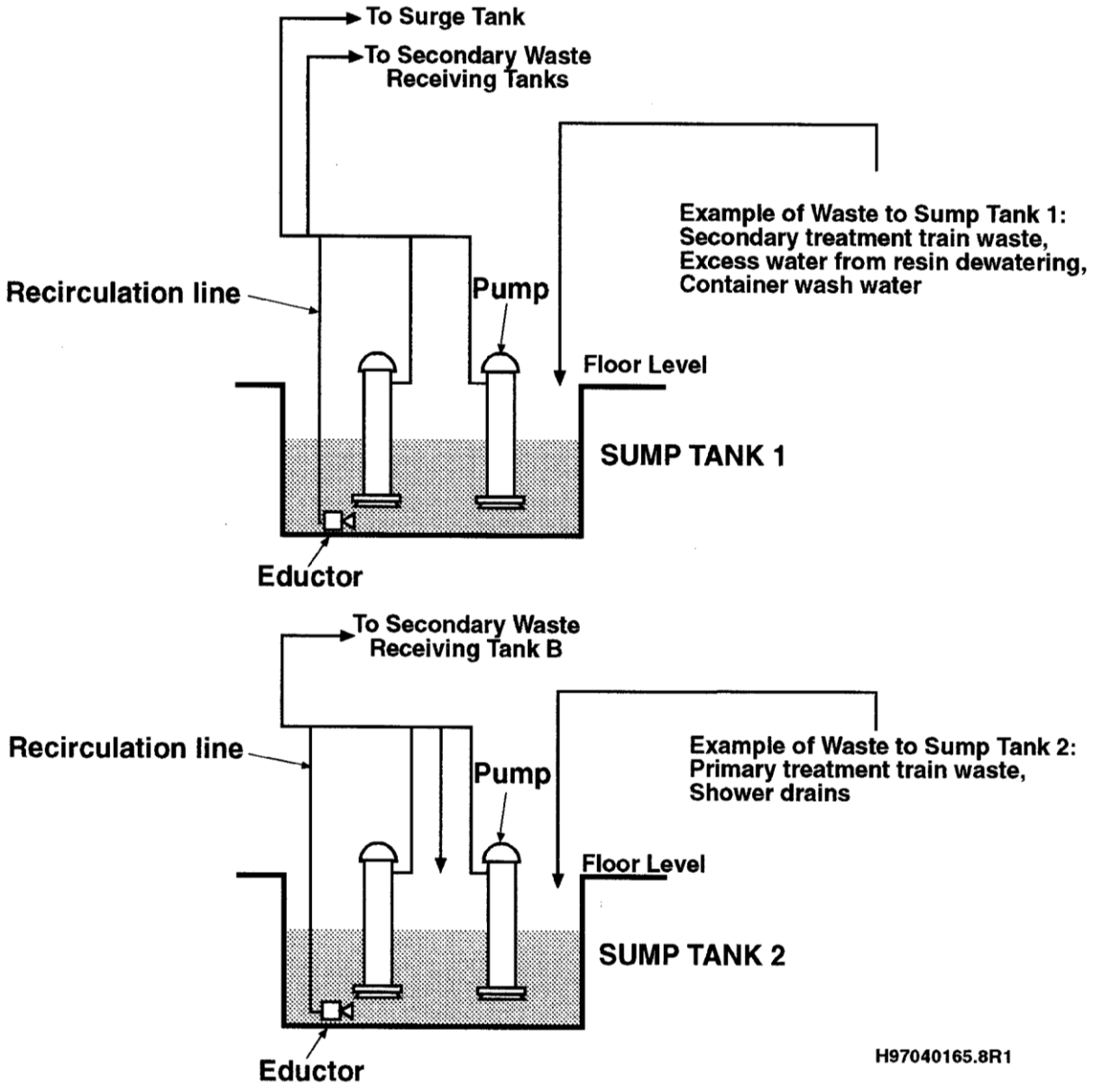


Figure C.14. 200 Area Effluent Treatment Facility Sump Tanks

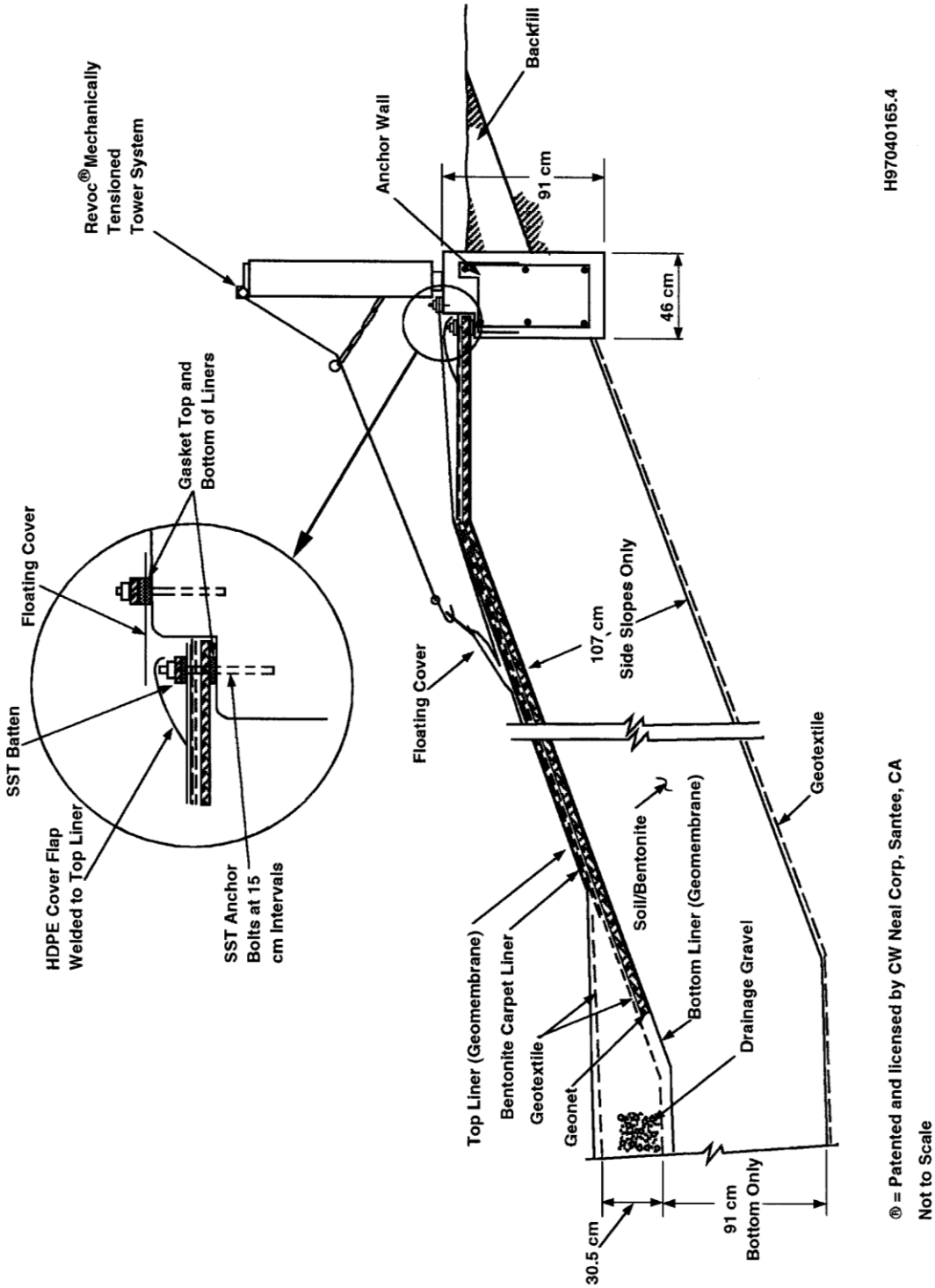


Figure C.15. Liner Anchor Wall and Cover Tension System

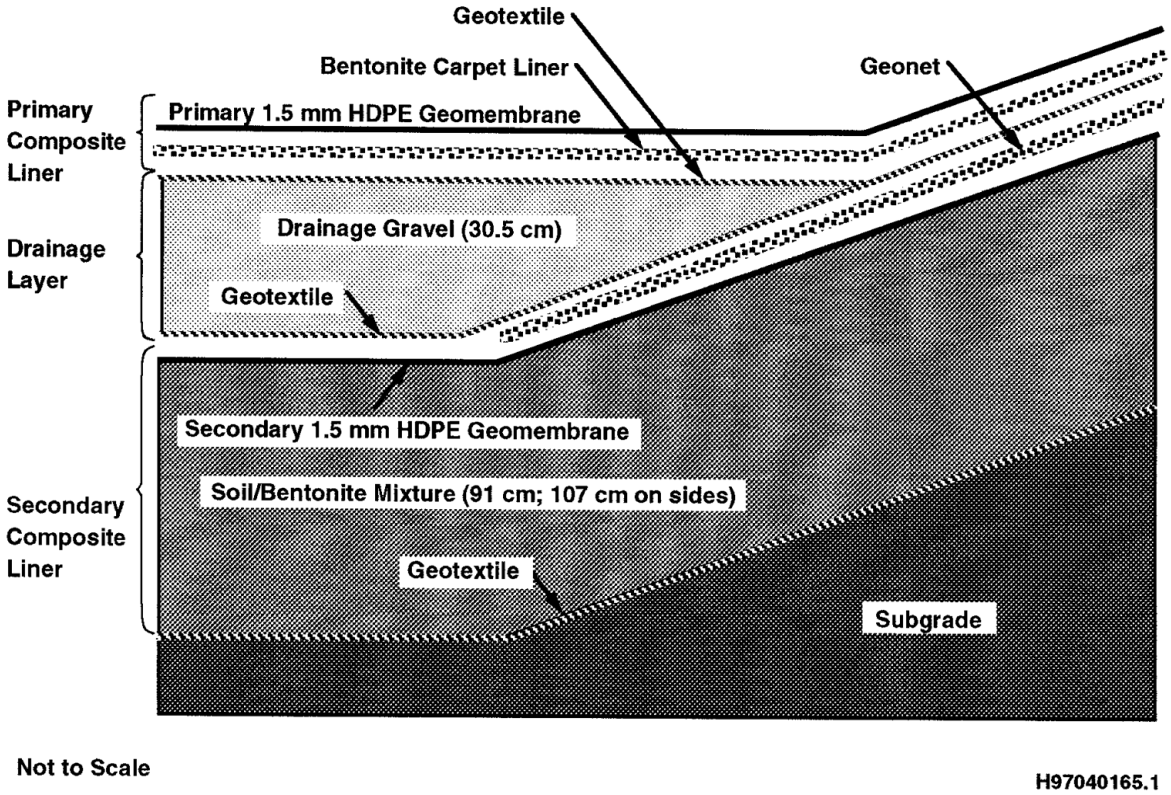


Figure C.16. Liner System Schematic

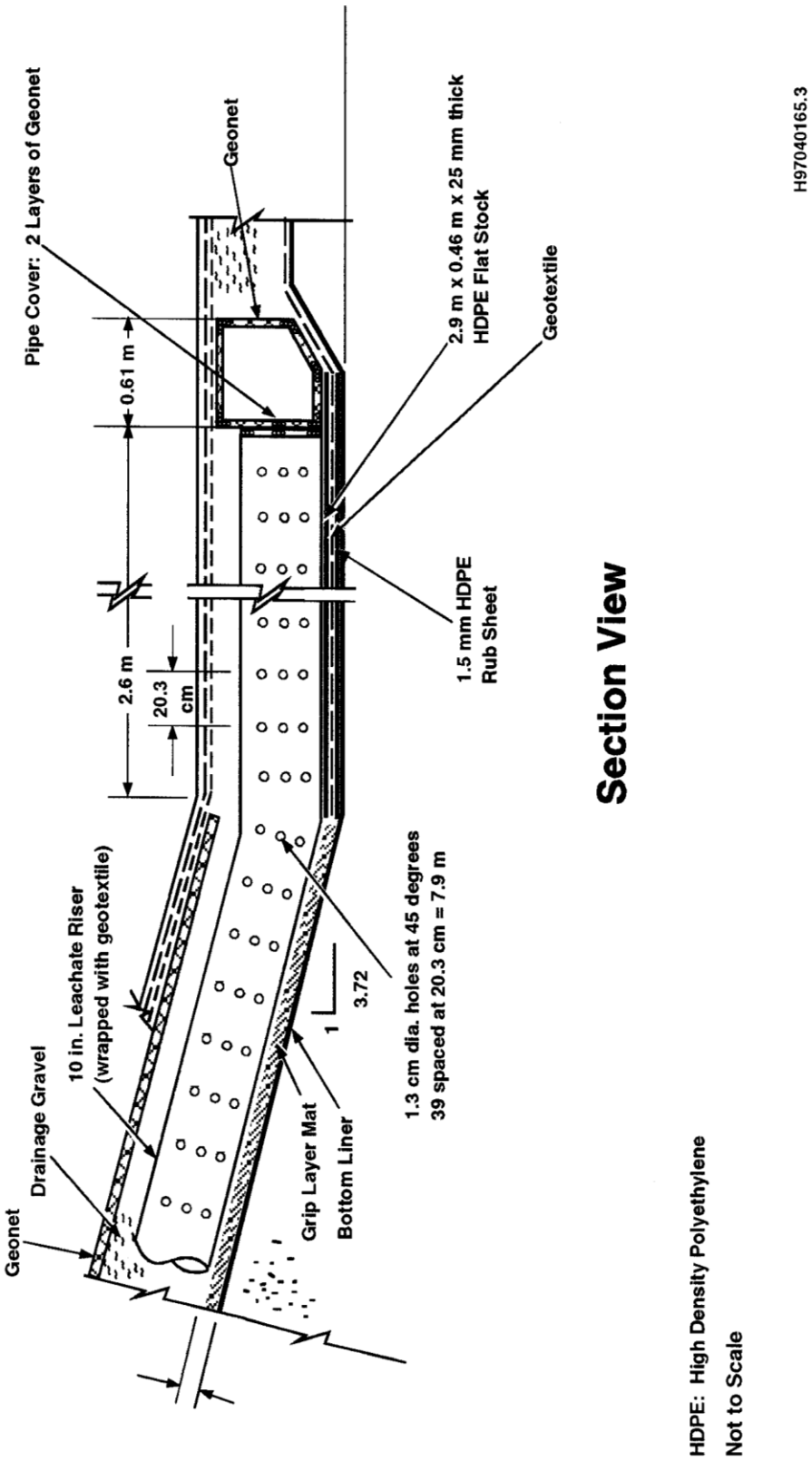


Figure C.17. Detail of Leachate Collection Sump

This page intentionally left blank.

LIQUID EFFLUENT RETENTION FACILITY (LERF) & 200 AREA EFFLUENT TREATMENT FACILITY (ETF) ADDENDUM E SECURITY REQUIREMENTS

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
06/30/2011	

This page intentionally left blank.

ADDENDUM E
SECURITY REQUIREMENTS

This page intentionally left blank.

ADDENDUM E
SECURITY REQUIREMENTS

TABLE OF CONTENTS

E. SECURITY REQUIREMENTS 5
E.1 Security 5
E.1.1 Waiver 5

This page intentionally left blank.

E. SECURITY REQUIREMENTS

The Liquid Effluent Retention Facility (LERF) and 200 Area Effluent Treatment Facility (200 Area ETF) are operated to minimize exposure of the general public and operating personnel to dangerous waste.

E.1 Security

Refer to Permit Attachment 3, Security. The LERF and 200 Area ETF are located within the 200 Area of the Hanford Facility and access is controlled by physical barriers, which complies with WAC 173-303-310(2)(c). Signs stating *Danger-Unauthorized Personnel Keep Out*, or equivalent language, legible at 25 feet or more, are posted near the entrance of each storage/processing area.

E.1.1 Waiver

Waiver of the security procedures and equipment requirements for LERF and 200 Area ETF are not requested, therefore; WAC 173-303-310(1)(a) and (b) are not applicable to LERF and 200 Area ETF.

This page intentionally left blank.

LIQUID EFFLUENT RETENTION FACILITY (LERF) & 200 AREA EFFLUENT TREATMENT FACILITY (ETF) ADDENDUM F PREPARDNESS AND PREVENTION

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
08/25/2016	8C.2016.Q2

This page intentionally left blank.

ADDENDUM F
PREPAREDNESS AND PREVENTION

This page intentionally left blank.

ADDENDUM F
PREPAREDNESS AND PREVENTION

TABLE OF CONTENTS

F. PREPAREDNESS AND PREVENTION 5
F.1 Preparedness and Prevention Requirements 5
F.1.1 Equipment Requirements 5
F.1.2 Aisle Space Requirement 6
F.2 Preventive Procedures, Structures, and Equipment 6
F.2.1 Unloading Operations, Spill Prevention, and Control 6
F.2.2 Runoff 6
F.2.3 Water Supplies 7
F.2.4 Equipment and Power Failure 7
F.2.5 Personnel Exposure 8
F.3 Prevention of Reaction of Ignitable, Reactive, and Incompatible Waste 8

This page intentionally left blank.

F. PREPAREDNESS AND PREVENTION

F.1 Preparedness and Prevention Requirements

The following sections document the preparedness and prevention measures taken at the Liquid Effluent Retention Facility (LERF) and 200 Area Effluent Treatment Facility (ETF).

F.1.1 Equipment Requirements

The following sections describe the internal and external communications systems and the emergency equipment required that could be activated by the LERF and 200 Area ETF Building Emergency Director (BED).

F.1.1.1 Internal Communications

When operators are present at the LERF, the operators carry two-way radios to maintain contact with 200 Area ETF personnel. The operators at LERF are informed of emergencies (e.g., building and/or area evacuations, take-cover events, high airborne contamination, fire, and/or explosion), and are provided with emergency instructions by several systems. These systems include the mobile two-way radios, and the telephone in the LERF instrument building.

The 200 Area ETF is equipped with an internal communication system to provide immediate emergency instruction to personnel. The onsite communication system at the 200 Area ETF includes telephones, mobile two-way radios, a public address system, and alarm systems. The telephone and radio systems provide for internal and external communication. Alarm systems exist to allow personnel to respond appropriately to various emergencies, including building evacuations, take cover events, and fire and/or explosion. Addendum J provides additional information on the response activities.

F.1.1.2 External Communications

The LERF and its operators are equipped with devices for summoning emergency assistance from the Hanford Fire Department, the Hazardous Materials Response Team, and/or Hanford patrol, as necessary. External communication to summon emergency assistance is made by a normal telephone system or mobile two-way radios. The LERF telephone is available in the instrumentation building. The 200 Area ETF uses fire alarm pull boxes and telephones for external communication and are located at numerous locations throughout the 200 Area ETF.

F.1.1.3 Emergency Equipment

The LERF and 200 Area ETF rely primarily on the Hanford Fire Department to respond to fires and other emergencies as described in Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02). All LERF and 200 Area ETF operators are familiar with the LERF and 200 Area ETF contingency plans (Addendum J) and are trained in the use of emergency pumping of LERF and 200 Area ETF systems, fire, and communications equipment.

Portable fire extinguishers, fire control equipment, spill control equipment, and decontamination equipment is available at various locations in the 200 Area ETF.

The 200 Area ETF has fire extinguishers, automatic fire suppression systems (200 Area ETF Control Room and electrical room), fire alarm pull boxes, and a water spray system (200 Area ETF operating and administrative portions).

Respirators, hazardous material protective gear, and special work procedure clothing for 200 Area ETF personnel are kept in the change room at the 200 Area ETF. Safety showers are located in convenient locations in the 200 Area ETF, and emergency eyewashes are available for use. Water for these devices is supplied from the 200 Area ETF sanitary water system.

F.1.1.4 Water for Fire Control

A water main is not provided to the LERF. The Hanford Fire Department is equipped with fire engines for fire control for fires requiring high water volume and pressure. The 200 Area ETF is serviced by two 12-inch raw water lines that are tied into the 200 East Area raw water distribution grids. These lines provide a looped configuration that supplies two independent sources of raw water for fire protection and raw water uses. Connections from the 200 Area ETF raw water system supply fire hydrants and the wet pipe sprinkler system. In the event that water pressure is lost, the Hanford Fire Department is equipped with fire engines to provide needed water.

F.1.2 Aisle Space Requirement

The operation of the LERF does not involve aisle space. Nevertheless, the LERF and the individual basins are easily accessible to emergency response personnel and vehicles. A 6.1-meter (20-feet)-wide service road runs along the base of the basin area on the east, south, and west sides within the operational security fence.

Aisle spacing at 200 Area ETF is sufficient to allow the movement of personnel and fire protection equipment in and around the containers. This storage arrangement also meets the requirements of the National Fire Protection Association (NFPA 1996) for the protection of personnel and the environment. A minimum 76-centimeter (30-inch) aisle space is maintained between rows of containers as required by WAC 173-303-630(5)(c).

F.2 Preventive Procedures, Structures, and Equipment

The following sections describe preventive procedures, structures, and equipment.

F.2.1 Unloading Operations, Spill Prevention, and Control

Underground pipelines that transfer aqueous waste to and from the LERF are encased in a secondary pipe. If a leak is detected in a pipeline, flow in the pipeline will be stopped and the cause of the leak investigated and remediated.

If it is required to transfer aqueous waste from one LERF basin to another, existing transfer pumps are used as described in Addendum C.

The 2025-ED Load-in Station is monitored continuously during tank-filling operations and filling is stopped immediately if leaks occur. Care is taken to ensure that even minor leaks are cleaned up immediately and disposed of in accordance with approved management procedures. Any spill that is determined to be a dangerous waste will be managed according to the requirements of WAC 173-303.

F.2.2 Runoff

The LERF is constructed and operated to ensure that all aqueous waste is contained within the basins. The basins are designed and operated to prevent overtopping. Furthermore, the basins are provided with very low-density polyethylene floating covers to prevent the introduction of precipitation into the basins. The basins also are graded to ensure that all precipitation outside the basins is directed away from the surface impoundments.

The basins are constructed so that the top of the basin dikes are approximately 3 meters (9.8 feet) above grade. The exterior side slopes of the basins have a 2.25 (horizontal) to 1 (vertical) slope. Run-on of precipitation to the basins from the surrounding area is not possible because the surrounding area slopes away from the LERF.

Dangerous waste and hazardous chemical handling areas at the 200 Area ETF are designed to contain spills, leaks, and wash water, thereby preventing run-off and subsequent releases. All dangerous and/or mixed waste loading and unloading areas are provided with secondary containment structures as described in Addendum C, Process Information.

F.2.3 Water Supplies

The LERF uses operating practices, structures, and equipment to prevent the contamination of natural water supplies (i.e., groundwater and surface water). The LERF is monitored continuously in the 200 Area ETF Control Room during liquid waste transfers and at least daily when waste transfers are not occurring to detect abnormal conditions (e.g., leaks), and regularly inspected to detect equipment and structural deteriorations that could allow possible water supply contamination. The basins are provided with a leachate collection system that is designed to contain any leachate generated. These systems, in conjunction with the double-composite liner system and underlying low permeable clay liner, ensure that should a release occur, the release will be fully contained within the basin configuration and, therefore, water supplies will be protected. Addendum J, Contingency Plan, provides information on procedures that are implemented if a release is detected at the LERF.

There are no drinking water wells near the 200 Area ETF. Therefore, a release would not immediately contaminate drinking water supplies. The 200 Area ETF uses operating practices, structures, and equipment to prevent the contamination of natural water supplies (i.e., groundwater and surface water). The 200 Area ETF is continuously monitored in the 200 Area ETF Control Room during liquid waste processing and/or Load-In Station operations transfer to detect abnormal conditions and at least daily when waste process and/or waste transfer operations are not occurring, and is inspected regularly to detect equipment and structural deteriorations that could allow spills to the environment. Areas in contact with dangerous and/or mixed waste are monitored continuously in the 200 Area ETF Control Room during Load-in Station and/or 200 Area ETF processing operations through a series of level and pressure indicators, leak detection alarms, equipment failure alarms, and control panel readouts. In addition, the 200 Area ETF is inspected regularly for the presence of leaks or other off normal conditions wherever possible (in all areas that can be safely entered).

In addition to detailed operating practices, structures and equipment are used at the 200 Area ETF to prevent contamination of water supplies. The structures and equipment designed to prevent contamination of water supplies are the same as the structures and equipment used to prevent run-off from dangerous and/or mixed waste handling areas.

F.2.4 Equipment and Power Failure

The storage function of the LERF is not affected by loss of power and a temporary loss of power would not pose a threat to the environment. Loss of electrical power would not cause the storage of the waste to be jeopardized. For process condensate transferred from the 242-A Evaporator, appropriate valving procedures are followed to ensure a smooth restart of the flow to the LERF in the event of a power failure at the 242-A Evaporator.

The 200 Area ETF does not have a standby power source. Power to selected lighting, computers, and process controls is configured with an uninterruptible power supply. During partial loss of normal power, the affected pumps and subsystems will be shut down. Complete loss of power to the 200 Area ETF shuts down the entire 200 Area ETF except for the instruments, connected to the uninterruptible power supply. The uninterruptible power supply provides temporary power to some systems to assist in an orderly shutdown of the process in the event power cannot be restored quickly. Redundant pumps allow the process to continue to operate when only one component is out of service.

When power at the 200 Area ETF is lost, the valves assume a fail-safe position to allow the process to remain in a safe shutdown mode until restoration of power. This action allows the operators to perform equipment surveys during shutdown and to confirm that there are no safety issues because the 200 Area ETF is shut down. Because a power failure would also shutoff flow into the 200 Area ETF, there will not be any increase in volume in any of the holdup basins, tanks, or other systems.

A combination of reliability, redundancy, maintenance, and repair features are used in the 200 Area ETF equipment and systems to minimize random failure of equipment. For crucial systems such as ventilation

filters, redundant trains are provided to mitigate equipment and system failure. Spare parts are maintained for essential production and safety equipment.

F.2.5 Personnel Exposure

At the LERF and 200 Area ETF, operating practices, structures, and equipment are used to prevent undue exposure of personnel to dangerous and/or mixed waste. All personnel handling waste use protective clothing and equipment. All operations are conducted so that exposure to dangerous and/or mixed waste and hazardous materials are maintained as low as reasonably achievable (ALARA).

Protective clothing and equipment are prescribed for personnel handling chemicals or dangerous waste. Before the start of any operation that could expose personnel to the risk of injury or illness, a review of the operation is performed to ensure that the nature of hazards that might be encountered is considered and appropriate protective gear is selected. Personnel are instructed to wear personal protective equipment in accordance with training, posting, and instructions.

A change trailer at LERF is located between Basins 42 and 43. In addition, the change trailer has an operations office for working with procedures. Exits within the change trailer are clearly marked. A storage building is located within the perimeter fence, northwest of the basins. The LERF storage building also is provided with separate storage areas for clean and contaminated equipment. A decontamination shower and decontamination building is located at the 272-AW Building, approximately 1.6 kilometers (1 mile) from the LERF or at the 200 Area ETF.

The 200 Area ETF has eyewash stations and safety showers in convenient locations for use by personnel. The following structures and equipment were incorporated into the 200 Area ETF design to minimize personnel exposure.

- Offices, 200 Area ETF Control Room, clean- and soiled-clothes storage areas, change rooms, and the lunchroom are situated to minimize casual exposure of personnel.
- Building exit pathways are located to provide rapid egress in emergency evacuations.
- Emergency lighting devices are located strategically throughout the 200 Area ETF.
- Audio and/or visual alarms are provided for all room air samplers, area alarms, and liquid monitors. Visual readouts for these alarm systems are located in less contaminated areas to minimize exposure to personnel.
- Areas for decontaminating and maintaining equipment are provided in contaminated areas to limit the spread of contamination to uncontaminated areas such as the 200 Area ETF Control Room.
- Instrument interlock systems automatically return process operations to a safe condition if an unsafe condition should occur.
- The 200 Area ETF ventilation systems are designed to provide airflow from uncontaminated zones to progressively more contaminated zones.

Whenever possible, exposures to hazards are controlled by accepted engineering and/or administrative controls. Protective gear is used where effective engineering or administrative controls are not feasible.

F.3 Prevention of Reaction of Ignitable, Reactive, and Incompatible Waste

Typically, aqueous waste managed at the LERF or 200 Area ETF does not display the characteristics of reactivity or ignitability. Any aqueous waste streams exhibiting these characteristics are blended or mixed at LERF to a concentration where the waste no longer exhibits reactive or ignitable characteristics.

Incompatible aqueous waste is not expected to be stored or treated at the LERF or 200 Area ETF (Addendum B, Waste Analysis Plan). Therefore, the requirements of WAC 173-303-806(4)(a) are not applicable.

LIQUID EFFLUENT RETENTION FACILITY (LERF) & 200 AREA EFFLUENT TREATMENT FACILITY (ETF) ADDENDUM H CLOSURE PLAN

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
08/25/2016	8C.2016.Q2

This page intentionally left blank.

ADDENDUM H
CLOSURE PLAN

This page intentionally left blank.

ADDENDUM H
CLOSURE PLAN

TABLE OF CONTENTS

H. CLOSURE PLAN 5
H.1 Closure Plan 5
H.2 Closure Performance Standard 5
H.2.1 Closure Standards for Metal Surfaces, Rubber, Tanks, and Concrete 5
H.2.2 Closure Standards for Piping and Ancillary Equipment 6
H.2.3 Closure Standards for Underlying Soils 6
H.3 Closure Activities 6
H.3.1 General Closure Activities 7
H.3.2 Constituents of Concern for Closure for the Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility 7
H.3.3 Removing Dangerous Waste 7
H.3.4 Decontaminating Structures, Equipment, and Soils 8
H.4 Maximum Waste Inventory 12
H.5 Closure of Containers, Tanks, and Surface Impoundments 12
H.5.1 Closure of Containers 12
H.5.2 Closure of Tanks 12
H.5.3 Closure of Surface Impoundments 12
H.6 Schedule for Closure 12

This page intentionally left blank.

H. CLOSURE PLAN

This addendum describes the planned activities and performance standards for closing Liquid Effluent Retention Facility (LERF) and 200 Area Effluent Treatment Facility (ETF).

H.1 Closure Plan

The LERF and 200 Area ETF will be closed by removal or decontamination with respect to dangerous waste contamination that resulted from operation as Treatment, Storage, and Disposal (TSD) units, with closure of LERF occurring first. To facilitate closure, the LERF retention basins are being viewed as consisting of seven components: the covers and primary liner, drainage layer system/bentonite carpet liner, secondary liner, soil/bentonite, internal and/or external piping, ancillary equipment, and concrete basins. To facilitate closure of 200 Area ETF, the 200 Area ETF is being viewed as consisting of six components: tanks, internal and/or external piping, ancillary equipment, concrete floors/dikes/ encasements, structures, and soil directly beneath the structure. It is anticipated that closure of LERF and 200 Area ETF will begin after the projected 30-year active life of LERF and 200 Area ETF. If it is determined that closure by removal or decontamination is not possible, the closure plan will be modified to address required post closure activities.

Uncontaminated structures will be left for future use or disassembled, dismantled, and removed for disposal. Uncontaminated equipment and structures could include aqueous makeup, HVAC and piping, steam condensate and cooling water piping, and the 200 Area ETF Control Room and office areas.

Closure by removal or decontamination requires decontamination or removal and disposal of all dangerous waste, waste residues, contaminated equipment, soil, or other material established in accordance with the removal or decontamination closure performance standards of WAC 173-303-610(2). This and future closure plan revisions will provide for compliance with these performance standards.

H.2 Closure Performance Standard

Closure by removal or decontamination, as provided for in this plan based on the requirements of WAC 173-303-610(2), will eliminate future maintenance and will be protective of human health and the environment by removing or reducing chemical contamination at LERF and 200 Area ETF to levels that are below concern with respect to human health and the environment.

This plan proposes to leave clean structures and equipment in place after closure for potential use in future operations. This need will be evaluated at the time of closure.

H.2.1 Closure Standards for Metal Surfaces, Rubber, Tanks, and Concrete

This closure plan proposes use of a 'clean debris surface' (defined in the following paragraph) as the clean closure performance standard for the metal surfaces, rubber (i.e., basin covers, liners, etc.), tanks, and concrete that will remain after closure. This approach is consistent with the Washington State Department of Ecology (Ecology) guidance (Publication #94-111, Ecology 2005) for achievement of clean closure. Additionally, adherence to this guidance ensures that all residues have been removed as required by WAC 173-303-640 for closure of the 200 Area ETF tank systems.

The clean debris surface standard is verified visually.

> *A clean debris surface means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area* (40 CFR 268.45).

When a physical extraction method is used on concrete, the performance standard is based on removal of the contaminated layer of debris. The physical extraction performance standard for concrete is removal of 0.6 centimeter (0.25 inches) of the surface layer and treatment to a clean debris surface. Inspections to verify achievement of a clean debris surface will be performed and documented.

H.2.2 Closure Standards for Piping and Ancillary Equipment

The internal and external piping of both LERF and 200 Area ETF that has contacted dangerous waste will be flushed and drained as part of closure. When practical, ancillary equipment, which has contacted dangerous waste will also be flushed and drained. For piping and ancillary equipment where the contaminated surfaces can be inspected, an inspection will be performed to see if the surfaces meets the clean debris surface standard in 40 CFR 268.45, incorporated by reference by WAC 173-303-140, and can be declared non-dangerous in accordance with WAC 173-303-071(3)(qq). If it is not possible to inspect the contaminated surfaces or meet the clean debris surface performance standard, the particular piping or ancillary equipment of concern will be removed, designated, and disposed of accordingly.

Dangerous and/or mixed-waste materials generated during closure activities will be managed in accordance with WAC 173-303-610(5). Removal of any dangerous wastes or dangerous constituents during partial or final closure will be handled in accordance with applicable requirements of WAC 173-303-610(5).

H.2.3 Closure Standards for Underlying Soils

The LERF retention basins have a leachate collection system that channels the leachate to sumps at the bottom of the basins. The collected liquid is pumped back into the basins, thereby limiting fluid head on the secondary liner. The secondary liner is comprised of several protective layers, including a high-density polyethylene geomembrane and a soil/bentonite admixture. The soil below the LERF only could be contaminated if the layers of the secondary liner had failed. The primary liner and the drainage gravel, geotextile, and geonet between the primary and secondary liners cannot easily be decontaminated. The high-density polyethylene layer of the secondary liner also cannot be decontaminated. These materials will be removed and disposed according to the requirements of WAC 173-303-170. The soil/bentonite admixture will be sampled and analyzed for constituents of concerns according to the sampling and analysis plan developed prior to the time of closure. If the analytical results determine that the constituents of concern are at or below the levels in WAC 173-303-610(2)(b)(i), or background levels for Hanford soil if background is greater, the soil/bentonite admixture and the soil below LERF will be considered clean closed.

Clean closure of soil under the 200 Area ETF will be accomplished by demonstrating that the coated concrete floor kept contaminants from reaching the soil. The coated concrete floor provided secondary containment for all the tanks and process piping. Unless inspections identify potential through-thickness cracks indicating containment failure and a subsequent potential for soil contamination from TSD unit operations, the soil will be considered clean closed. However, if inspections identify such cracks and there have been documented spills in the vicinity, potential soil contamination will be investigated. Soils will be sampled and analyzed for constituents of concern according to the sampling and analysis plan. The sampling and analysis plan will be prepared following the completion of a data quality objectives process in accordance with EPA/600/R-96/055 (QA/G-4), *Data Quality Objectives Process*, as amended. The data quality objectives process will be initiated prior to closure on a schedule to ensure timely closure of LERF. The sampling and analysis plan will be submitted to Ecology as part of a permit modification request meeting the requirements of WAC 173-303-830. The sampling and analysis plan will be prepared consistent with EPA/240/B-01/003 (EPA QA/R-5), *EPA Requirements for Quality Assurance Project Plans*, as amended.

If the soil analytical results determine that the constituents of concern are at or below the levels in WAC 173-303-610(2)(b)(i), or background levels in the Hanford soil if background is greater, the soil will be considered clean closed. If the constituents of concern exceed background levels, the soil will be closed per the standards of WAC 173-303-610(2)(b).

H.3 Closure Activities

The LERF and 200 Area ETF were designed for a 30-year active life.

At the time of closure, the closure plan will be modified as necessary to reflect current regulation or informational revisions in accordance with WAC 173-303-610(3)(b). If it is determined that clean closure is not possible, the closure plan will be modified to address required post closure activities.

H.3.1 General Closure Activities

The approach to LERF closure is to dispose of accumulated basin aqueous waste by processing the waste through 200 Area ETF. Primary basin liners, covers, drainage gravel, geonets, and secondary High Density Polyethylene (HDPE) liners will be removed, designated, and disposed of as described in Sections H.3.4.1 and H.3.4.2. Any remaining solids (residue) within the basins will also be removed, designated, and disposed of accordingly. Piping associated with LERF closure is intended to be decontaminated, drained, and inspected. Piping that meets the closure standard in Section H.2.2 will be left in place. Piping that does not meet the closure standard, or cannot be inspected, will be disposed of accordingly. Rinsate generated during decontamination also will be disposed of through 200 Area ETF. Sampling will assess whether contamination beneath the secondary HDPE liner has occurred. Contamination above background levels, if present, will be removed or decontaminated to meet the regulatory requirements of WAC 173-303-610(2)(b).

The approach to 200 Area ETF closure is to process any aqueous waste through the effluent treatment system. Any waste, which cannot be treated at 200 Area ETF as the facility is being closed, will be transferred to other TSD units or off-site TSD facility. Piping will be rerouted and temporary piping installed to allow the isolation of tanks and ancillary equipment for draining, decontamination, and closure. Rerouted and temporary piping will be closed in the same manner as process piping. All structures and equipment will be decontaminated to the closure standards in Section H.2.2 or disposed. Piping associated with 200 Area ETF closure is intended to be decontaminated, drained, and inspected. Piping that meets the closure standard in Section H.2.2 will be left in place. Piping that does not meet the closure standard, or cannot be inspected, will be disposed of accordingly. Contamination, if present, will be managed in compliance with regulatory requirements.

Equipment or materials used in performing closure activities will be decontaminated or disposed at a permitted facility.

H.3.2 Constituents of Concern for Closure for the Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility

Using the list of dangerous waste numbers in the Addendum A, Part A Form, constituents in the final delisting in 40 CFR 261 Appendix IX, sample results from wastes added to LERF and 200 Area ETF, process knowledge and the risk to human health and the environment, the constituents of concern for closure will be determined through the data quality objective process. Based on constituents in wastewater received at LERF from 2000 to 2006 which are present at five percent of their delisting levels or higher, the constituents of concern are:

- Acetone
- Ammonia
- Barium
- Chromium
- Carbon tetrachloride
- Fluoride
- Lead
- Mercury
- Methyl ethyl ketone
- n-Butyl alcohol
- Total cresols
- Tributyl phosphate
- Vanadium

Arsenic and beryllium are excluded because they are present in Hanford soils and may therefore give a false positive sample result. Constituents of concern vary in each basin. For example, ammonia may be present only in LERF Basin 42. The constituents of concern for each basin will be determined by process knowledge as part of the Data Quality Objectives process for the Sampling and Analysis Plan.

H.3.3 Removing Dangerous Waste

At the start of LERF closure, aqueous waste will be transferred sequentially from each basin to another LERF basin or to 200 Area ETF for treatment.

At a pump rate of about 284 liters (75 gallons) per minute, it will take approximately 60 days to empty a full basin. Basin covers will remain in place to prevent possible wind dispersion of waste until all basin waste has been removed.

All of the aqueous waste inventory at the 200 Area ETF will be processed before closure. Any residue remaining in piping, equipment, or the LERF liner will be removed to an appropriate disposal unit. All containerized waste will be dispositioned. All secondary waste in containers will be transferred to an appropriate TSD unit.

H.3.4 Decontaminating Structures, Equipment, and Soils

This section discusses the activities necessary to implement a clean closure strategy for the LERF and 200 Area ETF.

H.3.4.1 Covers and Primary Liner

The following steps will be performed to close each LERF basin cover and primary liner:

- Wastewater will be removed from the basins and transferred to another LERF basin or to 200 Area ETF. Additional pumps and piping may be installed to empty the basin as low as possible.
- The basin cover will be cut into pieces and disposed in containers.
- As much as practical of the remaining residue within the basins will be removed and transferred to containers, another LERF basin, or 200 Area ETF. Rinsing may be performed to facilitate removal.
- The pipe risers, transfer pump, HDPE primary liner and bentonite carpet liner will be cut into pieces and disposed in containers.

H.3.4.2 Drainage Layer and Secondary Liner

The following steps will be performed to close each LERF basin drainage layer and secondary liner:

- The drainage gravel, geotextile, and geonet will be cut into pieces, and disposed in containers.
- As much as practical of the remaining residue on the secondary liner will be removed and transferred to containers, another LERF basin or 200 Area ETF. Rinsing may be performed to facilitate removal of residue.
- The HDPE liner portion of the secondary liner will be visually inspected for physical damage. This will provide potential sampling locations to determine if the soil/bentonite below the HDPE liner may be clean closed.
- The leachate pump, pump riser, and HDPE liner portion of the secondary liner will be removed, cut into pieces, and disposed in containers.
- The soil/bentonite portion of the secondary liner will be visually inspected for signs of contamination. This will provide potential sampling locations to determine if the soil/bentonite may be clean closed.

Assessment of contamination beneath the LERF's secondary liner will be performed within each basin by sampling the top surface of the 91-centimeter (36-inch) thick layer of soil/bentonite. Biased and random location selection will be used to increase the probability of detecting leachate contamination. Some sampling points will be chosen randomly, while others will be chosen where physical damage was noted during the inspection of the secondary HDPE liner and soil/bentonite layer, and in areas where the underlying material porosity and permeability and the hydraulic head would most likely drive any leachate. The leakage rate through the liner would increase toward the bottom of the liner as hydraulic head increases. Any leakage that did occur in the sloped sides could be expected to travel down slope through the geotextile between the primary and secondary liner until reaching the bottom of the liner.

Therefore, the most likely area of contamination would be the soil/bentonite in the leachate sump and at the bottom of the basin. Sampling and disposal objectives will be determined at the time prior to closure activities through the data quality objectives process. The sampling and analysis plan will be prepared following the completion of a data quality objectives process in accordance with EPA/600/R-96/055 (QA/G-4) *Data Quality Objectives Process*, as amended.

The data quality objectives process will be initiated prior to closure on a schedule to ensure timely closure of LERF. The sampling and analysis plan will be submitted to Ecology as part of a permit modification request meeting the requirements of WAC 173-303-830. The sampling and analysis plan will be prepared consistent with EPA/240/B-01/003 (EPA QA/R-5), *EPA Requirements for Quality Assurance Project Plans*, as amended.

Sampling of the soil/bentonite will be performed in accordance with the sampling methods allowed for in WAC 173-303-110(2). Special care will be needed in sampling for volatiles. To aid in ensuring sample integrity, the initial sampling of the soil/bentonite may proceed while the secondary HDPE liner is in the process of being removed.

If no constituents of concern are found above soil closure performance standards (Section H.2.3), no further analysis will be done. If the initial sample analysis indicates liner leakage, additional samples from different depths and locations will be taken to determine the spatial extent of contamination. The soil/bentonite will be removed in the area around the contamination and placed in containers. If contamination is found to extend through the entire depth of the soil/bentonite layer, soil beneath the basin that is contaminated above closure performance standards will also be removed and placed in containers.

H.3.4.3 Tanks

The following general steps will be performed to close, each 200 Area ETF tank and ancillary equipment:

- Wastewater and chemical additions to the tank will be isolated or rerouted to a downstream tank.
- Piping and ancillary equipment associated with the tank will be flushed with water and drained to the tank being closed, to another tank, or to containers.
- Wastewater will be removed from the tank and transferred to another tank. Additional pumps and piping may be installed to empty the tank as low as possible.
- All remaining residue at the bottom of the tank will be removed and transferred to another tank or containers. Rinsing may be performed to facilitate removal of residue.
- An initial visual inspection of the tank's interior and exterior surfaces will be performed to determine the type of flushing that will allow the tank to be clean closed, or whether the tank cannot be clean closed.
- The tank's surfaces, piping and ancillary equipment will be cleaned by chemical or physical extraction techniques described in 40 CFR 268.45. Flush solution will be transferred to another tank or containers. All flush solution at the bottom of the tank will be removed before visual inspection.
- The tank, piping, and ancillary equipment will be inspected visually for compliance with the performance standard in Sections H.2.1 and H.2.2.

Closure will begin with the Load-In Station tanks, surge tank, and other tanks of the main treatment train. The secondary treatment train will operate as long as possible to reduce the volume of flush water requiring disposal. Condensate from the secondary treatment train will be routed to the main treatment train or the verification tanks for storage or treatment.

After rinsing, the tanks will be inspected visually for compliance with the performance standard. Visual inspection might be made remotely using a camera or other device that allows verification of meeting the performance standard.

If any areas are found not meeting the clean debris surface performance standard, these areas will be decontaminated in-place, or the contaminated portions will be removed, designated, and disposed accordingly. Per 40 CFR 268.45, Table 1 incorporated by reference at WAC 173-303-140, only removal of contaminants from the surface layer is necessary for metal surfaces.

The outside of the tanks also will be inspected for compliance to the performance standard. Any areas found not to meet this performance standard will be decontaminated in-place, or the contaminated portions will be removed, designated, and disposed accordingly.

Before using decontamination solutions on the outside of the tanks, the floor will be inspected for cracks or other openings that could provide a pathway to soil. This inspection will be performed as described in Section H.2.3 in conjunction with mapping of potential through-thickness cracks. Any such cracks will be mapped. The cracks will be sealed before beginning treatment or other engineered containment devices (e.g., portable catch basins, liners) will be used to collect and contain solutions.

Decontamination residues will be collected, designated, and managed as appropriate. If it is not possible to meet the clean closure performance standard, contaminated portions of the tanks could be removed, designated, and disposed of accordingly. The inspections for a clean debris surface will be documented on an inspection record.

H.3.4.4 Internal and External Piping and Ancillary Equipment

The internal piping and ancillary equipment for both LERF and 200 Area ETF, which have contacted dangerous waste will be flushed and drained as part of closure. Any treatment media, such as filters, reverse osmosis membranes, ion exchange resins, will be removed from the ancillary equipment, and disposed of accordingly. Where the contaminated surfaces can be inspected, an inspection will be performed to see if the piping and ancillary equipment meet the clean debris surface standard in 40 CFR 268.45 and can be declared non-dangerous. If it is not possible to meet the clean debris surface standard or the piping or ancillary equipment cannot be inspected, those portions of the piping and ancillary equipment will be removed, designated, and disposed of accordingly.

External piping (transfer lines) associated with LERF and 200 Area ETF consist of below grade and above grade piping. Below grade, piping will be dispositioned at closure consistent with the practices for below grade piping in the 200 Areas at the time of closure consistent with the 200-IS-1 operable unit decisions. Above grade piping will be dispositioned consistent with the provisions for internal piping.

Rinsate from the LERF and 200 Area ETF external piping and LERF internal piping will be processed through 200 Area ETF. Dangerous and/or mixed-waste solutions and materials generated during closure activities, which cannot be treated at 200 Area ETF will be managed in accordance with WAC 173-303-610(5).

H.3.4.5 Concrete

At LERF, the concrete catch basins are located at the northeast corner of each retention basin, where inlet pipes, leachate risers, and transfer pipe risers emerge for the basin. The concrete catch basin is curbed, and coated with a chemical resistant epoxy sealant. The concrete catch basin is sloped so that any leaks or spills from the piping or connections will drain into the basin. At the 200 Area ETF, the coated concrete floor and berm provides secondary containment for all the tanks and process piping.

Closure of concrete at LERF and 200 Area ETF will be performed after the associated tanks, piping, ancillary equipment, and structures have been closed. All concrete will be inspected visually and surveyed before any decontamination. The purpose of the inspection will be twofold: to identify and map any cracks in the concrete that might have allowed contaminants a pathway to the soil below (Section H.2.3), and to identify areas that potentially are contaminated with dangerous waste or dangerous waste residues. The inspection standard will be a clean debris surface as defined in Section H.2.1. The inspection of the concrete for a clean debris surface will be documented on an inspection record. Those areas already meeting the standard can be clean closed as is.

Those potentially contaminated areas will undergo decontamination to meet the clean closure standard of a clean debris surface. The concrete will be washed down; the rinsate collected, designated, and disposed of accordingly. The concrete will be reinspected for a clean debris surface. Concrete surfaces indicated by visual examination, as still being potentially contaminated will have the surface layer removed to a depth of 0.6 centimeter (0.25 inches) by scabbing or other approved methods. This will not threaten the environment, even if potential through-thickness cracks had been found during the inspection, because concrete decontamination (scabbing) will not employ liquid solutions that could enter cracks and because scabbing residues will be vacuumed away from cracks as, any residue is generated.

Achievement of a clean debris surface will be documented on an inspection record. Decontamination residues will be collected, designated, and managed as appropriate.

H.3.4.6 Structures

If contaminated with either dangerous or mixed waste constituents, the 200 Area ETF structures will be decontaminated and/or disassembled, if necessary, packaged, and disposed of in accordance with existing land disposal restrictions (WAC 173-303-140).

Closure steps could include the following activities.

- Containerize (as necessary and practicable) and remove any remaining waste.
- Review operating records for spillage incidents and visually inspect storage area surfaces for evidence of contamination or for cracks that could harbor contamination or allow the escape of decontamination solutions. Inspect storage area surfaces for visible evidence of contamination (e.g., discoloration, material degradation, wetness, and odor). If contamination is evident, the affected area(s) will be decontaminated.
- Decontaminate 200 Area ETF walls and floors to minimize the potential for loose contamination and facilitate any required surveys and/or chemical field screening. The structures could be cleaned by water rinse or high-pressure, low-volume steam cleaning coupled with a detergent wash. After decontamination, the walls and floors will be compared to closure performance standards.
- Collect rinsate and manage as dangerous waste for appropriate disposal.
- Secure (lock) personnel entries into building and post doors with appropriate warning signs.

H.3.4.7 Underlying Soils

Clean closure of soil under LERF's secondary liner will be accomplished by demonstrating that the liners and leak detection system kept contaminants from reaching the soil. The secondary liner provided secondary containment for the LERF basins. Unless inspections identify potential leaks, punctures, cracks, or tears indicating containment failure and a subsequent potential for soil contamination from TSD unit operations, the soil will be considered clean closed. However, if inspections identify such leaks, punctures, etc., potential soil contamination will be investigated.

Clean closure of soil under 200 Area ETF will be accomplished by demonstrating that the coated concrete floor kept contaminants from reaching the soil. The coated concrete floor and bermed area provided secondary containment for all the tanks and process piping. Unless inspections identify potential through-thickness cracks indicating containment failure and a subsequent potential for soil contamination from TSD unit operations, the soil will be considered clean closed. However, if inspections identify such cracks and there have been documented spills in the vicinity, potential soil contamination will be investigated.

Where it is possible visually to inspect directly beneath the tanks, a visual inspection will be performed. Where it is not possible visually to inspect beneath the tanks, an evaluation of the tank integrity will be made. The condition of the tank will be evaluated to determine if there was any potential for leakage. If no cracks, severe corrosion, or evidence of leaks is observed, it will be reasoned that mixed or dangerous waste solutions could not have penetrated to the soil directly below the tank.

External piping (transfer lines) between the 242-A Evaporator and LERF and 200 Area ETF are double lined with a leak detection system. If records indicate that no leaks from the primary piping occurred, the soil will be considered clean with respect to RCRA closure.

Where there is evidence that contamination may have leaked into the soil below tanks, concrete, or the soil/bentonite layer at LERF, the contaminated tank, concrete, or soil/bentonite layer will be removed to allow the underlying soil to be sampled to determine the depth of the contamination. Soil that is contaminated above the closure performance standards in Section H.2.3 will be removed, placed in containers, and disposed accordingly.

H.4 Maximum Waste Inventory

The maximum waste inventory for LERF and 200 Area ETF is in Addendum A.

H.5 Closure of Containers, Tanks, and Surface Impoundments

The following sections cover closure of containers, closure of tanks, and closure of surface impoundments.

H.5.1 Closure of Containers

Containers at 200 Area ETF will be used to contain dangerous waste in the event of a spill, unexpected release, or equipment failure. Containers will be used to accumulate nonradioactive dangerous waste and/or mixed wastes. All containers will be emptied and treated prior to closure of 200 Area ETF. Any containers used to contain dangerous and/or mixed waste at the 200 Area ETF that is generated during the closure process and therefore cannot be treated at 200 Area ETF will be designated and shipped to an onsite TSD unit or off-site TSD facility. Containers of dangerous and/or mixed waste will not be left in the 200 Area ETF after closure.

H.5.2 Closure of Tanks

Clean closure of 200 Area ETF will consist of the removal and disposal of all dangerous waste and the decontamination and/or removal and disposal of equipment which does not meet the performance standards in Section H.2, including tanks. The 200 Area ETF was designed to incorporate removable components. This design facilitates closure by allowing complete removal of equipment, which does not meet the performance standards.

H.5.3 Closure of Surface Impoundments

At closure, all of LERF that received regulated waste will be closed in accordance with the requirements of this approved closure plan, which are intended to ensure compliance with the requirements of WAC 173-303-650(6)(a)(i). All equipment, structures, and other material associated with closure of LERF will be decontaminated or removed in accordance with WAC 173-303-610(2). All basin waste and decontamination rinsate will be transferred to 200 Area ETF. Sampling and testing will be conducted as described in Section H.3.4.2.

H.6 Schedule for Closure

Closure of LERF and 200 Area ETF is not anticipated to occur within the next 30 years. The actual year of closure will depend on the time required for current waste to be processed and what role the LERF and 200 Area ETF will play in processing additional waste generated during future activities in the 200 Areas. Other factors affecting the year of closure include changes in operational requirements, lifetime extension upgrades, and unforeseen factors. When a definite closure date is established, notification of closure will be provided in accordance with Permit Condition II.J.3.

The activities required to complete closure are planned to be accomplished within 180 days in accordance with WAC 173-303-610(4)(b). Should a modified schedule be necessary, a revised schedule will be proposed through the permit modification procedure in accordance with WAC 173-303-610(4)(b).

LIQUID EFFLUENT RETENTION FACILITY (LERF) & 200 AREA EFFLUENT TREATMENT FACILITY (ETF) ADDENDUM I INSPECTION REQUIREMENTS

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
08/25/2016	8C.2016.Q2

This page intentionally left blank.

ADDENDUM I
INSPECTION REQUIREMENTS

This page intentionally left blank.

ADDENDUM I
INSPECTION REQUIREMENTS

TABLE OF CONTENTS

I. INSPECTION REQUIREMENTS 5
I.1 Inspection Plan 5
I.1.1 General Inspection Requirements 5
I.1.2 Specific Process Inspection Requirements 6
I.1.3 Inspection Log 8
I.1.4 Storage of Ignitable or Reactive Wastes 8
I.1.5 Instrumentation Monitoring 10

TABLES

Table I.1. Visual Inspection Schedule for the LERF and 200 Area ETF 9
Table I.2. Inspection Plan for Instrumentation Monitoring 11

This page intentionally left blank.

I. INSPECTION REQUIREMENTS

I.1 Inspection Plan

This addendum describes the method and schedule for inspections of the Liquid Effluent Retention Facility (LERF) and 200 Area Effluent Treatment Facility (ETF). The purpose of inspections is to help ensure that situations do not exist that might cause or lead to the release of dangerous and/or mixed waste that could pose a threat to human health and the environment. Abnormal conditions identified by an inspection will be corrected on a schedule that prevents hazards to workers, the public, and the environment.

I.1.1 General Inspection Requirements

The content and frequency of inspections are described in this section. Inspection records are retained in the Hanford Facility Operating Record, LERF and 200 Area ETF file, or other approved locations, in accordance with Permit Condition II.I.1.

In certain areas of the 200 Area ETF, many inspections are performed remotely to maintain as low as reasonably achievable (ALARA) exposure. Monitoring instruments are connected to audible alarms and visual indicators track alarm status. The monitoring system provides trending of selected monitoring data, graphics, and equipment summary displays.

A preventive maintenance recall system is employed to direct preventive maintenance activities at the LERF and 200 Area ETF. Equipment requiring maintenance is checked as indicated by the maintenance history and the manufacturer's recommendations. The preventive maintenance of certain equipment might not be possible if the LERF or the 200 Area ETF is in an operational mode. Thus, the preventive maintenance could be performed slightly earlier or later than planned to minimize impact on operations.

Instrumentation at 200 Area ETF is calibrated regularly to ensure accuracy and reliability. All process control instrumentation is calibrated on a schedule depending on previous calibration experience. An instrument calibration and recall system is employed to manage calibrations.

I.1.1.1 Types of Problems

Key components of the LERF inspection program include the following areas:

- Structural integrity of the basins.
- Catch basin secondary containment system integrity.
- Evidence of release from basins.
- Safety, communications, and emergency equipment.

Key components of the 200 Area ETF inspection program include the following areas:

- Condition of tanks and ancillary piping.
- Condition of containers.
- Condition of the process control equipment.
- Condition of emergency equipment.
- Condition of secondary containment.

Table I.1 and Table I.2 provide a description of LERF and 200 Area ETF items to be inspected.

I.1.1.2 Frequency of Inspections

The frequency of inspections is based on the rate of possible deterioration of equipment and the probability of a threat to human health or the environment.

The LERF and 200 Area ETF is inspected as indicated in Table I.1 and Table I.2.

I.1.2 Specific Process Inspection Requirements

The following sections describe the specific process inspections performed at LERF and 200 Area ETF.

I.1.2.1 Container Inspections

Containers are used at the 200 Area ETF to store solidified secondary waste, such as the powder waste from the thin film dryer and maintenance and operations waste. When containers are being held in container storage areas, the following inspection schedule is maintained:

- Daily visual inspection of container storage area for leaks, spills, accumulated liquids, and open or improperly sealed containers.
- Weekly visual inspection of container labels to ensure labels are not obscured, removed, or otherwise unreadable.
- Weekly visual inspection for deterioration of containers, containment systems, or cracks in protective coating or foundations caused by corrosion, mishandling, or other factors.

Following the inspections, an inspection datasheet is signed and dated by the inspector and supervisor.

I.1.2.2 Tank Inspections

A description of the tank systems and ancillary equipment at the 200 Area ETF is given in Addendum C. Inspections and frequencies are given in Table I.1 and Table I.2. This section includes a brief discussion of the inspections.

I.1.2.2.1 Overfill Protection

Tanks that have the possibility of being overfilled have level instrumentation that alarms before the tanks reach overflow. High tank level alarms annunciate in the 200 Area ETF Control Room, allowing operating personnel to take immediate action to stop the vessels from overfilling. These alarms are monitored continuously in the 200 Area ETF Control Room during solution transfers. When tank level instrumentation is inoperable, the alternate controls discussed in Addendum C, Section C.4.4.2 are followed to prevent tank overfilling.

I.1.2.2.2 Visual Inspections

Visual inspections of tanks and secondary containments are performed to check for leaks, signs of corrosion or damage, and malfunctioning equipment. Inspections are performed on tanks, secondary containment within the 200 Area ETF, surge tank, and verification tank, and associated secondary containment.

I.1.2.2.3 Secondary Containment Leak Detectors

The surge tank and verification tank secondary containment systems have sloped floors that drain solutions to sumps equipped with leak detectors that alarm in the 200 Area ETF Control Room. These alarms are monitored continuously in the 200 Area ETF Control Room during 200 Area ETF processing operations or during waste transfer, and at least daily when processing operations or waste transfers are not occurring. If an alarm is activated, further investigation is performed to determine if the source is a tank leak or other solution (i.e., precipitation).

I.1.2.2.4 Integrity Assessments

The initial integrity assessment was issued in 1995 (Addendum C). Consistent with the recommendations of the integrity assessment, a periodic integrity assessment program was developed for the 200 Area ETF tanks and is discussed in detail in Addendum C, Section C.4.1.5.

I.1.2.2.5 Effluent Treatment Facility Piping

The 200 Area ETF employs an extensive piping system. During inspections at the 200 Area ETF, any aboveground piping is inspected visually for signs of leakage and for general structural integrity.

During the visual inspection, particular attention is paid to valves and fittings for signs of cracking, deformation, and leakage.

I.1.2.3 Surface Impoundments and Condition Assessment

The following describes the surface impoundment inspections performed at LERF.

I.1.2.3.1 Overtopping Control

Under current operating conditions, 0.61 meters (2 feet) of freeboard is maintained at each LERF basin, which corresponds to an operating level of 6.8 meters (22.2 feet), or operating capacity of 29.5 million liters (7.8 million gallons). Level indicators at each basin are monitored to confirm that this level is not exceeded.

Before an aqueous waste is transferred into a basin, administrative controls are implemented to ensure overtopping will not occur during the transfer. The volume of feed to be transferred is compared to the available volume in the receiving basin. The transfer is not initiated unless there is sufficient volume available in the receiving basin or a cut-off level is established. The transfer into the basin would be stopped when this cut-off level is reached.

The LERF basins also are provided with floating very low-density polyethylene covers that are designed and constructed to prevent overtopping by the introduction of precipitation and dust into the basins. Overtopping and flow control also are discussed in Addendum C.

I.1.2.3.2 Impoundment Contents

The LERF basins are inspected weekly to assess whether the contents are escaping from a basin. Level indicators are inspected weekly to check for unaccountable change in the level of the basins.

I.1.2.3.3 Leak Detection

The leachate detection, collection, and removal system is described in Addendum C. The leachate collection sump pump is activated when the liquid level in the leachate sump reaches a preset level. A flow meter/totalizer measures the amount of leachate removed. In addition, the timer on the leachate pump tracks the cumulative pump run time. The leak rate through the primary liner can be determined using one of two methods:

1) Measured as the leachate flow meter/totalizer readings (flow meters/totalizers are located on the outflow line from the collection sumps in the bottom of the LERF basins) or

2) Calculated using the pump operating time readings multiplied by the pump flow rate (the pump runs at a constant flow rate).

Calculations using either method are sufficient for compliance. If either the flow meter/ totalizer or pump operating time system is not functioning, this is identified as an abnormal condition (see Section I.1).

The LERF employs a double walled transfer piping between 242-A Evaporator and LERF and between LERF and 200 Area ETF. The WAC 173-303-650 regulations do not require a discussion of piping for surface impoundments. However, for the purposes of comprehensive coverage of the LERF, inspections and integrity assessments are performed on the piping system. Aqueous waste (e.g., process condensate) is transferred from the 242-A Evaporator to the LERF via a buried pipeline. Likewise, aqueous waste is transferred to the 200 Area ETF via buried pipelines. At the LERF dikes, aboveground piping serves to transfer waste from one basin to another.

The buried pipelines normally are continuously monitored during transfers by a leak detection system (Addendum C). Leak detection system alarms annunciate to the 200 Area ETF Control Room, which is monitored continuously during waste transfers and daily when no waste is transferring. As an alternative to continuous leak detection, the transfer lines can be inspected daily during transfers by opening the secondary containment drain lines at the LERF catch basins (for 242-A Evaporator transfers to LERF) and the surge tank (for LERF transfers to 200 Area ETF) to inspect for leakage.

During the routine inspections at LERF, the aboveground piping system is inspected for signs of leakage and for general structural integrity. During the visual inspection, particular attention is paid to valves and fittings for signs of cracking, deformation, and leakage.

I.1.2.3.4 Dike Erosion

The LERF basins and dikes are visually inspected weekly and after significant precipitation events for run-on, run-off, cover integrity, erosion problems, or other signs of deterioration in the dikes from precipitation, wind, burrowing mammals, or vegetation.

I.1.2.3.5 Structural Integrity

A written certification attesting to the structural integrity of the basin dikes, signed by a qualified, registered professional engineer, is provided in Addendum C.

I.1.2.3.6 Container Inspection

Normal operation of the LERF does not involve the storage of dangerous waste in containers. Therefore, the inspection requirements of this section normally are not applicable to the LERF. Any containerized dangerous waste generated at LERF will be brought to the 200 Area ETF and managed in accordance with WAC 173-303-630 and is discussed in Addendum C.

I.1.3 Inspection Log

Observations made and deficiencies noted during an inspection are recorded on inspection log sheets (also called turnover sheets). On completion, the log sheet includes the inspector's printed name, signature, date, and time; the log sheet is submitted for review and approval by LERF and 200 Area ETF management or their designee, as required by operating procedures. Once approved, the log sheet is kept in the Hanford Facility Operating Record, LERF and 200 Area ETF files. Inspection records are retained in the Hanford Facility Operating Record, LERF and 200 Area ETF files, or other approved locations, in accordance with Permit Condition II.I.1. The inspection records are used to help determine any necessary corrective actions. Problems identified during the inspections are prioritized and addressed in a timely fashion to mitigate health risks to workers, maintain integrity of the TSD units, and prevent hazards to public health and the environment.

If while performing an inspection, a leak or spill is discovered, facility operations responds per the emergency response procedures action is taken to stop the leak and determine the cause. The waste is removed from the secondary containment in a timely manner that prevents harm to human health and the environment.

I.1.4 Storage of Ignitable or Reactive Wastes

The LERF could receive an aqueous waste that is designated reactive or ignitable. Any aqueous waste exhibiting these characteristics is managed (e.g., through blending in LERF) such that the waste no longer exhibits the reactive or ignitable characteristics.

Though unlikely, the 200 Area ETF secondary wastes might have the characteristics of being reactive or ignitable. A qualified inspector performs annual fire inspections of the 200 Area ETF using a checklist developed specifically for facilities that handle dangerous and/or mixed waste.

Table I.1. Visual Inspection Schedule for the LERF and 200 Area ETF

Item	Inspection	Frequency
2025-ED Load-In Station		
Load-In Station tank system	Inspect area for leaks. Note any unusual noises or vibration from the system pumps. Inspect secondary containment system for signs of deterioration.	Daily
Main Treatment Train		
Surge tank system	Inspect area for leaks. Note any unusual noises or vibration from the system pumps. Inspect secondary containment system for signs of deterioration.	Daily
Rough filter	Inspect for leaks.	Daily
Ultraviolet oxidation system	Inspect module for leaks Inspect peroxide storage tank, ancillary equipment for leaks.	Daily
pH adjustment tank	Inspect tank and ancillary equipment for leaks	Daily
H_2O_2 decomposer	Inspect tank and ancillary equipment for leaks	Daily
Fine filter	Inspect module for leaks	Daily
Degasification system	Inspect module for leaks. Note any unusual noises or vibration from the degasification blower.	Daily
Reverse osmosis system	Inspect tanks and ancillary equipment for leaks. Note any unusual noises or vibration from the system pumps.	Daily
Polishers	Inspect tanks and ancillary equipment for leaks.	Daily
Effluent pH adjustment tank	Inspect tank and ancillary equipment for leaks.	Daily
Verification tanks	Inspect tanks and ancillary equipment for leaks. Note any unusual noises or vibration from the system pumps. Inspect secondary containment system for signs of deterioration.	Daily
Secondary Treatment Train		
Secondary waste receiving tank	Inspect tank and ancillary equipment for leaks	Daily
200 Area ETF evaporator	Inspect tank and equipment for leaks. Note any unusual noises or vibration from the system pumps or compressor.	Daily
Concentrate tank	Inspect tank and ancillary equipment for leaks.	Daily
Thin Film Dryer Room	Inspect piping and ancillary equipment for spills, leaks, and accumulated liquids (viewed through camera). Note any unusual noises or vibration from the system pumps or blower.	Daily[1]
Container handling	Inspect area for spills, leaks, accumulated liquids.	Daily
Container handling	Inspect for deterioration of containers and secondary containment, including corrosion and cracks in secondary containment foundation and coating. Inspect container labels to ensure that they are readable.	Weekly
Support Systems		
Vessel ventilation system	Inspect filters (HEPA and pre-filters), check vessel off gas pressures, system flow, and discharge temperatures.	Daily
Sump tank system	Inspect sump trenches for unexpected liquids, which indicate spills or leaks from process equipment.	Daily

[1]If the camera system is inoperable, daily visual inspections will be performed or the Thin Film Dryer will be emptied and isolated as described in Addendum C, Section C.4.4.2, to prevent waste additions that could result in undetected leaks or spills in the Thin Film Dryer Room.

Item	Inspection	Frequency
Safety Systems		
Eye wash stations	Check status; check for adequate pressure	Monthly
Safety showers	Check status; check for adequate pressure	Monthly
Emergency Systems		
Fire extinguishers	Check for adequate charge.	Monthly
Emergency lighting	Test operability.	Monthly
Processing Area		
Uninterruptible power supply	Check output voltage and visually inspect battery pack for corrosion and leakage. Check indicator lights for fault conditions.	Annually
LERF (Surface Impoundment)		
LERF basins and dikes	Check the overtopping controls and integrity of the basins and dikes	Weekly
LERF contents	Check basin level indicators for unaccountable changes in the level of the basins	Weekly
Leak Detections	Determine the leak rate per wetted surface area	Weekly
LERF basins and dikes	Check for run-on, run-off, cover integrity, erosion problems, and other signs of deterioration	Weekly & After significant precipitation events
Ignitable and Reactive		
Ignitable and reactive waste	Storage in compliance with Hanford Site fire protection standards and WAC 173-303-630(8)	Annually[2]
Container Storage Areas Other Than Secondary Treatment Train		
Container Storage	Container labels to ensure labels are not obscured, removed, or otherwise unreadable	Weekly
	Deterioration of containers, containment systems, or cracks in protective coating or foundations caused by corrosion, mishandling, or other factors	Weekly
	Leaks, spills, accumulated liquids, and open or improperly sealed containers	Daily

HEPA – High efficiency particulate air

[2]When waste management activities occur

I.1.5 Instrumentation Monitoring

Continuous monitoring applies to the electronic monitoring performed in the 200 Area ETF Control Room for this instrumentation during 200 Area ETF processing operations and/or 2025-E Load-In Station transfers. Data from alarms, leak detectors, and level transmitters are monitored daily in the 200 Area ETF Control Room when waste transfers are not occurring (see C.2.5.1). In cases where this instrumentation is out of service (e.g., calibration, power failures, or maintenance) daily visual inspections will be performed in accordance with WAC 173-303-640, using the alternate methods discussed in Addendum C, Section C.1 for leak detection, Section C.4.3.1.2 for level inspection, and Section C.4.4.2 for overfill prevention will be followed.

In the event the electronic leak detectors or level indicators for Sump Tank 1 or Sump Tank 2 are out of service, daily visual inspections will be performed each operating day (WAC-173-303-640).

Inspections pertaining to instrumentation monitoring is provided in Table I.2.

Table I.2. Inspection Plan for Instrumentation Monitoring

Item	Inspection	Frequency
2025-ED Load-In Station		
Level alarm LAHH-59A-109/-117	Monitor liquid level in Load-In Tanks TK-109 and TK-117 to prevent overflow	Continuously
Level alarm LSH-59A-003	Monitor liquid level in Load-In Tanks TK-1 to prevent overflow	Continuously
Leak detector	Monitor for leakage in the Load-In Station tank pit sump	Continuously
Main Treatment Train		
Leak detector LAH-20B009	Monitor for leakage in the surge tank drainage sump	Continuously
Level alarm LAH-60A013	Monitor surge tank level to prevent overflow	Continuously
Level alarm LAHL-60C-111	Monitor liquid levels in the pH adjustment tank to prevent overflow	Continuously
Level alarm LAHL-60F-101	Monitor liquid levels in the first RO feed tank to prevent overflow	Continuously
Level alarm LAHL-60F-201	Monitor liquid levels in the second RO feed tank to prevent overflow	Continuously
Level alarms LAHL-60C-211	Monitor liquid levels in the effluent pH adjustment tank to prevent overflow	Continuously
Level transmitter LAHX-60H001A/B/C	Monitor liquid level in verification tanks to prevent overflow	Continuously
Leak detector LAH-20B010	Monitor for leakage in the verification tank drainage sump	Continuously
Secondary Treatment Train		
Level alarm LAHL-60I-001A/B	Monitor liquid levels in secondary waste receiver tanks A and B to prevent overflow.	Continuously
Level alarm LAHL-60J-001A/B	Monitor liquid levels in concentrate tanks A and B to prevent overflow.	Continuously
Level alarm LAHL-60I-107	Monitor liquid levels in the evaporator tank to prevent overflow.	Continuously
Level alarm LAHL-60J-036	Monitor liquid levels in the spray condenser tank to prevent overflow.	Continuously
Level alarm LAHL-60I-108	Monitor liquid levels in the distillate flash tank to prevent overflow.	Continuously
Level alarm LAH-60I-119	Monitor liquid levels in the entrainment separator tank to prevent overflow.	Continuously
Level transmitter LAH-20B001	Monitor liquid level in Sump Tank 1 to prevent overflow.	Continuously
Level transmitter LAH-20B002	Monitor liquid level in Sumo Tank 2 to prevent overflow.	Continuously
Leak detector LAH-20B003	Monitor for leakage to Sump No. 1.	Continuously

Item	Inspection	Frequency
Leak detector LAH-20B005	Monitor for leakage to Sump No. 2.	Continuously
Leak detector	Monitor for leakage from pipeline between 200 Area ETF and 2025-ED Load-In Station.	Continuously
Leak detector	Monitor for leakage from pipeline between 200 Area ETF and LERF.	Continuously
Leak detector	Monitor for leakage from pipeline between LERF and the 242-A Evaporator.	Continuously

LIQUID EFFLUENT RETENTION FACILITY (LERF) & 200 AREA EFFLUENT TREATMENT FACILITY (ETF) ADDENDUM J CONTINGENCY PLAN

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
08/25/2016	8C.2016.Q2

This page intentionally left blank.

ADDENDUM J
CONTINGENCY PLAN

This page intentionally left blank.

ADDENDUM J
CONTINGENCY PLAN

TABLE OF CONTENTS

J. CONTINGENCY PLAN 5
J.1 Building Evacuation Routing 7
J.2 Building Emergency Director 7
J.3 Implementation of the Plan 7
J.3.1 Protective Actions Responses 8
J.3.2 Response to Facility Operations Emergencies 10
J.3.3 Prevention of Recurrence or Spread of Fires, Explosions, or Releases 12
J.3.4 Incident Recovery and Restart of Operations 12
J.3.5 Incompatible Waste 13
J.3.6 Post Emergency Equipment Maintenance and Decontamination 13
J.4 Emergency Equipment 13
J.4.1 Fixed Emergency Equipment 14
J.4.2 Portable Emergency Equipment 14
J.4.3 Communications Equipment/Warning Systems 15
J.4.4 Personal Protective Equipment 15
J.4.5 Spill Control and Containment Supplies 15
J.4.6 Incident Command Post 16
J.5 Required Reports 16
J.6 Plan Location and Amendments 16
J.7 Facility/Building Emergency Response Organization 16

FIGURES

Figure J.1. Evacuation Routes from Building 2025E 9
Figure J.2. LERF and 200 Area ETF Site Plan 10

TABLE

Table J.1. Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3) 5

This page intentionally left blank.

J. CONTINGENCY PLAN

The requirements for a contingency plan at the Liquid Effluent Retention Facility (LERF) and 200 Area Effluent Treatment Facility (ETF) are satisfied in the following documents: portions of Hanford Facility Permit (Permit) Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02) and this Addendum.

The unit specific building emergency plan also serves to satisfy a broad range of other requirements [e.g., Occupational Safety and Health Administration standards (29 Code of Federal Regulations [CFR] 1910), *Toxic Substance Control Act of 1976* (40 CFR 761) and U.S. Department of Energy Orders]. Therefore, revisions made to portions of this unit specific building emergency plan that are not governed by the requirements of Washington Administrative Code (WAC) 173-303 will not be considered as a modification subject to WAC 173-303-830 or Permit Condition I.C.3.

Table J.1 identifies the sections of the unit specific building emergency plan written to meet WAC 173-303-350(3) contingency plan requirements. In addition, Section 12.0 of the unit specific building emergency plan is written to meet WAC 173-303 requirements identifying where copies of Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02) and the building emergency plan are located and maintained on the Hanford Facility. Therefore, revisions to Addendum J require a modification subject to WAC 173-303-830 and/or Permit Condition I.C.3.

Table J.1. Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3)

Requirement	Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02)	Building Emergency Plan[1] (HNF-IP-0263-ETF)	Part III, OU-3, LERF & 200 Area ETF, Addendum J
-350(3)(a) - A description of the actions, which facility personnel must take to comply with this section and WAC 173-303-360.	X[2] Section 1.3.4	X[2] Sections 7.1, 7.2 through 7.2.5, and 7.3[3] Sections 4.0 (1st paragraph), 8.2, 8.3, 8.4, 11.0	X[2] Sections J.3.1, J.3.2, through J.3.2.5, and J.3.3[3] Sections J.3, J.3.4, J.3.5, J.3.6, and J.5
-350(3)(b) - A description of the actions which shall be taken in the event that a dangerous waste shipment, which is damaged or otherwise presents a hazard to the public health and the environment, arrives at the facility, and is not acceptable to the owner or operator, but cannot be transported pursuant to the requirements of WAC 173-303-370(5), Manifest system, reasons for not accepting dangerous waste shipments.	X[2] Section 1.3.4	X[2, 4] Section 7.2.5.1	X[2,4] Section J.3.2.5.1
-350(3)(c) - A description of the arrangements agreed to by local police departments, fire departments, hospitals, contractors, and state and local emergency response teams to coordinate emergency services as required in WAC 173-303-340(4).	X Sections 3.2.3, 3.3.1, 3.3.2, 3.4, 3.4.1.1, 3.4.1.2, 3.4.1.3, 3.7, and Table 3-1		

Table J.1. Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3)

Requirement	Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02)	Building Emergency Plan[1] (HNF-IP-0263-ETF)	Part III, OU-3, LERF & 200 Area ETF, Addendum J
-350(3)(d) - A current list of names, addresses, and phone numbers (office and home) of all persons qualified to act as the emergency coordinator required under WAC 173-303-360(1). Where more than one person is listed, one must be named as primary emergency coordinator, and others must be listed in the order in which they will assume responsibility as alternates. For new facilities only, this list may be provided to the department at the time of facility certification (as required by WAC 173-303-810(14)(a)(I)), rather than as part of the permit application.		X[5] Section 3.1, 13.0	X[5] Sections J.2 and J.7
-350(3)(e) - A list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems, and decontamination equipment), where this equipment is required. This list must be kept up to date. In addition, the plan must include the location and a physical description of each item on the list, and a brief outline of its capabilities.		X Section 9.0	X Section J.4
-350(3)(f) - An evacuation plan for facility personnel where there is a possibility that evacuation could be necessary. This plan must describe the signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes.	X[6] Figure 7-3 and Table 5-1	X[7] Section 1.5	X[7] Section J.1

An "X" indicates requirement applies.

[1]Portions of Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02) not enforceable through Appendix A of that document are not made enforceable by reference in the building emergency plan.

[2]Permit Attachment 4, H*anford Emergency Management Plan* (DOE/RL-94-02) contains descriptions of actions relating to the Hanford Site Emergency Preparedness System. No additional description of actions are required if at the site level. If other credible scenarios exist or if emergency procedures at the unit are different, the description of actions contained in the building emergency plan will be used during an event by a building emergency director.

[3]Sections J.1, J.2 through J.2.5, and J.3 of the building emergency plan are those sections subject to the Class 2 "Changes in emergency procedures (i.e., spill or release response procedures)" described in WAC 173-303-830, Appendix I, Section B.6.a.

[4]This requirement only applies to TSD units, which receive shipment of dangerous or mixed waste defined as off-site shipments in accordance with WAC 173-303.

[5]Emergency Coordinator names and home telephone numbers are maintained separate from any contingency plan document, on file in accordance with Permit Condition II.A.4 and are updated, at a minimum, monthly.

[6]The Hanford Facility (site wide) signals are provided in this document. No unit/building signal information is required unless unique devices are used at the unit/building.

[7]An evacuation route for the TSD unit must be provided. Evacuation routes for occupied buildings surrounding the TSD unit are provided through information boards posted within buildings.

J.1 Building Evacuation Routing

Figures J.1 and J.2 provide identification of the primary and secondary staging areas and a general layout of the building 2025-E and LERF and 200 Area ETF. Alternate evacuation routes will be used on a case-by-case basis based on meteorological conditions at the time of the event.

J.2 Building Emergency Director

Emergency response will be directed by the Building Emergency Director (BED) until the Incident Commander (IC) arrives. The Incident Command System and staff with supporting on-call personnel fulfill the responsibilities of the Emergency Coordinator as discussed in WAC 173-303-360.

During events, LERF and 200 Area ETF personnel perform response duties under the direction of the BED. The Incident Command Post (ICP) is managed by the senior Hanford Fire Department official, unless the event is determined to be primarily a security event, in which case the Hanford Fire Department and Hanford Patrol will operate under a unified command system with Hanford Patrol making all decisions pertaining to security. These individuals are designated as the IC and as such, have the authority to request and obtain any resources necessary for protecting people and the environment. The BED becomes a member of the ICP and functions under the direction of the IC. In this role, the BED continues to manage and direct LERF and 200 Area ETF operations.

A listing of BEDs by title, work location, and work telephone numbers is contained in Section J.7 of this plan. The BED is on the premises or is available through an "on-call" list 24 hours a day. Names and home telephone numbers of the BEDs are available from the Patrol Operations Center (POC) in accordance with Permit Condition II.A.4.

J.3 Implementation of the Plan

In accordance with WAC 173-303-360(2)(b) the BED ensures that trained personnel identify the character, source, amount, and areal extent of the release, fire, or explosion to the extent possible. Identification of waste can be made by activities that can include, but are not limited to, visual inspection of involved containers, sampling activities in the field, reference to inventory records, or by consulting with facility personnel. Samples of materials involved in an emergency might be taken by qualified personnel and analyzed as appropriate. These activities must be performed with a sense of immediacy and shall include available information.

The BED shall use the following guidelines to determine if an event has met the requirements of WAC 173-303-360(2)(d):

1. The event involved an unplanned spill, release, fire, or explosion,

AND

2.a The unplanned spill or release involved a dangerous waste, or the material involved became a dangerous waste as a result of the event (e.g., product that is not recoverable.), or

2.b The unplanned fire or explosion occurred at the LERF and 200 Area ETF or transportation activity subject to RCRA contingency planning requirements,

AND

3. Time urgent response from an emergency services organization was required to mitigate the event or a threat to human health or the environment exists.

As soon as possible, after stabilizing event conditions, the BED shall determine, in consultation with the site contractor environmental single point-of-contact, if notification to the Washington State Department of Ecology (Ecology) is needed to meet WAC 173-303-360(2)(d) reporting requirements. If all of the conditions under 1, 2, and 3 are met, notifications are to be made to Ecology. Additional information is found in Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Section 4.2.

If review of all available information does not yield a definitive assessment of the danger posed by the incident, a worst-case condition will be presumed and appropriate protective actions and notifications will

be initiated. The BED is responsible for initiating any protective actions based on their best judgment of the incident.

The BED must assess each incident to determine the response necessary to protect the personnel, facility, and the environment. If assistance from Hanford Patrol, Hanford Fire Department, or ambulance units is required, the Hanford Emergency Response Number (911 from site office phones/373-0911 from cellular phones) must be used to contact the POC and request the desired assistance. To request other resources or assistance from outside the LERF and 200 Area ETF, the POC business number is 373-3800.

J.3.1 Protective Actions Responses

Protective action responses are discussed in the following sections. The steps identified in the following description of actions do not have to be performed in sequence because of the unanticipated sequence of incident events.

J.3.1.1 Evacuation

The objective of a facility evacuation order is to limit personnel exposure to hazardous materials or dangerous/mixed waste by increasing the distance between personnel and the hazard. The scope of the evacuation includes evacuation of the facility because of an event at the facility as well as evacuation of the facility in response to a site evacuation order. Evacuation will be directed by the BED when conditions warrant and will apply to all personnel not actively involved in the event response or emergency plan related activities.

The BED will initiate the evacuation by directing an announcement be made to evacuate along with the evacuation location over a public address system, facility radios, and, as conditions warrant, by activating the 200 Area site evacuation alarms by calling the POC using 911 from site office phones/373-0911 from cellular phones. Personnel proceed to a predetermined staging area (shown in Figure J.2), or other safe upwind location, as determined by the BED. The BED will determine the operating configuration of the facility and identify any additional protective actions to limit personnel exposure to the hazard.

Emergency organization personnel or assigned operations personnel will conduct a sweep of occupied buildings to ensure that all non-essential personnel and visitors have evacuated. For an immediate evacuation, accountability will be performed at the staging area. The BED will assign personnel as accountability aides and staging managers with the responsibility to ensure that evacuation actions are taken at all occupied buildings at the LERF and 200 Area ETF. All implementing actions executed by the aides/managers are directed by the emergency response procedures. When evacuation actions are complete, the aides/managers will provide a status report to the BED. The BED will provide status to the IC.

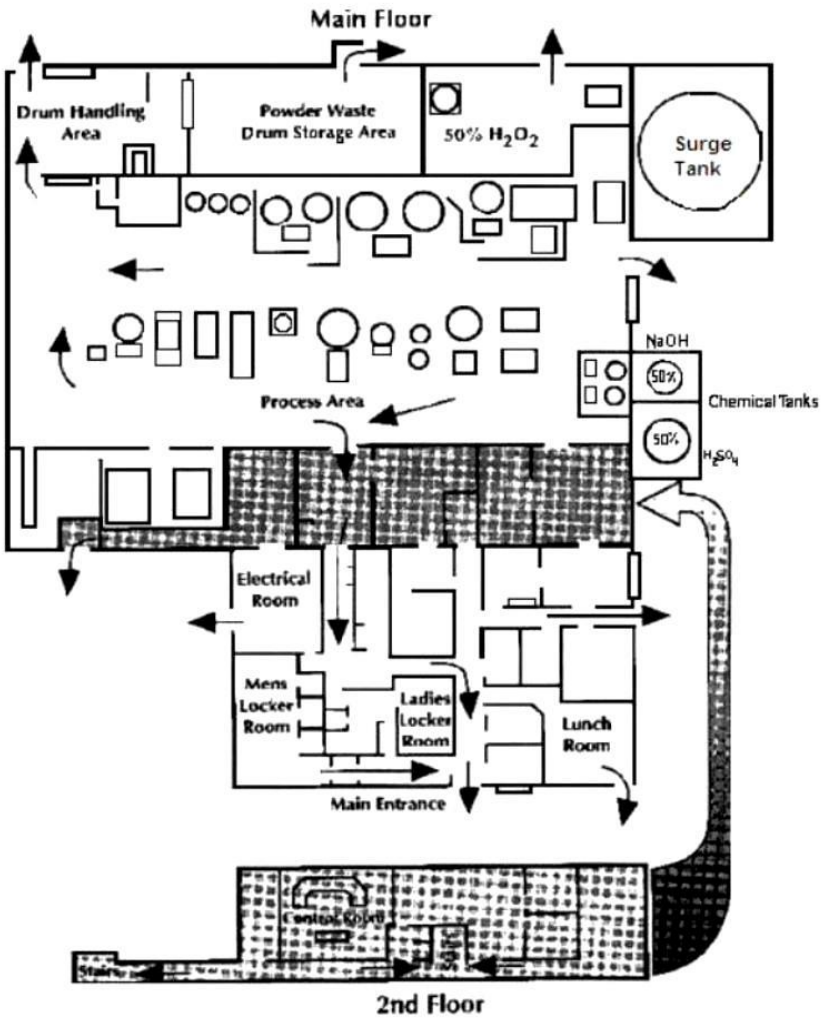


Figure J.1. Evacuation Routes from Building 2025E

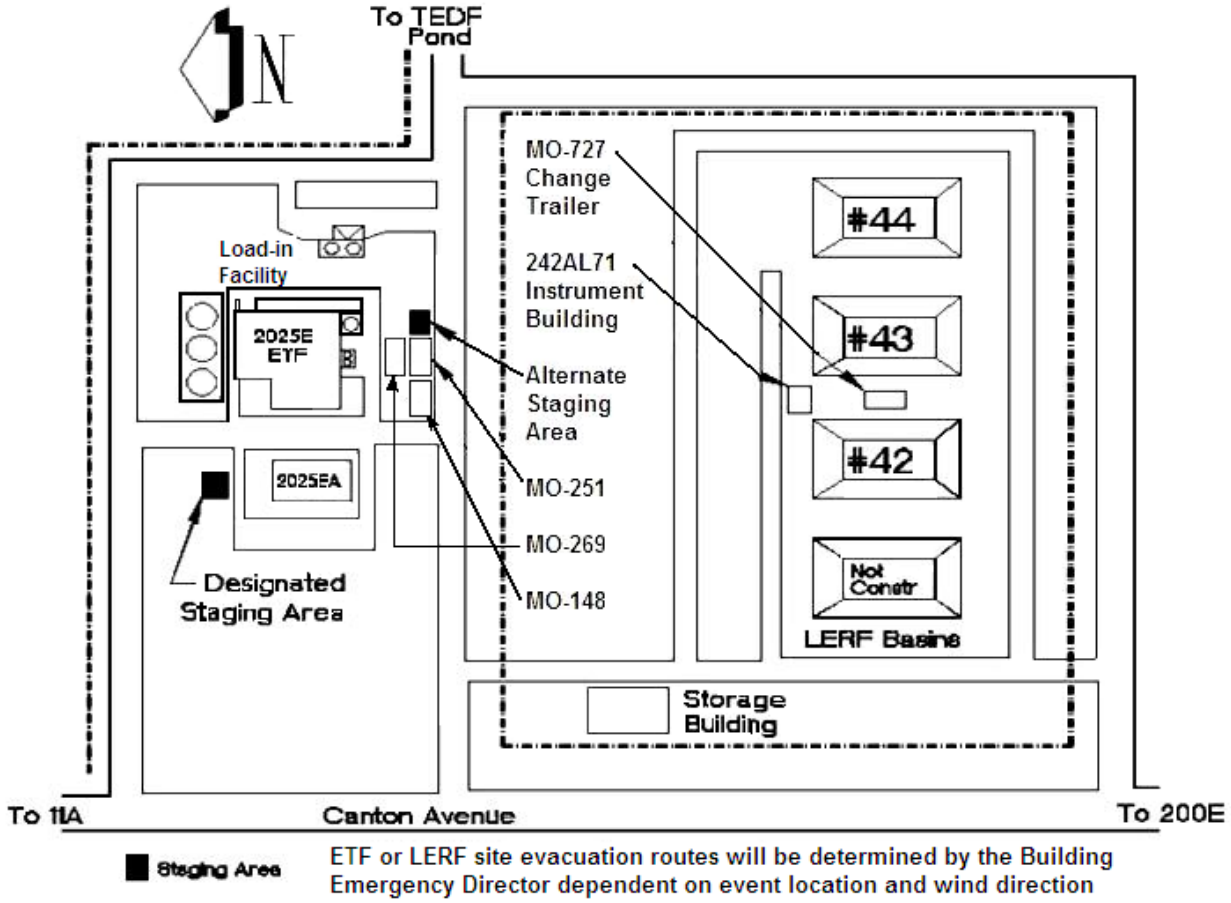


Figure J.2. LERF and 200 Area ETF Site Plan

J.3.1.2 Take Cover

The objective of the take cover order is to limit personnel exposure to hazardous materials, or dangerous/mixed waste when evacuation is inappropriate or not practical. Evacuation might not be practical or appropriate because of extreme weather conditions or the material release might limit the ability to evacuate safely personnel.

The BED will initiate the take cover by directing an announcement be made over the public address system, facility radios, and, as conditions warrant, by activating the 200 Area site take cover alarms by calling the POC using 911 from site office phones/373-0911 from cellular phones). Actions to complete a facility take-cover will be directed by the emergency response procedure. Protective actions associated with operations include configuring, or shutting down, the ventilation systems. Determination of additional take cover response is based on plant operating configuration, weather conditions, amount and duration of release, and other conditions, as applicable to the event and associated hazard. As a minimum, personnel exposure to the hazard will be minimized. The BED will assign personnel as accountability aides with responsibility to ensure that take-cover actions are taken at all occupied buildings at 200 Area ETF. All implementing actions executed by the aides/managers are directed by the emergency response procedure. When take cover actions are complete, the aides/manager will provide the BED with a status report.

J.3.2 Response to Facility Operations Emergencies

Depending on the severity of the following events, the BED reviews the site wide procedures and LERF and 200 Area ETF emergency response procedure(s) and, as required, categorizes and/or classifies the event. If necessary, the BED initiates area protective actions and Hanford Site Emergency Response

Organization activation. The steps identified in the following description of actions do not have to be performed in sequence because of the unanticipated sequence of incident events.

J.3.2.1 Loss of Utilities

A case-by-case evaluation is required for each event to determine loss of utility impacts. When a BED determines a loss of utility impact, actions are taken to ensure dangerous and/or mixed waste is being properly managed, to the extent possible given event circumstances. As necessary, the BED will stop operations and take appropriate actions until the utility is restored.

J.3.2.2 Major Process Disruption/Loss of Plant Control

The hazards assessment has determined that this occurrence does not pose significant risk to human health or the environment.

J.3.2.3 Pressure Release

The hazards assessment has determined that a pressure release does not pose significant risk to human health or the environment. Hazardous material release and dangerous/mixed waste releases are addressed in Section J.2.5.

J.3.2.4 Fire and/or Explosion

In the event, of a fire, the discoverer activates a fire alarm (pull box); calls 911 from site office phones/373-0911 from cellular phones or verifies that the Hanford Emergency Response Number has been called. Automatic initiation of a fire alarm (through the smoke detectors, and sprinkler systems) is also possible.

- Unless otherwise instructed, personnel shall evacuate the area/building by the nearest safe exit and proceed to the designated staging area for accountability.
- On actuation of the fire alarm, ONLY if time permits, personnel should shut down equipment, secure waste, and lock up classified materials (or hand carry them out). The alarm automatically signals the Hanford Fire Department.
- The BED proceeds directly to the ICP, obtains all necessary information pertaining to the incident, and sends a representative to meet Hanford Fire Department.
- The BED provides a formal turnover to the IC when the IC arrives at the ICP.
- The BED informs the Hanford Site Emergency Response Organization as to the extent of the emergency (including estimates of dangerous waste and mixed waste quantities released to the environment).
- If operations are stopped in response to the fire, the BED ensures that systems are monitored for leaks, pressure buildup, gas generation, and ruptures.
- Hanford Fire Department firefighters extinguish the fire as necessary.

Note: Following a fire and/or explosion, WAC 173-303-640(7) will be addressed for the 200 Area ETF regarding fitness for use.

J.3.2.5 Hazardous Material, Dangerous and/or Mixed Waste Spill

Spills can result from many sources including process leaks, container spills or leaks, damaged packages or shipments, or personnel error. Spills of mixed waste are complicated by the need to deal with the extra hazards posed by the presence of *Atomic Energy Act* materials. These controls include containment berms, dedicated spill control sumps, remote gauges, and level indicators as well as spray shields on chemical pipe flanges. WRPS procedures provide alarm response and maintenance actions for leak detection equipment, surveillance of possible leak locations, and response actions for detected spills.

- The discoverer notifies BED and initiates SWIM response:
  Stops work
  Warns others in the vicinity
  Isolates the area
  Minimizes the exposure to the hazards
- If Operations are stopped, the BED ensures that the plant is put in a safe shutdown configuration.
- The BED determines if emergency conditions exist requiring response from the Hanford Fire Department based on classification of the spill and injured personnel, and evaluates need to perform additional protective actions.
- If the Hanford Fire Department resources are not needed, the spill is mitigated with resources identified in Section J.4 of this plan and proper notifications are made.
- If the Hanford Fire Department resources are needed, the BED calls 911 from site office phones/373-0911 from cellular phones.
- The BED sends a representative to meet the Hanford Fire Department.
- The BED provides a formal turnover to the IC when the IC arrives at the ICP.
- The BED informs the Hanford Site Emergency Response Organization as to the extent of the emergency (including estimates of dangerous waste and mixed waste quantities released to the environment).
- If operations are stopped in response to the spill, the BED ensures that systems are monitored for leaks, pressure buildup, gas generation, and ruptures.
- Hanford Fire Department stabilizes the spill.

Note: For response to leaks or spills and disposition of leaking or unfit-for-use tank systems, refer to WAC 173-303-640(7).

J.3.2.5.1 Damaged, or Unacceptable Shipments

During the course of receiving an onsite transfer of dangerous and/or mixed waste at LERF and 200 Area ETF an unanticipated event could be discovered resulting in a conformance issue concerning the waste. Damaged or unacceptable shipments resulting from onsite transfers are not subject to WAC 173-303-370 however conformance issues must be resolved in order to maintain proper records.

The following actions are taken to resolve the conformance issue:

- Operations management is notified of the damaged or unacceptable waste to be received.
- If the conformance issue results in a spill or release, actions described in Section J.3.2.5 are taken.
- The generating organization is notified of the conformance issue.

An operations representative, in conjunction with the generating organization, determines the course of action to resolve the conformance issue.

J.3.3 Prevention of Recurrence or Spread of Fires, Explosions, or Releases

The BED, as part of the ICP, takes the steps necessary to ensure that a secondary release, fire, or explosion does not occur. The BED will take measures, where applicable, to stop processes and operations, collect and contain released waste, and remove or isolate containers. The BED also monitors for leaks, pressure buildups, gas generation, or ruptures in valves, pipes, or other equipment, whenever this is appropriate.

J.3.4 Incident Recovery and Restart of Operations

A recovery plan is developed when necessary in accordance with Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Section 9.2. A recovery plan is needed following an

event where further risk could be introduced to personnel, the LERF and 200 Area ETF, or the environment through recovery action and/or to maximize the preservation of evidence.

If this plan was implemented according to Section J.3 of this plan, Ecology is notified before operations can resume. The Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Section 5.1 discusses different reports to outside agencies. This notification is in addition to those required reports and includes the following statements:

- There are no incompatibility issues with the waste and released materials from the incident.
- All the equipment has been cleaned, fit for its intended use, and placed back into service.

The notification required by WAC 173-303-360(2)(j) may be made via telephone conference. Additional information that Ecology requests regarding these restart conditions will be included in the required 15-day report identified in Section J.5 of this plan.

For emergencies not involving activation of the Hanford EOC, the BED ensures that conditions are restored to normal before operations are resumed. If the Hanford Site Emergency Response Organization was activated and the emergency phase is complete, a special recovery organization could be appointed at the discretion of RL to restore conditions to normal. This process is detailed in RL and contractor emergency procedures. The makeup of this organization depends on the extent of the damage and the effects. The onsite recovery organization will be appointed by the appropriate contractor's management.

J.3.5 Incompatible Waste

After an event, the BED or the onsite recovery organization ensures that no waste that might be incompatible with the released material is treated, stored, and/or disposed of until cleanup is completed. Cleanup actions are taken by LERF and 200 Area ETF personnel or other assigned personnel. Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Section 9.2.3, describes actions to be taken.

Waste from cleanup activities is designated and managed as newly generated waste. A field check for compatibility before storage is performed as necessary. Incompatible wastes are not placed in the same container. Containers of waste are placed in storage areas appropriate for their compatibility class.

If incompatibility of wastes was a factor in the incident, the BED or the onsite recovery organization ensures that the cause is corrected.

J.3.6 Post Emergency Equipment Maintenance and Decontamination

All equipment used during an incident is decontaminated (if practicable) or disposed of as spill debris. Decontaminated equipment is checked for proper operation before storage for subsequent use. Consumable and disposed materials are restocked. Fire extinguishers are replaced.

The BED ensures that all equipment is cleaned and fit for its intended use before operations are resumed. Depleted stocks of neutralizing and absorbing materials are replenished; protective clothing is cleaned or disposed of and restocked, etc.

J.4 Emergency Equipment

Emergency resources and equipment for the LERF and 200 Area ETF are presented in this section.

J.4.1 Fixed Emergency Equipment

Type	Location	Capability
Safety shower/eye wash stations (200 Area ETF only)	• 2025-E Rm 112 Laboratory • 2025-E Rm 122 Decon Station • 2025-E Rm 131, South Process Area • 2025-E Rm 134, Air Compressor Room • 2025-E Concentrated acid/caustic tank area (outside) • 2025-ED Load-In Station (outside)	Assist in flushing chemicals/ materials from the body and/ or eyes and face of personnel.
Wet pipe sprinkler (200 Area ETF only)	Throughout building 2025-E except those areas protected by preactive sprinklers	Assist in the control of a fire.
Preactive sprinkler (200 Area ETF only)	200 Area ETF Control Room, communications room, electrical equipment room	Assist in the control of a fire. Maintained dry to prevent accidental damage to equipment
Fire alarm pull boxes (200 Area ETF only)	All high traffic areas in operations administration and support areas, truck bay, and process area	Activate the local fire alarm
E-lights	Throughout 200 Area ETF	1 hour temporary lighting

J.4.2 Portable Emergency Equipment

Type	Location	Capability
Fire extinguisher ABC type	Throughout 200 Area ETF (Administrative/Support areas), LERF, and TEDF	Fire suppression for Class A, B, and C fires
Fire extinguisher BC type	Throughout 200 Area ETF (process area and electrical room)	Fire suppression for Class B and C fires
Portable safety showers and Eye Wash Stations	As needed for special evolutions and maintenance	Assist in flushing chemicals/ materials from the body and/or eyes and face of personnel.

J.4.3 Communications Equipment/Warning Systems

Type	Location	Capability
Fire alarms (200 Area ETF only)	Corridors, locker rooms, process area, drum storage, and truck bay	Audible throughout 200 Area ETF
Take cover/evacuation	Throughout the 200 Area ETF	Audible outside buildings and inside administrative buildings
Public address system (200 Area ETF Only)	Throughout the 200 Area ETF	Audible throughout 200 Area ETF
Portable radios	Operations and maintenance personnel	Communication to 200 Area ETF Control Room
Telephone	• **200 Area ETF:** Control Room, 2025-E, 2025-EA offices, MO-148, MO-269, MO-251, 2025-EC-71. • **LERF:** MO-727 and 242AL71 instrument building, LERF Garage 242AL11 • **TEDF:** 225-E (pump house 1), 225W (pump house 2), 6653 (sample building), 6653-A (pump house 3)	Internal and external communications. Allows notification of outside resources (POC, HFD, Hanford Patrol, etc.

Note: Sitewide communications and warning systems are identified in Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Table 5.1.

J.4.4 Personal Protective Equipment

Type	Location	Capability
Acid suits	In the spill response cabinets in 2025E	Chemical protection for personnel during containment and isolation
Respirators	2025-E, 1st Floor	Filtered air for recovery of known hazards

J.4.5 Spill Control and Containment Supplies

Type	Location	Capability
Spill bags, drums, carts, etc.	• 2025-E in process area • 2025-E upper level process area • 2025-E Rm 125A • 2025-ED Load-In Station • TEDF 6653 Disposal Building	Support containment and cleanup of hazardous material spills
Spill response cabinet	• 2025-E Rm 122 • container storage CONEX East of 2025E building within the TSD unit boundary • outside southeast side of 2025E • TEDF 6653 Disposal Building • MO-727 Change Trailer	Support equipment for spill response

J.4.6 Incident Command Post

The ICPs for the LERF and 200 Area ETF are in the 200 Area ETF Control Room or 2025-EA. Emergency resource materials are stored at each location. The IC could activate the Hanford Fire Department Mobile Command Unit if necessary.

J.5 Required Reports

Post incident, written reports are required for certain incidents on the Hanford Site. The reports are described in Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Section 5.1.

Facility management must note in the Hanford Facility Operating Record, LERF & 200 Area ETF File, the time, date and details of any incident that requires implementation of the contingency plan (refer to Section J.3). Within 15 days after the incident, a written report must be submitted to Ecology. The report must include the elements specified in WAC 173-303-360(2)(k).

J.6 Plan Location and Amendments

Copies of this plan are maintained at the following locations:

- 200 Area ETF Control Room
- Building 2025EA ICP

This plan will be reviewed and immediately amended as necessary, in accordance with Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Section 14.3.1.1.

J.7 Facility/Building Emergency Response Organization

LERF and 200 Area ETF Building Emergency Directors		
Title	**Work Location**	**Work Phone**
Shift Operation Manager (SOM)	2025-E Building	373-9000 or 373-9500

Names and home telephone numbers of the BEDs are available from the POC (373-3800) in accordance with Permit Condition II.A.4.

PUREX STORAGE TUNNELS
CHAPTER 3.0
WASTE ANALYSIS PLAN

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
10/2006	

This page intentionally left blank.

CHAPTER 3.0
WASTE ANALYSIS PLAN

This page intentionally left blank.

CHAPTER 3.0
WASTE ANALYSIS PLAN

TABLE OF CONTENTS

3.0 WASTE ANALYSIS PLAN 7
3.1 Chemical, Biological, and Physical Analyses 7
3.2 Tracking System 7
3.3 Facility Description 8
3.3.1 Process and Activities 9
3.3.2 Physical Characterization of Material to be Stored 10
3.4 Identification/Classification and Quantities Of Dangerous Waste Managed Within The PUREX Storage Tunnels 10
3.5 Waste Analysis Parameters 10
3.5.1 Waste Identification 10
3.5.2 Parameter and Rationale Selection Process 14
3.5.3 Rationale for Parameter Selection 15
3.5.4 Special Parameter Selection 15
3.5.5 Selection of Sampling Procedures 15
3.5.6 Sampling Strategies 15
3.5.7 Selection of Sampling Equipment 16
3.5.8 Maintaining and Decontaminating Field Equipment 16
3.5.9 Sample Preservation and Storage 17
3.5.10 Quality Assurance and Quality Control Procedures 17
3.5.11 Health and Safety Protocols 17
3.6 Laboratory Selection and Testing and Analytical Methods 17
3.6.1 Laboratory Selection 17
3.6.2 Testing and Analytical Methods 17
3.7 Waste Re-Evaluation Frequencies 18
3.8 Special Procedural Requirements 18
3.8.1 Procedures for Receiving Wastes Generated Offsite 18
3.8.2 Procedures for Ignitable, Reactive, and Incompatible Waste 18
3.8.3 Provisions for Complying with Land Disposal Restriction Requirements 18
3.8.4 Deviations from the Requirements of this Plan 18
3.9 Recordkeeping 18
3.10 References 18

TABLE

Table 3.1. PUREX Storage Tunnels Inventory 19

GLOSSARY

ALARA	as low as reasonably achievable
ECOLOGY	Washington State Department of Ecology
EHW	extremely hazardous waste
EPA	U.S. Environmental Protection Agency
pH	negative logarithm of the hydrogen-ion concentration
PUREX	plutonium-uranium extraction
QA/QC	quality assurance and quality control
TSD	treatment, storage, and/or disposal
WAC	Washington Administrative Code
WAP	waste analysis plan

METRIC CONVERSION CHART

The following conversion chart provides the reader an aid in conversion.

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			Length		
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
Area			Area		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
Mass (weight)			Mass (weight)		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			Volume		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76456	cubic meters	cubic meters	1.308	cubic yards
Temperature			Temperature		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE, Second Ed., 1990, Professional Publications, Inc., Belmont, California.

3.0 WASTE ANALYSIS PLAN

This chapter provides information on the chemical, biological, and physical characteristics of the dangerous waste stored in the PUREX Storage Tunnels. Waste in the tunnels is stored and managed as mixed waste. The PUREX Storage Tunnels provide the necessary shielding for the protection of employees and the environment from mixed waste.

3.1 Chemical, Biological, and Physical Analyses

Regulated material presently stored in the PUREX Storage Tunnels contains the following dangerous waste:

- Lead
- Mercury
- Silver and silver salts
- Chromium
- Cadmium
- Barium
- Mineral oil

In general, dangerous waste is either attached to, contained within, or actually is material removed from the PUREX Plant and other onsite sources. Changes in dangerous waste stored is updated annually in the annual dangerous waste report submitted to Ecology. Future storage of barium and selenium may occur in Tunnel Number 2. The PUREX Storage Tunnels are permitted as a miscellaneous unit under WAC 173-303-680 because the tunnels are not a typical containerized storage unit. That is, the bulk of the material stored in the tunnels is not placed in a container; rather, this material is placed on a portable device (railcar) used as a storage platform. The mixed waste stored in the PUREX Storage Tunnels is encased or contained within carbon or stainless steel plate, pipe, or vessels that meet the WAC 173-303-040 definition of container. Therefore, the mixed waste normally is not exposed to the tunnel environment.

The only free-liquid dangerous waste stored in the tunnels is elemental mercury. The mercury is contained within thick-walled (0.8-centimeter) thermowells. The amount of mercury per thermowell is less than 1.7 liters.

Other liquid containers, such as large discarded process tanks, are stored in the PUREX Storage Tunnels. These containers are 'empty' [per WAC 173-303-160(2)(a)]. In the future, containers will be flushed and the final rinsate sampled and analyzed to verify that the residual heel is not a dangerous waste.

The only stored mixed waste that is designated as either reactive or ignitable (D001) is silver nitrate in the silver reactors [WAC 173-303-090(5)]. There is no mixed waste designated as reactive (D003). The potential for ignition from this source is considered negligible because this material is dispersed on ceramic packing and is physically isolated from contact with any combustible material or ignition source.

3.2 Tracking System

Specific waste tracking forms for the movement of waste destined for the PUREX Storage Tunnels are used. These waste tracking forms effectively track waste inventories from generation through storage.

The waste tracking forms and other supporting documentation will be maintained at the Hanford Facility for a minimum of 5 years following closure of the PUREX Storage Tunnels.

3.3 Facility Description

This waste analysis plan (WAP) has been prepared for the PUREX Storage Tunnels, located on the Hanford Facility, Richland, Washington. This WAP applies to all mixed waste (containing dangerous components) regulated by WAC 173-303 that is transferred to and/or contained in the PUREX Storage Tunnels.

The PUREX Storage Tunnels are permitted as a miscellaneous unit under WAC 173-303-680. The bulk of the waste stored in the PUREX Storage Tunnels is not placed in a typical container; rather, this waste is placed on a portable device (railcar) that is used as a storage platform. In general, the mixed waste stored in the PUREX Storage Tunnels is encased or contained within carbon or stainless steel plate, pipe, or vessels. Therefore, the mixed waste normally is not exposed to the tunnel environment.

The PUREX Facility, located in the 200 East Area, consists of two separate treatment, storage, and/or disposal (TSD) units, the PUREX Plant (202-A Building) and the PUREX Storage Tunnels. Access to the PUREX Storage Tunnels is by means of the railroad tunnel.

The PUREX Storage Tunnels branch off from the railroad tunnel and extend southward from the east end of the PUREX Plant. The tunnels are used for storage of mixed waste from the PUREX Plant and from other onsite sources. Each storage tunnel is isolated from the railroad tunnel by a water-fillable shielding door. There are no electrical utilities, water lines, drains, fire detection or suppression systems, or communication systems provided inside the PUREX Storage Tunnels.

Material selected for storage is loaded on railcars modified to serve as both transport and storage platforms. Normally, a remote-controlled, battery-powered locomotive was used to position the railcar in the storage tunnel. In the past and possibly in the future, other remote movers, e.g., standard locomotive with a string of railcar spacers, power winch, etc., have or could be used to position a railcar in the tunnel or to withdraw a car from the tunnel. The railcar storage positions are numbered sequentially, commencing with Position 1 that abuts the rail stop bumper at the south end of each tunnel. Position 2 is the location of the railcar that abuts the railcar in Position 1 and so forth. The railcars and material remain in the storage tunnel until final disposition is determined. Each railcar is retrievable; however, because the railcars are stored on a single, dead-end railroad track, the railcars can be removed only in reverse order (i.e., last in, first out).

Construction of Tunnel Number 1 was completed in 1956. The Tunnel has three areas, the water-fillable door, the storage area, and the vent shaft. The water-fillable door is located at the north end of Tunnel Number 1 and separates the storage tunnel from the railroad tunnel. The door is 7.5 meters high, 6.6 meters wide, and 2.1 meters thick, and is constructed of 1.3-centimeter steel plate. The door is hollow so that the door can be filled with water to act as a shield when the door is in the down (closed) position. If the door is filled with water, the water must be pumped from the door before the door can be raised. Above the door is a reinforced concrete structure in which the door is raised to open the tunnel. Electric hoists used for opening and closing the door are located on the top of this concrete structure.

The storage area is that portion of the tunnel that extends southward from the water-fillable door. Inside dimensions of Tunnel Number 1 are 109.1 meters long, 6.7 meters high, and 5.9 meters wide. Ceiling and walls are 35.6-centimeters thick and constructed of 30.5- by 35.6-centimeter creosote pressure-treated Douglas fir timbers arranged side by side. The first 30.5 meters of the east wall are constructed of 0.9-meter-thick reinforced concrete. A 40.8-kilogram mineral-surface roofing material was used to cover the exterior surface of the timbers before placement of 2.4 meters of earth fill. The earth cover serves as protection from the elements and as shielding. The timbers that form the walls rest on reinforced concrete footings 0.9 meter wide by 0.3 meter thick. The floor consists of a railroad track laid on a gravel bed. The space between the ties is filled to top-of-tie with gravel ballast. The tracks are on a 1.0 percent downward slope to the south to ensure that the railcars remain in their storage position. A railcar bumper is located 2.4 meters from the south end of the tracks to act as a stop. The capacity of the storage area is eight, 12.8-meter-long railcars.

In June 1960, the first two railcars were loaded with a single, approximately 12.5-meter-long, failed separation column and placed in Tunnel Number 1. Between June 1960 and January 1965, six more railcars were placed in Tunnel Number 1, filling the tunnel. After the last car was placed in the northern-most storage position (Position 8), the water-fillable door was closed, filled with water, and deactivated electrically.

Construction of Tunnel Number 2 was started and completed in 1964. Like Tunnel Number 1, Tunnel Number 2 consists of three functional areas: the water-fillable door, the storage area, and the vent shaft. Construction of Tunnel Number 2 differs from that of Tunnel Number 1 as follows.

- A combination of steel and reinforced concrete was used in the construction of the storage area for Tunnel Number 2 rather than wood timbers, as used in Tunnel Number 1.
- Tunnel Number 2 is longer, having a storage capacity of five times that of Tunnel Number 1.
- The floor of Tunnel Number 2, outboard of the railroad ties, slopes upward to a height of approximately 1.8 meters above the railroad bed, whereas the floor in Tunnel Number 1 remains flat all the way out to the sidewalls.
- The railroad tunnel approach to Tunnel Number 2 angles eastward then angles southward to parallel Tunnel Number 1. The approach to Tunnel Number 1 is a straight extension southward from the PUREX Plant. Center-line to center-line distance between the two tunnels is approximately 18.3 meters.

The physical structure of the water-fillable door at the north end of Tunnel Number 2 essentially is identical to the water-fillable door for Tunnel Number 1. The water-fillable door for Tunnel Number 2 is approximately 57.9 meters south and 18.3 meters east of the water-fillable door for Tunnel Number 1. As of March 1997, the door is empty and there is no plan to fill the door.

The storage area of Tunnel Number 2 is that portion of the tunnel extending southward from the water-fillable door. Construction of this portion of Tunnel Number 2 consists of a 10.4-meter diameter, steel (0.5 centimeter plate), and semicircular-shaped roof, supported by internal I-beam wales attached to external, reinforced concrete arches. The concrete arches are 0.4 meter thick and vary in width from 0.4 to 1.8 meters. The arches are spaced on 4.8-meter centers. This semicircular structure is supported on reinforced concrete grade beams approximately 1.8 meters wide by 1.2 meters thick (one on each side) that run the full length of Tunnel Number 2. The interior and exterior surfaces of the steel roof are coated with a bituminous coating compound to inhibit corrosion. The entire storage area is covered with 2.4 meters of earth fill to serve as shielding.

The nominal inside dimensions of Tunnel Number 2 are 514.5 meters long, 7.9 meters high, and 10.4 meters wide. However, because of the arch-shaped cross-section of Tunnel Number 2 and entry clearance at the water-fillable door, the usable storage area (width and height above top-of-rail) is 6.7 meters high and 5.8 meters wide, the same dimensions as for Tunnel Number 1. The floor consists of a railroad track laid on a gravel bed. The space between ties is filled to top-of-tie with gravel ballast. Commencing at the ends of the 2.4-meter-long ties, the earth floor is sloped upward on a 1 (vertical) to 1 1/2 (horizontal) grade. The tracks are on a 1/10 of 1 percent downgrade slope to the south to ensure the railcars remain in their storage position. A railcar bumper is located 2.4 meters from the south end of the tracks to act as a stop. The capacity of the storage area is 40, 12.8-meter-long railcars.

The first railcar was placed in storage in December 1967. Table 3.1 contains an approximate inventory of waste stored in the PUREX Storage Tunnels.

3.3.1 Process and Activities

The function of the PUREX Tunnels is to store mixed waste until the waste can be processed for final disposal. When waste is to be placed in the storage tunnels, a work plan, describing the overall transfer activities, and a storage tunnel checklist are prepared. The work plan and storage tunnel checklist are routed for review and concurrence by key personnel and forwarded to management for approval.

3.3.2 Physical Characterization of Material to be Stored

Physical characterization of waste includes an evaluation of the following physical properties:

- Length, width, and height
- Gross weight and volume
- Preferred orientation for transport and storage
- Presence of dangerous waste constituents

Information sources used in physical characterization include equipment fabrication and installation drawings, operational records, and process knowledge. Physical characterization provides information necessary to describe the waste material. Such information also is used to design and fabricate, if required, supports on the railcar.

Before removal from service, the equipment could be flushed to minimize loss of products, to reduce contamination, and to reduce dangerous waste constituents present in a residual heel to nonregulated levels. When equipment is flushed, analysis of the rinsate is used to determine when these goals have been achieved.

3.4 Identification/Classification and Quantities Of Dangerous Waste Managed Within The PUREX Storage Tunnels

Table 3.1 contains an approximation of the total amount of waste stored within the PUREX Storage Tunnels.

3.5 Waste Analysis Parameters

Analytical requirements were selected based on knowledge required for the safe handling and storage of the waste within the PUREX Storage Tunnels, including any operational compliance issues.

3.5.1 Waste Identification

A prerequisite step in proper waste management is to address whether waste being considered for management within the PUREX Storage Tunnels falls within the scope of this unit's permit. This includes identifying any dangerous waste in accordance with regulatory and permit requirements and applicability of any land disposal restrictions.

This section provides information on how the chemical and physical characteristics of the mixed waste currently stored in the PUREX Storage Tunnels were determined so that the waste is stored and managed properly.

Regulated material presently stored in the PUREX Storage Tunnels contains the following dangerous waste:

- Lead
- Mercury
- Silver and silver salts
- Chromium
- Cadmium
- Barium
- Mineral oil

Storage of non-PUREX Plant waste is reviewed on a case-by-case basis. Sampling, chemical analysis, process knowledge (as discussed in the following section), and/or inventory information from waste tracking forms provided from other onsite sources are required to confirm the characteristics and quantities of mixed waste to be stored. Future waste and dangerous constituents might not be in the same configuration or form as described in the following sections.

3.5.1.1 Lead

Lead stored was used in various capacities during past Hanford Facility operations. Primary functions of lead included use as weights, counterweights, and shielding. Often the lead is encased in steel (carbon or stainless) to facilitate its attachment to various types of equipment.

Lead exhibits the characteristic of toxicity as determined by the toxicity characteristics leaching procedure and is designated D008 [WAC 173-303-090(8)]. The quantity of lead present could produce an extract greater than 500 milligrams per liter should the lead be exposed to a leachate. However, because the bulk of the lead is encased in steel, is stored inside a weather-tight structure, and is elevated above floor level on railcars that isolate the lead from other materials stored, the potential for exposure of bare lead to a leachate is considered negligible.

Sampling and chemical analysis is not performed on lead associated with the material placed in the PUREX Storage Tunnels. Therefore, the accuracy of the estimate on the amount of lead presently stored in each tunnel is limited to the data available from process knowledge. Counterweights on equipment dunnage and lead used for shielding cannot be quantified by existing historical records and are not included for lead listed on Table 3.1. However, if removed from the tunnels, the material will be examined and any suspect attachments will be removed, evaluated, and disposed of in accordance with established methods.

3.5.1.2 Mercury

Mercury is contained within thermowells that are an integral part of spent reactor fuel dissolvers used at the PUREX Plant. The dissolvers are large 304L stainless steel process vessels that are approximately 2.7 meters in diameter, 7.3 meters tall, and weigh approximately 26,309 kilograms. The outer shell is constructed of a 1-centimeter-thick plate. The dissolvers were used in decladding and dissolving spent reactor fuel in the PUREX Plant.

Depending on the specific dissolver in question, 19.1 or 45.4 kilograms of mercury (1.4 or 1.77 liters) were poured in each of the two thermowells per dissolver (38.2 or 90.8 kilograms total per dissolver) following vertical installation of the dissolvers inside the PUREX canyon and before the dissolver was installed in a process cell. The mercury served to transfer heat from the dissolver interior to the thermohm temperature sensor mounted within the thermowell. This mercury remains within the thermowells of discarded dissolvers. In preparation for storage, the thermohms were removed and the upper end of each thermowell was plugged with a 304L stainless steel nozzle plug. In storage, the discarded dissolver rests in an inclined position in a cradle on the railcar. The mercury contained in the thermowells remains in the lower portion of each thermowell and, under normal conditions, is never in contact with the mechanical closure on the nozzle end of the thermowell.

Mercury exhibits the characteristic of toxicity as determined by the toxicity characteristics leaching procedure and is designated D009 [WAC 173-303-090(8)].

The potential for mercury to become exposed to leachate is considered negligible. The PUREX Storage Tunnels are designed and constructed as weather-tight structures. Further, the mercury is encased in a stainless steel pipe within a stainless steel vessel that is stored on a railcar above the floor level of the tunnels. Therefore, exposure of the mercury stored in the tunnels to leachate is not considered a credible occurrence.

Sampling and chemical analysis is not performed on mercury associated with the dissolvers stored in Tunnel Number 2. The quantity of mercury present in each thermowell is documented on Table 3.1.

3.5.1.3 Silver

Silver, mostly in the form of silver salts deposited on unglazed ceramic packing, is contained within the discarded silver reactors stored in Tunnel Number 2. The silver reactors were used to remove iodine from the offgas streams of the spent reactor fuel dissolvers. The reactor vessel is approximately 1.4 meters in diameter by 4.1 meters tall and is constructed of 1-centimeter 304L stainless steel. The vessel contains two 1.2-meter-deep beds of packing. Each bed consists of a 30.5-centimeter depth of 2.5-centimeter unglazed ceramic saddles topped with a 0.6-meter depth of 1.3-centimeter unglazed ceramic saddles. The two beds are separated vertically by a distance of about 0.6 meter, and each bed rests on a support made of stainless steel angles and coarse screen. The packing was coated initially with 113.4 kilograms of silver nitrate used for iodine retention. Nozzles on the top of the reactor were provided to allow flushing and/or regeneration of the packing with silver nitrate solution as the need arose.

Because of competing reactions, which include conversion of silver nitrate to silver iodide, reduction of silver nitrate to metallic silver, and formation of silver chloride, the packing of a stored silver reactor contains a mixture of silver nitrate, silver halides, and silver fines.

Silver salts exhibit the characteristics of toxicity as determined by the toxicity characteristics leaching procedure and are designated D011 [WAC 173-303-090(8)]. Silver salts exhibit the characteristic of ignitability and are designated as D001 [WAC 173-303-090(5)].

The potential of silver, including silver salts, stored in the PUREX Storage Tunnels to become exposed to leachate is considered negligible. Silver is contained within a stainless steel vessel, stored inside a weather-tight structure, and elevated above floor level on a railcar. Therefore, exposure of the silver stored in the tunnels to leachate is not considered a credible occurrence. In addition, the contained silver is isolated from contact with any combustibles; therefore, the possibility of ignition is considered extremely remote.

Provisions for taking samples of the packing were not provided in the design of the vessels. Therefore, sampling and chemical analysis are not performed for silver salts before placing a silver reactor in storage. However, for accountability, the total silver content (Table 3.1) is considered silver nitrate, the salt that exhibits the characteristics of both ignitability and toxicity.

The quantity of silver salts contained within a discarded silver reactor is a function of silver nitrate regeneration history. Operating records (process knowledge) of regenerations and flushes are used to estimate the total accumulation of silver within each reactor.

3.5.1.4 Chromium

Presently, chromium stored in Tunnel Number 2 is contained within a failed concentrator removed from the PUREX Plant, and within stainless steel containers received from the 324 Building. The concentrator is a vertical tube structure that was used to concentrate aqueous streams from the final uranium cycle, final plutonium cycles, final neptunium cycles, and condensate from the acid recovery system for recycle. Following service, the concentrator was inspected and found to contain silicate solids with high levels of chromium from the corrosion of stainless steel. The existence of chromium within the 324 Building waste was determined through process knowledge. Chromium exhibits the characteristic of toxicity as determined by the toxicity characteristics leaching procedure and is designated D007 [WAC 173-303-090(8)]. The potential for the chromium stored in Tunnel Number 2 to become exposed to leachate is considered negligible. Tunnel Number 2, is designed and constructed to be weather-tight. Further, the chromium is encased within stainless steel vessels and containers that are stored on railcars above the floor level of the tunnel. Therefore, exposure of the chromium stored in the tunnel to leachate is not considered a credible occurrence.

The quantity of chromium within the concentrator was estimated by calculating the volume of silicate solids and the percentage of chromium within the silicate solids. The quantity of chromium in the 324 Building waste was based on process knowledge.

3.5.1.5 Cadmium

Presently, cadmium stored in the PUREX Storage Tunnel Number 2 is associated with shielding and with a dissolver moderator removed from the PUREX Plant, and within stainless steel containers received from the 324 Building. The cadmium was used to shield equipment and consists of sheets of the metal attached to lead, both of which could be encased in steel. The cadmium received from the 324 Building was used in waste technology research and development programs.

The dissolvers are annular vessels that are geometrically favorable for criticality safety. The dissolvers were placed over cadmium lined (neutron absorbers) moderators for additional criticality safety. The moderator is a centrally located, cylindrical, cadmium-jacketed 0.08-centimeter-thick concrete 15.2-centimeter-thick neutron absorber. The moderators are approximately 4.4 meters tall by approximately 1.5 meters outer diameter.

Cadmium exhibits the characteristic of toxicity as determined by the toxicity characteristics leaching procedure and is designated D006 [WAC 173-303-090(8)]. If exposed to a leachate, the quantity of cadmium present could produce an extract having a concentration of greater than or equal to 1 milligram per liter, but less than 100 milligrams per liter; therefore, the mixed waste is managed as a WT02 [WAC 173-303-100(5)].

The potential for the cadmium stored in Tunnel Number 2 to become exposed to leachate is considered negligible. Tunnel Number 2 is designed and constructed to be weather-tight. Further, the cadmium is stored on railcars above the floor level of the tunnel. Therefore, exposure of the cadmium stored in the tunnel to leachate is not considered a credible occurrence.

3.5.1.6 Barium

Presently, barium is stored in Tunnel Number 2 in stainless steel containers received from the 324 Building. The waste was generated during numerous research and development programs conducted in B-Cell of the Waste Technology Engineering Laboratory (324 Building). The existence of barium within the 324 Building waste was determined through process knowledge.

Barium exhibits the characteristic of toxicity as determined by the toxicity characteristics leaching procedure and is designated D005 [WAC 173-303-090(8)].

The potential for barium stored in Tunnel Number 2 to become exposed to leachate is considered negligible. Tunnel Number 2 is designed and constructed to be weather-tight. Further, the barium is encased in steel containers stored on a railcar above the floor level of the tunnel. Therefore, exposure of the barium stored in the tunnel to leachate is not considered a credible occurrence.

3.5.1.7 Mineral Oil

Presently, mineral oil is stored in Tunnel Number 2 in stainless steel containers received from the 324 Building. The mineral oil was used in the B-Cell viewing windows in the 324 Building. Oil leaking from the windows was absorbed on rags and clay absorbent material.

The material safety data sheet for the mineral oil lists a lethal dose (LD50) of 2 grams per kilogram (dermal rabbit). Therefore, the oil designates as a Toxic Category A WT02 [WAC 173-303-100(5)].

The potential for the absorbed mineral oil stored in Tunnel Number 2 to become exposed to leachate is considered negligible. Tunnel Number 2 is designed and constructed to be weather-tight. Further, the mineral oil is encased in steel containers stored on a railcar above the floor level of the tunnel. Therefore, exposure of the mineral oil stored in the tunnel to leachate is not considered a credible occurrence.

3.5.1.8 Identification of Incompatible Waste

The next step is to ensure that sufficient information concerning the waste has been provided so the waste can be managed properly. This includes identifying incompatible waste. These safety issues primarily are related to prevention of unwanted chemical reactions that could create a catastrophic situation, such as a fire, an explosion, or a large chemical release.

3.5.1.9 Operational Considerations

Sufficient information must be available to ensure that incoming waste meets operational acceptance limits, e.g., physical size, ALARA concerns, and WAC 173-303 requirements. These operating specifications are limits and controls imposed on a process or operation that, if violated, could jeopardize the safety of personnel, and could damage equipment, facilities, or the environment. Operating specifications have been established from operating experience, process knowledge, and calculations.

3.5.2 Parameter and Rationale Selection Process

This WAP describes the process to ensure that the dangerous waste components of the material stored in the tunnels are properly characterized and designated so that dangerous and mixed waste is managed properly.

The parameters considered for waste designation under WAC 173-303-070(3) and the rationale for there application is discussed in the following sections.

3.5.2.1 Discarded Chemical Products

The first category of dangerous waste designation is "Discarded Chemical Products" (WAC 173-303-081). The waste stored in the tunnels does not fit the definitions in WAC 173-303-081 for a discarded chemical product. Therefore, the waste stored in the PUREX Storage Tunnels is not designated as a discarded chemical product.

3.5.2.2 Dangerous Waste Sources

The second category of dangerous waste designation is "Dangerous Waste Sources" (WAC 173-303-082). The waste stored in the tunnels is not listed on the "Dangerous Waste Sources List" (WAC 173-303-9904). Therefore, the waste stored in the PUREX Storage Tunnels is not designated as a dangerous waste source.

3.5.2.3 Dangerous Waste Characteristics

The third category of dangerous waste designation is "Dangerous Waste Characteristics" (WAC 173-303-090). The characteristics are as follows.

- Characteristic of Ignitability – Although the solid silver nitrate has not been tested in accordance with Appendix F of 49 CFR 173, the waste is assumed to be an oxidizer as specified in 49 CFR 173.127(a). Therefore, the silver nitrate waste is assumed to exhibit the characteristic of ignitability under WAC 173-303-090(5) and is designated as D001.
- Characteristic of Corrosivity – Some of the material stored within the tunnels either has contained or has been in contact with corrosive liquids. The standard operating procedure has been to flush vessels with water to recover as much special nuclear material as practical. In addition, flushing removes much of the mixed waste contamination, minimizing the spread of contamination during handling. Currently, the final aqueous rinse is sampled and analyzed to confirm that the pH is greater than 2 and less than 12.5. Therefore, the waste stored in the PUREX Storage Tunnels is not designated as corrosive waste.

- Characteristic of Reactivity – The waste stored in the tunnels does not meet any of the definitions of reactivity as defined in WAC 173-303-090(7). The waste material is not unstable, does not react violently with water, does not form explosive mixtures, or does not generate toxic gases. Therefore, the waste stored in the PUREX Storage Tunnels is not designated as reactive waste.
- Characteristic of Toxicity – Lead, mercury, silver, chromium, barium, and cadmium are identified on the Toxicity Characteristics list. The quantity of these materials stored in the tunnels is sufficient that, should the substances come in contact with a leachate (an event considered unlikely), the concentration of the extract could be above the limits identified in the list. Therefore, this waste is designated D005, D006, D007, D008, D009, and D011.

The PUREX Storage Tunnels also are permitted for selenium (D010). Currently, there is no waste stored in the tunnels that is designated for D010; however, there is a potential for waste with this waste number to be stored within the tunnels.

3.5.2.4 Dangerous Waste Criteria

The fourth category of dangerous waste designation is "Dangerous Waste Criteria" (WAC 173-303-100). The criteria are as follows:

- Toxicity Criteria – Cadmium meets the toxicity criteria in WAC 173-303-100(5) when performing a book designation. Because of the concentrations present, the waste containing these constituents is designated as dangerous waste (DW) and is assigned the dangerous waste number of WT02.
- Persistence Criteria – Currently, no waste stored in the tunnels has been designated as persistent per WAC 173-303-100(6).

3.5.2.5 Waste Designation Summary

The mixed waste currently stored in the PUREX Storage Tunnels is designated as follows:

- Lead – D008; EHW
- Mercury – D009; EHW
- Silver and silver salts – D001, D011; EHW
- Chromium – D007; EHW
- Cadmium – D006, WT02; DW
- Barium – D005; EHW
- Mineral Oil – WT02; DW

3.5.3 Rationale for Parameter Selection

Refer to Section 3.5.2.

3.5.4 Special Parameter Selection

Refer to Section 3.5.2.

3.5.5 Selection of Sampling Procedures

The following sections discuss the sampling methods and procedures that will be used. Sampling usually will be in accordance with requirements contained in the pertinent sampling analysis plan, procedures, and/or other documents that specify sampling and analysis parameters.

3.5.6 Sampling Strategies

The only analysis presently used in support of the PUREX Storage Tunnels operation is a corrosivity check on the final in-place aqueous rinse of discarded vessels before the vessels are released for storage.

The pH is determined by a pH meter using U.S. Environmental Protection Agency (EPA) Test Method 9040 or 9041 in Test Methods for the Evaluation of Solid Waste: Physical/Chemical Methods (EPA 1986). The Resource Conservation and Recovery Act (RCRA) sampling will not be performed on any waste currently stored in the PUREX Storage Tunnels.

Waste received that is not generated at the PUREX Plant could require sampling strategies associated with this waste that will be developed on a case-by-case basis.

Sampling Methods

Process knowledge of the characteristics and the quantities of the dangerous waste to be stored in the PUREX Storage Tunnels is considered sufficient to properly designate and manage the stored waste.

The waste currently stored in the tunnels is lead, mercury, chromium, cadmium, barium, mineral oil, silver, and silver salts. Sampling and chemical analysis of the lead, mercury, cadmium, barium, mineral oil, or chromium to confirm their presence would not provide additional data beneficial to proper management of the waste and would not comply with ALARA principles. The silver salts are dispersed over a large area on ceramic packing contained within a large stainless steel reactor vessel. Representative sampling of the ceramic packing is not considered to be practical and therefore was not performed.

If RCRA sampling is required for operation of the PUREX Storage Tunnels, representative sampling methods referenced in WAC 173-303-110 or some other method approved by the Washington State Department of Ecology (Ecology) will be used. For waste received from other Hanford Facility activities, existing sampling, chemical analysis, and/or process knowledge documentation is used to confirm the characteristics and quantities of mixed waste to be stored. Storage of non-PUREX Facility waste is reviewed on a case-by-case basis.

3.5.6.1 Frequency of Analyses

Because the dangerous waste components of mixed waste stored in the PUREX Storage Tunnels are stable and will remain undisturbed for a long time, the waste designations and quantities present will remain the same as assigned at the time of storage. Therefore, repeated analysis is not considered necessary to ensure that waste designation data are representative.

3.5.7 Selection of Sampling Equipment

The only analysis presently used in support of the PUREX Storage Tunnels operation is for corrosivity on the final in-place aqueous rinse of discarded vessels before the vessels are released for storage. The pH is determined by Method 9040 or 9041 (SW-846). The RCRA sampling methods, as referenced in WAC 173-303-110, will not be performed on any waste currently stored in the PUREX Storage Tunnels.

3.5.8 Maintaining and Decontaminating Field Equipment

All RCRA sampling equipment used to collect and transport samples must be free of contamination that could alter test results. Equipment used to obtain and contain samples must be clean. Acceptable cleaning procedures for sample bottles and equipment include, but are not limited to, washing with soap or solvent, and steam cleaning. After cleaning, cleaning residues must be removed from all equipment that could come in contact with the waste. One method to remove these residues would be a solvent (acetone or other suitable solvent) rinse followed by a final rinse with deionized water. Equipment must be cleaned before use for another sampling event.

After completion of sampling, equipment should be cleaned as indicated previously. If decontamination of the equipment is not feasible, the sampling equipment should be disposed of properly.

3.5.9 Sample Preservation and Storage

Following RCRA sampling, sample preservation follows methods set forth for the specific analysis identified. Preservation is in accordance with the methods stated in SW-846 or any of the test methods adopted by the Hanford Facility that meet WAC 173-303 requirements. No preservation method will be used when there are ALARA concerns.

3.5.10 Quality Assurance and Quality Control Procedures

The only test method presently used in support of the PUREX Storage Tunnels operation is a corrosivity check on the final in-place aqueous rinse of discarded vessels before the vessels are released for storage. The RCRA sampling will not be performed on any waste currently stored in the PUREX Storage Tunnels. Field duplicates, field blanks, trip blanks, and equipment blanks will not be taken. Split samples could be taken at the request of Ecology.

Generally, quality assurance and quality control (QA/QC) requirements for sampling will be divided between paperwork requirements, such as chain-of-custody, and sampling and analysis activities. This section addresses sampling QA/QC requirements. Analytical QA/QC is discussed in Section 3.6.

A chain-of-custody procedure is required for all sampling identified by this WAP. At a minimum, the chain of custody must include the following: (1) description of waste collected, (2) names and signatures of samplers, (3) date and time of collection and number of containers in the sample, and (4) names and signatures of persons involved in transferring the samples.

3.5.11 Health and Safety Protocols

The safety and health protocol requirements established for the Hanford Site must be followed for all RCRA sampling activities required by this WAP.

3.6 Laboratory Selection and Testing and Analytical Methods

This section discusses laboratory selection and the types of acceptable analytical methods for RCRA samples.

3.6.1 Laboratory Selection

Laboratory selection is limited as only a few laboratories are equipped to handle mixed waste because of the special equipment and procedures that must be used to minimize personnel exposure to mixed waste. Laboratory selection depends on laboratory capability, nature of the sample, timing requirements, and cost. At a minimum, the selected laboratory must have the following:

- A comprehensive QA/QC program (both qualitative and quantitative).
- Technical analytical expertise.
- An effective information management system.

These requirements will be met if the selected laboratory follows the pertinent requirements contained in the Hanford Federal Facility Agreement and Consent Order Action Plan, Section 6.5. The selected laboratory also can meet these requirements by having some other type of QA/QC program as long as equivalent data quality is achieved.

3.6.2 Testing and Analytical Methods

The testing and analytical methods for corrosivity used by the various onsite analytical laboratories are outlined in SW-846. These methods in some cases deviate from SW-846 and American Society for Testing and Materials-accepted specifications for holding times, sample preservation, and other specific analytical procedures. These deviations are discussed in Analytical Methods for Mixed Waste Analyses at the Hanford Site (DOE/RL-94-97).

3.7 Waste Re-Evaluation Frequencies

Re-evaluation of waste within the PUREX Storage Tunnels will not occur because of the personnel and environmental exposure to mixed waste and the way the railcars are positioned in the tunnels. The waste is expected to remain stable.

3.8 Special Procedural Requirements

The following sections describe special procedural requirements associated with waste in the PUREX Storage Tunnels.

3.8.1 Procedures for Receiving Wastes Generated Offsite

The PUREX Storage Tunnels do not accept waste generated off the Hanford Site.

3.8.2 Procedures for Ignitable, Reactive, and Incompatible Waste

Presently, the only ignitable, reactive, or incompatible dangerous waste stored in the PUREX Storage Tunnels is the silver nitrate coating on the ceramic packing inside the silver reactors. This material is confined to the interior of a large stainless steel vessel (Section 3.5.1.1) that separates this material from all other waste material stored in the tunnel. The requirements in WAC 173-303-395(1)(a) require 'No Smoking' signs be conspicuously placed wherever there is a hazard present from ignitable or dangerous waste. 'No Smoking' signs are not considered appropriate at the PUREX Storage Tunnels because of ALARA principles. Smoking is not allowed in any area with ALARA concerns and rules prohibiting smoking are strictly enforced. This policy serves to achieve the no smoking intent of WAC 173-303-395(1)(a), posting and maintaining 'No Smoking' signs are not considered appropriate.

Isolated areas within the PUREX Storage Tunnels make periodic inspections inconsistent with ALARA guidelines[e.g., an annual fire inspection as required by WAC 173-303-395(1)(d) for storage areas containing ignitable waste]. Therefore, such inspections are not performed.

3.8.3 Provisions for Complying with Land Disposal Restriction Requirements

Operation of the PUREX Storage Tunnels does not involve land disposal or treatment of dangerous waste. The information provided by the generating unit regarding land disposal restrictions of dangerous waste is sufficient to operate the PUREX Storage Tunnels in compliance with land disposal restriction requirements. When final disposition of the waste occurs, this information will be passed on for final treatment or disposal of the waste.

3.8.4 Deviations from the Requirements of this Plan

Management may approve deviations from this plan if special circumstances arise that make this prudent. These deviations must be documented in writing with a copy to be retained by the management.

3.9 Recordkeeping

Records associated with this waste analysis plan and waste verification program are maintained on the Hanford Facility. These records will be maintained until closure of the PUREX Storage Tunnels. Records associated with the waste inventory will be maintained for 5 years.

3.10 References

Ecology, EPA, and DOE, 2003, Hanford Federal Facility Agreement and Consent Order, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S Department of Energy, Richland, Washington, amended periodically.

DOE/RL-94-97, Analytical Methods for Mixed Waste Analyses at the Hanford Site, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

EPA, 1986, Test Methods for the Evaluation of Solid Waste: Physical/Chemical Methods, SW-846, 3rd ed., U.S. Environmental Protection Agency, Washington, D.C.

Table 3.1. PUREX Storage Tunnels Inventory

PUREX #1 Storage Tunnel (218-E-14)
Tunnel #1 is at its Capacity as of 1/22/65

PUREX #1 Storage Tunnel is located at the southeast end of the PUREX Plant and is an extension of the railroad tunnel. The storage area is approximately 109 meters long, 6.9 meters high, and 5.8 meters wide. The tracks have a one percent downgrade toward the south end of the tunnel. The capacity of the Storage Tunnel is eight modified railroad cars, 12.8 meters long.

Position	PUREX #1 Storage Tunnel (218-E-14)
1. & 2.	HA column and miscellaneous jumpers in box placed in Tunnel #1 on 6/60 HA 4,700 Cu. Ft. Jumpers 2,190 Cu. Ft., Pb-~115 Kg
3.	E-F11 #1 (1WW Waste) Concentrator failed 7/24/60. Placed in Tunnel #1 on 7/29/60, 1,900 Cu. Ft.
4.	G-E2 Centrifuge, miscellaneous jumpers in box and two tube bundles. Placed in Tunnel #1 on 12/24/60. (FUG SER# 762) 2,465 Cu. Ft., Pb-~115 Kg.,
5.	E-H4 (3WB) Concentrator failed 1/4/61. Placed in Tunnel #1 on 1/4/61, 2,336 Cu. Ft.
6.	E-F6 (2\NW Waste) Original Concentrator failed 4/21/61. Placed in Tunnel #1 on 4/21/61, 2,336 Cu. Ft.
7.	E-F11 (1WW Waste) #2 Concentrator failed 2/1/62. Placed in Tunnel #1 on 2/8/62, 2,336 Cu. Ft.
8.	E-F6 (2WW Waste) #3 Spare Concentrator failed 5/23/64. Placed in Tunnel #1 on 1/22/65 Flat Car 3621, 2400 Cu. Ft.

Table 3.1. PUREX Storage Tunnels Inventory (con't)

The storage area is approximately 514.5 meters long, 7.9 meters high, and 10.4 meters wide. The tracks have a one percent downgrade toward the south end of the tunnel. The capacity of the Storage Tunnel is 38-40 modified railroad cars, 12.8 meters long. The Tunnel contains 21 cars as of 2/95.

Position	PUREX #2 Storage Tunnel (218-E-15)
1.	E-F6 # (2WW Waste) Concentrator, TK F 15-2, One tube bundle and agitator motors, placed in Tunnel on 12/12/67 on Car 61439. 2,400 Cu. Ft.
2.	E-F6 #5 (E-H4 3WB) Concentrator, two tube bundles placed in Tunnel on 3/26/69. On Car MILW 60883, 2,400 Cu. Ft.
3.	E-F6 #6 (2WW Waste) Concentrator, two tube bundles failed placed in Tunnel on 3/19/70. On Car 3612, 2,400 Cu. Ft.
4.	L Cell Package in a sealed steel box (H2-66012) placed in Tunnel on 12/30/70 on Car MILW 60033, 2,400 Cu. Ft.
5.	F2 Silver Reactor, F6 Demister, Vessel Vent Line, Steel Catwalk and Guard Rails, placed in Tunnel on 2/26/71. On Gondola Car 4610, 2,400 Cu. Ft., Ag-~625 Kg
6.	Modified A3-1 tower, scrubber, liquid, and vapor line placed in Tunnel on 12/12/71. On Gondola Car 4611, 2,400 Cu. Ft.
7.	A3 Dissolver placed in Tunnel on 12/22/71. On 9 Ft. shortened Car B58, 2,400 Cu. Ft., Hg--~45 Kg.
8.	A1W1 Fuel ends in steel liner box and NPR fuel handling equipment. Used with the suspected canisters, on Car 19808. Placed in Tunnel on 8/29/72, 800 Cu. Ft.

Position	PUREX #2 Storage Tunnel (218-E-15)
9.	C3 Dissolver placed in Tunnel on 9/30/72, on Car 19811, 1590 Cu. Ft., Hg-~45 Kg.
10.	E-H4 (3WB) Concentrator, #61 tube bundle, prototype cooling coil, and F-Fl Filter Tank, placed in Tunnel 8/30/83, on Car CDX-1, 2,400 Cu. Ft.
11.	A3 Dissolver (Vessel #10 and Heater Vessel #6), placed in Tunnel on 1/18/86, on Car 3613, 3960 Cu. Ft. Hg-~40 Kg., Cd-~43 Kg
12.	White box (H2-58456) containing eight tube bundles #S 57.
13.	J5 Tank (Vessel #30), FL condenser (Vessel #13), and F12-B Cell Block, old four-way dumper, disc yoke, and flange plate placed in Tunnel on 1/21/86, on Car 19806, 2,500 Cu. Ft.
14.	L-l Pulser, 2-column cartridges, 1-jumper cutter, 3-jumper alignment tools, 9-exterior dumping trunnions, 10-pumps, 3-agitators, 4-tube bundles, 2-vent jumpers and 7-yokes placed in Tunnel on 11/18/87, on Car PX-10 (10A-19380) & Rack H2-96629.50. 50 tons, 3,600 Cu. Ft., Pb-~2540 Kg.
15.	Silver Reactor, E-F2 steam heater, and storage liner (H2-65095), full of cut up jumpers placed in Tunnel on 5/13/88, on Car PX-9 (10A-19809) & S/R Cradle SK-GLR-11-2-87. 20 tons, 2,775 Cu. Ft., Cd-~13 Kg., Ag-~115 Kg., Pb-~230 Kg.
16.	E-J8-1 Unitized Concentrator Vessel #1 H2-52477, failed 3/11/89. Placed on storage Car H2-99608, Px-6 (10A-19028) and in #2 Tunnel 4/6/89 graveyards. Estimated 42 tons, 6,000 Cu. Ft.
17.	North storage liner H2-65095 containing six pumps, one agitator, and cut up jumper (14 tons). South storage liner H2-65095 containing one pump, one #15 yoke and cut up jumpers (11.5 tons). Placed on storage Car PX-19 (10A-19030) and in #2 Tunnel on days 8/5/89. Estimated 25.5 tons, 2,574 Cu. Ft.
18.	T-F5 Acid absorber, ID#1-T-F5/F-168713, H2-52535 and H2-52487/488. Placed on storage Car PX-2 and in #2 Tunnel on 4/8/94. Estimated 22 tons, 835 Cu. Ft.
19.	Four metal liner storage boxes H-2-65095-3/H-2-100187-0 containing failed jumpers and miscellaneous obsolete canyon equipment items. Placed on storage Car PX-23 and in #2 Tunnel 9/16/94. Estimated 60 tons, 4032 Cu. Ft.
20.	E-H4-1 unitized concentrator (H-2-52477/56213)/(E-H4-1) Placed in Tunnel on 1/27/95, on Car Px-28. Estimated 40 tons, 5,760 Cu. Ft., Cr-~8 Kg.
21.	Tank E-5 (H-2-52453)/(F-166955), lead storage box assembly (H-2-131629)/ (H-2-131629-1), H4 concentrator tower (H-2-58102)/(F-223017-CBT-4), hot shop cover plate (H-2-52222)/(”Q”), tube bundle wash capsule (H-2-58647), dissolver charging insert (H-2-75875)/ (H-2-75875-1), lifting yoke #7A (H-2-96837), lifting yoke #9 (H-2-52458). Placed in tunnel on 2/8/95 on Car PX-3609. Estimated 44 tons, 3,457 Cu. Ft., Pb-~1830 Kg
22.	Metal liner box (H-2-65096) containing jumpers and failed/obsolete canyon equipment. F7 neutron monitor (H-2-75825), lead storage box (H-2-131629) containing jumper counterweights and miscellaneous lead items, scrap hopper (H-2-57347) containing miscellaneous canyon equipment, canister capping station (H-2-821831), test canister containing various lengths of carbon steel pipe. Placed in Tunnel on 3-11-06, on Car #3616. Estimated weight 22 tons, 1,712 Cu. Ft., Pb-~3232 Kg., Cd-~2 Kg.
23.	Two burial boxes (H-2-100187) containing jumpers and failed/obsolete canyon equipment, lifting yoke (H-2-99652). Placed in Tunnel 3-11-96 on Car #PX-31. Estimated weight 21 tons, 2,116 Cu. Ft.

Position	PUREX #2 Storage Tunnel (218-E-15)
24.	Concrete burial box (H-1-44980) storing 8 containers of 324 Building, B-Cell waste. For additional details, see PUREX Work Plan WP-P-95-60. Placed in Tunnel on Car #PX-29, on April 26, 1996. Estimated weight 36 tons, 1,890 Cu. Ft. Cd-~10.5 kg., absorbed oil-~8.5 kg., Cr-~1 kg., Ba-~ 3 kg
25.	Concrete burial box (H-1-44980) storing 9 containers of 324 and 325 Building waste. For additional details, see PUREX Work Plan WP-P-96-015. Placed in tunnel on Car #10A-3619, on June 12, 1996. Estimated weight 46.5 tons, 1,890 Cu. Ft. Ba-~4g., Cd-<1g., Cr-~2g., Pb- <1g
26.	20,000-gallon liquid waste tank Car HO-10H-18580, empty per RCRA, placed in Tunnel on June 19, 1996, approximately 30 tons.
27.	20,000 gallon liquid waste tank Car HO-10H-18579, empty per RCRA, placed in Tunnel on June 19, 1996, approximately 30 Tons
28.	20,000-gallon liquid waste tank Car HO-10H-18582, empty per RCRA, placed in Tunnel on June 19, 1996, approximately 30 tons.

This page intentionally left blank.

PUREX STORAGE TUNNELS
CHAPTER 4.0
PROCESS INFORMATION

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
10/2006	

This page intentionally left blank

CHAPTER 4.0
PROCESS INFORMATION

This page intentionally left blank.

CHAPTER 4.0
PROCESS INFORMATION

TABLE OF CONTENTS

4.0 PROCESS INFORMATION 5
4.1 Operation of the PUREX Storage Tunnels 5
4.1.1 Preparation for Tunnel Activities 5
4.1.2 Tunnel Storage Activities 6
4.1.3 Removal of Stored Material 7
4.1.4 Filling the Water-Fillable Door (Tunnel Number 2) 7
4.1.5 Post Storage Activities 8
4.1.6 Operation of the Tunnel Ventilation System 8
4.2 Containers 8
4.2.1 Containers with Free Liquids 8
4.2.2 Containers without Free Liquids that do not Exhibit Ignitability or Reactivity 9
4.2.3 Protection of Extremely Hazardous Waste in Containers 9
4.2.4 Prevention of Reaction of Ignitable, Reactive, and Incompatible Waste in Containers 10
4.3 Engineering Drawings 10

FIGURE

Figure 4.1. Water Fillable Door Exterior (Tunnel Number 2) 12

This page intentionally left blank.

4.0 PROCESS INFORMATION

This chapter discusses the processes involved in the operation of the Plutonium Uranium Extraction Facility (PUREX) Storage Tunnels. The PUREX Storage Tunnels are used for the storage of mixed waste from the PUREX Plant and other onsite sources.

The PUREX Storage Tunnels were designed and constructed to provide a means of protecting personnel and the environment from exposure to mixed waste associated with stored material. This design also serves to protect personnel and the environment from the dangerous waste component of the mixed waste stored inside the tunnels.

The PUREX Storage Tunnels are being permitted as a miscellaneous unit under Washington Administrative Code (WAC) 173-303-680. The WAC regulations require that miscellaneous unit permit terms and provisions address appropriate requirements provided for other treatment, storage, and disposal (TSD) units. Because the operation and construction of the PUREX Storage Tunnels most closely resemble that of a container storage unit, the appropriate requirements prescribed for a container storage unit are addressed in this chapter.

4.1 Operation of the PUREX Storage Tunnels

This section describes the selection, characterization, preparation, placement, and removal activities associated with storage of mixed waste in the PUREX Storage Tunnels.

4.1.1 Preparation for Tunnel Activities

Management, with the concurrence of an appropriate cognizant engineer, determines when material is to be removed and transported to the PUREX Storage Tunnels. A job specific work plan describing the overall transfer activities is prepared.

4.1.1.1 Storage/Removal Equipment Preparation

A remotely controlled, battery-powered locomotive normally was used to move railcars into and out of the PUREX Storage Tunnels. Other mechanical means such as a standard locomotive or a winch also can be used independently or in combination with the remote locomotive should the need arise. Methods for use of the remote locomotive are described in this chapter as this represents the normal placement and removal of railcars at the PUREX Storage Tunnels. Should storage activities require the use of a mechanical means other than the remote locomotive to place or withdraw a railcar, methods for that application will be developed.

Preparatory activities associated with the remote-controlled locomotive included the following:

- Charging the batteries for both the locomotive and the radio transmitter.
- Performing operational checks.
- Installing a plastic shroud over the locomotive to facilitate decontamination.
- Installing an anticoupling device on the south coupler of the locomotive (storage only).
- Performing physical inspections of the railroad track within the railroad tunnel to ensure that the track switches are positioned properly and the track is clear of obstructions.

4.1.1.2 Water-Fillable Door Preparation

Each PUREX Storage Tunnel has a water-fillable door that isolates the storage area from the PUREX railroad tunnel.

Currently, the water-fillable door to Tunnel Number 2 is empty and is not expected to be filled. Operational checks are performed on the door hoists. Before performing operational checks on the water-fillable door, the operator confirms with a dispatcher that the railroad tunnel area is clear of personnel.

4.1.1.3 Other Preparation Tasks

Before material storage, the following preparatory tasks are completed.

- The storage tunnel exhaust fan is verified to be operating.
- Labels will be attached to the railcar in accordance with WAC 173-303-395(6) and 173-303-630(3) if the material contains dangerous waste components.

4.1.2 Tunnel Storage Activities

This section describes the placement of material within the PUREX Storage Tunnels.

4.1.2.1 Physical Characterization of Material to be Stored

Physical characterization includes an evaluation of the following physical properties:

- Length, width, and height.
- Gross weight and volume.
- Preferred orientation for transport and storage.
- Presence of mixed waste.

Information sources used in physical characterization include equipment fabrication and installation drawings, operational records, and process knowledge. Physical characterization provides information necessary to appropriately describe the mixed waste materials. Such information also is used to design and fabricate, if required, supports on the railcar.

Specific material known to contain constituents that would cause the equipment to be designated as mixed waste is discussed in the waste analysis plan (Chapter 3.0). The material includes but is not limited to dissolvers that contain elemental mercury; silver reactors that contain silver salts; jumpers and other equipment that have elemental lead counterweights; a concentrator that contains chromium; neutron absorbing equipment containing cadmium. Characteristics of these materials when stored as mixed waste are described in Chapter 3.0. Waste transferred to the PUREX Storage Tunnels from other than PUREX Plant also would be physically characterized.

4.1.2.2 Material Flushing

Before removal from service, the material from the PUREX Plant was flushed to minimize loss of products, to reduce contamination, and to reduce to nonregulatory levels the concentration of any dangerous chemicals present in a residual heel. In the future the analysis of the rinsate will be used to determine when these goals have been achieved. The analysis of the final flush will be retained as part of the PUREX Storage Tunnel records. Material removed from other onsite units will be prepared for transfer to the tunnels in accordance with this dangerous waste permit.

4.1.2.3 Railcar Preparation

Railcars are modified to serve as dedicated storage platforms and transporters for material placed in the PUREX Storage Tunnels. The wooden decking on the railcars is removed to minimize the amount of combustible material placed in the PUREX Storage Tunnels. The south coupler is disabled or removed to prevent the railcar from coupling to the railcar stored ahead. Brakes are disabled to ensure freewheeling of the railcar. Steel decking, catch pans filled with absorbent, and equipment cradles are provided as needed to modify the railcar for its specific task.

4.1.2.4 Placement of Material into Storage Position

With all preparations complete and with the approval of cognizant management, transferring material to the PUREX Storage Tunnels proceeds as follows.

- The water-fillable door to the storage tunnel is opened.
- The railcar is loaded as specified in the storage tunnel checklist.
- An inventory of items loaded on the railcar and a record of their location on the railcar are recorded in the storage tunnel checklist.
- A survey is obtained of the loaded railcar at a distance commensurate with ALARA practices.
- The railcar is pushed into the storage tunnel to its storage position.
- Once the railcar is in position, the water-fillable door is closed.

4.1.3 Removal of Stored Material

Removal of material stored within the PUREX Storage Tunnels is not conducted routinely. It is planned that the material will remain in storage until a means to accommodate processing and repackaging of the material for disposal or further storage or until another final disposition option becomes available. Removal of material from storage within the PUREX Storage Tunnels would proceed after the preparation activities identified in Section 4.1.1.

With all preparations complete and approval of management, removal of material from the storage area of the PUREX Storage Tunnels would proceed as follows.

- The equipment that will be used to remove material is positioned in the PUREX railroad tunnel.
- Verification is made that the PUREX railroad tunnel is configured properly to proceed with entrance into the PUREX Storage Tunnels (i.e., tunnel ventilation system is operating, the overhead door is closed and a survey of the area is performed for as low as reasonably achievable [ALARA] concerns).
- The water-fillable door is opened.
- The equipment that will be used to remove material is moved into the storage tunnel and connected to the railcar.
- Verification is made that the railcar is connected to the removal equipment and the railcar is extracted from the storage tunnel and positioned within the PUREX railroad tunnel.
- The water-fillable door is closed.

The loaded railcar retrieved from the tunnel would be remotely viewed and measurements may be obtained to determine the possibility of mixed waste containment failure during storage in the PUREX Storage Tunnels. If evidence of containment failure is detected, the specific details (i.e., material, location on railcar, storage position) would be documented and attached to the waste tracking form. This information would be maintained in the files and would be used to establish sampling locations within the tunnels at closure. After remote viewing and surveying, the railcar and associated material may be prepared as required for transfer to an appropriate onsite TSD unit for treatment or further storage.

4.1.4 Filling the Water-Fillable Door (Tunnel Number 2)

If shielding beyond that provided by the empty water-fillable door becomes necessary, the door can be filled with water. In the past, this was accomplished by connecting a fire hose from the water hydrant to the wall stub on the exterior of the door housing (Figure 4.1). Once the fire hose was in place, the hydrant valve was opened and the door was filled with water.

The hydrant was closed by personnel when a high-level indicator light illuminated. Although attendance by an operator is required at all times during filling operations, should the door overfill, excess water is channeled through a vent/spill pipe to the door sump. A 15.2-centimeter drain is provided in each door sump. Water accumulated in the door sump was pumped out to the Double-Shell Tank System, and the sump and drain were made inoperable during PUREX Facility deactivation activities.

The drain was sealed during PUREX Facility deactivation. In the future, a temporary source of water could be provided for filling the water-fillable door.

4.1.5 Post Storage Activities

The following post storage activities would conclude the tunnel storage task.

- Decontamination activities, if required, are performed.
- Management is notified of any unusual conditions observed during the storage/retrieval activities.

4.1.6 Operation of the Tunnel Ventilation System

The ventilation systems for Tunnel Number 1 and Tunnel Number 2 were designed to ventilate air from within the tunnels so the airborne contamination is vented through a High Efficiency Particulate Air (HEPA) filtered exhaust system.

4.1.6.1 Tunnel Number 1 Ventilation

Active ventilation of Tunnel Number 1 presently is not provided. After placement of the last railcar into Tunnel Number 1, the tunnel was sealed (Chapter 2.0). As part of the sealing activities, the ventilation fan was deactivated electrically and the exhaust stack and filter were isolated from the system by installing blanks upstream and downstream of both the exhaust fan and filter and the stack was removed. In the event railcar removal activities are initiated, it is planned that the ventilation system would be reactivated. Operation of the ventilation system would be similar to that for Tunnel Number 2.

4.1.6.2 Tunnel Number 2 Ventilation

The Tunnel Number 2 ventilation system presently is inactive. As part of PUREX Facility deactivation, the water-fillable door and outer PUREX railroad tunnel door were sealed. The seal may be temporary or permanent depending on the future need for storing waste in the tunnel. The ventilation system may be operated continuously, or de-energized and reactivated during waste placement activities. During deactivation, a blank was installed on the downstream side of the filter and the stack was capped. When the determination has been made that Tunnel Number 2 will no longer receive waste, the ventilation system will be blanked and deactivated electrically similar to the Tunnel Number 1 ventilation system. While the Tunnel Number 2 ventilation system is operating and the water-fillable door is closed, the exhaust system, which discharges approximately 100 cubic meters per minute, maintains a slightly negative pressure in the tunnel. The exhaust air is replaced by infiltration around the water-fillable door and through the porosity of the tunnel structure (e.g., the rail-bed ballast). When the water-fillable door is open (during transfer activities), inward airflow is maintained through the open doorway. This inward airflow channels airborne radioactive contamination away from both the railroad tunnel and personnel following railcars (if allowed) into the storage tunnel. A HEPA filter provides filtration of all exhaust air before release to the atmosphere. When the ventilation system is operating, the HEPA filter is tested in place at least annually to ensure radioactive particulate removal efficiency. Exhausted air is sampled periodically and analyzed for airborne radionuclides.

4.2 Containers

This section describes the various types of containment used to isolate mixed waste stored in the PUREX Storage Tunnels. The PUREX Storage Tunnels are considered to be a miscellaneous unit most closely resembling that of a container storage unit. The mixed waste stored in the PUREX Storage Tunnels is contained and is not considered a risk to human health or to the environment.

4.2.1 Containers with Free Liquids

The only mixed waste stored as a free liquid is elemental mercury. A small quantity, less than 1.7 liters, of mercury is contained in each of the two thermowells attached to and contained within each dissolver (Chapter 3.0).

Primary containment of the mercury is provided by the all-welded construction of the thermowell itself, which is fabricated from 7.6-centimeter, Schedule 80, 304L stainless steel pipe. The open upper end of the thermowell was plugged with a 304L stainless steel nozzle plug in preparation for storage. The dissolver rests on a cradle on its railcar in an inclined position. This ensures that the mercury remains in the lower portion of the thermowell and is not in contact with the mechanical closure on the nozzle end of the thermowell.

A secondary containment barrier for mercury, should it leak from the thermowell, is provided by the dissolver itself. The dissolver is a 304L stainless steel process vessel constructed from 1-centimeter-thick plate and is approximately 2.7 meters in diameter. The dissolver is of all-welded construction and contains no drains or nozzle outlets in the bottom several feet of its lower section, which contains both thermowells.

The 304L stainless steel used to contain the elemental mercury is both compatible with the waste itself and the storage environment. The potential for significant deterioration of either the primary or secondary containment barrier material before closure is considered to be negligible.

The dissolvers stored within the PUREX Storage Tunnels are not labeled as containing characteristic toxic mercury (D009) [WAC 173-303-090(8)(c)]. Procedures for labeling were not in place at the time of storage. Personnel access into the storage area for purposes such as labeling is not feasible and cannot be justified under ALARA guidelines. Based on ALARA, mixed waste presently within the PUREX Storage Tunnels will remain unlabeled. However, during future transfers of mixed waste into the PUREX Storage Tunnels the railcars will be labeled as specified by WAC 173-303-395(6) and WAC 173-303-630(3).

4.2.2 Containers without Free Liquids that do not Exhibit Ignitability or Reactivity

Most lead is fully contained in all-welded encasements of either carbon steel or 304L stainless steel (refer to Chapter 3.0, Table 1). The encasement serves as support, protection against mechanical damage, and protection of the lead from exposure to the environment. Also, lead has been placed in burial boxes of appropriate size. The boxes provide secondary containment for the lead in the unlikely event the primary encasement should fail. Although boxes may be open on the top, the PUREX Storage Tunnels are enclosed; therefore, the containers are protected from the elements.

Both carbon steel and 304L stainless steel used to encase the lead are compatible with the waste and the storage environment. Significant deterioration of either the primary or secondary containment barrier materials before closure is not considered to be credible.

In the past, material that contains lead or that has encased lead attached was not labeled as containing characteristic toxic lead (D008) [WAC 173-303-090(8)], because the requirements were not yet on line. As stated in Section 4.2.1, personnel entry into the tunnel storage area for purposes of labeling would be inconsistent with ALARA guidelines. However, during future storage of material containing lead the railcars will be labeled in accordance with WAC 173-303-395(6) and WAC 173-303-630(3).

4.2.3 Protection of Extremely Hazardous Waste in Containers

The present amount of mixed waste stored in the PUREX Storage Tunnels is sufficient to characterize this material as extremely hazardous waste. Because the PUREX Storage Tunnels are enclosed totally, protective covering from the elements and from run-on is provided for the storage of extremely hazardous waste. Periodic inspection of the equipment stored in the PUREX Storage Tunnels is not feasible and cannot be justified under ALARA guidelines. Safe management of this waste is based on the following considerations.

- The operation of the PUREX Storage Tunnels is passive, i.e., once a storage position is filled, the storage position remains undisturbed until closure.

- The extremely hazardous waste is compatible with its storage container and the storage environment.

4.2.4 Prevention of Reaction of Ignitable, Reactive, and Incompatible Waste in Containers

There is no reactive or incompatible waste known to be stored in the PUREX Storage Tunnels. The only mixed waste stored in the PUREX Storage Tunnels considered an ignitable waste is the silver nitrate in Tunnel Number 2. The silver nitrate fraction of the silver salts, within the silver reactors, exhibits the characteristic of ignitability as defined in 49 CFR 173.127(a). Therefore, the silver salts are managed as an ignitable dangerous waste in accordance with WAC 173-303-395.

- The risk of fire associated with the storage of silver nitrate in the PUREX Storage Tunnels is considered to be extremely low. This conclusion is based on the following considerations.
- The operation of the PUREX Storage Tunnels is passive; i.e., once a storage position is filled, the storage position remains undisturbed until closure.
- The silver nitrate is contained within large, heavy-walled stainless steel vessels that isolate the silver nitrate from contact with any combustibles that might be in the tunnels.
- The silver nitrate is dispersed over a large surface area on a ceramic packing substraight and is not conducive to build-up of heat that could lead to spontaneous combustion.
- Personnel access to the occupied areas of the tunnels is not permitted, thereby precluding activities that could present a fire hazard (e.g., smoking, flame cutting, welding, grinding, and other electrical activities).

Although ignitable waste storage units are required by WAC 173-303-395(1)(d) to have inspections conducted at least yearly by a fire marshall or professional fire inspector familiar with the requirements of the uniform fire code, the ALARA concerns within the PUREX Storage Tunnels make such inspections impractical. These inspections are not considered appropriate or necessary for the safe operation of the unit because of the nature of the ignitable waste, the means of storage, and ALARA concerns (Chapter 6.0, §6.2).

4.3 Engineering Drawings

As-built drawings for the PUREX Storage Tunnels:

H-2-55587	218-E-14 Structural Floor Plan and Section
H-2-55588	Structural Sections and Details: Disposal Facility for Failed Equipment
H-2-55589	Structural Sections and Details: Disposal Facility for Failed Equipment
H-2-55590	Door and Hoist Details
H-2-55591	Door and Hoist Details
H-2-55592	Door and Hoist Details
H-2-55593	Electrical Details
H-2-55594	Shielding Door Fill and Drain Lines Arrangement: Disposal Facility for Failed Equipment
H-2-55599	Electrical Door Control Plan, Elementary Diagram and Miscellaneous Details: Disposal Facility for Failed PUREX Equipment
H-2-58134	Ventilation Details; Sheet 1, Sheet 2, Sheet 3, Sheet 4
H-2-58175	PUREX Tunnel

H-2-58193	Sump Details
H-2-58194	Sump Details
H-2-58195	Structural Sections and Details: Equipment Disposal - PUREX
H-2-58206	Sump Details
H-2-58208	Fan Details; Sheet 1, Sheet 2, Sheet 3
H-2-94756	Filter Details; Sheet 1, Sheet 2

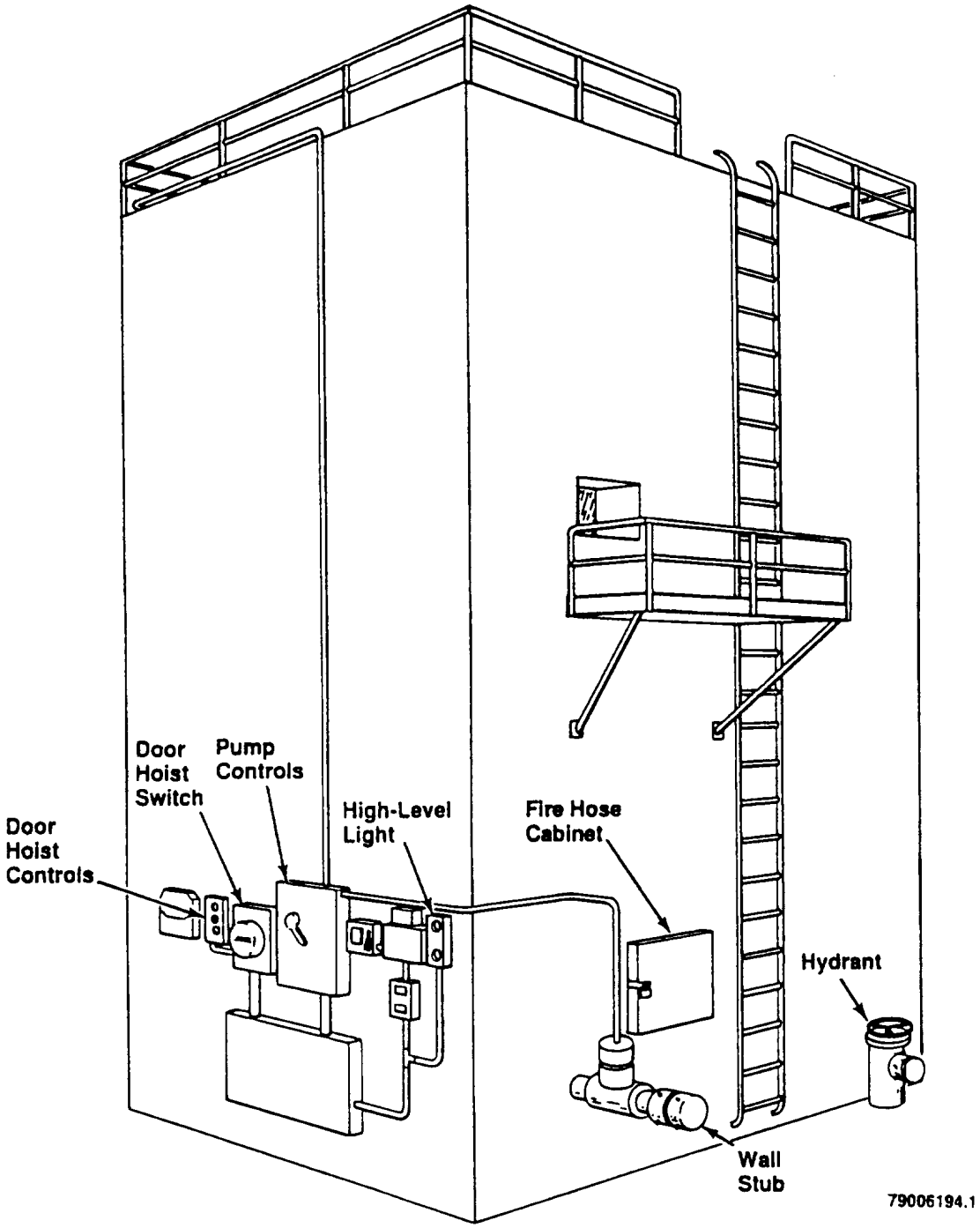


Figure 4.1. Water Fillable Door Exterior (Tunnel Number 2)

PUREX STORAGE TUNNELS
CHAPTER 11.0
CLOSURE AND FINANCIAL ASSURANCE

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
10/2006	

This page intentionally left blank.

CHAPTER 11.0
CLOSURE AND FINANCIAL ASSURANCE

This page intentionally left blank.

CHAPTER 11.0
CLOSURE AND FINANCIAL ASSURANCE

TABLE OF CONTENTS

11.0 CLOSURE AND FINANCIAL ASSURANCE 5

11.1 In Situ Disposal Options 5
11.1.1 Backfilling the PUREX Storage Tunnels with Gravel 5
11.1.2 Injecting the PUREX Storage Tunnels with Grout 5
11.1.3 Combination of Grout Injection and Backfilling 5

11.2 Retrieval/Clean Closure Options 6
11.2.1 Retrieval and Disposal in the PUREX Plant 6
11.2.2 Retrieval and Physical Processing (size reduction) in the PUREX Plant and Subsequent Disposal 6
11.2.3 Construction of a New Facility for Retrieval, Processing, and Treatment of Equipment for Disposal 6

This page intentionally left blank.

11.0 CLOSURE AND FINANCIAL ASSURANCE

Closure of the Plutonium Uranium Extraction Facility (PUREX) Storage Tunnels requires coordination with closure of the PUREX Plant to ensure a cost effective closure for both units. In addition, the nature of the mixed waste located within the PUREX Plant and PUREX Storage Tunnels precludes the determination of the type of treatment and/or disposition of the waste at this time.

The PUREX Storage Tunnels will be managed as a Resource Conservation and Recovery Act (RCRA) storage unit until closure can be coordinated with the final closure plan for the PUREX Plant. The PUREX Storage Tunnels closure plan will be submitted after any required National Environmental Policy Act of 1969 documentation and land usage agreements, which initiate disposition and aid in identifying or developing necessary disposition activities, have been adopted. The PUREX Storage Tunnels closure plan will be submitted for the Washington State Department of Ecology (Ecology) approval with the PUREX Plant closure plan.

The PUREX Storage Tunnels closure plan will be written to meet the requirements of Washington Administrative Code (WAC) 173-303-140 and WAC 173-303-610. This closure plan might consider but will not be limited to the following options for either in situ disposal or retrieval/clean closure of this unit.

Federal facilities are not required to comply with WAC 173-303-620 as is stated in the regulations and as described in Hanford Facility RCRA Permit, WA7890008967 (Permit) Condition II.H.3.

11.1 In Situ Disposal Options

This closure plan might consider but will not be limited to the following options for in situ disposal of waste in this unit.

11.1.1 Backfilling the PUREX Storage Tunnels with Gravel

This option could involve backfilling the tunnels with gravel to eliminate void space and prevent ground subsidence. A modified commercially available centrifugal rock-throwing device could be placed in newly constructed risers evenly spaced along each tunnel roof. Fill material could be supplied and dispersed into the tunnels by automated controls. Following the fill process, all equipment could be removed from the tunnel roofs and all means of access to the tunnels could be permanently sealed. Final activities could involve the construction of a final surface barrier that meets RCRA landfill cover requirements to prevent water from leaching mixed waste contained in the tunnels.

11.1.2 Injecting the PUREX Storage Tunnels with Grout

This option could involve the injection of grout material into each tunnel to stabilize and immobilize contained materials and prevent ground subsidence. A grout injector could be alternately placed in newly constructed risers evenly spaced along each tunnel roof. Grout material could be supplied and dispersed into the tunnels by automated controls. The grout material could be injected in lifts to accommodate curing and heat dissipation normally associated with the use of this type of material. Final activities could involve the construction of a final surface barrier that meets RCRA landfill cover requirements to prevent water from leaching mixed waste contained in the tunnels.

11.1.3 Combination of Grout Injection and Backfilling

This option combines grout injection with gravel backfilling similar to the processes discussed previously. Grout could be injected first to fill void spaces under the railcars and provide a basal structure. Gravel could be dispersed to fill remaining void space and prevent ground subsidence. Final activities could involve the construction of a final surface barrier that meets RCRA landfill cover requirements to prevent water from leaching mixed waste contained in the tunnels.

11.2 Retrieval/Clean Closure Options

This closure plan might consider but will not be limited to the following options for retrieval/clean closure of this unit.

11.2.1 Retrieval and Disposal in the PUREX Plant

Railcars stored in both tunnels could be remotely retrieved one at a time and moved beneath the horizontal door of the railroad tunnel extension for remote viewing, and if possible, characterization. Transfer procedures could be initiated to move waste material from the railcars to the PUREX Plant canyon deck area. Following transfer of the waste material, the railcars could be decontaminated and removed for final disposition at other onsite units. Final disposition of the waste transferred to the canyon deck area could be in accordance with PUREX Plant closure documentation. The PUREX Storage Tunnels could be closed after submittal and implementation of a PUREX Storage Tunnels closure plan in conjunction with PUREX Plant closure documentation. The PUREX Storage Tunnels closure plan will detail verification sampling and analysis to be performed as a part of closure activities.

11.2.2 Retrieval and Physical Processing (size reduction) in the PUREX Plant and Subsequent Disposal

Retrieval of waste material stored in the tunnels could be similar to that described in the previous section. Once the waste material was transferred to the PUREX Plant canyon deck area, characterization and size reduction of waste material could proceed. An area located on the canyon deck or in a process cell could be modified to include all necessary equipment to perform characterization and size reduction activities. Size reduction could be performed through various technologies that include, but are not limited to, flame cutting, water jet cutting, sawing, or other technologies. Final disposition of the processed waste material either onsite or offsite could be in accordance with regulations and procedures in place at that time. The PUREX Storage Tunnels could be closed after submittal and implementation of a PUREX Storage Tunnels closure plan in conjunction with PUREX Plant closure documentation. The PUREX Storage Tunnels closure plan will detail verification sampling and analysis to be performed as a part of closure activities.

11.2.3 Construction of a New Facility for Retrieval, Processing, and Treatment of Equipment for Disposal

This option involves the construction of a new unit that is either mobile or stationary to excavate, retrieve, and treat waste material stored in the tunnels. The unit could be constructed in a manner consistent with the retrieval and handling requirements for large, contaminated waste material. Following retrieval, the waste material could be treated in accordance with final onsite or offsite disposition requirements identified at such time. The excavated tunnels could have a temporary surface barrier placed in position until verification and sampling analysis could be performed as a part of closure activities to be performed in conjunction with PUREX Plant closure.

PUREX STORAGE TUNNELS
ADDENDUM E
SECURITY

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
9/30/2010	

This page intentionally left blank.

ADDENDUM E
SECURITY

This page intentionally left blank.

ADDENDUM E
SECURITY

TABLE OF CONTENTS

E. SECURITY 5
E.1 Security 5
E.1.1 Waiver 5

This page intentionally left blank.

E. SECURITY

This addendum discusses security for the Plutonium Uranium Extraction Facility (PUREX) Storage Tunnels.

E.1 Security

The Permittees will post signs at access points to the PUREX Storage Tunnels stating, DANGER-UNAUTHORIZED PERSONNEL KEEP OUT, or an equivalent legend. These signs will be written in English, legible from a distance of 7.6 meters, and visible from any approach to the active portion. [WAC 173-303-310(2)(a)].

E.1.1 Waiver

A waiver of the security procedures and equipment requirements for the PUREX Storage Tunnels is not requested. Therefore, the requirements of WAC 173-303-310(1)(a) and (b) are not applicable to the PUREX Storage Tunnels.

This page intentionally left blank.

PUREX STORAGE TUNNELS
ADDENDUM F
PREPAREDNESS AND PREVENTION

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
09/30/2010	

This page intentionally left blank.

ADDENDUM F
PREPAREDNESS AND PREVENTION

This page intentionally left blank.

ADDENDUM F
PREPAREDNESS AND PREVENTION

TABLE OF CONTENTS

F. PREPARDENESS AND PREVENTION 5
F.1 Preparedness and Prevention Requirements 5
F.1.1 Equipment Requirements 5
F.1.2 Aisle Space Requirement 5
F.2 Preventive Procedures, Structures, and Equipment 5
F.2.1 Unloading Operations 5
F.2.2 Runoff 6
F.2.3 Water Supplies 6
F.2.4 Equipment and Power Failures 6
F.2.5 Personnel Protection Equipment 7
F.3 Prevention of Reaction of Ignitable, Reactive, and/or Incompatible Waste 7

This page intentionally left blank.

F. PREPARDENESS AND PREVENTION

F.1 Preparedness and Prevention Requirements

This addendum discusses preparedness and prevention measures for the Plutonium Uranium Extraction Facility (PUREX) Storage Tunnels.

F.1.1 Equipment Requirements

The following sections describe the internal and external communications systems and emergency equipment required.

F.1.1.1 Internal Communications

The PUREX Storage Tunnels are not occupied and personnel entry is allowed only on a very limited basis and under close supervision. Normal and emergency communications equipment (portable two-way radios) is available for use.

F.1.1.2 External Communications

External communications equipment for summoning emergency assistance from the Hanford Fire Department and/or emergency response teams are provided by two-way portable radios or other devices.

F.1.1.3 Emergency Equipment

Equipment included in the emergency plan for the PUREX Storage Tunnels is provided in Addendum J.

F.1.1.4 Water for Fire Control

The fire hazard associated with the operation of the PUREX Storage Tunnels is considered to be very low because of the minimal amount of combustibles stored within the tunnels and the lack of an ignition source. In the event it is determined there is a fire in the storage area of the tunnels, the contingency plan will be activated. Because of the potential of the mixed waste stored within the tunnels to leach, the use of water for fire control will be avoided if possible. Reductions of the air supply to the storage area by isolation of the tunnel exhaust system, if operating, should permit the fire to self-extinguish. Should the fire continue to propagate, heavy equipment and cranes will be called to the scene to cover areas of the tunnels that might collapse. Heavy equipment and cranes are readily available on the Hanford Facility at all times and generally are available for deployment to the scene of an emergency within 1 hour. In the event that a fire resulted in the collapse of the tunnels, a recovery plan will be developed in accordance with emergency response procedures included in Addendum J. The recovery plan will take into consideration plans, if any, for retrieval of the waste stored within the tunnel(s).

F.1.2 Aisle Space Requirement

Requirements for aisle space are not considered appropriate for the safe operation of the PUREX Storage Tunnels and were not included in design documents.

F.2 Preventive Procedures, Structures, and Equipment

The following sections describe preventive procedures, structures, and equipment.

F.2.1 Unloading Operations

Operation of the PUREX Storage Tunnels does not involve the loading or unloading of dangerous waste. All loading and unloading operations are conducted at the PUREX Facility or other onsite units. Therefore, the requirements of WAC 173-303-806(4)(a)(viii)(A) are not applicable to the PUREX Storage Tunnels.

F.2.2 Runoff

The design of the PUREX Storage Tunnels included consideration and provisions for the control of runoff and run-on. Construction of both tunnels included the application of a moisture barrier before placement of the soil overburden. On Tunnel Number 1, 40.8-kilogram mineral surface roofing was applied to the external surfaces of the structural timbers (top and sides). The roofing material was nailed in place with an overlap of approximately 10 centimeters at all joints and seams. All interior and exterior steel surfaces of Tunnel Number 2 were coated with at least a 0.9-millimeter bituminous, solvent coal tar base, coating compound. The coating was applied using a two coat system, with each coat not less than 0.45 millimeters, ensuring a total dry film thickness of not less than 0.9 millimeter.

The soil overburden covering the PUREX Storage Tunnels also is contoured to provide a side slope of 2 (horizontal) to 1 (vertical). This construction serves to divert any seasonal or unanticipated run-on away from the storage area of the PUREX Storage Tunnels. For potential situations where a natural catastrophic event occurs, inspections of the tunnel side slopes are conducted to ensure the contours remain in a condition that ensures proper runoff and continues to divert run-on away from the tunnel storage areas.

Run-on at the PUREX Storage Tunnels is controlled by the design features of the exterior of the tunnels that serve to divert run-on away from the interior of the tunnels. Additionally, all waste within the tunnels is stored well above the floor level on railcars. The control of run-on combined with the storage of all waste above the floor elevation provides adequate assurance that runoff will not occur at the PUREX Storage Tunnels.

F.2.3 Water Supplies

Water was supplied to the PUREX Storage Tunnels from the PUREX Plant. This water was used for the sole purpose of filling the water-fillable doors should it have been determined necessary. There are no other sources or uses of water at the PUREX Storage Tunnels. The line that supplied water to the PUREX Storage Tunnels was blanked and emptied during deactivation activities. In the future, a temporary source of water would be provided for filling the water fillable door.

F.2.4 Equipment and Power Failures

The procedures, structures, and equipment used to mitigate the effects of equipment failure and power outage are described in the following sections.

F.2.4.1 Mitigation of the Effects of Equipment Failure

Maintaining safe storage of materials in the PUREX Storage Tunnels is not contingent on continued operation of equipment. The operable equipment associated with the PUREX Storage Tunnels were the remote controlled locomotive or waste placement and removal equipment, the railcars, and the water-fillable door and ventilation system for both tunnels. No operable equipment is associated with either tunnel, as these tunnels have been sealed and may no longer receive dangerous waste. Backup or redundant systems are not provided for either tunnel, as failure of the equipment would not have the potential to result in a release of dangerous waste to the environment. There are no hazards associated with tunnel equipment failure.

F.2.4.2 Mitigation of the Effects of Power Failure

Maintaining safe storage of materials in the PUREX Storage Tunnels is not contingent on continued supply of electrical power. Electrical power is required to operate the water-fillable door and the ventilation fan in both tunnels. Backup or redundant ventilation systems are not provided as the system is operated only to maintain air balance and provide secondary control of mixed waste airborne particulate. Power failure to either tunnel would not have the potential to result in the release of dangerous waste or mixed waste to the environment. There are no hazards associated with the shutdown of the tunnel ventilation systems due to loss of electrical power.

F.2.5 Personnel Protection Equipment

Personnel entering the PUREX Storage Tunnels are required to wear special protective clothing and respiratory protection at all times because of the material stored in the PUREX Storage Tunnels. Protective clothing and full-face respirators with filters are considered to be sufficient protection from the dangerous waste stored within the PUREX Storage Tunnels. Personnel are trained and qualified in using the protective equipment and are checked routinely for mask fit.

F.3 Prevention of Reaction of Ignitable, Reactive, and/or Incompatible Waste

There is no reactive or incompatible waste stored in the PUREX Storage Tunnels. The only ignitable waste stored within the tunnels is silver nitrate. The silver nitrate is present within the silver reactors (deposited on unglazed ceramic packing) stored in Tunnel Number 2.

Although silver nitrate exhibits the characteristic of ignitability, it is contained within stainless steel vessels, stored on railcars above the floor level, and isolated from combustible materials and other dangerous waste. Additional measures to prevent reaction of the ignitable waste are not considered necessary.

This page intentionally left blank.

PUREX STORAGE TUNNELS
ADDENDUM G
PERSONNEL TRAINING

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
09/30/2012	

This page intentionally left blank.

ADDENDUM G
PERSONNEL TRAINING

This page intentionally left blank.

ADDENDUM G
PERSONNEL TRAINING

PUREX Storage Tunnels Training Matrix

Permit (WA7890008967) Training Category	**Training Category[1]**					
	General Hanford Facility Training	**Contingency Plan Training**	**Emergency Coordinator Training**	**Operations Training**		
PUREX Storage Tunnels DWTP Implementing Plan	Orientation Program	Emergency Response (Contingency Plan)	Emergency Coordinator Training	General Waste Management		Misc. Unit
Job title/position						
Nuclear Chemical Operator	X	X		X		X
D&D worker	X	X				
Operations Manager	X	X				
Field Work Supervisor	X	X				
Environmental Compliance Officer	X			X		
Building Emergency Director	X		X			

[1] Refer to the Dangerous Waste Training Plan (DWTP) prepared for PUREX Storage Tunnels for a complete description

This page intentionally left blank.

PUREX STORAGE TUNNELS
ADDENDUM I
INSPECTION REQUIREMENTS

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
09/30/2010	

This page intentionally left blank.

ADDENDUM I
INSPECTION REQUIREMENTS

This page intentionally left blank.

ADDENDUM I
INSPECTION REQUIREMENTS

TABLE OF CONTENTS

I. INSPECTION REQUIREMENTS 5
I.1 PUREX Storage Tunnels 5

TABLES

Table I.1. Inspection Schedule 5

This page intentionally left blank.

I. INSPECTION REQUIREMENTS

This Addendum discusses the inspection requirements for dangerous waste management units within the Plutonium Uranium Extraction Facility (PUREX) Storage Tunnels.

I.1 PUREX Storage Tunnels

Because waste within the PUREX Storage Tunnels is inaccessible and exposure to the mixed waste would be extremely hazardous to personnel, inspection of the tunnel interior will not be performed. External inspections of the tunnels will be performed annually. The inspection schedule, log, and records will be maintained in the Hanford Facility Operating Record, PUREX Storage Tunnels File for a minimum of 5 years.

Information from inspections will be recorded on inspection logs. The log forms are used to initiate corrective action if necessary. The elements inspected at the PUREX Storage Tunnels are identified in Table I.1. Abnormal conditions are recorded, evaluated, and corrective action initiated as necessary.

Table I.1. Inspection Schedule

Requirement Description	Inspection Frequency	Types of Problems
Perform external surveillance of PUREX Storage Tunnels	Annual	External surfaces of the PUREX Storage Tunnels are observed for evidence of structural deterioration. Tunnel subsidence, erosion of the earth cover, and vent stack damage are of primary concern. The points of access to the PUREX Storage Tunnels are inspected to ensure warning signs are in place, visible, and legible.

This page intentionally left blank.

OFFICIAL USE ONLY

This information has been identified as **Official Use Only**.

Official Use Only (OUO) information is certain unclassified information that may be exempt from public release under the Freedom of Information Act (FOIA) and has the potential to damage governmental, commercial, or private interests if disseminated to persons who do not need to know the information to perform their jobs or other DOE-authorized activities.

Per the U.S. Department of Energy's Official Use Only Policy and DOE Order 471.3, Administrative Change 1, "Identifying and Protecting Official Use Only Information" and DOE M 471.3.1 Administrative Change 1, "Manual for Identifying and Protecting Official Use Only Information," the following document and associated changes is granted confidentiality and is exempt from public review:

Title: Addendum J: Contingency Plan

OFFICIAL USE ONLY

This information is exempt from public inspection and copying.

WASTE TREATMENT AND IMMOBILIZATION PLANT

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have a "**Last Modification Date**" which represents the last date the portion of the unit has been modified. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Last modification to Waste Treatment and Immobilization Plant **March 01, 2017**

Chapters	Last Modification Date	Modification Number
Unit-Specific Conditions	03/01/2017	8C.2016.Q4
1.0 Part A Form	09/2008	
2.0 Topographic Map	09/2007	
3.0 Waste Analysis Plan	06/2011	
3A Waste Treatment Plant Waste Analysis Plan	03/2007	
3B Quality Assurance Project Plan for Waste Analysis Plan	03/2007	
4.0 Process Information	06/20/2016	8C.2016.4F
4A Figures and Drawings	08/2012	
4C Compliance with Uniform Building Code Seismic Design Requirements	11/17/2008	
4D Pretreatment Facility	12/15/2016	8C.2016.Q3
4E Low-Activity Waste Vitrification Facility	12/15/2016	8C.2016.Q3
4F High-Level Waste Vitrification Facility	12/15/2016	8C.2016.Q3
4G Direct-Feed Low-Activity Waste (Effluent Management Facility) [Reserved]	12/15/2016	8C.2016.Q3
4H Analytical Laboratory	12/15/2016	8C.2016.Q3
4I Balance of Facilities	12/15/2016	8C.2016.Q3
5.0 Reserved		
6.0 Procedures to Prevent Hazards	08/2011	
6A Inspection Schedules	08/2011	
7.0 Contingency Plan	08/2011	
7A Emergency Response Plan	06/2011	
8.0 Personnel Training	06/2011	
9.0 Reserved		
10.0 Reserved		
11.0 Closure Plan	03/01/2017	8C.2016.Q4
11A Sampling and Analysis Plan for Closure of WTP Facility	05/23/2016	8C.2016.Q1
12.0 Reporting and Recordkeeping	08/2011	

WASTE TREATMENT AND IMMOBILIZATION PLANT

CHANGE CONTROL LOG

Appendices	Last Modification Date	Modification Number
Appendices 1: WTP Interim Compliance Schedule	09/30/2015	8C.2015.Q3
Appendices 2: Critical Systems for the WTP	03/2014	
Appendices 3: Reserved		
Appendices 4: Reserved		
Appendices 5: Reserved		
Appendices 6: Risk Assessment	01/28/2016	8C.2016.1F
Appendices 7: WTP Documents Applicable to all Regulated Areas	06/20/2016	8C.2015.4F
Appendices 8: Pretreatment Facility	09/30/2015	8C.2015.Q3
Appendices 9: Low-Activity Waste Building	03/01/2017	8C.2016.Q4
Appendices 10: High-Level Waste Building	09/30/2015	8C.2015.Q3
Appendices 11: Laboratory Building	03/01/2017	8C.2016.Q4
Appendices 12: Balance of Facilities	09/30/2015	8C.2015.Q3

WASTE TREATMENT AND IMMOBILIZATION PLANT
PART III, OPERATING UNIT GROUP 10 – SPECIFIC CONDITIONS

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
03/01/2017	8C.2016.Q4
12/15/2016	8C.2016.Q3
12/1/2016	8C.2016.7F

This page intentionally left blank.

PART III, OPERATING UNIT GROUP 10 – SPECIFIC CONDITIONS
WASTE TREATMENT AND IMMOBILIZATION PLANT

This page intentionally left blank.

PART III, OPERATING UNIT GROUP 10 – SPECIFIC CONDITIONS
WASTE TREATMENT AND IMMOBILIZATION PLANT

The Waste Treatment and Immobilization Plant (WTP) is the operating treatment and storage unit designed to treat the mixed (radioactive and dangerous) waste currently stored in underground tanks at the Hanford Site. Once the mixed waste is received at the WTP, it will be separated into High-level and Low-activity waste streams in the Pretreatment Building. The waste streams are then transferred to either the High-level Waste Building or the Low-Activity Waste Building, mixed with glass forming additives and heated to 950-1250°C in melters, and then poured into containers. As the containerized waste cools, it is immobilized in the glass matrix. Once the waste is immobilized, the container is finished (i.e. provided with a lid and decontaminated), and then transported from the WTP for disposal.

III.10.A COMPLIANCE WITH APPROVED PERMIT

The Permittees shall comply with all requirements set forth in the Hanford Facility RCRA Dangerous Waste Permit including all approved modification. All chapters, subsection, files, tables, addendums, and appendices included in the following unit-specific Conditions are enforceable in their entirety. In the event that a Unit-Specific Condition conflicts with Permit Conditions in Parts I or II of this Permit, the Unit-Specific Conditions shall prevail.

Where information regarding treatment, management, and disposal of the radioactive source, byproduct material, special nuclear material (as defined by the Atomic Energy Act of 1954, as amended) and/or the radionuclide component of mixed waste has been incorporated into this permit, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit and chapter 70.105 RCW. In the event of any conflict between Permit Condition III.10.A and any statement relating to the regulation of source, special nuclear, and byproduct material contained in portions of the permit application that are incorporated into this permit, Permit Condition III.10.A will prevail.

OPERATING UNIT GROUP 10

Addendum A	Part A, Form 3 Permit Application, Revision 1 (October 2008)
Addendum B	Waste Analysis Plan
	Addendum B1 Waste Treatment Plant Waste Analysis Plan
	Addendum B2 Quality Assurance Project Plan for Waste Analysis Plan
Addendum C	Process Information
	Addendum C1 Engineering Figures
	Addendum C2 Supplement 1 RPP-WTP Compliance with Uniform Building Code Seismic Design
Addendum D	Groundwater Monitoring (RESERVED)
Addendum E	Procedures to Prevent Hazards
	Addendum E1 Inspection Schedule
Addendum F	Contingency Plan
	Addendum F1 RPP-WTP Emergency Response Plan
Addendum G	Personnel Training
Addendum H	Closure
Appendix 1.0	Compliance Schedule

Appendix 2.0	Critical Systems
Appendix 3.0	RESERVED
Appendix 4.0	RESERVED
Appendix 5.0	RESERVED
Appendix 6.0	Risk Assessment
Appendix 6.0, §6.1	Environmental Risk Assessment Work Plan
Appendix 6.0, §6.1.1	Previously Submitted Preliminary Risk Assessment Work Plan
Appendix 6.0, §6.1.2	Documentation of Revisions to Preliminary Risk Assessment Work Plan
Appendix 6.0, §6.2	Final Risk Assessment Work Plan
Appendix 6.0, §6.3	Pre-Demonstration Test Risk Assessment Report (RESERVED)
Appendix 6.0, §6.3.1	Basis and Assumptions (RESERVED)
Appendix 6.0, §6.4	Final Risk Assessment Report (RESERVED)
Appendix 6.0, §6.4.1	Basis and Assumptions (RESERVED)
Appendix 7.0	WTP Documents Applicable to All Regulated Areas
Appendix 7.0, §7.1	Process Flow Diagrams
Appendix 7.0, §7.2	Piping and Instrumentation Diagrams & Related Documents
Appendix 7.0, §7.3	System Description Documentation (RESERVED)
Appendix 7.0, §7.4	General Arrangement Drawings (RESERVED)
Appendix 7.0, §7.5	Civil, Structural, and Architectural Criteria and Typical Design Details
Appendix 7.0, §7.6	Mechanical Drawings (RESERVED)
Appendix 7.0, §7.7	Specifications
Appendix 7.0, §7.8	Engineering Calculations (RESERVED)
Appendix 7.0, §7.9	Material Selection and Corrosion Evaluation Documentation
Appendix 7.0, §7.10	Critical Systems Equipment/Instrument List (RESERVED)
Appendix 7.0, §7.11	IQRPE Reports
Appendix 7.0, §7.12	Installation Plans
Appendix 7.0, §7.13	Instrument Control Logic and Narrative Description (RESERVED)
Appendix 7.0, §7.14	Descriptions of Instrument Installation and Testing Procedures (RESERVED)
Appendix 7.0, §7.15	Operating Documents
Appendix 8.0	Pretreatment Building
Appendix 8.0, §8.1	Process Flow Diagrams
Appendix 8.0, §8.2	Piping and Instrumentation Diagrams
Appendix 8.0, §8.3	System Description Documentation (RESERVED)
Appendix 8.0, §8.4	General Arrangement Drawings
Appendix 8.0, §8.5	Civil, Structural, and Architectural Criteria and Typical Design Details

Appendix 8.0, §8.6	Mechanical Drawings
Appendix 8.0, §8.7	Specifications
Appendix 8.0, §8.8	Engineering Calculations
Appendix 8.0, §8.9	Material Selection and Corrosion Evaluation Documentation
Appendix 8.0, §8.10	Critical Systems Equipment/Instrument List
Appendix 8.0, §8.11	IQRPE Reports
Appendix 8.0, §8.12	Installation Plans (RESERVED)
Appendix 8.0, §8.13	Instrument Control Logic and Narrative Description
Appendix 8.0, §8.14	Descriptions of Instrument Installation and Testing Procedures (RESERVED)
Appendix 8.0, §8.15	Operating Documents (RESERVED)
Appendix 9.0	LAW Building
Appendix 9.0, §9.1	Process Flow Diagrams
Appendix 9.0, §9.2	Piping and Instrumentation Diagrams
Appendix 9.0, §9.3	System Description Documentation (RESERVED)
Appendix 9.0, §9.4	General Arrangement Drawings
Appendix 9.0, §9.5	Civil, Structural, and Architectural Criteria and Typical Design Details
Appendix 9.0, §9.6	Mechanical Drawings
Appendix 9.0, §9.7	Specifications
Appendix 9.0, §9.8	Engineering Calculations
Appendix 9.0, §9.9	Material Selection and Corrosion Evaluation Documentation
Appendix 9.0, §9.10	Critical Systems Equipment /Instrument List
Appendix 9.0, §9.11	IQRPE Reports
Appendix 9.0, §9.12	Installation Plans (RESERVED)
Appendix 9.0, §9.13	Instrument Control Logic, and Narrative Description
Appendix 9.0, §9.14	Descriptions of Instrument Installation and Testing Procedures (RESERVED)
Appendix 9.0, §9.15	Demonstration Test Plan (RESERVED)
Appendix 9.0, §9.16	Demonstration Test Report (RESERVED)
Appendix 9.0, §9.17	Treatment Effectiveness Report (RESERVED)
Appendix 9.0, §9.18	Operating Documents
Appendix 10.0	HLW Building
Appendix 10.0, §10.1	Process Flow Diagrams
Appendix 10.0, §10.2	Piping and Instrumentation Diagrams
Appendix 10.0, §10.3	System Description Documentation (RESERVED)
Appendix 10.0, §10.4	General Arrangement Drawings
Appendix 10.0, §10.5	Civil, Structural, and Architectural Criteria and Typical Design Details

Appendix 10.0, §10.6	Mechanical Drawings
Appendix 10.0, §10.7	Specifications
Appendix 10.0, §10.8	Engineering Calculations
Appendix 10.0, §10.9	Material Selection and Corrosion Evaluation Documentation
Appendix 10.0, §10.10	Critical Systems Equipment/Instrument List
Appendix 10.0, §10.11	IQRPE Reports
Appendix 10.0, §10.12	Installation Plans (RESERVED)
Appendix 10.0, §10.13	Instrument Control Logic and Narrative Description
Appendix 10.0, §10.14	Descriptions of Instrument Installation and Testing Procedures (RESERVED)
Appendix 10.0, §10.15	Demonstration Test Plan (RESERVED)
Appendix 10.0, §10.16	Demonstration Test Report (RESERVED)
Appendix 10.0, §10.17	Treatment Effectiveness Report (RESERVED)
Appendix 10.0, §10.18	Operating Documents
Appendix 11.0	Laboratory Building
Appendix 11.0, §11.1	Process Flow Diagrams
Appendix 11.0, §11.2	Piping and Instrumentation Diagrams
Appendix 11.0, §11.3	System Description Documentation (RESERVED)
Appendix 11.0, §11.4	General Arrangement Drawings
Appendix 11.0, §11.5	Civil, Structural, and Architectural Criteria and Typical Design Details
Appendix 11.0, §11.6	Mechanical Drawings
Appendix 11.0, §11.7	Specifications (RESERVED)
Appendix 11.0, §11.8	Engineering Calculations
Appendix 11.0, §11.9	Material Selection and Corrosion Evaluation Documentation
Appendix 11.0, §11.10	Critical Systems Equipment/Instrument List
Appendix 11.0, §11.11	IQRPE Reports
Appendix 11.0, §11.12	Installation Plans (RESERVED)
Appendix 11.0, §11.13	Instrument Control Logic and Narrative Description
Appendix 11.0, §11.14	Descriptions of Instrument Installation and Testing Procedures (RESERVED)
Appendix 11.0, §11.15	Operating Documents (RESERVED)
Appendix 12.0	Balance of Facilities
Appendix 12.0, §12.1	Process Flow Diagrams (RESERVED)
Appendix 12.0, §12.2	Piping and Instrumentation Diagrams (RESERVED)
Appendix 12.0, §12.3	System Description Documentation (RESERVED)
Appendix 12.0, §12.4	General Arrangement Drawings (RESERVED)

Appendix 12.0, §12.5	Civil, Structural, and Architectural Criteria and Typical Design Details (RESERVED)
Appendix 12.0, §12.6	Mechanical Drawings (RESERVED)
Appendix 12.0, §12.7	Specifications (RESERVED)
Appendix 12.0, §12.8	Engineering Calculations (RESERVED)
Appendix 12.0, §12.9	Material Selection and Corrosion Evaluation Documentation (RESERVED)
Appendix 12.0, §12.10	Critical Systems Equipment/Instrument List (RESERVED)
Appendix 12.0, §12.11	IQRPE Reports (RESERVED)
Appendix 12.0, §12.12	Installation Plans (RESERVED)
Appendix 12.0, §12.13	Instrument Control Logic and Narrative Description (RESERVED)
Appendix 12.0, §12.14	Descriptions of Instrument Installation and Testing Procedures (RESERVED)
Appendix 12.0, §12.15	Operating Documents (RESERVED)

Facility-Specific Definitions

The following definitions are specific to the WTP Unit:

Ash: means a measure of the contribution of particulate matter from the melter feeds to the melter off-gas, as determined by representative sampling and analysis of the melter feed using ASTM MethodD-482, or an equivalent method.

Batch: refers to waste staged in one DST designated as mixed waste for transfer to the WTP Unit for treatment.

Continuous monitoring system: means using a device which continuously samples the regulated parameter specified on Permit Tables III.10.H.F, III.10.I.F, III.10.J.F, and III.10.K.F, with the exception of pressure, without interruption, evaluates the detector response at least once every fifteen (15) seconds and computes and records the average value at least every sixty (60) seconds, except during allowable periods of calibration and except as defined otherwise by the CEMS Performance Specifications in 4B and 8A in Appendix B, 40 CFR Part 60. For the parameter pressure, the term "continuous monitoring system" means using a device that continuously samples the pressure without interruption and evaluates the detector response without averaging at least once each second and records the value at least every sixty (60) seconds. In addition, if the AWFCO is engaged due to a pressure exceedance, the pressure value must be recorded.

Cascade event: means when additional waste feed cut-off parameter set points deviate outside the limits specified in Permit Tables III.10.H.F, III.10.I.F, III.10.J.F, and III.10.K.F after waste feed is cut-off, but while waste or waste residues are being managed in HLW and LAW.

Critical System: as applied to determining whether a Permit Modification is required, means those specific portions of a treatment, storage, and disposal (TSD) unit's structure, or equipment, whose failure could lead to the release of dangerous waste into the environment, and/or systems which include processes which treat, transfer, store, or dispose of regulated wastes. A list identifying the critical systems for the WTP is included in Appendix 2.

Dangerous and/or mixed waste management unit: means dangerous and/or mixed waste management units, areas, systems, and sub-systems as defined in Permit Tables III.10.D.A, III.10.E.A through D, III.10.F.A, III.10.G.A, III.10.H.A, III.10.I.A, III.10.J.A, and III.10.K.A.

Dioxin/furan" and "dioxins and furans: means tetra-, penta-, hexa-, hepta-, and octa-chlorinated dibenzo dioxins and furans.

HLW Vitrification System: is defined as specified on Permit Tables III.10.J.A and B, and III.10.K.A and B.

Hourly rolling average or HRA: will mean the arithmetic mean of the sixty (60) most recent one-minute readings recorded by the continuous monitoring system.

LAW Vitrification System: is defined as specified on Permit Tables III.10.H.A and B, and III.10.I.A and B.

Mode of operation: means operation of the LAW Vitrification System or the HLW Vitrification System within set limits for each operating parameter specified in Permit Tables III.10.H.D and F (for LAW) and Permit Tables III.10.I.D and F (for HLW).

One-minute average: means the average of detector responses calculated at least every sixty (60) seconds from responses obtained at least every fifteen (15) seconds.

Permittees: means the United States Department of Energy (owner/operator) and Bechtel National, Inc. (Co-operator).

Pretreatment Plant Miscellaneous Unit Systems: is defined as specified on Permit Tables III.10.G.A and B.

Primary sump: means any pit or reservoir that meets the WAC 173-303-040 definition of "tank," and those troughs/trenches connected to it, that serve to collect dangerous/hazardous waste, deliberately introduced (e.g., from decontamination or treatment activities), for transport to TSD facilities.

Rolling average: means the average of all one-minute averages over the averaging period.

Secondary sump: means any pit or reservoir that meets the WAC 173-303-040 definition of "tank," and those troughs/trenches connected to it, that serve to collect dangerous/hazardous waste, not deliberately introduced (e.g., from spills, leaks, or overflows), for transport to TSD facilities.

Secondary mixed waste stream: means treatment residues and materials derived from the treatment of mixed waste which continue to designate as a dangerous, extremely hazardous, or acutely hazardous waste and contains a radioactive component.

Standard operating procedure or SOP: will mean a written description of the procedures by which a process, equipment, etc. will be operated. An SOP may be written by the manufacturer and/or the Permittees.

Successful completion of the demonstration test: will mean operations including a minimum of three test runs without significant interruptions (i.e., once initiated, each test run must be continuous, and the samples have been preserved and maintained intact, and one in which sampling of exhaust gas was representative of the LAW Vitrification System or HLW Vitrification System Operations, whichever is applicable, and adequate to achieve evaluation of PODCs destruction and removal efficiency (DRE) to 99.99%).

TEQ or "toxic equivalents": refer to the sum of the weighted potencies of 7 polychlorinated dibenso-p –dioxins (PCDDs), 10 polychlorinated dibensofurans (PCDFs), and 12 dioxin-like (coplanar) polychlorinated biphenyl (PCBs), relative to a reference compound, 2, 3, 7, 8 – tetrachlorodibenzo-p-dioxin (2, 3, 7, 8 –TCDD).

Pre-process: means prior to introduction into a dangerous or mixed waste management unit at the WTP Unit.

In-process: means duration of a waste in a dangerous or mixed waste management unit at the WTP Unit.

Post-process: means prior to the introduction into a subsequent dangerous or mixed waste management unit at the WTP Unit or prior to shipment from the WTP Unit.

Vendor information: means documentation prepared by a vendor (e.g., catalog cut sheets) for plant items that are routinely manufactured and stocked by vendors (i.e., items that are considered "off the shelf") and are not being procured in accordance with Permittees' engineering drawings and specifications. Documentation such as catalog cut sheets will be annotated to specify selected items which meet Permittee's procurement requirements equipment specification. Documentation associated with "one of a kind", custom items, and commercial grade items (e.g., bulk pipe, valves) that will be procured in accordance with the Permittees engineering drawings and specifications is not considered vendor information. Changes to the drawings and specifications may require a permit modification.

Vitrification System Shutdown: means emergency and planned shutdowns of the vitrification system as defined in the operating procedure(s).

Vitrification System Startup: means startup of the vitrification system as defined in operating procedure(s).

FACILITY-SPECIFIC ACRONYMS

The following acronyms are specific to the WTP Unit:

AWFCO	Automatic Waste Feed Cut-off
CDR	Construction Deficiency Report
CEMS	Continuous Emissions Monitoring System
CMS	Continuous Monitoring System
CNP	Cesium Nitric Acid Recovery Process System
CRP	Cesium Resin Addition Process System
CPE	Cathodic Protection Electrical System
CXP	Cesium Ion Exchange Process System
DFETP	Dioxin and Furan Emission Test Plan
DRE	Destruction and Removal Efficiency
Dscf	Dry standard cubic feet
ERP	Emergency Response Plan
FEP	Waste Feed Evaporation Process System
FRP	Waste Feed Receipt Process System
HCP	HLW Concentrate Receipt Process System
HDH	HLW Canister Decontamination Handling System
HEH	HLW Canister Export Handling System
HEME	High Efficiency Mist Eliminator
HEPA	High Efficiency Particulate Air Filter
HFH	HLW Filter Cave Handling System
HFP	HLW Melter Feed Process System
HLP	HLW Lag Storage and Feed Blending Process System
HLW	High-level Waste

HMH	HLW Melter Handling System
HMP	HLW Melter Process System
HOP	HLW Vit Primary Offgas Treatment System
HPH	HLW Canister Pour Handling System
HSH	HLW Melter Cave Support Handling System
IHLW	Immobilized High-Level Waste (Glass)
ILAW	Immobilized Low-Activity Waste (Glass)
IQRPE	Independent, qualified, registered, professional engineer
LAB	WTP Laboratory Building
LAW	Low Activity Waste
LCP	LAW Concentrate Receipt Process System
LEH	LAW Container Export Handling System
LFH	LAW Canister Finishing Handling System
LFP	LAW Melter Feed Process System
LMH	LAW Melter Handling System
LMP	LAW Melter Process System
LOP	LAW Primary Offgas Process System
LPH	LAW Container Pour Handling System
LSH	LAW Melter Equipment Support Handling System
LSM	Locally Shielded Melter
LVP	LAW Secondary Offgas/Vessel Vent Process System
NCR	Nonconformance Report
PFH	Pretreatment Filter Cave Handling System
PIH	Pretreatment In-Cell Handling System
PJV	Pulse Jet Ventilation System
PODC	Principal Organic Dangerous Constituents
PTF	Pretreatment Building
PVP	Pretreatment Vessel Vent Process System
PVV	Process Vessel Vent System
PWD	Plant Wash and Disposal System
RDP	Spent Resin and Dewatering Process System
RDTP	Revised Demonstration Test Plan
RLD	Radioactive Liquid Waste Disposal System
RPP-WTP	River Protection Project-Waste Treatment Plant
RWH	Radioactive Solid Waste Handling System

SBS	Submerged Bed Scrubber
TCP	Treated LAW Evaporation Process System
TLP	Treated LAW Evaporation System
TOC	Total Organic Carbon
TXP	Technetium Ion Exchange Process System
TEP	Technetium Eluant Recovery Process System
UFP	Ultrafiltration Process System
WESP	Wet Electrostatic Precipitator
WTP	River Protection Project – Waste Treatment and Immobilization Project (also known as the Waste Treatment Plant and Vitrification Plant)
6% Mo	Six Percent Molybdenum Alloy
304L	ASTM A240 Grade 304L Stainless Steel
316L	ASTM A240 Grade 316L Stainless Steel

III.10.A COMPLIANCE WITH APPROVED PERMIT

III.10.B STANDARD CONDITIONS AND GENERAL FACILITY CONDITIONS

In addition to the conditions in this chapter, the Permittees must comply with all the applicable portions of the Dangerous Waste Permit for the Hanford Facility. In the event that a Unit-Specific Condition for the WTP Unit in Permit Conditions III.10.C. through III.10.K. conflicts with a general condition in Permit Conditions I and II of this permit, the Unit-Specific Condition will apply to the WTP Unit.

III.10.C UNIT-SPECIFIC CONDITIONS FOR THE WTP UNIT

III.10.C.1 RESERVED

III.10.C.2 General Waste Management

III.10.C.2.a Treatment or storage of dangerous waste or mixed waste in any new or modified portion of the facility may commence when the Permittees have submitted to Ecology, by certified mail, or hand delivery, a letter signed by the Permittees and a Registered Professional Engineer stating that the facility has been constructed or modified in compliance with the Permit in accordance with WAC 173-303-810(14)(a); and

III.10.C.2.a.i The Permittee has received a Permit modification approval pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f., or III.10.C.2.g., and

III.10.C.2.a.ii Ecology has inspected the modified or newly constructed facility and finds it is in compliance with the conditions of the Permit, or

III.10.C.2.a.iii Within fifteen days, of the date of submission of the Permittees' letter, Ecology has not notified the Permittees of intent to inspect.

III.10.C.2.b The Permittees are authorized to accept the dangerous and/or mixed waste specified in Operating Unit Group 10, Addendum A (Part A Form 3), and Addendum B (Waste Analysis Plan [WAP]).

III.10.C.2.c All dangerous and/or mixed waste must be managed only in areas authorized for dangerous and/or mixed waste management under the Permit conditions, except as allowed under WAC 173-303-200.

The authorized dangerous and/or mixed waste management areas of the WTP Unit are specified in Conditions III.10.D through III.10.K.

III.10.C.2.d Dangerous and/or mixed waste may be transferred from dangerous waste management units within the WTP operating unit to an on-site dangerous waste management unit or an off-site permitted TSD Facility using the manifest/tracking system required by permit condition II.N.

III.10.C.2.e Permit modifications pursuant to this Permit for dangerous and/or mixed waste at the request of the Permittees must be done according to the three tiered modification system specified in WAC 173-303-830(4) and Condition I.C.3. The Permit modification request must include page changes to the Permit, attachments, and permit application supporting documentation necessary to incorporate the proposed permit modification.

III.10.C.2.f In addition to other requirements in WAC 173-303-830, within forty-five (45) days of a permit change (i.e., permit modification) being put into effect or approved, the Permittees will provide copies of the Permit attachments to incorporate the change (if not already reflected in the change pages submitted in the original permit modification request). This submittal does not require re-certification in accordance with WAC 173-303-810(13).

III.10.C.2.g Permit modifications pursuant to Operating Unit Group 10, Appendix 1.0 will be prepared and issued pursuant to WAC 173-303-830(3)(a)(ii) and WAC 173-303-840.

III.10.C.2.h The Permittees must complete Compliance Schedule interim requirements as specified in Operating Unit Group 10, Appendix 1.0. If an interim requirement is not completed as specified, the Permittees will, within 14 days, notify Ecology in writing of its non-compliance. The notification will include the following:

III.10.C.2.h.i A description of any portion of the interim requirement completed;

III.10.C.2.h.ii Summaries of any problems affecting timely completion of the interim requirement;

III.10.C.2.h.iii A description of the plans for completing the remaining portion of the interim requirement, including any alternatives;

III.10.C.2.h.iv Projected interim requirement completion date.

III.10.C.2.i RESERVED

III.10.C.2.j RESERVED

III.10.C.2.k RESERVED

III.10.C.2.l During demonstration testing of the LAW Vitrification System and HLW Vitrification System, pursuant to Permit Sections III.10.H. and J., processing of materials in the LAW and HLW Vitrification Systems that would designate as dangerous waste are fully subject to the requirements of this Permit, excluding the melter feed system as identified in Tables III.10.H.A. and III.10.J.A., respectively. This exclusion does not apply to mixed waste.

III.10.C.2.m The Facility Owner will ensure WTP input is provided to the risk budget tool developed in accordance with permit condition III.11.I.5.

III.10.C.2.n The Permittees will submit the following reports, based on the August 2006 mass balance submitted to Ecology (DOE Letter 06-ESQ-081), for Ecology's review and comment/resolution. Updated information to the August 2006 Mass Balance may be used if available and mutually agreed upon by the Permittees and Ecology.

The reports will describe all of the treatment approaches identified in Permit Conditions III.10.C.2.n.i through III.10.C.2.n.v, and will be included in the administrative record.

III.10.C.2.n.i By June 30, 2010, the Permittees will perform an assessment that projects mixed waste constituents and the concentrations that are expected to be contained in each secondary mixed waste stream anticipated to be generated;

III.10.C.2.n.ii By June 30, 2010, the Permittees will identify appropriate LDR treatment standards for each mixed waste stream identified in Permit Condition III.10.C.2.n.i;

III.10.C.2.n.iii By June 30, 2010, the Permittees will identify which mixed waste streams that, from a qualitative risk perspective, reasonably may cause or may significantly contribute to an exceedance of applicable environmental standards at a disposal facility; and

III.10.C.2.n.iv By June 30, 2010, the Permittees will, for the mixed waste streams identified in Permit Condition III.10.C.2.n.iii, identify potential treatment approaches that mitigate their environmental impacts;

III.10.C.2.n.v By December 31, 2015, or 12 months prior to cold commissioning of the facility producing the waste, whichever is earlier, the Permittees will, for the mixed waste streams identified in Permit Condition III.10.C.2.n.iii, select appropriate treatment approaches that mitigate their environmental impacts.

III.10.C.2.o The Facility owner will evaluate all waste streams generated at the WTP for potential exceedances of applicable environmental standards and will ensure all mixed and dangerous waste streams generated at the WTP will not cause an exceedance of applicable environmental standards at an appropriate disposal facility on-site and is subject to the following requirements:

III.10.C.2.o.i ILAW glass will be engineered to be compliant with the disposal facility Waste Acceptance Criteria (WAC). The waste feed and ILAW glass recipes will be verified to be compliant with the permitted glass formulations (including planning for pertinent operating parameters) prior to vitrification.

III.10.C.2.o.ii Treatment methods for secondary waste streams projected to be generated by the WTP that are slated for disposal at the Hanford Site will be engineered to ensure that treated secondary wastes will comply with the on-site disposal facility WAC and applicable LDRs prior to generation. Prior to treatment, secondary wastes must be evaluated to ensure that selected treatment methods are still appropriate and continue to comply with the on-site disposal facility WAC and applicable LDRs; and

III.10.C.2.o.iii On a case-by-case basis, for any WTP mixed waste that does not meet the WAC for the disposal facility, Ecology will approve or deny acceptance of that waste into the disposal facility. This decision will be based on the disposal facility's WAC and compliance with WAC 173-303-140.

III.10.C.3 Waste Analysis

III.10.C.3.a RESERVED

III.10.C.3.b RESERVED

III.10.C.3.c The Permittees are responsible for obtaining accurate information for each waste stream. Inaccurate waste analysis information provided by the generating site (or unit) is not a defense for noncompliance by the Permittees with conditions of this Permit.

III.10.C.3.d Records and results of waste analyses conducted under the WAP will be maintained in accordance with Permit Condition II.I.1.

The WTP Unit operating record will include, but not be limited to, information requirements for monitoring in Permit Conditions I.F.1, I.F.2, and I.F.3.

III.10.C.3.e Prior to the initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit to Ecology for review and approval a revised WAP and QAPP pursuant to Conditions III.10.C.2.e and III.10.C.2.f, and the Compliance Schedule in Operating Unit Group 10, Appendix 1.0. The revised WAP and QAPP will include:

III.10.C.3.e.i All the elements listed in WAC 173-303-300(5), and Permit Condition II.D.1.

III.10.C.3.e.ii Requirements that characterization will be performed on the waste feed prior to transfer to the WTP Unit in conformance with the regulatory data quality objectives identified in the Regulatory DQO Optimization Report (24590-WTP-RPT-MGT-04-001, Rev 0), or any other parameters, and the rational for selecting these parameters. Requirements that the following analyses, at a minimum, will be conducted on each new batch prior to waste transfer to the WTP Unit, in accordance with the methods under WAC 173-303-110: Ammonia, pH, metals, organic acids, mercury, cyanide, volatiles, semi-volatiles, PCBs/pesticides, anions, TOC, and compatibility (ASTM Method D5058-90). For the purposes of this Permit Condition, a "new batch" is one that has been sampled and analyzed in accordance with the Regulatory DQO Optimization Report (24590-WTP-RPT-MGT-04-001, Rev 0), and has received no further additions. Further additions require the Permittees to resample and reanalyze, unless an exception is approved by Ecology on a case-by-case basis. Only mixed waste meeting the definition of "new batch", or granted an exception as discussed above, are authorized for transfer to the WTP Unit. Water additions for the purposes of waste transfer are not considered additions for the purposes of this Permit Condition.

III.10.C.3.e.iii Identify and include operating parameters to be monitored/controlled and limitations for these parameters for pre-process, in-process, and post-process operations addressing on a unit specific basis treatment effectiveness, as specified in Tables III.10.E.E through H, III.10.G.C, III.10.H.C, III.10.I.C, III.10.J.C, and III.10.K.C, waste compatibility, safe operation, and compatibility with unit materials of construction. Amend the sampling, analysis, and Quality Assurance/Quality Control (QA/QC) procedures to include these parameters and the monitoring frequency**.**

III.10.C.3.e.iv Requirements that the Permittees will, for Type I (primary) sumps if liquids are detected, and for Type II (secondary) sumps, as defined in Operating Unit Group 10, Addendum C, if liquid levels are outside normal operating parameters, either collect the liquid and return to the treatment process, or designate the sump contents for proper management and disposal prior to removal.

III.10.C.3.e.v For ILAW containers and IHLW canisters, a description of the procedures used for removal of mixed dangerous waste from exterior container surfaces, including a description of how contamination removal will be measured.

III.10.C.3.e.vi Requirement that wastes generated at the WTP Unit meet the receiving authorized TSD facility waste acceptance criteria prior to a waste stream transfer.

III.10.C.3.e.vii The frequency with which analysis of each waste will be reviewed, or repeated, to ensure that the analysis is accurate and current, including requirements and criteria for reevaluation of the sampling and analysis frequency for all waste streams.

III.10.C.3.e.viii Documentation demonstrating methods for obtaining samples of wastes are representative as discussed in WAC 173-303-110(2).

III.10.C.3.e.ix Where applicable, the methods for meeting the additional waste analysis requirements for specific waste management methods, as specified in WAC 173-303-140(4), 173-303-395(1), 173-303-630 through 173-303-695.

III.10.C.3.e.x For waste transferred from other permitted TSDs, the procedures for confirming that each dangerous waste received matches the identity of the waste specified on the accompanying waste profile documentation. This includes the procedure for identifying each waste movement at the Facility.

III.10.C.4 Recordkeeping

III.10.C.4.a The unit specific portion of the Hanford Facility Operating Record will include the documentation specified in Permit Attachment 6, Permit Condition II.I, (applicable to the WTP Unit), and other documentation specified in Operating Unit Group 10. Permit Attachment 6 provides a list of required records, and the methods of submittal for the facility and each unit group.

III.10.C.5 Procedure to Prevent Hazards

III.10.C.5.a The Permittees will design, construct, and operate the WTP Unit in compliance with Operating Unit Group 10, Addendum E, Section 6.1.

III.10.C.5.b The WTP Unit fire protection systems will be constructed to the applicable codes listed in Operating Unit Group 10, Addendum E, Section 6.3.1.4. Prior to the initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will update Operating Unit Group 10, Addendum E, Sections 6.3, 6.4, and 6.5 to be consistent with design details, and resubmit for approval as a permit modification pursuant to Permit Conditions III.10.C.2.e and III.10.C.2.f, and Operating Unit Group 10, Appendix 1.0. In addition to the stand-by diesel generator for the LAW and HLW melters, updated Section 6.4.4. will include descriptions of the essential loads and critical systems supplied with back-up, un-interruptible, and standby power.

III.10.C.5.c The Permittees will inspect the WTP Unit to prevent malfunctions and deterioration, operator errors, and discharges that may cause or lead to the release of dangerous waste constituents to the environment, or a threat to human health. Inspections must be conducted in accordance with the WTP Unit Inspection Schedule, Operating Unit Group 10, Addendum E, Section 6.2, and Addendum E1. Prior to the receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will update and resubmit to Ecology for review and approval Addendum E, Section 6.2 and the Inspection Schedule in Addendum E1 as a permit modification pursuant to Permit Conditions III.10.C.2.e and III.10.C.2.f, and Compliance Schedule in Operating Unit Group 10, Appendix 1.0. The revised schedule will include, but not be limited to the requirements in WAC 173-303-320(2) and III.10.C.5.c.i. through v. below.

III.10.C.5.c.i Detailed dangerous and/or mixed waste management unit specific and general inspection schedules and description of procedures pursuant to WAC 173-303-395(1)(d), 173-303-630(6), 173-303-640(4)(a)(i) and (6), 173-303-670(7)(b) in accordance with 173-303-680(3), and 173-303-695. The inspection schedule will be presented in the form of a table that includes a description of the inspection

requirements, inspection frequency, and types of problems to look for during the inspections.

III.10.C.5.c.ii The proposed locations (scaled drawing with layout) and capabilities of camera(s) (i.e., zoom angles, field of view, etc.) to be used for remote inspections.

III.10.C.5.c.iii Schedule and program description for performing integrity assessments as specified in Permit Conditions III.10.E.9.e.i., III.10.G.10.e.i., III.10.H.5.e.i., III.10.I.1.a.v., III.10.J.5.e.i., and III.10.K.1.a.v.

III.10.C.5.c.iv Inspection schedules for leak detection system and control instrumentation to include, but not limited to, valves pressure devices, flow devices, measuring devices, as specified in Permit Conditions III.10.E.9.e.xi, III.10.F.3.c, and III.10.G.10.e.xii, and Permit Conditions III.10.H.5.f.xvi, and III.10.J.5.f.xvi.

III.10.C.5.c.v Inspection schedule will include inspections for all dangerous and/or mixed waste management units specified in Permit Sections III.10.D, E, F, G, H, I, J, and K.

III.10.C.5.d The Permittees will equip the WTP Unit with the equipment specified in Operating Unit Group 10, Addendum E, as required by Permit Condition II.B.1.

III.10.C.5.e The Permittees will test and maintain the equipment specified in Operating Unit Group 10, Addendums E and E1, as necessary, to assure proper operation in the event of emergency.

III.10.C.5.f The Permittees will maintain access to communications or alarms as provided in the *RPP-WTP Emergency Response Plan*, Operating Unit Group 10, Addendum F1 and Permit Condition II.B.2.

III.10.C.6 Contingency Plan

III.10.C.6.a The Permittees will immediately carry out applicable provisions of Permit Condition II.A.1 and the *RPP-WTP Emergency Response Plan*, Operating Unit Group 10, Addendum F1 whenever there is a release of dangerous and/or mixed waste or dangerous waste constituents, or other emergency circumstance, any of which threatens human health or the environment.

III.10.C.6.b Prior to the initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will update the Contingency Plan and the *RPP-WTP Emergency Response Plan*, Operating Unit Group 10, Addendums F and F1, to be consistent with design details and WAC 173-303-350(3), incorporated by reference, and resubmit as a permit modification pursuant to Permit Conditions III.10.C.2.e and III.10.C.2.f, in compliance with WAC 173-303-350(5)(c), and Operating Unit Group 10, Appendix 1.0.

III.10.C.6.c After initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will review and amend, if necessary, the applicable portions of the Contingency Plan and the *RPP-WTP Emergency Response Plan*, Operating Unit Group 10, Addendums F and F1 in accordance with the provision of WAC 173-303-350(5). The Addendums F and F1 will be amended as a permit modification pursuant to Permit Conditions III.10.C.2.e and III.10.C.2.f.

III.10.C.6.d RESERVED

III.10.C.6.e RESERVED

III.10.C.7 Personnel Training

III.10.C.7.a Prior to the initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will update and resubmit, to Ecology for review and approval, the Training

Program description in Operating Unit Group 10, Addendum G as a permit modification pursuant to Permit Conditions III.10.C.2.e and III.10.C.2.f, and Compliance Schedule in Operating Unit Group 10, Appendix 1.0. The revised Training Program description will include but not be limited to:

III.10.C.7.a.i Detailed unit specific and general Training Program descriptions) as required to demonstrate compliance with WAC 173-303-330 and to include:

III.10.C.7.a.i.A Job titles and descriptions for each dangerous waste management position (e.g. waste designator, waste operator, laboratory technician, etc.);

III.10.C.7.a.i.B Outline of the training program updated to discuss initial, refresher, and on-the-job training; correlated to each dangerous waste management position;

III.10.C.7.a.i.C Table G-1 in Operating Unit Group 10, Addendum G, updated to include the type and amount of introductory, refresher, and on-the-job training required for each dangerous waste management position [WAC 173-303-806(4)(a)(xii)].

III.10.C.7.a.ii Sufficient detail to document that the training and qualification program for all categories of personnel whose activities may reasonably be expected to directly affect emissions from the LAW and HLW Systems, except control room operators, is appropriately consistent with 40 CFR 63.1206(c)(6)(ii), and for control room operators, is appropriately consistent with 40 CFR 63.1206(c)(6)(i) and 63.1206(c)(6)(iii) through 63.1206(c)(6)(vi) [WAC 173-303-680(2)].

III.10.C.7.b The Permittees will ensure that the LAW and HLW Systems are operated and maintained, at all times, by persons who are trained and qualified to perform these and any other duties that may reasonably be expected to directly affect emissions from the LAW and HLW Systems [WAC 173-303-680(2)].

III.10.C.7.c The Permittees will conduct personnel training in accordance with the approved description of the WTP Dangerous Waste Training Plan, Operating Unit Group 10, Addendum G, pursuant to WAC 173-303-330. The Permittees will maintain documents in accordance with Permit Condition II.C.1 and WAC 173-303-330(2) and (3).

III.10.C.7.d RESERVED.

III.10.C.7.e The Permittees will submit, under separate cover, the actual detailed WTP Dangerous Waste Training Plan in accordance with the Compliance Schedule in Operating Unit Group 10, Appendix 1.0. The WTP Dangerous Waste Training Plan will be reviewed for compliance with the outline of the training program in Operating Unit Group 10, Addendum G and requirements of WAC 173-303-330. The Training Plan will be incorporated into the Administrative Record.

III.10.C.8 Closure

III.10.C.8.a The Permittees must conduct closure of the WTP Unit according to the Closure Plan in Operating Unit Group 10, Addendum H, and Permit Condition III.10.C.8. The closure plan will be modified according to provisions of Permit Condition I.C.3.

III.10.C.8.b Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will update and resubmit the Closure Plan, Operating Unit Group 10, Addendum H for approval as a permit modification pursuant to Permit Condition III.10.C.2.g., to be consistent with design details and schedule described in Operating Unit Group 10, Appendix 1.0. The updated Closure Plan must be consistent with the closure performance standards specified in WAC 173-303-610(2)(a)-(b), WAC 173-340 and, in

addition for Containment Buildings, consistent with 40 CFR 264.1102(b) as referenced by WAC 173-303-695.

III.10.C.8.c The Permittees will submit, for Ecology review and approval, an update to the Closure Plan, Operating Unit Group 10, Addendum H, including all documentation required by Permit Condition II.D, within one hundred eighty (180) days prior to commencing partial closure, as a permit modification pursuant to Permit Conditions III.10.C.2.e and III.10.C.2.f.

III.10.C.8.d One hundred eighty (180) days prior to commencing final closure of Operating Unit Group 10, the Permittees must submit to Ecology, for review and approval, a revised Closure Plan, including all documentation required by Permit Condition II.D, as a permit modification pursuant to Permit Conditions III.10.C.2.e and III.10.C.2.f.

III.10.C.8.e RESERVED

III.10.C.8.f To achieve clean closure, the Permittees will remove dangerous waste, dangerous waste constituents, and dangerous waste residues throughout the closing unit and throughout any areas affected by releases from the closing unit to concentrations that do not exceed numeric cleanup levels determined using residential exposure assumptions according to the Model Toxics Control Act (MTCA) Regulations, Chapter 173-340 WAC and all structures, equipment, bases, liners, and other materials containing or contaminated with dangerous waste, constituents, or residues have met specific waste removal and decontamination standards approved by Ecology, in accordance with WAC 173-303-610(2)(b)(i)-(ii).

III.10.C.8.g RESERVED.

III.10.C.8.h Documentation supporting the independent registered professional engineer's certification of closure must be submitted to Ecology with the closure certification required by WAC 173-303-610(6). In addition to the items in Operating Unit Group 10, Addendum H, the documentation must include the following and other information Ecology may request.

III.10.C.8.h.i Sampling procedures that were followed;

III.10.C.8.h.ii Soil and concrete locations that were sampled;

III.10.C.8.h.iii Sample labeling and handling procedures that were followed, including chain of custody procedures;

III.10.C.8.h.iv Description of procedures that were followed to decontaminate concrete or metal to meet the clean closure standards approved by Ecology, in accordance with the closure performance standards of WAC 173-303-610(2)(a)(ii) and in a manner that minimizes or eliminates post-closure escape of dangerous waste constituents, or to achieve a "clean debris surface" as specified in 40 CFR 268.45, Table 1, concrete surfaces, as incorporated by reference in WAC 173-303-140. [WAC 173-303-610(2)(b)(ii)].

III.10.C.8.h.v Laboratory and field data, including supporting QA/QC summary;

III.10.C.8.h.vi Report that summarizes closure activities;

III.10.C.8.h.vii Copy of all field notes taken by the independent registered professional engineer; and

III.10.C.8.h.viii Copy of all contamination survey results.

III.10.C.9 Critical Systems

III.10.C.9.a The WTP Unit critical systems, as defined in the definition section of Operating Unit 10 and are identified in Operating Unit Group 10, Appendix 2.0.

III.10.C.9.b As the design proceeds, Ecology will modify this Permit for reasons described in the WAC 173-303-830(3) to add additional systems to the Critical Systems in Operating Unit Group 10, Appendix 2.0.

III.10.C.9.c The Permittees will conduct all construction subject to this Permit in accordance with the approved designs, plans, and specifications that are required by this Permit, except as specified in Conditions III.10.C.9.d. or III.10.C.9.e. For purposes of Conditions III.10.C.9.d. and III.10.C.9.e., the Ecology representative will be an Ecology construction inspector, project manager, or other designated representative of Ecology.

III.10.C.9.d The Permittees will submit a nonconformance report (NCR) or construction deficiency report (CDR) to the Ecology representative (s), as applicable, within seven (7) calendar days of the Permittees becoming aware of incorporation of minor nonconformance or construction deficiency from the approved designs, plans, and specifications into the construction of critical systems, as defined in the Hanford Site-wide Permit definition section. Such minor nonconformance or construction deficiency will be defined, for the purposes of this Permit Condition, as nonconformance or construction deficiency that is necessary to accommodate proper construction and the substitution or the use of equivalent or superior materials or equipment that do not substantially alter the Permit conditions or reduce the capacity of the facility to protect human health or the environment. Such minor nonconformance or construction deficiency will not be considered a modification of this Permit. If Ecology determines that the nonconformance or construction deficiency is not minor, it will notify the Permittees in writing that a permit modification is required for the deviation and whether prior approval is required from Ecology before work proceeds which affect the nonconforming or construction deficiency item.

III.10.C.9.e The Permittees will formally document, with a nonconformance report (NCR) or construction deficiency report (CDR), as applicable, incorporation of minor nonconformance or construction deficiency from the approved designs, plans, and specifications into the construction of non-critical systems subject to this Permit. Such minor nonconformance or construction deficiency will not be considered a modification of this Permit. All NCR's and CDR's will be maintained in the WTP Unit Operating Record and will be made available to Ecology upon request or during the course of an inspection. If Ecology determines that the nonconformance or construction deficiency is not minor, it will notify the Permittees in writing that a permit modification is required for the deviation and whether prior approval is required from Ecology before work proceeds which affect the nonconforming or construction deficiency item.

III.10.C.9.f For each Critical System identified in Operating Unit Group 10, Appendix 2.0, the Permittees will submit to Ecology for review and approval, following the schedule in Operating Unit Group 10, Appendix 1.0, the information identified in Permit Conditions III.10.D.10., III.10.E.9., III.10.F.7., III.10.G.10., III.10.H.5., and III.10.J.5. Information Ecology determines to incorporate into the Permit will follow the Permit Condition III.10.C.2.g. process, unless stated otherwise within the specific permit condition.

Information Ecology determines necessary to support design basis will be incorporated into the Administrative Record.

III.10.C.9.g Upon completion of the WTP Unit construction subject to this Permit, the Permittees will produce as-built drawings of the project which incorporate the design and construction modifications resulting from all change documentation as well as modifications made pursuant to Permit Conditions III.10.C.2.e., III.10.C.2.f., and III.10.C.2.g. The Permittees will place the as-built drawings into the operating record within twelve (12) months of completing construction.

III.10.C.9.h The Permittees will formally document changes to approved designs, plans, and specifications with design change documentation [e.g., Design Change Notice (DCN), Field Change Request (FCR), Field Change Notice (FCN), Specification Change Notice (SCN), and Supplier Deviation Disposition Request (SDDR)]. All design change documentation will be maintained in the WTP Unit-specific Operating Record and will be made available to Ecology upon request or during the course of an inspection. For any design change documentation affecting any critical systems, the Permittees will provide copies to Ecology within seven (7) calendar days. Identification of critical systems will be included by the Permittees in each WTP Unit-specific dangerous waste permit application, closure plan, or permit modification, as appropriate. If Ecology determines that the design change is not minor, it will notify the Permittees in writing that a permit modification is required for the design change and whether prior approval is required from Ecology before work affected by the design change may proceed.

III.10.C.9.i Ventilation system duct work is not required to be doubly contained within the WTP Unit. However, upon discovery of accumulation of liquids within the duct work, a compliance plan will be submitted within sixty (60) days of discovery to correct the problem.

III.10.C.10 Equivalent Materials

III.10.C.10.a If certain equipment, materials, and administrative information (such as names, phone numbers, addresses, formatting) are specified in this Permit, the Permittees may use equivalent or superior substitutes. Use of such equivalent or superior items within the limits (e.g., ranges, tolerances, and alternatives) already clearly specified in sufficient detail in Operating Unit Group 10, are not considered a Permit modification. However, the Permittees must place documentation of the substitution, accompanied by a narrative explanation and the date the substitution became effective in the operating record within seven (7) days of putting the substitution into effect, and submit documentation of the substitution to Ecology, for approval. Upon review of the documentation of the substitution, if deemed necessary, Ecology may require the Permittees to submit a permit modification in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2.f.

III.10.C.10.b If Ecology determines that a substitution was not equivalent to the original, they will notify the Permittees that the Permittees' claim of equivalency has been denied, of the reasons for the denial, and that the original material or equipment must be used. If the product substitution is denied, the Permittees will comply with the original approved product specification, find an acceptable substitution, or apply for a permit modification in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2.f.

III.10.C.11 Risk Assessment

III.10.C.11.a The Permittees will submit a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f., in accordance with Operating Unit Group 10, Appendix 1.0, to Ecology to incorporate revisions to the "Environmental Risk

Assessment Work Plan, Appendix 6.1. The revised document will be submitted for incorporation into Appendix 6.2 as the Final Risk Assessment Workplan. The Permittee will make revisions in consultation with Ecology to address the comments documented in Operating Unit Group 10, Appendix 6.1 and updated to address the following:

III.10.C.11.a.i EPA guidance for performance of Human Health and Ecological Risk Assessments for Hazardous Waste Combustion Facilities current at the time of the submittal, assuming both residential and non-residential use scenarios;

III.10.C.11.a.ii Toxicity data current at the time of the submittal;

III.10.C.11.a.iii Compounds newly identified or updated emissions data from current waste characterization and emission testing;

III.10.C.11.a.iv Air modeling updated to include stack gas parameters based on most current emissions testing and WTP Unit design;

III.10.C.11.a.v Physical/transport properties of constituents, current at the time of the submittal;

III.10.C.11.a.vi Process Description based on most current WTP Unit design;

III.10.C.11.a.vii Emissions data and all supporting calculations based on most current WTP Unit; and

III.10.C.11.a.viii Update of receptor locations based on land use or land use zoning changes, if any.

III.10.C.11.b Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit for Ecology review and approval as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f., a Pre-Demonstration Test Risk Assessment Report as Appendix 6.3. The Pre-Demonstration Test Risk Assessment Report will address and include the following:

III.10.C.11.b.i Direct and indirect human health and ecological risk assessments performed pursuant to the Final Risk Assessment Work Plan in Permit Condition III.10.C.11.a.

III.10.C.11.b.ii Submittal of projected stack emissions data for Tables III.10.G.D., III.10.H.E., and III.10.J.E. and;

III.10.C.11.b.iii Submittal of the Basis and Assumptions (for incorporation into Appendix 6.3.1) for these emissions, including but not limited to, projected operating conditions, feed-rates, and treatment effectiveness, consistent with information provided and approved pursuant to Permit Conditions III.10.G.6., III.10.G.10., III.10.H.1., III.10.H.5., III.10.J.1., and III.10.J.5.

III.10.C.11.c Within ninety (90) days of Ecology approval of the Demonstration Report(s) submitted pursuant to Permit Condition III.10.H.3.d.i, the Permittees will submit a Final Risk Assessment Report as Operating Unit Group 10, Appendix 6.4, incorporating the emission test results from the Demonstration Report(s). The Final Risk Assessment Report will be prepared in accordance with the Final Risk Assessment Work Plan in Appendix 6.2, (as approved pursuant to Permit Condition III.10.C.11.a), except the following updates are hereby incorporated. The Permittees will also submit with this Final Risk Assessment Report, Permit Tables III.10.G.D. and III.10.I.E. and Operating Unit Group 10, Appendix 6.4.1 (Basis and Assumptions) updated to incorporate the emissions data from this Final Risk Assessment Report(s), as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f.

III.10.C.11.c.i Toxicity data current at the time of the submittal;

III.10.C.11.c.ii Compounds newly identified or updated emissions data from current waste characterization and emission testing;

III.10.C.11.c.iii Air modeling updated to include stack gas parameters based on most current emissions testing;

III.10.C.11.c.iv Physical/transport properties of constituents current at the time of the submittal;

III.10.C.11.c.v Update of receptor locations based on land use or land use zoning changes, if any;

III.10.C.11.c.vi Process description based on current WTP Unit design;

III.10.C.11.c.vii Emissions data and all supporting calculations based on current WTP Unit; and

III.10.C.11.c.viii Data from final risk assessment report pursuant to Permit Condition III.10.C.11.d, if available first, or simultaneously.

III.10.C.11.d Within ninety (90) days of Ecology approval of the Demonstration Report(s) submitted pursuant to Permit Condition III.10.J.3.d.i, the Permittees will submit a Final Risk Assessment Report as Operating Unit Group 10, Appendix 6.4, incorporating the emission test results from the Demonstration Report(s). The Final Risk Assessment Report will be prepared in accordance with the Final Risk Assessment Work Plan in Appendix 6.2, (as approved by Ecology pursuant to Permit Condition III.10.C.11.a), except the following updates are hereby incorporated. The Permittees will also submit with this Final Risk Assessment Report, Permit Tables III.10.G.D. and III.10.K.E. and Operating Unit Group 10, Appendix 6.4.1 (Basis and Assumptions) updated to incorporate the emissions data from this Final Risk Assessment Report, as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f.

III.10.C.11.d.i Toxicity data current at the time of the submittal;

III.10.C.11.d.ii Compounds newly identified or updated emissions data from current waste characterization and emission testing;

III.10.C.11.d.iii Air modeling updated to include stack gas parameters based on most current emissions testing;

III.10.C.11.d.iv Physical/transport properties of constituents current at the time of the submittal;

III.10.C.11.d.v Update of receptor locations based on land use or land use zoning changes, if any;

III.10.C.11.d.vi Process description based on current WTP Unit design;

III.10.C.11.d.vii Emissions data and all supporting calculations based on current WTP Unit; and

III.10.C.11.d.viii Data from final risk assessment report pursuant to Permit Condition III.10.C.11.c, if available first, or simultaneously.

III.10.C.11.e The Final Risk Assessment Report(s) required by Permit Conditions III.10.C.11.c. and III.10.C.11.d. may be combined, or provided separately, as appropriate.

III.10.C.12 RESERVED

III.10.C.13 Remote Data Access

Onsite, unrestricted, twenty-four (24) hour access to key WTP Unit operating data and emissions monitoring data will be provided to Ecology. This onsite, unrestricted access will include providing and maintaining for Ecology only use a computer terminal and printer with access to key WTP Unit operating data bases and emissions monitoring data

bases. This terminal will be equipped with all necessary software and hardware to monitor, retrieve, and trend this data. Additional remote access will be provided on Ecology request if security concerns can be addressed.

III.10.C.14 Interim Period of Operation during Post Demonstration Test Period prior to receiving Ecology approval of the complete Demonstration Test Reports and the Final Risk Assessment Report.

III.10.C.14.a During this Interim Period of Operation, the Permittees are authorized to treat dangerous waste and mixed waste feed meeting the waste acceptance criteria of the Waste Analysis Plan in Addendum B, subject to the following conditions:

III.10.C.14.a.i Obtain receipt of Ecology's approval for the LAW Vitrification System according to Permit condition III.10.H.3.d.iii., prior to receiving dangerous or mixed waste feed into the LAW Vitrification System

III.10.C.14.a.ii Obtain receipt of Ecology's approval for the HLW Vitrification System according to Permit condition III.10.J.3.d.iii., prior to receiving dangerous or mixed waste feed into the HLW Vitrification System

III.10.C.14.a.iii Accept and treat up to 3 million gallons of Hanford tank waste feed in WTP.

III.10.C.15 Support Systems

III.10.C.15.a Mechanical Handling Systems

III.10.C.15.a.i The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., in accordance with the Compliance Schedule, as specified in Operating Unit Group 10, Appendix 1.0, engineering information as specified below, for incorporation into Appendices 9.6, 9.10, 10.6, and 10.10, or into the Administrative Record where noted.

A. System Descriptions for each Mechanical Handling system identified in Permit Table III.10.C.A, for incorporation into the Administrative Record (Compliance Schedule Item 36).

B. Mechanical Handling Diagrams and Mechanical Handling Data Sheets for the following pieces of equipment (Compliance Schedule Item 37):

a. HDH-CRN-00005
b. HEH-CRN-00003
c. HPH-CRN-00001
d. HPH-CRN-00002
e. HSH-CRN-00001
f. HSH-CRN-00014
g. LEH-CRN-00003
h. LPH-CRN-00002
i. HEH-CRN-00001

C. Permit condition III.10.C.15.a. does not require:

a. Additional submittals beyond those described in permit condition III.10.C.15.a.;
b. IQRPE reports for equipment identified in III.10.C.15.a.i (B);
c. Installation inspections for equipment identified in III.10.C.15.a.i(B); and

d. Other inspection, verification, operability, maintenance, or records management beyond that which is specified elsewhere in this permit, for equipment identified in III.10.C.15.a.i (B), or by conditions III.10.C.15.a.ii and III.10.C.15.a.iii.

III.10.C.15.a.ii The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to initial receipt of dangerous waste and/or mixed waste in the WTP Unit, engineering information as identified below for incorporation into Appendices 9.13, 9.18, 10.13, and 10.18.

A. Equipment instrument logic narrative description related to safe operation of equipment covered by III.10.C.15.a.i(B), including but not limited to allowed travel path for bridge and trolley, upper and lower hook travel limits, two-blocking prevention, hook load limits, wire rope misreeling, and overspeed protection (Compliance Schedule Item 38).

B. Descriptions of operational procedures demonstrating appropriate controls and practices are in place to ensure equipment covered by III.10.C.15.a.i.(B) will be operated in a safe and reliable manner that will not result in damage to regulated tank systems, miscellaneous unit systems, or canisters of vitrified waste (Compliance Schedule Item 39).

III.10.C.15.a.iii Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., the following for incorporation into Addendum C: Updated Narrative Description and figures for all Mechanical Handling Systems identified in Permit Table III.10.C.A., to include but not limited to travel path, fail safe conditions, fail safe logic control, safety features and controls that minimize the potential for release of dangerous/mixed waste during normal operations, and lifting and/or load capabilities of each crane specified in III.10.C.15.a.i.(B).

Tables III.10.C.A – Mechanical Handling Systems		
Pretreatment Building		
	Pretreatment Filter Cave Handling System	PFH
	Pretreatment In-Cell Handling System	PIH
	Radioactive Solid Waste Handling System	RWH
Low-Activity Waste Building		
	Radioactive Solid Waste Handling System	RWH
	LAW Melter Equipment Support Handling System	LSH
	LAW Container Pour Handling System	LPH
	LAW Container Finishing Handling System	LFH
	LAW Melter Handling System	LMH
	LAW Canister Export Handling System	LEH
High-Level Waste Building		
	HLW Melter Cave Support Handling System	HSH
	HLW Canister Export Handling System	HEH
	HLW Filter Cave Handling System	HFH
	HLW Canister Pour Handling System	HPH

	HLW Canister Decontamination Handling System	HDH
	HLW Melter Handling System	HMH
	Radioactive Solid Waste Handling System	RWH

III.10.D CONTAINERS

III.10.D.1 Container Storage Areas and Storage Limits

III.10.D.1.a The Permittees may store dangerous and/or mixed waste meeting the waste acceptance criteria for containerized waste in the WAP, Operating Unit Group 10, Addendum B, (as approved pursuant to Permit Conditions III.10.C.3. and III.10.C.2), for storage in dangerous and/or mixed waste container storage units identified in Tables III.10.D.A through C.

III.10.D.1.b The Permittees may store containerized dangerous and mixed waste only in container storage areas listed in Permit Tables III.10.D.A (as approved/modified pursuant to Permit Condition III.10.D.10.), in accordance with Permit Section III.10.D, and in accordance with Operating Unit Group 10, Chapters 1.0 and 4.0, and Appendices 9.4, 9.5, 9.7, 9.8, 9.9, 9.18, 10.4, 10.5, 10.7, 10.8, 10.9, 10.18, 12.4, 12.5, 12.7, 12.8, 12.9, and 12.15, as approved pursuant to Permit Conditions III.10.D.10.b. through d. The Permittees will limit the total volume of waste to quantities specified for the individual container storage areas listed in Permit Table III.10.D.A.

III.10.D.1.c The Permittees must maintain a free volume (i.e., free volume = total capacity of containment system minus volume occupied by equipment and containers within containment systems) within containment systems identified in Permit Tables III.10.D.B and III.10.D.C (as approved/modified pursuant to Permit Condition III.10.D.10.), equal to ten percent (10%) of the total volume of dangerous and mixed waste stored within the containment system, or the volume of the largest container stored within the containment system, whichever is greater.

III.10.D.1.d The Permittees will maintain documentation in the operating record for each container storage area listed in Permit Table III.10.D.A (as approved/modified pursuant to Permit Condition III.10.D.10.), in accordance with WAC 173-303-380.

III.10.D.1.e For the purpose of determining compliance with container storage area capacity limits and containment system requirements, every waste container will be considered to be full.

III.10.D.1.f RESERVED

III.10.D.2 Container Storage Areas Design and Construction

III.10.D.2.a The Permittees will construct container storage areas identified in Permit Tables III.10.D.A through III.10.D.C, as specified in all applicable drawings and specifications in Operating Unit Group 10, Appendices 9.4, 9.5, 9.7, 9.8, 9.9, 10.4, 10.5, 10.7, 10.8, 10.9, 12.4, 12.5, 12.7, 12.8, and 12.9, as approved pursuant to Permit Condition III.10.D.10.b.

III.10.D.2.b RESERVED

III.10.D.2.c All container storage areas identified in Permit Tables III.10.D.A through III.10.D.C (as approved/modified pursuant to Permit Condition III.10.D.10.), must be constructed to protect containers from contact with accumulated liquids (e.g., leaks, spills, precipitation,

fire water, liquids from damaged or broken pipes) [WAC 173-303-630(7)(a)(i) and WAC 173-303-630(7)(c)(ii)].

III.10.D.2.d Modifications to approved design, plans, and specifications for the container storage areas identified in Permit Tables III.10.D.A through III.10.D.C must be made in accordance with Permit Conditions III.10.C.2.e., f., and g, or III.10.C.9.d, e., and h.

III.10.D.3 Container Storage Area Installation

III.10.D.3.a RESERVED

III.10.D.3.b The Permittees will obtain and place in the WTP Unit operating record, within thirty (30) days of completion of each container storage area identified in Permit Tables III.10.D.A, through III.10.D.C (as approved/modified pursuant to Permit Condition III.10.D.10.), written statements by a qualified, installation inspector or a qualified registered, professional engineer, attesting that these areas were installed in compliance with WAC 173-303-630(7)(a), (b), and (c) [WAC 173-303-630(7), WAC 173-303-806(4)(b)(i)].

III.10.D.4 Container Management Practices

III.10.D.4.a RESERVED

III.10.D.4.b The Permittees will manage all waste in container storage areas identified in Permit Tables III.10.D.A through III.10.D.C (as approved/modified pursuant to Permit Condition III.10.D.10.), in accordance with procedures described in Operating Unit Group 10, Addendum C, Appendices 9.18, 10.18, and 12.15, as approved pursuant to Permit Condition III.10.D.10.c, and the following conditions:

III.10.D.4.b.i The operating records and waste tracking procedures will indicate all times at which containerized dangerous and mixed waste were removed from and returned to designated staging, storage, segregation, and treatment areas as approved pursuant to Permit Condition III.10.D.10.c.vi. (WAC 173-303-380).

III.10.D.4.b.ii The physical arrangement (i.e., spacing) of dangerous and mixed waste containers will be as specified in WAC 173-303-630(5)(c), except for the immobilized LAW containers and IHLW waste canisters, which must be as described in Operating Unit Group 10, Addendum C, Sections 4E.1.2.1, 4F.1.2.1, as updated pursuant to Permit Condition III.10.D.10.c.i.

III.10.D.4.b.iii All container storage areas must be operated to protect containers from contact with accumulated liquids resulting from leaks, spills, or precipitation [WAC 173-303-630(7)(a)(i) and (c)(ii)].

III.10.D.4.b.iv At all times, the Permittees will place and store ignitable and/or reactive dangerous and/or mixed waste in accordance with the procedures described in Operating Unit Group 10, Appendix 8.15, 9.18, 10.18, 11.15 and 12.15, as approved pursuant to Permit Condition III.10.D.10.c.xi.

III.10.D.4.b.v At all times, the Permittees will place and store incompatible dangerous and/or mixed waste in accordance with the procedures described in Operating Unit Group 10, Appendix 8.15, 9.18, 10.18, 11.15, and 12.15, as approved pursuant to Permit Condition III.10.D.10.c.xii.

III.10.D.4.b.vi At all times, storage containers holding dangerous and/or mixed waste that contain free liquids and/or exhibit either the characteristic of ignitability or reactivity as described in WAC 173-303-090(5) or (7), must be provided with a containment

system in accordance with WAC 173-303-630(7)(a)(i) through (iii) [WAC 173-303-630(7)(c)].

III.10.D.4.b.vii At all times, containers holding dangerous and/or mixed waste in container storage areas must be closed, except when it is necessary to add or remove waste [WAC 173-303-630(5)(a)].

III.10.D.4.b.viii At all times, containers holding dangerous and/or mixed waste must not be opened, handled, or stored in a manner which may rupture the container or cause it to leak [WAC 173-303-630(5)(b)].

III.10.D.4.b.ix A storage container holding a dangerous and/or mixed waste that is incompatible, as defined in WAC 173-303-040, with any waste or other materials stored nearby in other containers, piles, open tanks, or surface impoundments must be separated from the other waste or materials or protected from them by means of a dike, berm, or wall. [WAC 173-303-630(9)(c)].

III.10.D.4.b.x If a container holding dangerous and/or mixed waste is not in good condition (e.g., exhibits severe rusting, apparent structural defects, or any other condition that could lead to container rupture or leakage) or is leaking, the Permittees will manage the container in accordance with procedures described in Operating Unit Group 10, Appendices 8.15, 9.18, 10.18, 11.15, and 12.15, as approved pursuant to Permit Condition III.10.D.10.c.viii. [WAC 173-303-630(2)].

III.10.D.4.b.xi RESERVED

III.10.D.4.b.xii The Permittees will ensure that all containers used for dangerous and/or mixed waste management, are made of or lined with materials which will not react with and are otherwise compatible with the waste to be stored [WAC 173-303-630(4)].

III.10.D.4.b.xiii Except for lab packs assembled in compliance with WAC 173-303-161 requirements, the Permittees will not place incompatible wastes, or incompatible wastes and materials, in the same container, unless WAC 173-303-395(1)(b) is complied with [WAC 173-303-630(9)(a)].

III.10.D.4.b.xiv The Permittees will not place dangerous and/or mixed waste in an unwashed container that previously held an incompatible waste or material [WAC 173-303-630(9)(b)].

III.10.D.5 Identification of Containers and Container Storage Areas

III.10.D.5.a Pursuant to WAC 173-303-630(3), the Permittees will ensure that all dangerous and/or mixed waste containers (except as otherwise specified in Operating Unit Group 10, Addendum C, Sections 4D.1.3, 4E.1.3, 4F.1.3, 4H.1.3, 4I.1.3, as updated pursuant to Permit Condition III.10.D.10.c.i., for containers of ILAW and IHLW) are labeled in a manner that adequately identifies the major risk(s) associated with the contents. For purposes of container labeling, major risk(s) could include but are not limited to the following:

III.10.D.5.a.i PERSISTENT (if a WP01 or WP02 waste code);

III.10.D.5.a.ii TOXIC (if a WT01, WT02, or D waste code other than D001, D002, or D003);

III.10.D.5.a.iii IGNITABILITY (if a D001 and other waste codes);

III.10.D.5.a.iv CORROSIVE (if a D002 and other waste codes);

III.10.D.5.a.v REACTIVE (if a D003 and other waste codes).

III.10.D.5.b For all dangerous and mixed waste containers (except as otherwise specified in Operating Unit Group 10, Addendum C, Sections 4D.1.3, 4E.1.3, 4F.1.3, 4H.1.3, 4I.1.3, as updated pursuant to Permit Condition III.10.D.10.c.i., for containers of ILAW and canisters of IHLW), the Permittees will ensure that:

III.10.D.5.b.i Labels are not obscured or otherwise unreadable;

III.10.D.5.b.ii Waste containers are oriented so as to allow inspection of the labels identified in Permit Conditions III.10.D.5.a and III.10.D.5.b, the container tracking number, and, to the extent possible, any labels which the generator placed upon the container; and

III.10.D.5.b.iii Empty dangerous and mixed waste containers, as defined by WAC 173-303-160(2), must have their dangerous and/or mixed waste labels destroyed or otherwise removed immediately upon being rendered empty.

III.10.D.5.c The Permittees will post entrances and access points to all ILAW containers and IHLW canister storage areas, and any other areas where containers of ILAW and IHLW are handled, with signs that, in addition to meeting the requirements of WAC 173-303-310(2)(a), clearly identify the major risk(s) associated with the containers of ILAW and IHLW.

III.10.D.6 **Containment Systems**

Containerized dangerous and mixed waste, and other materials that are incompatible, will not be staged, segregated, or stored within the same containment system as identified in Permit Table III.10.D.C., as approved/modified pursuant to Permit Condition III.10.D.10. (e.g., metal pan, concrete berm, portable containment system) [WAC 173-303-630(9)(c)].

III.10.D.6.a The integrity of containment systems identified in Permit Table III.10.D.C. (as approved/modified pursuant to Permit Condition III.10.D.10.) must be maintained so that cracks, gaps, loss of integrity, deterioration, corrosion, or erosion of containment pads, joints in containment pads, berms, curbs, trenches, sumps, and coatings are repaired in accordance with Operating Unit Group 10, Addendum E, as approved/modified pursuant to Permit Conditions III.10.D.10.c.vii., III.10.C.5.b., and III.10.C.5.c. [WAC 173-303-320, WAC 173-303-630(7)(a)(i)].

III.10.D.6.b An impermeable coating, as specified in Operating Unit Group 10, Appendices 9.4, 9.5, 9.7, 9.8, 9.9, 10.4, 10.5, 10.7, 10.8, 10.9, 12.4, 12.5, 12.7, 12.8, and 12.9 will be maintained for all concrete containment systems and will meet the following performance standards [WAC 173-303-630(7)(a)]:

III.10.D.6.b.i The coating must seal the containment system surface such that no cracks, seams, or other pathways through which liquid could migrate are present;

III.10.D.6.b.ii The coating must be of adequate thickness and strength to withstand the normal operation of equipment and personnel within the given area such that degradation or physical damage to the coating or lining can be identified and remedied before waste could migrate from the containment system; and

III.10.D.6.b.iii The coating must be compatible with the waste managed in the containment system.

III.10.D.6.c The Permittees must inspect all containment systems specified in Permit Table III.10.D.C in accordance with the inspection schedules and requirements in Operating Unit Group

10, Addendum E, as approved/modified pursuant to Permit Conditions III.10.D.10.c.vii. and III.10.C.5.c, and take the following actions if liquid is detected in these containment systems:

III.10.D.6.c.i Remove the liquid from the containment system in accordance with procedures described in Operating Unit Group 10, Addendum E, (as modified pursuant to Permit Conditions III.10.C.5.b. and III.10.C.5.c.), Permit Condition III.10.C.6.a., and Operating Unit Group 10, Addendum F1 (as modified pursuant to Permit Condition III.10.C.6.b. and III.10.C.6.c.). The liquid removed from containment systems will be managed as dangerous and/or mixed waste, except for liquids from the Non-Radioactive Dangerous Waste Container Storage Area which will be managed as dangerous waste, unless the Permittees demonstrate through designation, (in accordance with WAC 173-303-070, incorporated by reference), that the liquid is no longer dangerous.

III.10.D.6.c.ii Determine the source of the liquid.

III.10.D.6.c.iii If the source of the liquid is determined to be a leak in a container, the Permittees must follow the procedures specified in Permit Condition III.10.D.4.b.x.

III.10.D.6.c.iv The Permittees must take action to ensure the incident that caused liquid to enter the containment system will not reoccur.

III.10.D.6.c.v The Permittees will document in the WTP Unit operating record actions/procedures taken to comply with i. through iv. above in accordance with WAC 173-303-630(6).

III.10.D.6.c.vi The Permittees will notify and report releases to the environment to Ecology in accordance with Permit Condition III.10.C.6.a.

III.10.D.7 Inspections

III.10.D.7.a The Permittees will inspect the container storage areas in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E of this Permit, as modified pursuant to Permit Condition III.10.C.5.c.

III.10.D.7.b The inspection data for the container storage areas will be recorded, and the records will be placed in the WTP Unit operating record in accordance with Permit Condition III.10.C.4.

III.10.D.8 Recordkeeping (WAC 173-303-380)

For the container storage areas, the Permittees will record and maintain in the WTP Unit operating record, all monitoring, recording, maintenance, calibration, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Condition III.10.C.4. and III.10.C.5.

III.10.D.9 Closure

The Permittees will close the container storage areas identified in Permit Tables III.10.D.A through III.10.D.C in accordance with Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

III.10.D.10 Compliance Schedules

III.10.D.10.a All information identified for submittal to Ecology in III.10.D.10.b. through III.10.D.10.d. of this compliance schedule must be signed in accordance with requirements in WAC 173-303-810(12).

III.10.D.10.b The Permittees will submit to Ecology, consistent with the schedule described in Operating Unit Group 10, Appendix 1.0, for review and approval, prior to construction of container storage area and associated containment systems as identified in Permit Tables III.10.D.A and III.10.D.B respectively, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 9.4, 9.5, 9.7, 9.8, 9.9, 10.4, 10.5, 10.7, 10.8, 10.9, 12.4, 12.5, 12.7, 12.8, and 12.9 of this Permit. In order to incorporate engineering information specified below into Operating Unit Group 10, Appendices 9.4, 9.5, 9.7, 9.8, 9.9, 10.4, 10.5, 10.7, 10.8, 10.9, 12.4, 12.5, 12.7, 12.8, and 12.9, Permit Condition III.10.C.2.g. process will be followed. At a minimum, container storage area and containment system drawings and specifications will show the following pursuant to WAC 173-303-806(4)(b):

III.10.D.10.b.i Design drawings (General Arrangement Drawings - in plan) and specifications including references to specific building codes (e.g., UBC, ASCE) for each container storage areas' foundation and associated containment system. These items should show basic design parameters and dimensions, and location of the container storage areas and associated containment systems; how containment system design promotes positive drainage control (such as a locked drainage valve) to prevent release of contaminated liquids and so that uncontaminated liquids can be drained promptly for convenience of operation; capacity of the containment system relative to the volume of the largest container to be stored; how the base underlying the containers is sloped (i.e., floor slopes to sumps) or the containment system is otherwise designed and operated to drain and remove liquids resulting from leaks, spills, or other liquids, or how containers are kept from contact with standing liquids in the containment system (i.e., elevated or are otherwise protected); for container storage areas without associated containment systems, a description of how the storage area is designed or operated to drain and remove liquids or how containers are kept from contact with standing liquids;

III.10.D.10.b.ii Containment systems materials selection documentation (including, but not limited to, materials of construction, coatings and liner materials for concrete portions of containment systems);

III.10.D.10.b.iii Sketches, drawings, or data demonstrating compliance with WAC 173-303-630(8) (location of buffer zone and containers holding ignitable or reactive waste) and WAC 173-303-630(9)(c) (location of incompatible waste), where applicable;

III.10.D.10.b.iv Submit Permit Table III.10.D.B. completed to provide for all containment systems, the information as specified in each column heading, consistent with information to be provided in III.10.D.10.b.i. through iii. above.

III.10.D.10.c Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will update and submit to Ecology, consistent with the schedule described in Operating Unit Group 10, Appendix 1.0, for review and approval, the following, as specified below, for incorporation into Operating Unit Group 10, Addendum C, and Appendices 9.18, 10.18, and 12.15, except Permit Condition III.10.D.10.c.vii., which will be incorporated into Operating Unit Group 10, Addendum E. In order to incorporate the following information (specified below) into Operating Unit Group 10, Appendix 9.18, 10.18, and 12.15, Permit Condition III.10.C.2.g. will be followed. All information provided under this permit condition must be consistent with information provided pursuant to Permit Conditions III.10.D.10.b., III.10.D.10.c., and III.10.D.10.d. as approved by Ecology, and will include at a minimum, the following information as required pursuant to WAC 173-303-630 and WAC 173-303-340:

III.10.D.10.c.i Operating Unit Group 10, Addendum C, Narrative Descriptions, updated;

III.10.D.10.c.ii Descriptions of procedures for addition and removal of waste from containers;

III.10.D.10.c.iii Descriptions of procedures for opening and closing of containers, including any inspections performed prior to opening;

III.10.D.10.c.iv Descriptions of procedures for handling and transport of containers within the WTP Unit;

III.10.D.10.c.v Description of the tracking system used to track containers throughout the WTP Unit pursuant to WAC 173-303-380. The tracking system, at a minimum, will do the following:

A. Track the location of containers within the WTP Unit;

B. Track which containers have been shipped off-facility and/or off-site, and to where they have been shipped;

C. For containers intended for transport off-site, include information in accordance with the requirements specified in WAC 173-303-190(3)(b);

D. Record the date container is placed in the container storage area;

E. Record the nature of the waste in any given container, including dangerous waste designation codes, any associated land disposal restriction treatment requirements, and the major risk(s) associated with the waste (as described in Permit Conditions III.10.D.5.a. and III.10.D.5.c.).

III.10.D.10.c.vi Descriptions of procedures for container spacing, stacking, and labeling pursuant to WAC 173-303-630(3), WAC 173-303-630(5)(c), WAC 173-303-340(3), WAC 173-303-630(6);

III.10.D.10.c.vii Descriptions of procedures for investigating container storage areas and investigating and repairing containment systems [WAC 173-303-320, WAC 173-303-630(6)];

III.10.D.10.c.viii Descriptions of procedures for responding to damaged (e.g., severe rusting, apparent structural defects) or leaking containers [WAC 173-303-630(2)];

III.10.D.10.c.ix Descriptions of operational procedures demonstrating how accumulated liquids can be analyzed and removed from containment systems to prevent overflow [WAC 173-303-806(4)(b)(i)(E)];

III.10.D.10.c.x For portable containment systems, vendor information, design drawings, or sketches showing the following information. These items will include as a minimum basic design parameters, dimensions, and materials of construction; how the design promotes positive drainage control (such as a locked drainage valve) to prevent release of contaminated liquids and so that uncontaminated liquids can be drained promptly for convenience of operation; how the base underlying the containers is sloped (i.e., floor slopes to sumps) or the containment system is otherwise designed and operated to drain and remove liquids resulting from leaks, spills, or other liquids, or how containers are kept from contact with standing liquids in the containment system (i.e., elevated or are otherwise protected); and capacity of the containment system relative to the volume of the largest container to be stored;

III.10.D.10.c.xi Where ignitable and reactive waste are stored or otherwise managed in containers, a description of the procedures used to ensure compliance with WAC 173-303-630(8)(a) and (b);

III.10.D.10.c.xii Where incompatible waste are stored or otherwise managed in containers, a description of the procedures used to ensure compliance with WAC 173-303-630(9)(a) and (b), and 173-303-395(1)(b) and (c);

III.10.D.10.c.xiii Submit Permit Table III.10.D.C completed to provide for all portable containment systems, the information as specified in each column heading, consistent with information to be provided in III.10.D.10.c.i. through xii. above;

III.10.D.10.c.xiv Test procedures and results or other documentation or information to show that the waste do not contain free liquids, as applicable.

III.10.D.10.d Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit to Ecology, consistent with the schedule described in Operating Unit Group 10, Appendix 1.0, for review and approval, completed Permit Tables III.10.D.A, III.10.D.B, and III.10.D.C, for incorporation into Operating Unit Group 10, Addendum C, and Appendices 9.18, 10.18, and 12.15 of this Permit. In order to incorporate the information into Operating Unit Group 10, Addendum C, and Appendices 9.18, 10.18, and 12.15 of this Permit, Permit Condition III.10.C.2.g. process will be followed.

Table III.10.D.A –Container Storage/Containment Building Areas Description

Dangerous and Mixed Waste Container Storage Areas	Maximum Capacity Gallons (Solids)(ft^3)[d]	Maximum Operating Volume (Liquid[c])
HLW Vitrification Plant		
IHLW Canister Storage Cave[a] (Room H-0132)	163,599 gal. (21,870 ft^3)	NA
HLW East Corridor El. 0' (Rooms HC-0108/09/10)	183,721 gal. (24,560 ft^3)	NA
HLW Loading Area (Room H-0130)	142,204 gal. (19,010 ft^3)	NA
Other Areas		
Non-Radioactive Dangerous Waste Container Storage Area[b]	56,104 gal. (7,500 ft^3)	RESERVED
Failed Melter Storage Facility (Building 32)[f]	403,947 gal. (54,000 ft^3)	RESERVED
Lab Waste Management Area (Rooms A-0139, A-0139A/B/C/D)	139,586 gal. (18,660 ft^3)	RESERVED
Containment Buildings/Container Storage	**Maximum Capacity Gallons (Solids)(ft^3)[d]**	**Maximum Operating Volume (Liquid[c])**
Pretreatment Plant	RESERVED	RESERVED
P-0123 Pretreatment Hotcell Containment Building	RESERVED	RESERVED
Pretreatment Maintenance Containment Building	RESERVED	RESERVED
PM0124 Hotcell Crane Maintenance Area	RESERVED	RESERVED
P-0121A Spent Resin Dewatering	RESERVED	RESERVED
P-0421A General Filter Room	RESERVED	RESERVED
P-0122A Waste Packaging Area	RESERVED	RESERVED
P-0123A Remote Decontamination Maintenance Cave	RESERVED	RESERVED
P-0124 C3 Workshop	RESERVED	RESERVED
P-0124A C3 Workshop	RESERVED	RESERVED
P-0125 Filter Cask Airlock	RESERVED	RESERVED
P-0125A Filter Cask Area	RESERVED	RESERVED
P-0128A MSM Repair Area	RESERVED	RESERVED
P-0128 Temporary Storage Room	RESERVED	RESERVED
P-0223 Pretreatment Filter Package Maintenance Containment Building		
P-0335 Pretreatment Filter Cave Room	RESERVED	RESERVED

P-0335A Decon Chamber	RESERVED	RESERVED
P-0431A General Filter Room	RESERVED	RESERVED
LAW Vitrification Plant		
L-0112 LAW LSM Gallery Containment Building	RESERVED	RESERVED
LAW Container Finishing Containment Building	RESERVED	RESERVED
L-0109B Swabbing Area Line 2	RESERVED	RESERVED
L-0109C Decontamination Area Line 2	RESERVED	RESERVED
L-0109D Inert Fill Area Line 2	RESERVED	RESERVED
L-0115B Swabbing Area Line 1	RESERVED	RESERVED
L-0115C Decontamination Area Line 1	RESERVED	RESERVED
L-0115D Inert Fill Area Line 1	RESERVED	RESERVED
L-0109E Container Monitoring/Export Area	RESERVED	RESERVED
L-0115E Container Monitoring/Export Area	RESERVED	RESERVED
L-0119B LAW Consumable Import/Export Containment Building	RESERVED	RESERVED
L-0226A LAW C3 Workshop Containment Building	RESERVED	RESERVED
LAW Pour Cave Containment Building	RESERVED	RESERVED
L-B015A Melter 1 Pour Cave	RESERVED	RESERVED
L-B013C Melter 1 Pour Cave	RESERVED	RESERVED
L-B013B Melter 2 Pour Cave	RESERVED	RESERVED
L-B011C Melter 2 Pour Cave	RESERVED	RESERVED
L-B011B Future Melter 3 Pour Cave	RESERVED	RESERVED
L-B009B Future Melter 3 Pour Cave	RESERVED	RESERVED
LAW Buffer Container Containment Building	RESERVED	RESERVED
L-B025C Container Buffer Store	RESERVED	RESERVED
L-B025D Container Rework	RESERVED	RESERVED
HLW Vitrification Plant		
HLW Melter Cave 1 Containment Building:	RESERVED	RESERVED
H-0117 Melter Cave 1		
H-0116B Melter Cave 1 C3/C5 Airlock		
H-0310A Melter Cave 1 Equipment Decon Pit		
HLW Melter Cave 2 Containment Building:	RESERVED	RESERVED
H-0106 Melter Cave 2		
H-0105B Melter Cave 2 C3/C5 Airlock		
H-0304A Melter Cave 2 Equipment Decon Pit		
H-0136 IHLW Canister Handling Cave Containment Building	RESERVED	RESERVED
H-0133 IHLW Canister Swab and Monitoring Cave Containment Building	RESERVED	RESERVED
HLW C3 Workshop Containment Building:	RESERVED	RESERVED
H-0311A C3 Workshop		

H-0311B C3 MSM Maintenance Workshop		
H-0104 HLW Filter Cave Containment Building	RESERVED	RESERVED
H-B032 HLW Pour Tunnel 1 Containment Building	RESERVED	RESERVED
H-B005A HLW Pour Tunnel 2 Containment Building	RESERVED	RESERVED
HLW Waste Handling Area Containment Building:	RESERVED	RESERVED
H-0410B E&I Room		
H0411 Waste Handling Room		
HLW Drum Swabbing and Monitoring Area Containment Building:	RESERVED	RESERVED
H-0126A Crane Maintenance Room		
H-0126B Swabbing and Monitoring Area		
H-B028 Cask Transfer Tunnel		

[a]Capacity is for immobilized glass waste storage.

[b]Capacity is for dangerous and/or mixed waste storage.

[c]All material within the containment systems will be considered waste for the purposes of calculating free volume, where free volume is the amount of space available in containment systems (i.e., free volume = total capacity of containment systems [which includes total capacity of portable containment systems] minus volume occupied by equipment and containers within containment systems).

[d]Gallons converted to cubic feet using a conversion factor of 1 gallon (liquid) x 0.134 = 1ft^3 (rounded to the nearest whole number).

[e]Location and capacities of containers stored within portable containment systems specified on Table III.10.D.C are limited to the dangerous and mixed waste container storage areas and capacities specified above.

[f]The dimension for height (H) is based on the height of the largest waste container stored in the area (i.e., LAW container is 7.5 ft., HLW canister is 15 ft., melters are assumed to be 16 ft., and a B-25 box is 5 ft. – stacked a maximum of two high is 10ft).

Table III.10.D.B – Container Storage Area Containment Systems

Container Storage Areas	Permanent Containment System Description – Drawing #s	Permanent Containment System Sump/Floor Drain ID#	Permanent Containment System Dimensions[a] (ft) & Materials of Construction	Permanent Containment System Capacity (gal) (relative to 10% of the volume of all containers within the container storage area, or 100% of the volume of the largest container, whichever is greater).
Failed Melter Storage Facility (Building 32)	24590-BOF-P1-32-00001, Rev. 2	N/A	45’ x 75” x 16’[b]	403,947 gal. (54,000 ft^3)

[a]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

[b]The dimension for height (H) is based on the height of the largest waste container stored in the area (i.e., LAW container is 7.5 ft., HLW canister is 15 ft., melters are assumed to be 16 ft., and a B-25 box is 5 ft. – stacked a maximum of two high is 10 ft).

Table III.10.D.C – Container Storage Area Portable Containment Systems[a]

Portable Containment System Description – Specifications and Vendor Information	Portable Containment System Container Storage Area(s) Location(s)	Portable Containment System Dimensions[b] (ft) & Materials of Construction	Portable Containment System Capacity (gal) (relative to 10% of the volume of all containers managed within the portable containment system, or 100% of the volume of the largest container, whichever is greater).
RESERVED	RESERVED	RESERVED	RESERVED

[a] Location and capacities of containers stored within portable containment systems specified on this Permit Table are limited to the dangerous and mixed waste container storage areas and capacities specified in Permit Table III.10.D.A.

[b]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

III.10.E TANK SYSTEMS

III.10.E.1 Approved Waste and Storage Limits

III.10.E.1.a The Permittees may store in tank systems all dangerous and/or mixed waste listed in the Part A Forms, Operating Unit Group 10, Addendum A of this Permit and in accordance with the Waste Analysis Plan, Operating Unit Group 10, Addendum B as approved pursuant to Permit Condition III.10.C.3. of this Permit. Total tank system dangerous and/or mixed waste storage at the Facility will not exceed the volume(s) specified in the Part A Form 3 Permit Application, Addendum A of this permit.

III.10.E.1.b The Permittees may store and manage dangerous and/or mixed waste only in approved tank systems listed in Permit Tables III.10.E.A through D, I, K, M, and O, as approved/modified pursuant to Permit Condition III.10.E.9., in accordance with Permit Section III.10.E of this Permit, and in accordance with Operating Unit Group 10, Adendums1.0 and 4.0, and Operating Unit Group 10, Appendices 8.1 through 8.15, 9.1 through 9.14, 9.18, 10.1 through 10.14, 10.18, and 11.1 through 11.15 of this Permit, as approved pursuant to Permit Conditions III.10.E.9.b through e. The Permittees will limit the total volume of waste to quantities specified for the individual units listed in Permit Tables III.10.E.A through D, I, K, M, and O.

III.10.E.1.c The Permittees will manage ignitable and reactive, and incompatible waste in accordance with WAC 173-303-395(1). Any tank system specified in Permit Tables III.10.E.A through D and III.10.E, I, K, M, and O as approved/modified pursuant to Permit Condition III.10.E.9., in which ignitable, reactive, or incompatible waste are managed will meet the requirements specified in WAC 173-303-640(9) and (10).

III.10.E.1.d The Permittees will ensure all certifications required by specialists (e.g., independent, qualified, registered professional engineer; independent corrosion expert; independent, qualified installation inspector; etc.) use the following statement or equivalent pursuant to Permit Condition III.10.C.10 of this Permit:

"I, (Insert Name) have (choose one or more of the following: overseen, supervised, reviewed, and/or certified) a portion of the design or installation of a new tank system or component located at (address), and owned/operated by (name(s)). My duties were: (e.g., installation inspector, testing for tightness, etc.), for the following tank system components (e.g., the tank, venting piping, etc.), as required by the Dangerous Waste Regulations, namely, WAC 173-303-640(3) (applicable paragraphs (i.e., (a) through (g)).

"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 inquiry of those individuals immediately responsible for obtaining the 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."

III.10.E.1.e In all future permit submittals, the Permittees will include tank names with the tank designation (e.g., Process Condensate Vessels located in the RLD System are designated V45028A and V45028B, respectively).

III.10.E.2 Tank System Design and Construction

III.10.E.2.a The Permittees will construct the tank systems identified in Permit Tables III.10.E.A through D, I, K, M, and O, as approved/modified pursuant to Permit Condition III.10.E.9., as specified in Operating Unit Group 10, Appendices 8.1 through 8.14, 9.1

through 9.14, 10.1 through 10.14, and 11.1 through 11.14 of this Permit, as approved pursuant to Permit Conditions III.10.E.9.b., III.10.E.9.c., and III.10.E.9.d.

III.10.E.2.b The Permittees will construct all secondary containment systems identified in Permit Tables III.10.E.A through D, and I through P, as approved/modified pursuant to Permit Condition III.10.E.9., as specified in Operating Unit Group 10, Appendices 8.2, 8.4 through 8.15, 9.2, 9.4 through 9.14, 9.18, 10.2, 10.4 through 10.14, 10.18 and 11.2, 11.4 through 11.15**,** 11.15 of this Permit, as approved pursuant to Permit Conditions III.10.E.9.b., III.10.E.9.c., and III.10.E.9.d.

III.10.E.2.c Modifications to approved design, plans, and specifications in Operating Unit Group 10 of this Permit for the WTP Unit Tank Systems will be allowed only in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g., III.10.C.9.d, e., and h.

III.10.E.2.d The Permittees will maintain construction access to the internal portions of installed tanks with pulse jet mixers until Ecology has provided written approval of the tank system designs for wear allowance pursuant to WAC 173-303-640(3)(a).

III.10.E.2.d.i The Permittees will not install the following tanks in the WTP Unit until Ecology has provided written approval of the tank system designs for wear allowance pursuant to WAC 173-303-640(3)(a):

- Plant Wash Vessel, PWD-VSL-00044.
- Acidic Waste Vessel, RLD-VSL-00007.
- Plant Wash and Drains Vessel, RLD-VSL-00008.
- HLW Feed Receipt Vessel, HLP-VSL-00022.
- HLW Lag Storage Vessels, HLP-VSL-00027A and HLP-VSL-00027B.
- HLW Feed Blend Vessel, HLP-VSL-00028.
- Ultrafiltration Feed Preparation Vessels, UFP-VSL-00001A and UFP-VSL-00001B.
- Ultrafiltration Feed Vessels, UFP-VSL-00002A and UFP-VSL-00002B.

III.10.E.2.d.ii Except where exempted in writing by Ecology on the basis that wear allowance provisions will not be affected, fabrication and assembly of the following tanks and their internal components will be suspended until Ecology has provided written approval of the tank system designs for wear allowance pursuant to WAC 173-303-640(3)(a).

- HLW Feed Receipt Vessel, HLP-VSL-00022.
- HLW Lag Storage Vessels, HLP-VSL-00027A and HLP-VSL-00027B.
- HLW Feed Blend Vessel, HLP-VSL-00028.
- Ultrafiltration Feed Vessels, UFP-VSL-00002A and UFP-VSL-00002B.

III.10.E.3 Tank System Installation and Certification

III.10.E.3.a The Permittees must ensure that proper handling procedures are adhered to in order to prevent damage to the system during installation. Prior to covering, enclosing, or placing a new tank system or component in use, an independent, qualified, installation inspector or an independent, qualified, registered professional engineer, either of whom is trained and experienced in the proper installation of tank systems or components, must inspect the system for the presence of any of the following items:

III.10.E.3.a.i Weld breaks;

III.10.E.3.a.ii Punctures;

III.10.E.3.a.iii Scrapes of protective coatings;

III.10.E.3.a.iv Cracks;

III.10.E.3.a.v Corrosion;

III.10.E.3.a.vi Other structural damage or inadequate construction/installation.

All discrepancies must be remedied before the tank system is covered, enclosed, or placed in use [WAC 173-303-640(3)(c)].

III.10.E.3.b For tank systems or components that are placed underground and that are back-filled, the Permittees must provide a backfill material that is a non-corrosive, porous, homogeneous substance. The backfill must be installed so that it is placed completely around the tank and compacted to ensure that the tank and piping are fully and uniformly supported [WAC 173-303-640(3)(d)].

III.10.E.3.c The Permittees must test for tightness all new tanks and ancillary equipment prior to these components being covered, enclosed, or placed into use. If a tank system is found not to be tight, all repairs necessary to remedy the leak(s) in the system must be performed prior to the tank system being covered, enclosed, or placed in use [WAC 173-303-640(3)(e)].

III.10.E.3.d The Permittees must ensure ancillary equipment is supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction [WAC 173-303-640(3)(f)].

III.10.E.3.e The Permittees must provide the type and degree of corrosion protection recommended by an independent corrosion expert, based on the information provided in Operating Unit Group 10, Appendices 8.9, 8.11, 9.9, 9.11, 10.9, 10.11, 11.9, and 11.11 of this Permit, as approved pursuant to Permit Conditions III.10.E.9.b.i., III.10.E.9.b.iv., III.10.E.9.b.v., III.10.E.9.c.i., III.10.E.9.c.iv., III.10.E.9.c.v., III.10.E.9.d.i., III.10.E.9.d.iv., and III.10.E.9.d.v. or other corrosion protection if the Ecology believes other corrosion protection is necessary to ensure the integrity of the tank system during use of the tank system. The installation of a corrosion protection system that is field fabricated must be supervised by an independent corrosion expert to ensure proper installation [WAC 173-303-640(3)(g)].

III.10.E.3.f Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will obtain, and keep on file in the WTP Unit operating record, written statements by those persons required to certify the design of the tank system and supervise the installation of the tank system in accordance with the requirements of WAC 173-303-640(3)(b), (c), (d), (e), (f), and (g), attesting that each tank system and corresponding containment system listed in Permit Tables III.10.E.A through D and III.10.E.I through P, as approved/modified pursuant to Permit Condition III.10.E.9., were properly designed and installed, and that repairs, pursuant to WAC 173-303-640(3)(c) and (e) were performed [WAC 173-303-640(3)(a) WAC 173-303-640(3)(h)].

III.10.E.3.g The independent tank system installation inspection and subsequent written statements will be certified pursuant to Permit Condition III.10.E.1.d., comply with all requirements of WAC 173-303-640(3)(h) and will consider, but not be limited to, the following tank system installation documentation:

III.10.E.3.g.i Field installation report with date of installation;

III.10.E.3.g.ii Approved welding procedures;

III.10.E.3.g.iii Welder qualifications and certification;

III.10.E.3.g.iv Hydro-test reports, as applicable, in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section VIII, Division 1, American Petroleum Institute (API) Standard 620, or Standard 650 as applicable;

III.10.E.3.g.v Tester credentials;

III.10.E.3.g.vi Field inspector credentials;

III.10.E.3.g.vii Field inspector reports;

III.10.E.3.g.viii Field waiver reports; and

III.10.E.3.g.ix Non-compliance reports and corrective action (including field waiver reports) and repair reports.

III.10.E.4 Integrity Assessments

III.10.E.4.a The Permittees will ensure periodic integrity assessments are conducted on the WTP Unit Tank Systems listed in Permit Tables III.10.E.A through D, I, K, M, and O, as approved/modified pursuant to Permit Condition III.10.E.9., over the term of this Permit as specified in WAC 173-303-640(3)(b), following the description of the integrity assessment program and schedule in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.E.9.e.i. and III.10.C.5.c. Results of the integrity assessments will be included in the WTP Unit operating record until ten (10) years after post-closure, or corrective action is complete and certified, whichever is later.

III.10.E.4.b The Permittees will address problems detected during the tank integrity assessments specified in Permit Condition III.10.E.4.a. following the integrity assessment program in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.E.9.e.i. and III.10.C.5.c.

III.10.E.4.c The Permittees must immediately and safely remove from service any Tank System or secondary containment system which through an integrity assessment is found to be "unfit for use" as defined in WAC 173-303-040, following Permit Conditions III.10.E.5.i.i through iv., vi., and vii. The affected tank system or secondary containment system must be either repaired or closed in accordance with Permit Condition III.10.E.5.i.v. [WAC 173-303-640(7)(e) and (f), WAC 173-303-640(8)].

III.10.E.5 Tank Management Practices

III.10.E.5.a No dangerous and/or mixed waste will be managed in the WTP Unit Tank System unless the operating conditions, specified under Permit Condition III.10.E.5 are complied with.

III.10.E.5.b The Permittees will install and test all process and leak detection system monitoring/instrumentation, as specified in Permit Tables III.10.E.E through H, as approved/modified pursuant to Permit Condition III.10.E.9., in accordance with Operating Unit Group 10, Appendices 8.1, 8.2, 8.14, 9.1, 9.2, 9.14, 10.1, 10.2, 10.14,

11.1, 11.2, and 11.14 of this Permit, as approved pursuant to Permit Conditions III.10.E.9.e.ix. and III.10.E.9.d.x.

III.10.E.5.c The Permittees will not place dangerous and/or mixed waste, treatment reagents, or other materials in the WTP Unit Tank System if these substances could cause the tank system to rupture, leak, corrode, or otherwise fail [WAC 173-303-640(5)(a)].

III.10.E.5.d The Permittees will operate the WTP Unit Tank System to prevent spills and overflows using the description of controls and practices as required under WAC 173-303-640(5)(b) described in Permit Condition III.10.C.5., and Operating Unit Group 10, Appendices 8.15, 9.18, 10.18, and 11.15 of this Permit, as approved pursuant to Permit Condition III.10.E.9.e.iv. [WAC 173-303-640(5)(b), WAC 173-303-806(4)(c)(ix)].

III.10.E.5.e For routinely non-accessible WTP Unit Tank Systems, as specified in Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.E.9.e.vi., the Permittees will mark all routinely non-accessible tank system access points with labels or signs to identify the waste contained in the tanks. The label, or sign, must be legible at a distance of at least fifty (50) feet and must bear a legend that identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the tank system(s). For the purposes of this Permit condition, "routinely non-accessible" means personnel are unable to enter these areas while waste is being managed in them [WAC 173-303-640(5)(d)].

III.10.E.5.f For all tank systems not addressed in Permit Condition III.10.E.5.e., the Permittees will mark all these tank systems holding dangerous and/or mixed waste with labels or signs to identify the waste contained in the tank. The labels, or sign, must be legible at a distance of at least fifty (50) feet, and must bear a legend that identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the tank system(s) [WAC 173-303-640(5)(d)].

III.10.E.5.g The Permittees will ensure that the secondary containment systems for the WTP Unit Tank Systems listed in Permit Tables III.10.E.A through D, I, K, M, and O, as approved/modified pursuant to Permit Condition III.10.E.9., are free of cracks or gaps to prevent any migration of dangerous and/or mixed waste or accumulated liquid out of the system to the soil, ground water, or surface water at any time that waste is in the tank system. Any indication that a crack or gap may exist in the containment systems will be investigated and repaired in accordance with Operating Unit Group 10, Appendices 8.15, 9.18, 10.18, and 11.15 of this Permit, as approved pursuant to Permit Condition III.10.E.9.e.v [WAC 173-303-320, WAC 173-303-640(4)(b)(i), WAC 173-303-640(4)(e)(i)(C), WAC 173-303-640(6), and WAC 173-303-806(4)(c)(vii)].

III.10.E.5.h An impermeable coating, as specified in Operating Unit Group 10, Appendices 8.4, 8.5, 8.7, 8.9, 8.11, 8.12, 9.4, 9.5, 9.7, 9.9, 9.11, 9.12, 10.4, 10.5, 10.7, 10.9, 10.11, 10.12, 11.4, 11.5, 11.7, 11.9, 11.11, and 11.12 of this Permit, as approved pursuant to Permit Condition III.10.E.9.b.v., will be maintained for all concrete containment systems and concrete portions of containment systems for each WTP Unit Tank System listed in Permit Tables III.10.E.A through D and I through P, as approved/modified pursuant to Permit Condition III.10.E.9. Concrete containment systems that do not have a liner and have construction joints, must meet the requirements of WAC 173-303-640(4)(e)(ii)(C)

and -806(4)(c)(vii). The coating will prevent migration of any dangerous and/or mixed waste into the concrete. All coatings will meet the following performance standards:

III.10.E.5.h.i The coating must seal the containment surface such that no cracks, seams, or other avenues through which liquid could migrate are present;

III.10.E.5.h.ii The coating must be of adequate thickness and strength to withstand the normal operation of equipment and personnel within the given area such that degradation or physical damage to the coating or lining can be identified and remedied before dangerous and/or mixed waste could migrate from the system; and

III.10.E.5.h.iii The coating must be compatible with the dangerous and/or mixed waste, treatment reagents, or other materials managed in the containment system [WAC 173-303-640(4)(e)(ii)(D), WAC 173-303-806(4)(c)(vii)].

III.10.E.5.i The Permittees will inspect all secondary containment systems for WTP Unit Tank Systems listed in Permit Tables III.10.E.A through D and I through P, as approved/modified pursuant to Permit Condition III.10.E.9., in accordance with the Inspection Schedule specified in Operating Unit Group 10, Addendum E1 of this Permit, as approved pursuant to Permit Conditions III.10.E.9.e.v. and III.10.C.5., and take the following actions if a leak or spill of dangerous and/or mixed waste is detected in these containment systems [WAC 173-303-320, WAC 173-303-640(5)(c), WAC 173-303-640(6), WAC 173-303-640(7), WAC 173-303-806(4)(a)(v)]:

III.10.E.5.i.i Immediately and safely stop the flow of dangerous and/or mixed waste into the tank system or secondary containment system, in accordance with procedures based on all applicable safety analysis documentation;

III.10.E.5.i.ii Determine the source of the dangerous and/or mixed waste;

III.10.E.5.i.iii Remove the waste from the secondary containment area pursuant to WAC 173-303-640(7)(b). The waste removed from containment areas of WTP Unit Tank Systems will be managed as dangerous and/or mixed waste;

III.10.E.5.i.iv If the cause of the release was a spill that has not damaged the integrity of the tank system, the Permittees may return the tank system to service pursuant to WAC 173-303-640(7)(e)(ii). In such a case, the Permittees will take action to ensure the incident that caused liquid to enter the containment systems of these tank systems will not reoccur [WAC 173-303-320(3);

III.10.E.5.i.v If the source of the dangerous waste and/or mixed waste is determined to be a leak from a primary WTP Unit Tank System, or the system is unfit for use as determined through an integrity assessment or other inspection, the Permittees must comply with the requirements of WAC 173-303-640(7) and take the following actions [WAC 173-303-640(5)(c)]:

A. Close the tank system according to procedures in WAC 173-303-640(7)(e)(i), and Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.; or

B. Repair and re-certify (in accordance with WAC 173-303-810(13)(a) as modified pursuant to Permit Condition III.10.E.1.d.) the tank system in accordance with Operating Unit Group 10, Appendices 8.15, 9.18, 10.18, and 11.15 of this Permit, as approved pursuant to Permit Condition III.10.E.9.e.v. before the tank system is placed back into service [WAC 173-303-640(7)(e) and (f), and WAC 173-303-806(4)(c)(vii)];

III.10.E.5.i.vi The Permittees will document in the operating record actions/procedures taken to comply with III.10.E.5.i.i. through v. above in accordance with WAC 173-303-640(6)(d);

III.10.E.5.i.vii The Permittees will notify and report releases to the environment to Ecology in accordance with WAC 173-303-640(7)(d).

III.10.E.5.j If liquids (e.g., dangerous and/or mixed waste leaks and spills, precipitation, fire water liquids from damaged or broken pipes) cannot be removed from the secondary containment system within twenty-four (24) hours, Ecology will be verbally notified within twenty-four (24) hours of discovery. The notification will provide the information in A, B, and C listed below. The Permittees will provide Ecology with a written demonstration within seven (7) business days, identifying at a minimum [WAC 173-303-640(4)(c)(iv), WAC 173-303-640(7)(b)(ii), WAC 173-303-806(4)(c)(vii)]:

A. Reasons for delayed removal;

B. Measures implemented to ensure continued protection of human health and the environment;

C. Current actions being taken to remove liquids from secondary containment.

III.10.E.5.k The Permittees will operate the WTP Unit Tank System in accordance with Operating Unit Group 10, Addendum C as updated pursuant to Permit Condition III.10.E.9.e.vi. and Appendices 8.15, 9.18, 10.18, and 11.15 of this Permit, as approved pursuant to Permit Condition III.10.E.9.e., and the following:

III.10.E.5.k.i The Permittees will operate the WTP Unit Tank System in order to maintain the systems and process parameters listed in Permit Tables III.10.E.E through H, as approved/modified pursuant to Permit Condition III.10.E.9., within the operating trips and operating ranges specified in Permit Tables III.10.E.E through H, and consistent with assumptions and basis which are reflected in Operating Unit Group 10, Appendix, 6.3.1. as approved pursuant to Permit Condition III.10.C.11.b. [WAC 173-303-815(2)(b)(ii) and WAC 173-303-640(5)(b)]. For the purposes of this permit condition, Operating Unit Group 10, Appendix 6.3.1 will be superseded by Appendix 6.4.1 upon its approval pursuant to either Permit Conditions III.10.C.11.c. or III.10.C.11.d.;

III.10.E.5.k.ii The Permittees will calibrate/function test the instruments listed on Permit Tables III.10.E.E through H in accordance with Operating Unit Group 10, Appendices 8.15, 9.18, 10.18, and 11.15 of this Permit, as approved pursuant to Permit Condition III.10.E.9.e.xi.

III.10.E.5.l Tank systems that have the potential for formation and accumulation of hydrogen gases must be operated to maintain hydrogen levels below the lower explosive limit [WAC 173-303-815(2)(b)(ii)].

III.10.E.5.m For each tank system holding dangerous waste which are acutely or chronically toxic by inhalation, operate the system to prevent escape of vapors, fumes or other emissions into the air [WAC 173-303-640(5)(e), WAC 173-303-806(4)(c)(xii)].

III.10.E.6 Inspections [WAC 173-303-640(6)]

III.10.E.6.a The Permittees will inspect the WTP Unit Tank Systems in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E1 of this Permit, as modified pursuant to Permit Condition III.10.C.5.c.

III.10.E.6.b The inspection data for the WTP Unit Tank Systems will be recorded, and the records will be placed in the WTP Unit operating record, in accordance with Permit Condition III.10.C.4.

III.10.E.7 Recordkeeping (WAC 173-303-380)

For the WTP Unit Tank Systems, the Permittees will record and maintain in the WTP Unit operating record, all monitoring, calibration, recording, maintenance, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Conditions III.10.C.4. and III.10.C.5.

III.10.E.8 Closure

The Permittees will close the WTP Unit Tank Systems in accordance with Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

III.10.E.9 Compliance Schedule

III.10.E.9.a All information identified for submittal to Ecology in b. through e. of this compliance schedule must be signed and certified in accordance with requirements in WAC 173-303-810(12), as modified in accordance with Permit Condition III.10.E.1.d. [WAC 173-303-806(4)].

III.10.E.9.b The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to construction of each secondary containment and leak detection system for the WTP Unit Tank System (per level, per WTP Unit building and outside the WTP Unit buildings) as identified in Permit Tables III.10.E.A through D, J, L, N, and P, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 8.4, 8.5, 8.7, 8.8, 8.9, 8.11, 8.12, 9.4, 9.5, 9.7, 9.8, 9.9, 9.11, 9.12, 10.4, 10.5, 10.7, 10.8, 10.9, 10.11, 11.4, 11.5, 11.7, 11.8, 11.9, and 11.11 of this Permit. At a minimum, engineering information specified below will show the following as required pursuant to WAC 173-303-640 (the information specified below will include dimensioned engineering drawings and information on sumps and floor drains):

III.10.E.9.b.i IQRPE Reports (specific to foundation, secondary containment, and leak detection system) will include review of design drawings, calculations, and other information on which the certification report is based and will include as applicable, but not limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendices 8.0 through 11.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. IQRPE Reports will be consistent with the information separately provided in Permit Conditions III.10.E.9.b.ii. through ix. below. The IQRPE Report(s) (specific to foundation, secondary containment and leak detection system) for the LAW and HLW buildings (-21 foot elevation only) will be submitted with the first IQRPE Report for tanks, identified in Permit Condition III.10.E.9.c.i. [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)];

III.10.E.9.b.ii Design drawings (General Arrangement Drawings in plan) and specifications for the foundation, secondary containment, including, liner installation details, and leak

detection methodology [Note: leak detection systems for areas where daily, direct, or remote visual inspection is not feasible, will be continuous in accordance with WAC 173-303-640(4)(e)(iii)(C)]. These items should show the dimensions, volume calculations, and location of the secondary containment system, and should include items such as floor/pipe slopes to sumps, tanks, floor drains [WAC 173-303-640(4)(b) through (f), WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)];

III.10.E.9.b.iii The Permittees will provide the design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the secondary containment system. This information will demonstrate the foundation will be capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift [WAC 173-303-640(4)(c)(ii), WAC 173-303-806(4)(c)(vii)];

III.10.E.9.b.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil, including factors affecting the potential for corrosion as required under WAC 173-303-640(3)(a)(iii)(B) [WAC 173-303-806(4)(c)(v)];

III.10.E.9.b.v Secondary containment/foundation and leak detection system materials selection documentation (including, but not limited to, concrete coatings and water stops, and liner materials as applicable) [WAC 173-303-806(4)(c)(i)];

III.10.E.9.b.vi Detailed description of how the secondary containment for each tank system will be installed in compliance with WAC 173-303-640(3)(c) [WAC 173-303-806(4)(c)(vi)];

III.10.E.9.b.vii Submit Permit Tables III.10.E.J, L, N, and P, completed to provide for all secondary containment sumps and floor drains, the information as specified in each column heading, consistent with information to be provided in Permit Conditions III.10.E.9.b.i. through vi. above;

III.10.E.9.b.viii Documentation that secondary containment and leak detection systems will not accumulate hydrogen gas levels above the lower explosive limit and in accordance with Appendix 7.15 for incorporation into the Administrative Record [WAC 173-303-340].

III.10.E.9.b.ix A detailed description of how tank system design provides access for conducting future tank integrity assessments [WAC 173-303-640(3)(b), WAC 173-303-806(4)(c)(vi)];

III.10.E.9.c The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to installation of each tank as identified in Permit Tables III.10.E.A through D, and I, K, M, and O engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 8.1 through 8.9, 8.11 through 8.14, 9.1 through 9.9, 9.11 through 9.14, 10.1 through 10.9, 10.11 through 10.14, 11.1 through 11.9, and 11.11 through 11.14 of this Permit. Tanks will include primary sumps. At a minimum, engineering information specified below will show the following as required pursuant to WAC 173-303-640 (the information specified below will include dimensioned engineering drawings):

III.10.E.9.c.i IQRPE Reports (specific to tanks) will include review of design drawings, calculations, and other information on which the certification report is based and will include as applicable, but not limited to, review of such information described below.

Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendices 8.0 through 11.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information separately provided in Permit Conditions III.10.E.9.c.ii. through xii. below and the IQRPE Report specified in Permit Condition III.10.E.9.b.i. [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)];

III.10.E.9.c.ii Design drawings (General Arrangement Drawings in plan , Process Flow Diagrams, Piping and Instrumentation Diagrams [including pressure control systems], Mechanical Drawings) and specifications, and other information, specific to tanks (to show location and physical attributes of each tank) [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i) through (iv)];

III.10.E.9.c.iii The Permittees will provide the design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the tank(s). Structural support calculations specific to off-specification, non-standard, and field fabricated tanks will be submitted for incorporation into the Administrative Record [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)];

III.10.E.9.c.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with water, including factors affecting the potential for corrosion as required under WAC 173-303-640(3)(a)(iii)(B) [WAC 173-303-806(4)(c)(v)];

III.10.E.9.c.v Tank materials selection documentation (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)];

III.10.E.9.c.vi Tank vendor information (including, but not limited to required performance warranties, as available), consistent with information submitted under ii. above, will be submitted for incorporation into the Administrative Record [WAC 173-303-640, and WAC 173-303-806(4)(c)];

III.10.E.9.c.vii System Descriptions related to tanks will be submitted for incorporation into the Administrative Record;

III.10.E.9.c.viii Mass balance for each projected operating condition, including assumptions and formulas used to complete the mass balance, so that they can be independently verified, and will be submitted for incorporation into the Administrative Record;

III.10.E.9.c.ix A detailed description of how the tanks will be installed in compliance with WAC 173-303-640(3)(c), (d), and (e) [WAC 173-303-806(4)(c)(vi)];

III.10.E.9.c.x Submit Permit Tables III.10.E.I, K, M, and O, completed to provide for all primary containment sumps and floor drains, the information as specified in each column heading, consistent with information to be provided in Permit Conditions III.10.E.9.c.i. through ix.;

III.10.E.9.c.xi Documentation that tanks are designed to prevent the accumulation of hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-340];

III.10.E.9.c.xii Documentation that tanks are designed to prevent escape of vapors and emissions of acutely or chronically toxic (upon inhalation) Extremely Hazardous Waste limit and

in accordance with Appendix 7.15 for incorporation into the Administrative Record [WAC 173-303-640(5)(e), WAC 173-303-806(4)(c)(xii)];

III.10.E.9.d The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to installation of ancillary equipment for each tank system, as identified in Permit Tables III.10.E.A, through D, and I through P, not addressed in Permit Condition III.10.E.9.c., engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 8.1 through 8.9, 8.11 through 8.14, 9.1 through 9.9, 9.11 through 9.14, 10.1 through 10.9, 10.11 through 10.14, 11.1 through 11.9, and 11.11 through 11.14 of this Permit. At a minimum, engineering information specified below will show the following as required pursuant to WAC 173-303-640 (the information specified below will include dimensioned engineering drawings):

III.10.E.9.d.i IQRPE Reports (specific to ancillary equipment) will include a review of design drawings, calculations, and other information as applicable, on which the certification report is based. The reports will include, but not be limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 8.0 through 11.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information provided separately in Permit Conditions III.10.E.9.d.ii. through xiii. below and the IQRPE Reports specified in Permit Conditions III.10.E.9.b and III.10.E.9.c. [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)];

III.10.E.9.d.ii Design drawings (Process Flow Diagrams, Piping and Instrumentation Diagrams [including pressure control systems], etc.) specifications (including required performance warranties), and other information specific to ancillary equipment (these drawings should include all equipment such as pipe, valves, fittings, pumps, instruments, etc.) [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i), (iii), (iv)];

III.10.E.9.d.iii The Permittees will provide the design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the ancillary equipment [WAC 173-303-640(3)(a), WAC 173-303-640(3)(f), WAC 173-303-806(4)(c)(i)];

III.10.E.9.d.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil and water, including factors affecting the potential for corrosion as required under WAC 173-303-640(3)(a)(iii)(B) [WAC 173-303-806(4)(c)(v)];

III.10.E.9.d.v Materials selection documentation for ancillary equipment (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), WAC 173-303-806(4)(c)(i)];

III.10.E.9.d.vi Vendor information, consistent with information submitted under ii. above, will be submitted for incorporation into the Administrative Record [WAC 173-303-640, and WAC 173-303-806(4)(c)];

III.10.E.9.d.vii Tank, ancillary equipment, and leak detection system instrument control logic narrative description (e.g., descriptions of fail-safe conditions, etc.);

III.10.E.9.d.viii System Descriptions related to ancillary equipment and system descriptions related to leak detection systems, , for incorporation into the Administrative Record;

III.10.E.9.d.ix A detailed description of how the ancillary equipment will be installed and tested [WAC 173-303-640(3)(c) through (e), WAC 173-303-640(4)(b) and (c), and WAC 173-303-806(4)(c)(vi)];

III.10.E.9.d.x For process monitoring, control, and leak detection system instrumentation for the WTP Unit Tank System as identified in Permit Tables III.10.E.E through H, a detailed description of how the process monitoring, control, and leak detection system instrumentation will be installed and tested [WAC 173-303-640(3)(c) through (e), WAC 173-303-640(4)(b) and (c), WAC 173-303-806(4)(c)(vi)];

III.10.E.9.d.xi Mass balance for projected normal operating condition used in developing the process and instrumentation diagrams, including assumptions and formulas used to complete the mass balance, so that they can be independently verified, for incorporation into the Administrative Record;

III.10.E.9.d.xii Documentation that ancillary equipment is designed to prevent the accumulation of hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-340].

III.10.E.9.d.xiii Leak detection system documentation (e.g. vendor information, etc.) consistent with information submitted under Permit Condition III.10.E.9.c.ii. and Permit Conditions III.10.E.9.d.ii., vii., viii. and x. above, will be submitted for incorporation into the Administrative Record.

III.10.E.9.e Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., the following as specified below for incorporation into Operating Unit Group 10, Appendices 8.15, 9.18, 10.18, 11.15 of this Permit, except Permit Condition III.10.E.9.e.v., which will be incorporated into Operating Unit Group 10, Addendum E of this Permit. All information provided under this permit condition must be consistent with information provided pursuant to Permit Conditions III.10.E.9.b., c., d., and e., III.10.C.3.e., and III.10.C.11.b., as approved by Ecology.

III.10.E.9.e.i Integrity assessment program and schedule for all WTP Unit tanks will address the conducting of periodic integrity assessments on all WTP Unit tanks over the life of the tank, in accordance with III.10.E.9.b.ix. and WAC 173-303-640(3)(b), and descriptions of procedures for addressing problems detected during integrity assessments. The schedule must be based on past integrity assessments, age of the tank system, materials of construction, characteristics of the waste, and any other relevant factors [WAC 173-303-640(3)(b), WAC 173-303-806(4)(c)(vi)];

III.10.E.9.e.ii Detailed plans and descriptions, demonstrating the leak detection system is operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of dangerous and/or mixed waste, or accumulated liquid in the secondary containment system within twenty-four (24) hours [WAC 173-303-640(4)(c)(iii)]. Detection of a leak of at least 0.1 gallons per hour within twenty-four (24) hours is defined as being able to detect a leak within twenty-four (24) hours. Any exceptions to this criteria must be approved by Ecology [WAC 173-303-640(4)(c)(iii), WAC 173-303-806(4)(c)(vii)];

A. Dangerous waste pipe penetrations that require a penetration seal in accordance with the International Building Code (IBC) and DOE-STD-1066, DOE Standard for Fire Protection Design Criteria, or to meet ventilation sealing requirements identified in Table III.10.E.Q, are not required to meet the 0.1 gallons per hour within twenty-four (24) hours leak detection rate for those sections of piping that

are in contact with approved silicone or equivalent low-permeability seal material.

B. Piping on either side of the penetration seal must meet the requirements of III.10.E.9.e.ii.

C. Revisions (including additions or deletions to Table III.10.E.Q will be submitted to Ecology for review and approval pursuant to Conditions III.10.C.2.e and III.10.C.2.f. Addition of penetration seal locations to Table III.10.E.Q. will be approved by Ecology prior to installation of the penetration seals.

Table III.10.E.Q Tank System Penetration Seal Locations

Facility	Room No	Orientation	Discipline	Penetration Sequence No
Reserved	Reserved	Reserved	Reserved	Reserved

III.10.E.9.e.iii Detailed operational plans and descriptions, demonstrating that spilled or leaked waste and accumulated liquids can be removed from the secondary containment system within twenty-four (24) hours [WAC 173-303-806(4)(c)(vii)];

III.10.E.9.e.iv Descriptions of operational procedures demonstrating appropriate controls and practices are in place to prevent spills and overflows from tanks or containment systems in compliance with WAC 173-303-640(5)(b)(i) through (iii) [WAC 173-303-640(5)(b), WAC 173-303-806(4)(c)(ix)];

III.10.E.9.e.v Description of procedures for investigation and repair of tank systems [WAC 173-303-320, WAC 173-303-640(6), WAC 173-303-640(7)(e) and (f), WAC 173-303-806(4)(a)(v), WAC 173-303-806(4)(c)(vii)];

III.10.E.9.e.vi Updated Addendum C, Narrative Descriptions, Tables and Figures as identified in Permit Tables III.10.E.A through D (as modified pursuant to Permit Condition III.10.E.9.e.xii.) and updated to identify routinely non-accessible tank systems;

III.10.E.9.e.vii Description of procedures for management of ignitable and reactive, and incompatible dangerous and/or mixed waste in accordance with WAC 173-303-640(9) and (10) [WAC 173-303-806(4)(c)(x)].

III.10.E.9.e.viii A description of the tracking system used to track dangerous and/or mixed waste throughout the WTP Unit Tank System, pursuant to WAC 173-303-380.

III.10.E.9.e.ix Permit Tables III.10.E.E through H will be completed for WTP Unit Tank System process and leak detection system monitors and instruments (to include but not limited to: instruments and monitors measuring and/or controlling flow, pressure, temperature, density, pH, level, humidity, and emission) to provide the information as specified in each column heading. Process and leak detection system monitors and instruments for critical systems as specified in Operating Unit Group 10, Appendix 2.0 and as updated pursuant to Permit Condition III.10.C.9.b. and for operating parameters as required to comply with Permit Condition III.10.C.3.e.iii. will be addressed. Process monitors and instruments for non-waste management operations (e.g., utilities, raw chemical storage, non-contact cooling waters, etc.) are excluded from this permit condition.

III.10.E.9.e.x Supporting documentation for operating trips and expected operating range as specified in Permit Tables III.10.E.E through H as approved pursuant to Permit Condition III.10.E.9.e.ix.

III.10.E.9.e.xi Documentation of process and leak detection instruments and monitors (as listed in Permit Tables III.10.E.E through H) for the WTP Unit Tank Systems are to include but not be limited to the following:

A. Procurement specifications.

B. Location used.

C. Range, precision, and accuracy.

D. Detailed descriptions of calibration/functionality test procedures (e.g., method number [ASTM]) or provide a copy of manufacturer's recommended calibration procedures.

E. Calibration/functionality test, inspection, and routine maintenance schedules and checklists, including justification for calibration, inspection and maintenance frequencies, criteria for identifying instruments found to be significantly out of calibration, and corrective action to be taken for instruments found to be significantly out of calibration (e.g., increasing frequency of calibration, instrument replacement, etc.).

F. Equipment instrument control logic narrative description (e.g., descriptions of failsafe conditions, etc.), as identified in Permit Tables III.10.E.E through H not addressed in Permit Condition III.10.E.9.d.

III.10.E.9.e.xii Permit Tables III.10.E.A through D amended as follows:

A. Under column 1, update and complete list of dangerous and/or mixed waste tank systems, including plant items that comprise each system (listed by item number).

B. Under column 2, update and complete system designations.

C. Under column 3, replace the 'reserved' with the Operating Unit Group 10, Appendices 8.0, 9.0, 10.0, and 11.0, subsections specific to tank systems as listed in column 1.

D. Under column 4, update and complete list of narrative description tables and figures.

E. Under column 5, update and complete maximum capacity, for each tank.

III.10.E.9.e.xiii Permit Tables III.10.E.I, K, M, and O amended as follows:

A. Under column 1, replace the 'reserved' with the updated and complete list of sump numbers and room location.

B. Under column 2, replace the 'reserved' with the updated and complete maximum sump capacities in gallons.

C. Under column 3, replace the 'reserved' with the updated and complete sump dimensions and materials of construction.

D. Under column 4, replace the 'reserved' with the updated and complete list of engineering descriptions (drawing numbers, specifications, etc.).

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Waste Feed Receipt Process System FRP-VSL-00002A (Waste Feed Receipt Vessel) FRP-VSL-00002B (Waste Feed Receipt Vessel) FRP-VSL-00002C (Waste Feed Receipt Vessel) FRP-VSL-00002D (Waste Feed Receipt Vessel)	FRP	**24590-PTF** -M2-FRP-P0001, Rev 2 -M2-FRP-P0002, Rev 2 -M2-FRP-P0003, Rev 2 -M2-FRP-P0004, Rev 4 -M5-V17T-00003, Rev 2 -M6-FRP-00001001, Rev 0 -M6-FRP-00001002, Rev 0 -M6-FRP-00002001, Rev 0 -M6-FRP-00002002, Rev 0 -M6-FRP-00003001, Rev 0 -M6-FRP-00003002, Rev 0 -M6-FRP-00003003, Rev 0 -M6-FRP-00003004, Rev 0 -M6-FRP-00003005, Rev 0 -M6-FRP-00005001, Rev 0 -M6-FRP-00005002, Rev 0 -M6-FRP-00005003, Rev 0 -M6-FRP-00005004, Rev 0 -M6-FRP-00005005, Rev 0 -M6-FRP-00005006, Rev 0 -M6-FRP-00005007, Rev 0 -M6-FRP-00005008, Rev 0 -M6-FRP-00006001, Rev 0 -M6-FRP-00006002, Rev 0	Section 4D.2.1; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	FRP-VSL-00002A = 472,900 FRP-VSL-00002B = 472,900 FRP-VSL-00002C = 472,900 FRP-VSL-00002D = 472,900

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-FRP-00006003, Rev 0 -M6-FRP-00006004, Rev 0 -M6-FRP-00006005, Rev 0 -M6-FRP-00006006, Rev 0 -M6-FRP-00006007, Rev 0 -M6-FRP-00006008, Rev 0 -M6-FRP-00007001, Rev 0 -M6-FRP-00007002, Rev 0 -M6-FRP-00007003, Rev 0 -M6-FRP-00007004, Rev 0 -M6-FRP-00007005, Rev 0 -M6-FRP-00007006, Rev 0 -M6-FRP-00007007, Rev 0 -M6-FRP-00007008, Rev 0 -M6-FRP-00008001, Rev 0 -M6-FRP-00008002, Rev 0 -M6-FRP-00008003, Rev 0 -M6-FRP-00008004, Rev 0 -M6-FRP-00008005, Rev 0 -M6-FRP-00008006, Rev 0 -M6-FRP-00008007, Rev 0 -M6-FRP-00009001, Rev 0 -M6-FRP-00010001, Rev 0 -M6-FRP-00020001, Rev 0 -M6-FRP-00020002, Rev 0		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-FRP-00020003, Rev 0 -M6-FRP-00020004, Rev 0 -M6-FRP-00020005, Rev 0 -M6-FRP-00020006, Rev 0 -M6-FRP-00020007, Rev 0 -MVD-FRP-00005, Rev 12 -MVD-FRP-00006, Rev 12 -MVD-FRP-00007, Rev 12 -MVD-FRP-00008, Rev 12 -N1D-FRP-00001, Rev 7 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Waste Feed Evaporation Process System FEP-VSL-00005 (Waste Feed Evaporator Condensate Vessel)	FEP	**24590-PTF** -3PS-MEVV-T0001, Rev 2 -M5-V17T-00004001, Rev 3 -M6-FEP-00001001, Rev 1 -M6-FEP-00001002, Rev 0 -M6-FEP-00001003, Rev 0 -M6-FEP-00001004, Rev 0	Section 4D.2.2; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	FEP-VSL-00005 = 5,022 FEP-VSL-00017A = 85,496 FEP-VSL-00017B = 85,496

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
FEP-VSL-00017A (Waste Feed Evaporator Feed Vessel) FEP-VSL-00017B (Waste Feed Evaporator Feed Vessel)		-M6-FEP-00003001, Rev 0 -M6-FEP-00003002, Rev 0 -M6-FEP-00006001, Rev 1 -M6-FEP-00006002, Rev 1 -M6-FEP-00006003, Rev 1 -M6-FEP-00006004, Rev 1 -M6-FEP-00006005, Rev 0 -M6-FEP-00007001, Rev 1 -M6-FEP-00007002, Rev 1 -M6-FEP-00007003, Rev 1 -M6-FEP-00007004, Rev 1 -M6-FEP-00007005, Rev 0 -M6-FEP-00008001, Rev 0 -M6-FEP-00008002, Rev 0 -MVD-FEP-P0001, Rev 2 -MVD-FEP-P0002, Rev 2 -MVD-FEP-00003, Rev 1 -MV-FEP-P0001, Rev 0 -MV-FEP-P0002, Rev 0 -N1D-FEP-00002, Rev 6 -N1D-FEP-P0003, Rev 1 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev. 4		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		24590-WTP -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Ultrafiltration Process System UFP-VSL-00001A (Ultrafiltration Feed Preparation Vessel) UFP-VSL-00001B (Ultrafiltration Feed Preparation Vessel) UFP-VSL-00002A (Ultrafiltration Feed Vessel) UFP-VSL-00002B (Ultrafiltration Feed Vessel) UFP-VSL-00062A (Ultrafilter Permeate Collection Vessel) UFP-VSL-00062B (Ultrafilter Permeate Collection Vessel)	UFP	**24590-PTF** -M5-V17T-00009, Rev 2 -M5-V17T-00011, Rev 2 -M6-UFP-00001001, Rev 0 -M6-UFP-00001002, Rev 0 -M6-UFP-00001003, Rev 0 -M6-UFP-00001004, Rev 0 -M6-UFP-00001005, Rev 0 -M6-UFP-00001006, Rev 0 -M6-UFP-00001007, Rev 0 -M6-UFP-00002001, Rev 0 -M6-UFP-00002002, Rev 0 -M6-UFP-00002003, Rev 0 -M6-UFP-00002004, Rev 0 -M6-UFP-00002005, Rev 0 -M6-UFP-00002006, Rev 0 -M6-UFP-00002007, Rev 1 -M6-UFP-00002008, Rev 0 -M6-UFP-00003001, Rev 0 -M6-UFP-00003002, Rev 0	Section 4D.2.3; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	UFP-VSL-00001A = 75,594 UFP-VSL-00001B = 75,594 UFP-VSL-00002A = 39,629 UFP-VSL-00002B = 40,378 UFP-VSL-00062A = 34,700 UFP-VSL-00062B = 34,700 UFP-VSL-00062C = 34,700 UFP-FILT-00001A= 474 UFP-FILT-00001B = 474 UPF-FILT-00002A = 474

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
UFP-VSL-00062C (Ultrafilter Permeate Collection Vessel) UFP-FILT-00001A (Ultrafilter) UFP-FILT-00001B (Ultrafilter) UFP-FILT-00002A (Ultrafilter) UFP-FILT-00002B (Ultrafilter) UFP-FILT-00003A (Ultrafilter) UFP-FILT-00003B (Ultrafilter) UFP-FILT-00004A (Ultrafilter) UFP-FILT-00004B (Ultrafilter) UFP-FILT-00005A (Ultrafilter) UFP-FILT-00005B (Ultrafilter)		-M6-UFP-00003003, Rev 0 -M6-UFP-00003004, Rev 0 -M6-UFP-00003005, Rev 0 -M6-UFP-00003006, Rev 0 -M6-UFP-00003007, Rev 1 -M6-UFP-00003008, Rev 0 -M6-UFP-00004001, Rev 1 -M6-UFP-00004002, Rev 1 -M6-UFP-00004003, Rev 1 -M6-UFP-00005001, Rev 0 -M6-UFP-00005002, Rev 0 -M6-UFP-00005003, Rev 0 -M6-UFP-00005004, Rev 0 -M6-UFP-00005005, Rev 0 -M6-UFP-00005006, Rev 0 -M6-UFP-00005007, Rev 0 -M6-UFP-00006001, Rev 0 -M6-UFP-00006002, Rev 0 -M6-UFP-00006003, Rev 0 -M6-UFP-00006004, Rev 0 -M6-UFP-00006005, Rev 0 -M6-UFP-00006006, Rev 0 -M6-UFP-00006007, Rev 0 -M6-UFP-00007001, Rev 1 -M6-UFP-00007002, Rev 1		UPF-FILT-00002B = 474 UPF-FILT-00003A = 474 UPF-FILT-00003B = 474 UPF-FILT-00004A = 380 UPF-FILT-00004B = 380 UPF-FILT-00005A = 380 UPF-FILT-00005B = 380

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-UFP-00007003, Rev 1 -M6-UFP-00007004, Rev 1 -M6-UFP-00007005, Rev 1 -M6-UFP-00007006, Rev 1 -M6-UFP-00007007, Rev 1 -M6-UFP-00009001, Rev 0 -M6-UFP-00009002, Rev 0 -M6-UFP-00009003, Rev 0 -M6-UFP-00009004, Rev 0 -M6-UFP-00009005, Rev 0 -M6-UFP-00009006, Rev 0 -M6-UFP-00010001, Rev 0 -M6-UFP-00010002, Rev 0 -M6-UFP-00010003, Rev 0 -M6-UFP-00010004, Rev 0 -M6-UFP-00010005, Rev 0 -M6-UFP-00010006, Rev 0 -M6-UFP-00010007, Rev 0 -M6-UFP-00011001, Rev 0 -M6-UFP-00011002, Rev 0 -M6-UFP-00011003, Rev 0 -M6-UFP-00011004, Rev 0 -M6-UFP-00011005, Rev 0 -M6-UFP-00015001, Rev 0 -M6-UFP-00015002, Rev 0		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-UFP-00016001, Rev 0 -M6-UFP-00017001, Rev 0 -M6-UFP-00021001, Rev 0 -M6-UFP-00021002, Rev 0 -M6-UFP-00022001, Rev 0 -M6-UFP-00022002, Rev 0 -M6-UFP-00027001, Rev 0 -M6-UFP-00027002, Rev 0 -M6-UFP-00027003, Rev 0 -M6-UFP-00027004, Rev 0 -M6-UFP-00027005, Rev 0 -M6-UFP-00027006, Rev 0 -M6-UFP-00027007, Rev 0 -MLD-UFP-P0007, Rev 1 -MVD-UFP-00001, Rev 12 -MVD-UFP-00014, Rev 11 -MVD-UFP-00015, Rev 11 -MVD-UFP-00002, Rev 12 -MVD-UFP-00005. Rev 11 -MVD-UFP-00006, Rev 11 -MVD-UFP-00007, Rev 11 -MV-UFP-00001001, Rev 1 -MV-UFP-00001002, Rev 1 -MV-UFP-00001003, Rev 1 -MV-UFP-00002001, Rev 1		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-MV-UFP-00002002, Rev 1 -MV-UFP-00002003, Rev 1 -MV-UFP-00003, Rev 6 -MV-UFP-00004, Rev 6 -MV-UFP-P0005, Rev 0 -MV-UFP-P0006, Rev 0 -MV-UFP-P0007, Rev 0 -MV-UFP-00016, Rev 3 -MV-UFP-00017, Rev 3 -MV-UFP-00018, Rev 3 -MV-UFP-00028, Rev 1 -MV-UFP-00029, Rev 1 -MV-UFP-00030, Rev 1 -MV-UFP-00031, Rev 1 -N1D-UFP-P0001, Rev 2 -N1D-UFP-P0002, Rev 2 -N1D-UFP-P0003, Rev 5 -N1D-UFP-P0004, Rev 3 -N1D-UFP-P0005, Rev 2 -N1D-UFP-P0008, Rev 2 -N1D-UFP-00009, Rev 0 -P1-P01T-00001, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
HLW Lag Storage and Feed Blending Process System HLP-VSL-00022 (HLW Feed Receipt Vessel) HLP-VSL-00027A (HLW Lag Storage Vessel) HLP-VSL-00027B (HLW Lag Storage Vessel) HLP-VSL-00028 (HLW Feed Blend Vessel)	HLP	**24590-PTF** -M5-V17T-00007, Rev 2 -M5-V17T-00008, Rev 3 -M6-HLP-00001001, Rev 0 -M6-HLP-00001002, Rev 0 -M6-HLP-00001003, Rev 1 -M6-HLP-00001004, Rev 0 -M6-HLP-00002001, Rev 0 -M6-HLP-00002002, Rev 1 -M6-HLP-00003001, Rev 0 -M6-HLP-00003002, Rev 1 -M6-HLP-00003003, Rev 1 -M6-HLP-00005001, Rev 0 -M6-HLP-00005002, Rev 0 -M6-HLP-00005003, Rev 0 -M6-HLP-00005004, Rev 0 -M6-HLP-00005005, Rev 0 -M6-HLP-00005006, Rev 0 -M6-HLP-00005007, Rev 0 -M6-HLP-00006001, Rev 0 -M6-HLP-00006002, Rev 0 -M6-HLP-00006003, Rev 0	Section 4D.2.4; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	HLP-VSL-00022 = 268,800 HLP-VSL-00027A = 127,260 HLP-VSL-00027B = 127,260 HLP-VSL-00028 = 142,200

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-HLP-00006004, Rev 0 -M6-HLP-00006005, Rev 0 -M6-HLP-00006006, Rev 0 -M6-HLP-00006007, Rev 0 -M6-HLP-00007001, Rev 0 -M6-HLP-00007002, Rev 0 -M6-HLP-00007003, Rev 0 -M6-HLP-00007004, Rev 0 -M6-HLP-00007005, Rev 0 -M6-HLP-00007006, Rev 0 -M6-HLP-00007007, Rev 0 -M6-HLP-00009001, Rev 0 -M6-HLP-00009002, Rev 0 -M6-HLP-00009003, Rev 0 -M6-HLP-00010001, Rev 0 -M6-HLP-00010002, Rev 0 -M6-HLP-00010003, Rev 0 -M6-HLP-00027001, Rev 0 -M6-HLP-00027002, Rev 0 -M6-HLP-00027003, Rev 0 -M6-HLP-00027004, Rev 0 -M6-HLP-00027005, Rev 0 -M6-HLP-00027006, Rev 0 -M6-HLP-00028004, Rev 0 -M6-HLP-00028005, Rev 0		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-HLP-00028006, Rev 0 -MVD-HLP-00006, Rev 8 -MVD-HLP-00007, Rev 8 -MVD-HLP-00008, Rev 9 -MVD-HLP-00009, Rev 8 -MV-HLP-00003001, Rev 0 -MV-HLP-00004, Rev 2 -MV-HLP-00005, Rev 2 -MV-HLP-00006, Rev 2 -N1D-HLP-00001, Rev 6 -N1D-HLP-P0003, Rev 1 -N1D-HLP-00007, Rev 6 -N1D-HLP-00010, Rev 6 -P1-P01T-00001, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0003, Rev 3		

Cesium Ion Exchange Process System CXP-VSL-00004 (Cesium Ion Exchange Feed CXP-VSL-00026A (Cesium Ion Exchange Treated LAW Collection Vessel) CXP-VSL-00026B (Cesium Ion Exchange Treated LAW Collection Vessel) CXP-VSL-00026C (Cesium Ion Exchange Treated LAW Collection Vessel) CXP-IXC-00001 (Cesium Ion Exchange Column) CXP-IXC-00002 (Cesium Ion Exchange Column) CXP-IXC-00003 (Cesium Ion Exchange Column) CXP-IXC-00004 (Cesium Ion Exchange Column)	CXP	**24590-PTF** -M5-V17T-00012001, Rev 0 -M5-V17T-00012002, Rev 0 -M5-V17T-00013, Rev 3 -M5-V17T-00025, Rev 1 -M6-CXP-00001002, Rev 1 -M6-CXP-00001003, Rev 1 -M6-CXP-00001004, Rev 2 -M6-CXP-00001006, Rev 0 -M6-CXP-00001007, Rev 0 -M6-CXP-00002001, Rev 1 -M6-CXP-00002002, Rev 1 -M6-CXP-00003001, Rev 1 -M6-CXP-00003002, Rev 1 -M6-CXP-00003003, Rev 0 -M6-CXP-00005001, Rev 1 -M6-CXP-00005002, Rev 1 -M6-CXP-00005003, Rev 1 -M6-CXP-00005004, Rev 0 -M6-CXP-00007, Rev 2 -M6-CXP-000100001, Rev 0 -M6-CXP-000100002, Rev 0 -M6-CXP-000100003, Rev 0 -M6-CXP-000100004, Rev 0 -M6-CXP-00011001, Rev 0 -M6-CXP-00011002, Rev 0 -M6-CXP-00011003, Rev 0 -M6-CXP-00011004, Rev 0 -M6-CXP-00011005, Rev 0	Section 4D.2.5; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	CXP-VSL-00004 = 10,633 CXP-VSL-00026A = 38,000 CXP-VSL-00026B = 38,000 CXP-VSL-00026C = 38,000 CXP-IXC-00001 = 680 CXP-IXC-00002= 680 CXP-IXC-00003 = 680 CXP-IXC-00004 = 680

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-CXP-00011006, Rev 0 -M6-CXP-00011007, Rev 0 -M6-CXP-00012001, Rev 0 -M6-CXP-00012002, Rev 0 -M6-CXP-00012003, Rev 0 -M6-CXP-00012004, Rev 0 -M6-CXP-00013, Rev 2 -MV-CXP-P0002, Rev 0 -MV-CXP-P0008, Rev 0 -MV-CXP-P0009, Rev 0 -MV-CXP-P0010, Rev 0 -MVD-CXP-P0015, Rev 0 -MVD-CXP-P0021, Rev 1 -MVD-CXP-P0022, Rev 1 -MVD-CXP-P0023, Rev 1 -N1D-CXP-P0003, Rev 1 -N1D-CXP-P0007, Rev 1 -P1-P01T-00001, Rev 7 -P1-P01T-00002, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Cesium Nitric Acid Recovery Process System CNP-VSL-00001 (Cesium Evaporator Eluant Lute Pot) CNP-VSL-00003 (Eluate Contingency Storage Vessel) CNP-VSL-00004 (Cesium Evaporator Recovered Nitric Acid Vessel)	CNP	**24590-PTF** -M5-V17T-00014, Rev 2 -M6-CNP-00001001, Rev 0 -M6-CNP-00001002, Rev. 0 -M6-CNP-00001003, Rev. 0 -M6-CNP-00002001, Rev 0 -M6-CNP-00002002, Rev 0 -M6-CNP-00002003, Rev 0 -M6-CNP-00003001, Rev 0 -M6-CNP-00003002, Rev 0 -M6-CNP-00003003, Rev 0 -M6-CNP-00003004, Rev 0 -M6-CNP-00004, Rev 3 -M6-CNP-00005, Rev 2 -MV-CNP-P0001, Rev 1 -MV-CNP-P0002, Rev 1 -MV-CNP-P0005, Rev 0 -MVD-CNP-P0003, Rev 1 -MVD-CNP-P0007, Rev 2 -MVD-CNP-P0010, Rev 0 -N1D-CNP-P0006, Rev 3 -N1D-CNP-P0009, Rev 1 -N1D-CNP-P0011, Rev 1 -P1-P01T-00001, Rev 7	Section 4D.2.6; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	CNP-VSL-00001 = 109 CNP-VSL-00003 = 21,713 CNP-VSL-00004 = 11,115

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Treated LAW Concentrate Storage Process System TCP-VSL-00001 (Treated LAW Concentrate Storage Vessel)	TCP	**24590-PTF** -M5-V17T-00006, Rev 1 -M6-TCP-00001001, Rev 0 -M6-TCP-00001002, Rev 0 -M6-TCP-00001003, Rev 0 -M6-TCP-00002001, Rev 1 -M6-TCP-00002002, Rev 1 -M6-TCP-00002003, Rev 1 -M6-TCP-00002004, Rev 1 -M6-TCP-00002005, Rev 1 -MV-TCP-P0002, Rev 1 -MVD-TCP-P0002, Rev 2 -N1D-TCP-P0001, Rev 2 -P1-P01T-00001, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3	Section 4D.2.12; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	TCP-VSL-00001 = 146,740
Treated LAW Evaporation Process System TLP-VSL-00002 (Treated LAW Evaporator Condensate Vessel)	TLP	**24590-PTF** -3PS-MEVV-T0001, Rev 3 -M5-V17T-00005, Rev 2 -M6-TLP-00001, Rev 3 -M6-TLP-00002001, Rev 0	Section 4D.2.11; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	TLP-VSL-00002 = 2,227 TLP-VSL-00009A = 130,010 TLP-VSL-00009B = 130,010

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
TLP-VSL-00009A (LAW SBS Condensate Receipt Vessel) TLP-VSL-00009B (LAW SBS Condensate Receipt Vessel)		-M6-TLP-00002002, Rev 0 -M6-TLP-00002003, Rev 0 -M6-TLP-00002004, Rev 0 -M6-TLP-00003001, Rev 0 -M6-TLP-00003002, Rev 0 -M6-TLP-00003003, Rev 0 -M6-TLP-00003004, Rev 0 -M6-TLP-00005001, Rev 0 -M6-TLP-00005002, Rev 0 -M6-TLP-00005003, Rev 0 -M6-TLP-00005004, Rev 0 -M6-TLP-00005005, Rev 0 -M6-TLP-00006001, Rev 0 -M6-TLP-00006002, Rev 0 -M6-TLP-00006003, Rev 0 -M6-TLP-00006004, Rev 0 -M6-TLP-00006005, Rev 0 -MVD-TLP-P0001, Rev 2 -MVD-TLP-P0002, Rev 2 -MVD-TLP-00004, Rev 1 -MV-TLP-P0001, Rev 1 -MV-TLP-P0002, Rev 1 -N1D-TLP-P0001, Rev 2 -N1D-TLP-P0006, Rev 1 -P1-P01T-00001, Rev 7		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-P1-P01T-P0002, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Spent Resin and Dewatering Process System RDP-VSL-00002A (Spent Resin Slurry Vessel) RDP-VSL-00002B (Spent Resin Slurry Vessel) RDP-VSL-00002C (Spent Resin Slurry Vessel) RDP-VSL-00004 (Spent Resin Dewatering Moisture Separation Vessel)	RDP	**24590-PTF** -3PS-MWD0-TP003, Rev 1 -M5-V17T-00020, Rev 2 -M6-RDP-00001001, Rev 0 -M6-RDP-00001002, Rev 0 -M6-RDP-00001003, Rev 0 -M6-RDP-00001004, Rev 0 -M6-RDP-00001005, Rev 0 -M6-RDP-00002, Rev 4 -M6-RDP-00006, Rev 3 -MVD-RDP-P0005, Rev 1 -MVD-RDP-P0006, Rev 1 -MVD-RDP-P0007, Rev 3 -MVD-RDP-P0008, Rev 0 -MV-RDP-P0001, Rev 0 -MV-RDP-P0002, Rev 0 -MV-RDP-P0003, Rev 0 -P1-P01T-00001, Rev 7	Section 4D.2.13; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	RDP-VSL-00002A = 15,230 RDP-VSL-00002B = 15,230 RDP-VSL-00002C = 15,230 RDP-VSL-00004 = 101

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		24590-WTP -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Pretreatment Plant Radioactive Liquid Waste Disposal System RLD-TK-00006A (Process Condensate Tank) RLD-TK-00006B (Process Condensate Tank) RLD-VSL-00017A (Alkaline Effluent Vessel) RLD-VSL-00017B (Alkaline Effluent Vessel)	RLD	**24590-PTF** -M5-V17T-00022003, Rev 2 -M5-V17T-00022004, Rev 3 -M6-RLD-00001001, Rev 0 -M6-RLD-00001002, Rev 0 -M6-RLD-00001003, Rev 0 -M6-RLD-00001004, Rev 0 -M6-RLD-00002001, Rev 0 -M6-RLD-00002002, Rev 0 -M6-RLD-00002003, Rev 0 -M6-RLD-00003001, Rev 0 -M6-RLD-00003002, Rev 0 -M6-RLD-00003003, Rev 0 -M6-RLD-00004, Rev 2 -M6-RLD-00005, Rev 3 -M6-RLD-00006, Rev 3 -M6-RLD-00007001, Rev 0 -MVD-RLD-P0005, Rev 3 -MVD-RLD-P0006, Rev 3 -MV-RLD-P0001, Rev 0	Section 4D.2.16; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	RLD-TK-00006A = 343,734 RLD-TK-00006B = 343,734 RLD-VSL-00017A = 34,340 RLD-VSL-00017B = 34,340

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-MV-RLD-P0002, Rev 0 -N1D-RLD-P0002, Rev 2 -P1-P01T-00001, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Pretreatment Plant Wash and Disposal System PWD-VSL-00015 (Acidic/Alkaline Effluent Vessel) PWD-VSL-00016 (Acidic/Alkaline Effluent Vessel) PWD-VSL-00033 (Ultimate Overflow Vessel) PWD-VSL-00043 (HLW Effluent Transfer Vessel) PWD-VSL-00044 (Plant Wash Vessel)	PWD	**24590-PTF** -M5-V17T-00022001, Rev 2 -M5-V17T-00022002, Rev 2 -M6-PWD-00001, Rev 2 -M6-PWD-00002001, Rev 0 -M6-PWD-00002002, Rev 0 -M6-PWD-00003001, Rev 0 -M6-PWD-00003002, Rev 0 -M6-PWD-00003003, Rev 0 -M6-PWD-00003004, Rev 0 -M6-PWD-00005, Rev 3 -M6-PWD-00006, Rev 2 -M6-PWD-00007, Rev 3 -M6-PWD-00008, Rev 3 -M6-PWD-00009, Rev 3 -M6-PWD-00010, Rev 3	Section 4D.2.15; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	PWD-VSL-00015 = 119,150 PWD-VSL-00016 = 119,150 PWD-VSL-00033 = 41,650 PWD-VSL-00043 = 41,650 PWD-VSL-00044 = 103,024 PWD-VSL-00046 = 4,982

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
PWD-VSL-00046 (C3 Floor Drain Collection Vessel)		-M6-PWD-00011, Rev 2 -M6-PWD-00012, Rev 2 -M6-PWD-00014, Rev 3 -M6-PWD-P0018, Rev 0 -M6-PWD-P0019, Rev 0 -M6-PWD-00020001, Rev 0 -M6-PWD-00020002, Rev 0 -M6-PWD-00020003, Rev 0 -M6-PWD-00020004, Rev 0 -M6-PWD-00020005, Rev 0 -M6-PWD-00020006, Rev 0 -M6-PWD-00021001, Rev 0 -M6-PWD-00021002, Rev 0 -M6-PWD-00021003, Rev 0 -M6-PWD-00021004, Rev 0 -M6-PWD-00021005, Rev 0 -M6-PWD-00021006, Rev 0 -M6-PWD-00023001, Rev 0 -M6-PWD-00023002, Rev 0 -M6-PWD-00023003, Rev 0 -M6-PWD-00023004, Rev 0 -M6-PWD-00023005, Rev 0 -M6-PWD-00024001, Rev 0 -M6-PWD-00024002, Rev 0 -M6-PWD-00024003, Rev 0		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-PWD-00024004, Rev 0 -M6-PWD-00024005, Rev 0 -M6-PWD-00024006, Rev 0 -M6-PWD-00024007, Rev 0 -M6-PWD-00025001, Rev 0 -M6-PWD-00025002, Rev 0 -M6-PWD-00025003, Rev 0 -M6-PWD-00025004, Rev 0 -M6-PWD-00026, Rev 2 -M6-PWD-00029, Rev 3 -M6-PWD-00033, Rev 2 -M6-PWD-00041, Rev 3 -M6-PWD-00043, Rev3 -M6-PWD-00044, Rev 3 -M6-PWD-00046, Rev 2 -M6-PWD-00050, Rev 2 -M6-PWD-00051, Rev 2 -M6-PWD-00057, Rev 4 -M6-PWD-00058, Rev 4 -MVD-PWD-P0001, Rev 3 -MVD-PWD-P0002, Rev 3 -MVD-PWD-P0003, Rev 2 -MVD-PWD-P0010, Rev 1 -MVD-PWD-P0011, Rev 3 -MVD-PWD-P0012, Rev 3		

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-MV-PWD-P0001001, Rev 1 -MV-PWD-P0001002, Rev 1 -MV-PWD-P0003001 , Rev 1 -MV-PWD-P0003002, Rev 1 -MV-PWD-P0005, Rev 1 -MV-PWD-P0006, Rev 1 -MV-PWD-P0007, Rev 1 -MV-PWD-P0010, Rev 1 -N1D-PWD-P0001, Rev 1 -N1D-PWD-P0002, Rev 5 -N1D-PWD-P0003, Rev 3 -N1D-PWD-P0005, Rev 2 -N1D-PWD-P0006, Rev 2 -P1-P01T-00001, Rev 7 -P1-P01T-00006, Rev 4		
Pretreatment Vessel Vent Process System PVP-VSL-00001 (Vessel Vent HEME Drain Collection Vessel)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021002, Rev 2 -M5-V17T-00021004, Rev 2 -M6-PVP-00002, Rev 3 -M6-PVP-00004001, Rev 0 -M6-PVP-00004002, Rev 0 -M6-PVP-00017001, Rev 0 -M6-PVP-00017002, Rev 0 -M6-PVP-00017003, Rev 0	Section 4D.4.2; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	PVP-VSL-00001 = 1,969

Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-PVP-00018001, Rev 1 -M6-PVP-00018002, Rev 0 -MVD-PVP-P0001, Rev 0 -MV-PVP-P0002, Rev 1 -N1D-PVP-P0002, Rev 1 -P1-P01T-00001, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Pretreatment In-Cell Handling System PIH-TK-00001 (Decontamination Soak Tank)	PIH	**24590-PTF** -M6-PIH-00001001, Rev 0 -M6-PIH-00001002, Rev 0 -P1-P01T-00001, Rev 7 **24590-WTP** -3PS-HD00-T0001, Rev 4	Section 4.D.2.14; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	PIH-TK-00001 = 1504

Table III.10.E.B – LAW Vitrification Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
LAW Concentrate Receipt Process System LCP-VSL-00001 (LAW Melter 1 Concentrate Receipt Vessel) LCP-VSL-00002 (LAW Melter 2 Concentrate Receipt Vessel)	LCP	**24590-LAW** -M5-V17T-P0001, Rev 0 -M5-V17T-P0002, Rev 0 -M6-LCP-00001002, Rev 0 -M6-LCP-00001003, Rev 0 -M6-LCP-00002003, Rev 0 -M6-LCP-00002004, Rev 0 -MV-LCP-P0001, Rev 0 -MV-LCP-P0002, Rev 0 -MVD-LCP-P0004, Rev 1 -MVD-LCP-P0005, Rev 1 -N1D-LCP-P0001, Rev 1 -P1-P01T-00002, Rev 7	Section 4E.2.1; Tables 4-3 and 4-6; and Figures C1-1 and C1-3 of Operating Unit Group 10, Addendum C of this Permit.	LCP-VSL-00001 = 18,130 LCP-VSL-00002 = 18,130
LAW Melter Feed Process System LFP-VSL-00001 (Melter 1 Feed Preparation Vessel) LFP-VSL-00002 (Melter 1 Feed Vessel) LFP-VSL-00003 (Melter 2 Feed Preparation Vessel)	LFP	**24590-LAW** -M5-V17T-P0001, Rev 0 -M5-V17T-P0002, Rev 0 -M6-LFP-00001001, Rev 0 -M6-LFP-00001002, Rev 0 -M6-LFP-00001003, Rev 0 -M6-LFP-00001004, Rev 0 -M6-LFP-00001005, Rev 0 -M6-LFP-00001006, Rev 0 -M6-LFP-00003001, Rev 0 -M6-LFP-00003002, Rev 0	Section 4E.2.1; Tables 4-3 and 4-6; and Figures C1-1 and C1-3 of Operating Unit Group 10, Addendum C of this Permit.	LFP-VSL-00001 = 9,123 LFP-VSL-00002 = 9,123 LFP-VSL-00003 = 9,123 LFP-VSL-00004 = 9,123

Table III.10.E.B – LAW Vitrification Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
LFP-VSL-00004 (Melter 2 Feed Vessel)		-M6-LFP-00003003, Rev 0 -M6-LFP-00003004, Rev 0 -M6-LFP-00003005, Rev 0 -M6-LFP-00003006, Rev 0 -MV-LFP-P0001, Rev 0 -MV-LFP-P0002, Rev 0 -MV-LFP-P0004, Rev 0 -MV-LFP-P0005, Rev 0 -MVD-LFP-P0007, Rev 1 -MVD-LFP-P0008, Rev 1 -MVD-LFP-P0010, Rev 1 -MVD-LFP-P0011, Rev 1 -P1-P01T-00002, Rev 7 -N1D-LFP-00004, Rev 2 -N1D-LFP-00006, Rev 0		
LAW Secondary Off-gas/Vessel Vent Process System LVP-TK-00001 (LAW Caustic Collection Tank)	LVP	**24590-LAW** -M5-V17T-P0011, Rev 1 -P1-P01T-00004, Rev 5 -VDCN-M-13-00001 -MTD-LVP-00001, Rev 1 -N1D-LVP-00002, Rev 2	Section 4E.4.2.2; Tables 4-3 and 4-6; and Figures C1-1 and C1-3 of Operating Unit Group 10, Addendum C of this Permit.	LVP-TK-00001= 14,232
LAW Primary Off-gas Process System	LOP	**24590-LAW** -M5-V17T-P0007, Rev 0 -M5-V17T-P0008, Rev 0	Section 4E.4.2.1; Tables 4-3 and 4-6; and Figures C1-1 and C1-3 of Operating Unit Group 10, Addendum C of this Permit.	LOP-VSL-00001 = 9,056 LOP-VSL-00002 = 9,056

Table III.10.E.B – LAW Vitrification Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
LOP-VSL-00001 (LAW Melter 1 SBS Condensate Vessel) LOP-VSL-00002 (LAW Melter 2 SBS Condensate Vessel)		-M6-LOP-P0001, Rev 2 -M6-LOP-P0002, Rev2 -MV-LOP-P0001, Rev 0 -MV-LOP-P0002, Rev 0 -MVD-LOP-00004, Rev 6 -MVD-LOP-00005, Rev 6 -N1D-LOP-00002, Rev 3 -P1-P01T-00002, Rev 7		
LAW Vitrification Plant Radioactive Liquid Waste Disposal System RLD-VSL-00003 (Plant Wash Vessel) RLD-VSL-00004 (C3/C5 Drains/Sump Collection Vessel) RLD-VSL-00005 (SBS Condensate Collection Vessel)	RLD	**24590-LAW** -M5-V17T-P0014, Rev 2 -M6-RLD-00001001, Rev 0 -M6-RLD-00001002, Rev 0 -M6-RLD-00001003, Rev 0 -M6-RLD-00001004, Rev 0 -M6-RLD-00001005, Rev 0 -M6-RLD-00001006, Rev 0 -M6-RLD-00002001, Rev 0 -M6-RLD-00002002, Rev 0 -M6-RLD-00002003, Rev 0 -M6-RLD-00002004, Rev 0 -M6-RLD-00002005, Rev 0 -M6-RLD-00003001, Rev 0 -M6-RLD-00003002, Rev 2 -M6-RLD-00003003, Rev 2	Section 4E.2.3; Tables 4-3 and 4-6; and Figures C1-1 and C1-3 of Operating Unit Group 10, Addendum C of this Permit.	RLD-VSL-00003 = 25,780 RLD-VSL-00004 = 7696 RLD-VSL-00005 = 25,780

Table III.10.E.B – LAW Vitrification Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-MVD-RLD-P0001, Rev 1 -MVD-RLD-P0006, Rev 2 -MVD-RLD-P0007, Rev 2 -MV-RLD-P0001, Rev 2 -MV-RLD-P0002, Rev 1 -MV-RLD-P0003, Rev 1 -P1-P01T-00001, Rev 4 -P1-P01T-00002, Rev 7 -N1D-RLD-00001, Rev 5 -N1D-RLD-00002, Rev 3 -N1D-RLD-00005, Rev 4		

Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
HLW Concentrate Receipt Process System The HCP System has ancillary equipment only	HCP	**24590-HLW** -M5-V17T-00001, Rev 5 -M6-HCP-00001001, Rev 1 -M6-HCP-00002001, Rev 1	Section 4F.2.1; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	
HLW Melter Feed Process System HFP-VSL-00001 (Melter 1 Feed Preparation Vessel)	HFP	**24590-HLW** -3YD-HFP-00001[a] -M5-V17T-00001, Rev 5 -P1-P01T-00002, Rev 7 -M6-HFP-00001001, Rev 0 -M6-HFP-00001002, Rev 0 -M6-HFP-00001003, Rev 0 -M6-HFP-00001004, Rev 0 -M6-HFP-00007001, Rev 0 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3	Section 4F.2.1; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	HFP-VSL-00001 = 8,311
Melter Feed Process System cont. HFP-VSL-00002 (Melter 1 Feed Vessel)	HFP	**24590-HLW** -3YD-HFP-00001[a] -M5-V17T-00001, Rev 5 -P1-P01T-00002, Rev 7 -M6-HFP-00002001, Rev 0	Section 4F.2.1; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	HFP-VSL-00002 = 8,311

Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-M6-HFP-00002002, Rev 0 -M6-HFP-00002003, Rev 0 -M6-HFP-00008001, Rev 0 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Melter Feed Process System cont. HFP-VSL-00005 (Melter 2 Feed Preparation Vessel)	HFP	**24590-HLW** -3YD-HFP-00001[a] -M5-V17T-00001, Rev 5 -P1-P01T-00002, Rev 7 -M6-HFP-20001001, Rev 0 -M6-HFP-20001002, Rev 0 -M6-HFP-20001003, Rev 0 -M6-HFP-20001004, Rev 0 -M6-HFP-20007001, Rev 0 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3	Section 4F.2.1; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	HFP-VSL-00005 = 8,311

Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Melter Feed Process System cont. HFP-VSL-00006 (Melter 2 Feed Vessel)	HFP	**24590-HLW** -3YD-HFP-00001[a] -M5-V17T-00001, Rev 5 -P1-P01T-00002, Rev 7 -M6-HFP-20002001, Rev 3 -M6-HFP-20002002, Rev 3 -M6-HFP-20002003, Rev 3 -M6-HFP-20008001, Rev 0 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3	Section 4F.2.1; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	HFP-VSL-00006 = 8,311
Melter Off-gas Treatment Process System HOP-VSL-00903 (Melter 1 SBS Condensate Receiver Vessel) HOP-VSL-00904 (Melter 2 SBS Condensate Receiver Vessel)	HOP	**24590-HLW** -3YD-HOP-00001[a] -M5-V17T-P0003, Rev 1 -M5-V17T-P20003, Rev 1 -M6-HOP-00004, Rev 4 -M6-HOP-00006001, Rev 0 -M6-HOP-00006002, Rev 0 -M6-HOP-20004, Rev 5 -M6-HOP-20006001, Rev 0 -M6-HOP-20006002, Rev 0 -MVD-HOP-P0001, Rev 2	Section 4F.4.2; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	HOP-VSL-00903 = 9891 HOP-VSL-00904 = 9891

Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-MVD-HOP-P0012, Rev 1 -MV-HOP-P0001, Rev 2 -MV-HOP-P0003, Rev 2 -N1D-HOP-P0009, Rev 2 -P1-P01T-00001, Rev 9 **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
HLW Canister Decontamination Handling System HDH-VSL-00001 (Canister Rinse Vessel) HDH-VSL-00002 (Canister Decon Vessel 1) HDH-VSL-00003 (Waste Neutralization Vessel) HDH-VSL-00004 (Canister Decon Vessel 2)	HDH	**24590-HLW** -M5-V17T-00006, Rev 6 -M6-HDH-00001001, Rev 1 -M6-HDH-00002001, Rev 1 -M6-HDH-00002002, Rev 0 -M6-HDH-00002003, Rev 1 -M6-HDH-20001001, Rev 1 -M6-HDH-20001002, Rev 0 -M0-HDH-P0012001, Rev 1 -M0-HDH-P0012002, Rev 1 -MV-HDH-P0003, Rev 1 -MVD-HDH-P0003, Rev 2 -MVD-HDH-00006, Rev 5 -MVD-HDH-P0009, Rev 0 -N1D-HDH-00003, Rev 8	Section 4F.2.4; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	HDH-VSL-00001 = 3314 HDH-VSL-00002 = 630 HDH-VSL-00003 = 5315 HDH-VSL-00004 = 630

Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		-N1D-HDH-P0005, Rev 1 -N1D-HDH-P0007, Rev 1 -P1-P01T-00001, Rev 9 -P1-P01T-00002, Rev 7 -3YD-HDH-00002[a] **24590-WTP** -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
HLW Melter Cave Support Handling System HSH-TK-00001 (Decontamination Tank Melter Cave 1) HSH-TK-00002 (Decontamination Tank Melter Cave 2)	HSH	**24590-HLW** -M6-HSH-00004001, Rev 1 -M6-HSH-00004001, Rev 1 -M6-HSH-20004001, Rev 1 -M6-HSH-20004002, Rev 1 -M0-HSH-P0072, Rev 1 -N1D-HSH-P0001, Rev 1 -P1-P01T-00002, Rev 7 **24590-WTP** -3PS-HD00-T0001, Rev 4	Section 4F.2.4; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of Operating Unit Group 10, Addendum C of this Permit.	HSH-TK-00001 = 4,000 HSH-TK-00002 = 4,000
HLW Vitrification Plant Radioactive Liquid Waste Disposal System	RLD	**24590-HLW** -3YD-RLD-00001[a] -M5-V17T-P0007001, Rev 1	Section 4H.2.1; Tables 4-4 and 4-6; Figures C1-1 and C1-4 of	RLD-VSL-00002 = 334

Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
RLD-VSL-00002 (Off-gas Drains Collection Vessel) RLD-VSL-00007 (Acidic Waste Vessel) RLD-VSL-00008 (Plant Wash & Drain Vessel)		-M5-V17T-P0007002, Rev 1 -M6-RLD-00001001, Rev 0 -M6-RLD-00001002, Rev. 0 -M6-RLD-00001003, Rev 0 -M6-RLD-00002001, Rev 0 -M6-RLD-00002002, Rev 0 -M6-RLD-00002003, Rev 0 -M6-RLD-00002004, Rev 0 -M6-RLD-00006, Rev 4 -M6-RLD-00007, Rev 4 -M6-RLD-00014, Rev 5 -MV-RLD-00002, Rev 2 -MV-RLD-00003, Rev 0 -MV-RLD-00025001 Rev 0 -MV-RLD-00025002, Rev 0 -MV-RLD-00025003, Rev 0 -MV-RLD-00025004, Rev 0 -MVD-RLD-00005, Rev 9 -MVD-RLD-00007, Rev 7 -MVD-RLD-00008, Rev 4 -N1D-RLD-P0001, Rev 0 -N1D-RLD-P0006, Rev 0 -N1D-RLD-P0013, Rev 0 -P1-P01T-00001, Rev 9 -P1-P01T-00002, Rev 7	Operating Unit Group 10, Addendum C of this Permit.	RLD-VSL-00007 = 18,145 RLD-VSL-00008 = 13,774

Table III.10.E.C – HLW Vitrification Plant Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		24590-WTP -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
[a]System Descriptions are maintained in the Administrative Record, and are listed here for information only.				

1

Table III.10.E.D – Analytical Laboratory Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Radioactive Liquid Waste Disposal System RLD-VSL-00164 (Laboratory Area Sink Drain Collection Vessel) RLD-VSL-00165 (Hotcell Drain Collection Vessel)	RLD	**24590-LAB** -3YD-RLD-00001[a] -M5-V17T-00029, Rev 3 -M6-RLD-00001001, Rev 1 -M6-RLD-00001002, Rev 0 -M6-RLD-00001003, Rev 0 -M6-RLD-00001004, Rev 0 -M6-RLD-00002001, Rev 1 -M6-RLD-00002003, Rev 0 -M6-RLD-00006001, Rev 0 -M6-RLD-00006002, Rev 0 -M6-RLD-00006003, Rev 0 -M6-RLD-00007001, Rev 0 -M6-RLD-00007002, Rev 0 -M6-RLD-00008001, Rev 0 -M6-RLD-00008002, Rev 0 -MVD-RLD-P0164, Rev 1 -MVD-RLD-P0165, Rev 1 -MV-RLD-P0001, Rev 0 -N1D-RLD-P0002, Rev 1 -N1D-RLD-P0003, Rev 1 -P1-60-00007, Rev 3 -P1-60-00008, Rev 3	Section 4H.2.1; Table C-5 and 4-6 of Operating Unit Group 10, Addendum C of this Permit.	RLD-VSl-00164 = 3180 RLD-VSL-00165 = 9100

Table III.10.E.D – Analytical Laboratory Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		24590-WTP -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
[a]System Descriptions are maintained in the Administrative Record, and are listed here for information only.				

1

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PWD-SUMP-00071[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00040[a]	Not Applicable	Bubbler Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00001A[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00002[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00002A[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00003[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00004[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PWD-SUMP-00005[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00006[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00007[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00008[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00009[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00010[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00011[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00012[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PWD-SUMP-00013[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00026[c]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00026[b]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00028[c]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00028[b]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00029[c]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00029[b]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00031[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PWD-SUMP-00032[c]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00032[b]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00033[c]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00033[b]	Not Applicable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00034[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00035[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00036[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-SUMP-00037[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00003[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PVP-BULGE-00001	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PVP-BULGE-00002	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
TCP-BULGE-00004	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
DIW-BULGE-00001	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
DIW-BULGE-00002	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
CRP-BULGE-00001	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
CXP-BULGE-00004	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
UFP-BULGE-00001	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
UFP-BULGE-00002	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
UFP-BULGE-00005	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
UFP-BULGE-00006	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00001	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00002	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00003	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00004	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00005	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PWD-LDB-00006	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00007	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00008	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00009	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00010	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00011	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00012	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00013	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
PWD-LDB-00014	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00015	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00016	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00017	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00018	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
PWD-LDB-00019	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00012	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00013	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
ASX Sampler 00013 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
ASX Sampler 00017 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
ASX Sampler 00019 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
ASX Sampler 00020 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
ASX Sampler 00025 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.E.E – Pretreatment Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range

[a]Locator (including P&ID designator) is located on Permit Table III.10.E J – Pretreatment Plant Tank Systems Secondary Containment Systems Including Sumps and Floor Drains.

[b]Locator (including P&ID designator) is located on Permit Table III.10.E.I – Pretreatment Plant Tank Systems Primary Containment Systems.

[c]Leak detection instruments for secondary containment to a primary containment sump.

1

Table III.10.E.F – LAW Vitrification Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
RLD-SUMP-00028[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00029[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00030[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00031[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00032[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00035[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00036[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
LVP-FD-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
Melter 1 Encasement	Not Applicable	Conductivity Cable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

Assembly Drain									
Melter 2 Encasement Assembly Drain	Not Applicable	Conductivity Cable	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
ASX Sampler 00012 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
ASX Sampler 00013 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
		RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
		RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
[a]Locator (including P&ID designator) is located on Permit Table III.10.E L - LAW Vitrification Plant Tank Systems Secondary Containment Systems Including Sumps and Floor Drains.									

1

Table III.10.E.G - HLW Vitrification Plant Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
HCP-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HOP-SUMP-00003[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HOP-SUMP-00008[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HDH-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HDH-SUMP-00002[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HDH-SUMP-00003[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HFP-SUMP-00002[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HFP-SUMP-00005[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HSH-SUMP-00003[a]	Not Applicable	Bubbler	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HSH-SUMP-00007[a]	Not Applicable	Bubbler	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

HSH-SUMP-00008[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HSH-SUMP-00009[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HPH-SUMP-00001[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HPH-SUMP-00003[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
HPH-SUMP-00005[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
ASX Sampler 00028 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
ASX Sampler 00029 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
ASX Sampler 00042 Lower Containment Drain	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Locator (including P&ID designator) is located on Permit Table III.10.E. N - HLW Vitrification Plant Tank Systems Secondary Containment Systems Including Sumps, and Floor Drains.

1

Table III.10.E.H – Laboratory Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
RLD-SUMP-00041[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00042[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00043A[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00043B[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00044[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-SUMP-00045[a]	Not Applicable	Radar Leak Detector	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00002[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00004[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00005[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00006[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED

Table III.10.E.H – Laboratory Tank System Process and Leak Detection System Instruments and Parameters

Tank System Name and Locator (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Operating Trips (Description & Numerical Limits)	Instrument Calibration Method No. and Range
RLD-LDB-00007[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00008[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00009[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RLD-LDB-00011[a]	Not Applicable	Thermal Dispersion Level Switch	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	Not Applicable	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Locator (including P&ID designator) is located on Permit Table III.10.E P - Laboratory Tank Systems Secondary Containment Systems Including Sumps and Floor Drains.

1

Table III.10.E.I – Pretreatment Plant Tank Systems Primary[a] Containment Sump Systems

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[b] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
PWD-SUMP-00026 P-0123 (Hotcell El. 0)	RESERVED	RESERVED	RESERVED
PWD-SUMP-00028 P-0123 (Hotcell El. 0)	RESERVED	RESERVED	RESERVED
PWD-SUMP-00029 P-0123 (Hotcell El. 0)	RESERVED	RESERVED	RESERVED
PWD-SUMP-00032 P-0123A (Maintenance Cave, El. 0)	RESERVED	RESERVED	RESERVED
PWD-SUMP-00033 P-0123A (Maintenance Cave, El. 0)	RESERVED	RESERVED	RESERVED

[a] Primary sumps are defined in Permit Section III.10.C, and must comply with dangerous waste tank system requirements for tanks as described in WAC-173-303-640.

[b]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-SUMP-00071 P-B005 (Pit-19, El. –19')	60	Dry Sump	30"Dia x 18"Deep Epoxy	**24590-PTF** -M6-PWD-00041, Rev 3 -P1-P01T-00006, Rev 4

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-SUMP-00040 P-B002 (Pit-45, El. –45')	233.7	Dry Sump	60"x30"x30" Stainless Steel	**24590-PTF** -M6-PWD-00012, Rev 2 -P1-P01T-00006, Rev 4
PWD-SUMP-00001 P-0108B (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00008, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00001A P-0108C (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00010, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00002 P-0108A (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00008, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00002A P-0108 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00010, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00003 P-0106 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00008, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00004 P-0104 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00008, Rev 3 -P1-P01T-00001, Rev 7

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-SUMP-00005 P-0102A (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00008, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00006 P-0102 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00008, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00007 P-0109 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00009, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00008 P-0111 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00009, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00009 P-0112 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00009, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00010 P-0113 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00009, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00011 P-0114 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00009, Rev 3 -P1-P01T-00001, Rev 7

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-SUMP-00012 P-0117 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00009, Rev 3 -P1-P01T-00001, Rev 7
PWD-SUMP-00013 P-0117A (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00014, Rev 3 -P1-P01T-00001, Rev 7
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
PWD-SUMP-00031 P-0119 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-00010, Rev 3 -P1-P01T-00001, Rev 7
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
PWD-SUMP-00034 P-0121A (Spent Resin Dewatering, El. 0')	75	Dry Sump	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00012, Rev 2
PWD-SUMP-00035 P-0122A (Waste Packaging Area, El. 0')	75	Dry Sump	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00012, Rev 2

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-SUMP-00036 P-0118 (El. 0')	75	Dry Sump	30" Dia. By ~27" deep Stainless Steel	**24590-PTF** -M6-PWD-P0012, Rev 2 -P1-P01T-00001, Rev 7
PWD-SUMP-00037 P-0124A	7.5		30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00012, Rev 2
RLD-SUMP-00003 P-0150 (Radioactive Liquid Waste Disposal Area, El. 0', outdoor)	583	Dry Sump	78" x 48" x 36" Deep Epoxy coating	**24590-PTF** -M6-RLD-00002003, Rev 0
PVP-ZY-00037-S11B-03, P-0105 (PVP-BULGE-00001, El. 0')			3" Stainless Steel	**24590-PTF** -M6-PVP-00017002, Rev 0
PVP-ZY-00036-S11B-03, P-0101A (PVP-BULGE-00002, El. 0')			3" Stainless Steel	**24590-PTF** -M6-PVP-00018002, Rev 0
TCP-ZF-00032-S11B-03 Drain Line, P-0116 (TCP-BULGE-00004, El. 0')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-TCP-00001002, Rev 1
DIW-ZF-01511-S11B-03 Drain Line, P-0320 (DIW-BULGE-00001, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-DIW-00004001
DIW-ZF-01510-S11B-03, P-0320 Drain Line (DIW-BULGE-00002, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-DIW-00004001

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-FD-00005 PWD-ZF-03000-S11B-06 P-0123 (Hotcell, El.0')	939	N/A	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00011, Rev 2
PWD-FD-00006 PWD-ZF-03001-S11B-06 P-0123 (Hotcell, El.0')	939	N/A	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00011, Rev 2
PWD-FD-00435 P-0105		NA	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00349 P-0105		NA	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00436 P-0105		NA	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00438 P-0105A		NA	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00348 P-0105A		NA	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00437 P-0105B		NA	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-347 P-0105B		NA	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-346 P-0105C		NA	4" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044, Rev 3

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-FD-00293 P-0426 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00298 P-0425 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00309 P-0402 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00310 P-0402 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00311 P-0402 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00312 P-0402 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00376 P-0415 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00377 P-0415 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00378 P-0415 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00379 P-0415 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00380 P-0415A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-FD-00381 P-0415A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00382 P-0415A Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00383 P-0415A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00557 P-0430 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00559 P-0430 Drain, El. 77'	665	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00561 P-0430 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00563 P-0411 Drain, El. 77'	665	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00564 P-0411 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00565 P-0410 Drain, El. 77'	665	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00566 P-0410 Drain, El. 77'	665	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00571 P-0410 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-FD-00572 P-0410 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00573 P-0410 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00574 P-0410 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00575 P-0410 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00576 P-0410 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00583 P-0422A Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00584 P-0422A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00589 P-0402 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00590 P-0423 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00591 P-0423 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00592 P-0423 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-FD-00593 P-0423 Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00594 P-0423 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00595 P-0431A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00596 P-0431A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00597 P-0431A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00598 P-0431A Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00599 P-0431A Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00600 P-0431A Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00604 P-0431A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00605 P-0431A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00606 P-0431A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-FD-00607 P-0431A Drain, El. 77'	140	N/A	6" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00629 P-0425 Drain, El. 77'	655	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00630 P-0425 Drain, El. 77'	140	N/A	8" Dia 304L	**24590-PTF** -M6-PWD-00044, Rev 3
CRP-ZF-00002-S11B-03, P-0317 Drain Line (CRP-BULGE-00001 drain, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-CRP-00003001, Rev 0
CXP-ZF-00012-S11B-03 Drain Line, P-0317 (CXP-BULGE-00004, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-CXP-00003003, Rev 0
UFP-ZF-00043-S11B-03 Drain Line, P-0301 (UFP-BULGE-00001, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-UFP-00016001, Rev 0
UFP-ZF-00042-S11B-03 Drain Line, P-0301 (UFP-BULGE-00002, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-UFP-00017001, Rev 0
UFP-ZY-00002-S11B-03 Drain Line, P-0311 (UFP-BULGE-00005, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M56-UFP-00031001, Rev 0
UFP-ZY-00001-S11B-03 Drain Line, P-0311A (UFP-BULGE-00006, El. 56')	N/A	N/A	3" Stainless Steel	**24590-PTF** -M6-UFP-00032001, Rev 0

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-LDB-00001 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00002 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00003 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00004 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00005 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00006 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00007 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00008 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-LDB-00009 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00010 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00011 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050, Rev 2
PWD-LDB-00012 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2
PWD-LDB-00013 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2
PWD-LDB-00014 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2
PWD-LDB-00015 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2
PWD-LDB-00016 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
PWD-LDB-00017 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2
PWD-LDB-00018 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2
PWD-LDB-00019 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00051, Rev 2
RLD-LDB-00012 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	N/A	8" Dia. x 34" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00058, Rev 4
RLD-LDB-00013 P-B001 (Inter Facility Transfer Line Tunnel, El.-45')	6	N/A	8" Dia. x 34" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00058, Rev 4
ASX Sampler 00017 Lower Containment Trough/Dam (P-0311B, El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00007, Rev 3
ASX Sampler 00019 Lower Containment Trough/Dam (P-0302, El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00007, Rev 3
ASX Sampler 00020 Lower Containment Trough/Dam (P-0301, El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00007, Rev 3

Table III.10.E.J – Pretreatment Plant Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, Bulges, Autosamplers, and Floor Drains

Sump, Bulge or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing No.'s, Specifications No.'s, etc.)
ASX Sampler 00025 Lower Containment Trough/Dam (P-0307, El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00007, Rev 3
[a]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD). Note #1: These are special cases due to their location in equipment berms. The capacity for these drain lines is based on a unique bounding case for liquid spillage.				

1

Table III.10.E.K - LAW Vitrification Plant Tank Systems Primary[a] Containment Sump Systems

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[b] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RESERVED	RESERVED	RESERVED	RESERVED
[a] Primary sumps are defined in Permit Section III.10.C, and must comply with dangerous waste tank system requirements for tanks as described in WAC-173-303-640. [b]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).			

2

Table III.10.E.L - LAW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Bulges, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RLD-SUMP-00028	59	Dry Sump	24" Dia. By 30" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00002005, Rev 0 -P1-P01T-00001, Rev 4

Table III.10.E.L - LAW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Bulges, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
L-B001B (C3/C5 Drains/Sump Collection Vessel Cell, El. –21')				
RLD-SUMP-00029 L-0123 (Process Cell, El. +3')	37	Dry Sump	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002, Rev 1 -P1-P01T-00002, Rev 7
RLD-SUMP-00030 L-0123 (Process Cell, El. +3')	37	Dry Sump	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002, Rev 1 -P1-P01T-00002, Rev 7
RLD-SUMP-00031 L-0124 Process Cell Sump, El. +3')	37	Dry Sump	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002, Rev 1 -P1-P01T-00002, Rev 7
RLD-SUMP-00032 L-0124 (Process Cell, El. +3')	37	Dry Sump	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002, Rev 2 -P1-P01T-00002, Rev 7
RLD-SUMP-00035 L-0126 (Effluent Cell, El. +3')	37	Dry Sump	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003003, Rev 2 -P1-P01T-00002, Rev 7
RLD-SUMP-00036 L-0126 (Effluent Cell, El. +3')	37	Dry Sump	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003003, Rev 2 -P1-P01T-00002, Rev 7

Table III.10.E.L - LAW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Bulges, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
Drain Line ID# = RLD-FD-00001 L-B001B (RLD-BULGE-00001 Drain, El. -21')	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-RLD-00002003, Rev 0
Drain Line ID# = RLD-FD-00035 L-0126 (RLD-BULGE-0000-4 Drain El. +3')	N/A	N/A	2" Dia. 6% Mo	**24590-LAW** -M6-RLD-00001005, Rev 0
Drain Line ID# = LOP-FD-00001 L-0123 (LOP-BULGE-00001 drain El. +3)	N/A	N/A	2" Dia. 6% Mo	**24590-LAW** -M6-LOP-0001003, Rev 0
Drain Line ID# = LCP-FD-00001 L-0123 (LCP-BULGE-00001 Drain, El. +3')	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-LCP-00001001, Rev 0
Drain Line ID# = LCP-FD-00002 L-0123 (LCP-BULGE-00002 Drain, El. +3')	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-LCP-00001004, Rev 0 -M6-LCP-00001005, Rev 0
Drain Line ID# = RLD-WS-20037-S11B-01 L-0123 (Melter 1 Encasement Assembly Drain, El. +3')	N/A	N/A	1" Dia. 316L	**24590-LAW** -M6-LMP-00012001, Rev 0

Table III.10.E.L - LAW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Bulges, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
Drain Line ID# = LFP-FD-00001 L-0123 (LFP-BULGE-00001 Drain, El. +3)	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-LFP-00001005, Rev 0
Drain Line ID# = LOP-FD-00002 L-0124 (LOP-BULGE-00002 Drain, El. +3)	N/A	N/A	2" Dia. 6% Mo	**24590-LAW** -M6-LOP-00002003, Rev 0
Drain Line ID# = LCP-FD-00003 L-0124 (LCP-BULGE-00003 Drain, El. +3)	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-LCP-00002001, Rev 0 -M6-LCP-00002002, Rev 0
Drain Line ID# = LFP-FD-00002 L-0124 (LFP-BULGE-00002 Drain, El. +3)	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-LFP-00003005, Rev 0
Drain Line ID# = RLD-WS-20033-S11B-01 L-0124 (Melter 2 Encasement Assembly Drain, El. +3')	N/A	N/A	1" Dia. 316L	**24590-LAW** -M6-LMP-00042001, Rev 0
LVP-FD-00001 L-0218 (Berm floor drain for LVP-TK-00001, El. 28')[b]	N/A	N/A	4" Dia. 316L	**24590-LAW** -M6-LVP-00002003, Rev 0

Table III.10.E.L - LAW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Bulges, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RLD-FD-00025 L-0304F (Curb floor drain for Caustic Scrubber, El. 48')[b]	N/A	N/A	4" Dia. 316L	**24590-LAW** -M6-RLD-00003001, Rev 0
ASX Sampler 00012 Lower Containment Trough/Dam (L-0301, El. 48')	N/A	N/A	3" Dia. Stainless Steel (316L)	**24590-LAW** -M6-RLD-00003001, Rev 0
ASX Sampler 00013 Lower Containment Trough/Dam (L-0301, El. 48')	N/A	N/A	3" Dia. Stainless Steel (316L)	**24590-LAW** -M6-RLD-00003001, Rev 0

[a] Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).
[b] This sump is routinely accessible for inspections and maintenance.

Table III.10.E.M - HLW Vitrification Plant Tank Systems Primary[a] Containment Sump Systems

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[b] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RESERVED	RESERVED	RESERVED	RESERVED

[a] Primary sumps are defined in Permit Section III.10.C, and must comply with dangerous waste tank system requirements for tanks as described in WAC-173-303-640.
[b] Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

Table III.10.E.N - HLW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
HCP-SUMP-00001 H-B014 (Wet Process Cell, El. –21’)	75	Dry Sump	30” Dia. x 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00015001, Rev 0 -P1-P01T-00001, Rev 9
RLD-SUMP-00001 H-B014 (Wet Process Cell, El. –21’)	75	Dry Sump	30” Dia. X 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00015001, Rev 0 -P1-P01T-00001, Rev 9
HOP-SUMP-00003 H-B021 (SBS Drain Collection Cell 1, El. –21’)	75	Dry Sump	30” Dia. X 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00015001, Rev 0 -P1-P01T-00001, Rev 9
HOP-SUMP-00008 H-B005 (SBS Drain Collection Cell 2, El. -21’)	75	Dry Sump	30” Dia. X 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-20004001, Rev 0 -P1-P01T-00001, Rev 9
HDH-SUMP-00001 H-B039B (Canister Rinse Tunnel, El. –16.5’)	75	Dry Sump	30” Dia. X 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00016001, Rev 0 -P1-P01T-00001, Rev 9
HDH-SUMP-00002 H-B039A (Canister Rinse Bogie Maintenance Room, El. –16’)	75	Dry Sump	30” Dia. X 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00016001, Rev 0 -P1-P01T-00001, Rev 9
HDH-SUMP-00003 H-B035 (Canister Decon Cave, El. –16’)	75	Dry Sump	30” Dia. X 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00004002, Rev 0 -P1-P01T-00001, Rev 9
HFP-SUMP-00002 H-0117 (Melter Cave 1, El. 5’)	50	Dry Sump	20.5” X 20.5” X 16” Stainless Steel	**24590-HLW** -M6-RLD-00008002, Rev 0 -P1-P01T-00002, Rev 7

Table III.10.E.N - HLW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
HFP-SUMP-00005 H-0106 (Melter Cave 2 El. 5')	50	Dry Sump	20.5" X 20.5" X 16" Stainless Steel	**24590-HLW** -M6-RLD- 20005, Rev 6 -P1-P01T-00002, Rev 7
HSH-SUMP-00003 H-0117 (Melter Cave 1, El. 3')	50	Dry Sump	20.5" X 20.5" X 16" Stainless Steel	**24590-HLW** -M6-RLD-00008002, Rev 0 -P1-P01T-00002, Rev 7
HSH-SUMP-00007 H-0106 (Melter Cave 2, El. 3')	50	Dry Sump	20.5" X 20.5" X 16" Stainless Steel	**24590-HLW** -M6-RLD-20005001, Rev 0 -P1-P01T-00002, Rev 7
HSH-SUMP-00008 H-310A (Melter 1 Equip. Decon. Pit Area, El. 0')	50	Dry Sump	30" X 24" X 16" Stainless Steel	**24590-HLW** -M6-RLD-00003001, Rev 0 -P1-P01T-00002, Rev 7
HSH-SUMP-00009 H-0304A (Melter 2 Equip. Decon. Pit Area, El. 0')	50	Dry Sump	30" X 24" X 16" Stainless Steel	**24590-HLW** -M6-RLD-20003001, Rev 0 -P1-P01T-00002, Rev 7
HPH-SUMP-00001 H-0136 (Canister Handling Cave, El. -3')	75	Dry Sump	30" Dia. X 18" Deep Stainless Steel	**24590-HLW** -M6-RLD-00016001, Rev 0
HPH-SUMP-00005 H-0136 (Canister Handling Cave, El. -3')	75	Dry Sump	30" Dia. X 18" Deep Stainless Steel	**24590-HLW** -M6-RLD-00004001, Rev. 0
HPH-SUMP-00003 H-B032 (Pour Tunnel 1, El. -21')	75	Dry Sump	30" Dia. X 18" Deep Stainless Steel	**24590-HLW** -M6-RLD-00016001, Rev 0

Table III.10.E.N - HLW Vitrification Plant Tank Systems Secondary Containment Systems, Including Sumps, Autosamplers, and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) Capacity	Sump Type	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RLD-ZF-03330-S11B-03 H-B021 (SBS Drain Collection Cell 1)	N/A	N/A	Line Size Pipe Dia 3” 316L Stainless Steel	**24590-HLW** -M6-RLD-00015001, Rev 0
RLD-ZF-03447-S11B-03 H-B005 (SBS Drain Collection Cell 2)	N/A	N/A	Line Size Pipe Dia 3” 316L Stainless Steel	**24590-HLW** -M6-RLD-20004001, Rev 0
RLD-FD-0186 H-0308 (Melter 1 - Active Services Cell, El. 37’)	N/A	N/A	Line Size Pipe Dia 6” Stainless Steel	**24590-HLW** -M6-RLD-00015001, Rev 0
RLD-FD-0187 H-0302 (Melter 2 - Active Services Cell, El. 37’)	N/A	N/A	Line Size Pipe Dia 6” Stainless Steel	**24590-HLW** -M6-RLD-20004001, Rev 0
ASX Sampler 00028 Lower Containment Trough/Dam (H-0305A, El. 37’)	N/A	N/A	3” Dia. Stainless Steel	**24590-HLW** -M6-RLD-00002002, Rev 0
ASX Sampler 00029 Lower Containment Trough/Dam (H-0315, El. 37’)	N/A	N/A	3” Dia. Stainless Steel	**24590-HLW** -M6-RLD-00002002, Rev 0
ASX Sampler 00042 Lower Containment Trough/Dam (H-0318, El. 37’)	N/A	N/A	3” Dia. Stainless Steel	**24590-HLW** -M6-RLD-00002002, Rev 0
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

Table III.10.E.O – Laboratory Tank Systems Primary[a] Containment Sump Systems

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[b] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RESERVED	RESERVED	RESERVED	RESERVED

[a] Primary sumps are defined in Permit Section III.10.C, and must comply with dangerous waste tank system requirements for tanks as described in WAC-173-303-640.

[b]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

1

Table III.10.E.P – Laboratory Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, and Floor Drains

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Type/Nominal Operating Volume (gallons)	Sump Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RLD-SUMP-00041 A-B003 (C3 Effluent Vessel Cell, El. -18’7’)	30	Dry	30” Dia. X ~13” Deep Stainless Steel	**24590-LAB** -M6-RLD-P0002, Rev 1 -P1-60-00007, Rev 3
RLD-SUMP-00042 A-B004 (C5 Effluent Vessel Cell, El. -19’2’)	30	Dry	30” Dia. X ~13” Deep Stainless Steel	**24590-LAB** -M6-RLD-P0001, Rev 2 -P1-60-00007, Rev 3
RLD-SUMP-00045 A-B002 (C3 Pump Pit Sump, EL -6’-81/2”LP)	1.56	Dry	2’-0” X 2’-6” X 1/2”	**24590-LAB** -M6-RLD-P0002, Rev 1 -P1-60-00007, Rev 3
RLD-SUMP-00043A A-B007 (C5 Pump Pit Sump, EL -6’-7”LP)	1.40	Dry	1’-6” X 3’-0” X 1/2” Stainless Steel	**24590-LAB** -M6-RLD-P0001, Rev 2 -P1-60-00007, Rev 3

Table III.10.E.P – Laboratory Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, and Floor Drains

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Type/Nominal Operating Volume (gallons)	Sump Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RLD-SUMP-00043B A-B005 (C5 Pump Pit Sump, EL -6'-7" LP)	1.40	Dry	1'-6" X 3'-0" X 1/2" Stainless Steel	**24590-LAB** -M6-RLD-P0001, Rev 2 -P1-60-00007, Rev 3
RLD-SUMP-00044 A-B006 (C5 Piping Pit Sump, EL -6'-7" LP)	1.56	Dry	2'-0" X 2'-6" X 1/2" Stainless Steel	**24590-LAB** -M6-RLD-P0001, Rev 2 -P1-60-00007, Rev 3
RLD-WU-02207-S11E-04 A-B003, (C3 Effluent Vessel Cell)	N/A	N/A	4" Dia 316L	**24590-LAB** -M6-RLD-P0002, Rev 1
RLD-ZN-02203-S11E-04 A-B004, (C5 Effluent Vessel Cell)	N/A	N/A	4" Dia 316L	**24590-LAB** -M6-RLD-P0001, Rev 2
RLD-ZN-03393-S11E-04 A-B004, (C5 Effluent Vessel Cell)	N/A	N/A	4" Dia 316L	**24590-LAB** -M6-RLD-P0001, Rev 2
RLD-ZN-03394-S11E-04 A-B004, (C5 Effluent Vessel Cell)	N/A	N/A	4" Dia 316L	**24590-LAB** -M6-RLD-P0001, Rev 2
RLD-LDB-00002 A-B004 (C5 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-P0008, Rev 1
RLD-LDB-00004 A-B004 (C5 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-P0008, Rev 1

Table III.10.E.P – Laboratory Tank Systems Secondary Containment Systems, Including Sumps, Leak Detection Boxes, and Floor Drains

Sump I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Type/Nominal Operating Volume (gallons)	Sump Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications Nos., etc.)
RLD-LDB-00005 A-B003 (C3 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-P0007, Rev 1
RLD-LDB-00006 A-B003 (C3 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-P0007, Rev 1
RLD-LDB-00007 A-B003 (C3 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-P0007, Rev 1
RLD-LDB-00008 A-B003 (C3 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-P0007, Rev 1
RLD-LDB-00009 A-B004 (C5 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-P0008, Rev 1
RLD-LDB-00011 A-B003 (C3 Effluent Vessel Cell, El. -10')	6	N/A	8" Dia. x 24" Length/ Stainless Steel	**24590-LAB** -M6-RLD-00007001, Rev 0
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

III.10.F CONTAINMENT BUILDING UNITS

III.10.F.1 Containment Building Units and Storage Limits

III.10.F.1.a Approved Waste and Storage Limits

III.10.F.1.a.i The Permittees may store and treat, in containment building units listed in Permit Table III.10.F.A., as modified by Permit Condition III.10.F.7.d.iv., all dangerous and mixed waste listed in the Part A Forms, Operating Unit Group 10, Addendum A of this Permit**,** except for those wastes outside the waste acceptance criteria specified in the WAP, Operating Unit Group 10, Addendum B, as approved pursuant to Permit Condition III.10.C.3. Total dangerous and mixed waste storage at the containment building units will not exceed the sum of the capacities in column 7 of Permit Table III.10.F.A., as modified pursuant to Permit Condition III.10.F.7.d.iv.

III.10.F.1.a.ii The Permittees may place and store dangerous and mixed waste only in the containment building units listed in Permit Table III.10.F.A., as modified pursuant to Permit Condition III.10.F.7.d.iv., in accordance with Permit Condition III.10.F., and in accordance with Operating Unit Group 10, Chapters 1.0 and 4.0, and Operating Unit Group 10, Appendices 8.1, 8.2, 8.4 through 8.10, 8.13, 8.15, 9.1, 9.2, 9.4 through 9.10, 9.13, 9.18, 10.1, 10.2, 10.4 through 10.10, 10.13, and 10.18 of this Permit, as approved pursuant to Permit Conditions III.10.F.7.c. and III.10.F.7.d. The Permittees will limit the volume of dangerous and mixed waste to quantities specified for the individual areas listed in column 7 of Permit Table III.10.F.A., as modified pursuant to Permit Condition III.10.F.7.d.iv.

III.10.F.1.b The Permittees will manage any ignitable, reactive, or incompatible waste in these units in accordance with WAC 173-303-395(1). Any containment building units specified in Permit Table III.10.F.A. in which ignitable, reactive, or incompatible waste are managed will meet the requirements specified in WAC 173-303-640(9) and (10), in accordance with WAC 173-303-680(2).

III.10.F.1.c The Permittees must maintain documentation in the operating record of the description and quantity of dangerous waste in each containment building unit listed in Permit Table III.10.F.A., as modified pursuant to Permit Condition III.10.F.7.d.iv., in accordance with WAC 173-303-380.

III.10.F.1.d The Permittees will ensure all certifications required by specialists (e.g., qualified, registered, professional engineer, etc.) use the following statement or equivalent pursuant to Permit Condition III.10.C.10.:

"I, (Insert Name) have (choose one or more of the following: overseen, supervised, reviewed, and/or certified) a portion of the design or installation of a new containment building unit or component located at (address), and owned/operated by (name(s)). My duties were: (e.g., design engineer, etc.), for the following containment building unit components (e.g., the venting piping, etc.), as required by the Resource Conservation and Recovery Act (RCRA) regulation(s), namely, 40 CFR 264.1101(c)(2) in accordance with WAC 173-303-695).

"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 inquiry of those individuals immediately responsible for obtaining the 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."

III.10.F.2 Containment Building Unit Design and Construction

III.10.F.2.a The Permittees will design and construct the containment building units identified in Permit Table III.10.F.A., as modified pursuant to Permit Condition III.10.F.7.d.iv., as specified in Operating Unit Group 10, Appendices 8.1, 8.2, 8.4 through 8.10, 8.13, 8.15, 9.1, 9.2, 9.4 through 9.10, 9.13, 9.18, 10.1, 10.2, 10.4 through 10.10, 10.13, and 10.18 of this Permit, as approved in accordance with Permit Condition III.10.F.7.a. and WAC 173-303-695.

III.10.F.2.b The Permittees will design and construct all applicable containment building units' secondary containment systems for each unit listed in Permit Table III.10.F.A., as specified in Operating Unit Group 10, Appendices 8.4 through 8.9, 8.15, 9.4 through 9.9, 9.18, 10.4 through 10.9, and 10.18 of this Permit, as approved in accordance with Permit Condition III.10.F.7.a. and WAC 173-303-695.

III.10.F.2.c Modifications to approved design plans and specifications, in Operating Unit Group 10, Appendices 8.1, 8.2, 8.4 through 8.10, 8.13, 8.15, 9.1, 9.2, 9.4 through 9.10, 9.13, 9.18, 10.1, 10.2, 10.4 through 10.10, 10.13, and 10.18 of this permit, for the containment building units will be allowed only in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2.f., or III.10.C.2.g., III.10.C.9.d, and III.10.C.9.e.

III.10.F.3 Containment Building Unit Management Practices

III.10.F.3.a The Permittees will manage all dangerous and mixed waste in containment building units in accordance with procedures described in Operating Unit Group 10, Appendices 8.15, 9.18, 10.18 and Addendum C of this Permit, as approved pursuant to Permit Condition III.10.F.7.d.iv.

III.10.F.3.b The Permittees will follow the description of operating procedures described in Operating Unit Group 10, Appendices 8.15, 9.18, 10.18 and Addendum C, of this permit, as approved pursuant to Permit Condition III.10.F.7.d.iv. and Permit Condition III.10.F.3., and as specified below:

III.10.F.3.b.i Maintain the primary barrier to be free of significant cracks, gaps, corrosion, or other deterioration that could cause dangerous and mixed waste to be released from the primary barrier;

III.10.F.3.b.ii Maintain the level of stored/treated dangerous and mixed waste within the containment building unit walls so that the height of the wall is not exceeded;

III.10.F.3.b.iii Take measures to prevent the tracking of dangerous and mixed waste out of the unit by personnel or by equipment used in handling the waste. An area must be designated to decontaminate equipment and any rinsate must be collected and properly managed;

III.10.F.3.b.iv Maintain the containment building unit at all times to prevent the spread of airborne dangerous and/or mixed waste contamination into less contaminated or uncontaminated areas. All air pollution control devices for exhaust from containment building unit must be properly maintained and operational when storing or treating dangerous and mixed waste in the containment building units;

III.10.F.3.b.v Collect and remove liquids and waste to minimize hydraulic head on the containment system at the earliest practicable time.

III.10.F.3.c The Permittees will inspect the containment building units per requirements in the Operating Unit Group 10, Addendum E1 of this permit, as approved pursuant to Permit Condition III.10.C.5., 40 CFR 264.1101(c)(4),in accordance with WAC 173-303-695 and WAC 173-303-320 and record in the Facility's operating record, at least once every seven (7) days, data gathered from monitoring equipment and leak detection equipment as well as the containment building unit and area immediately surrounding the containment building unit to detect signs of releases of dangerous and mixed waste.

III.10.F.3.d Throughout the active life of the containment building unit, if the Permittees detects a condition that could lead to or has caused a release of dangerous and/or mixed waste, the Permittees must repair the condition promptly, in accordance with the following procedures:

III.10.F.3.d.i Upon detection of a condition that has led to the release of dangerous and/or mixed waste (e.g., upon detection of leakage from the primary barrier) the Permittees must:

A. Enter a record of the discovery in the facility operating record;

B. Immediately remove the portion of the containment building unit affected by the condition from service;

C. Determine what steps must be taken to repair the containment building unit, remove any leakage from the secondary collection system, and establish a schedule for accomplishing the cleanup and repairs; and

D. Within seven (7) days after the discovery of the condition, notify Ecology of the condition, and within fourteen (14) working days, provide a written notice to Ecology with a description of the steps taken to repair the containment building unit, and the schedule for accomplishing the work.

III.10.F.3.d.ii Ecology will review the information submitted, make a determination regarding whether the containment building unit must be removed from service completely or partially until repairs and cleanup are complete, and notify the Permittees of the determination and underlying rationale in writing.

III.10.F.3.d.iii Upon completing all repairs and cleanup the Permittees must notify Ecology in writing and provide verification, signed by a qualified, registered, professional engineer, that repairs have been completed according to the written notice submitted in accordance with Permit Condition III.10.F.3.d.i.D.

III.10.F.4 Inspections [WAC 173-303-640(6)]

III.10.F.4.a The Permittees will inspect the containment building units in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E of this Permit, as modified pursuant to Permit Condition III.10.C.5.c.

III.10.F.4.b The inspection data for the containment building units will be recorded, and the records will be placed in the WTP Unit operating record, in accordance with Permit Condition III.10.C.4.

III.10.F.5 Recordkeeping (WAC 173-303-380)

For the containment building units, the Permittees will record and maintain in the WTP Unit operating record, all monitoring, calibration, recording, maintenance, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Conditions III.10.C.4. and III.10.C.5.

III.10.F.6 Closure

The Permittees will close the containment building units in accordance with Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

III.10.F.7 Compliance Schedule

III.10.F.7.a All information identified for submittal to Ecology in Permit Conditions III.10.F.7.b. through e. of this compliance schedule must be signed in accordance with requirements in WAC 173-303-810(12), as modified in accordance with Permit Condition III.10.F.1.d. [WAC 173-303-806(4)].

III.10.F.7.b Prior to initial receipt of dangerous and/or mixed waste, the Permittees will submit to Ecology a certification by a qualified, registered, professional engineer that the containment building units design meets the requirements of Permit Conditions III.10.F.1.and III.10.F.2. in accordance with Permit Condition III.10.F.7.a. The certification will also be stored in the WTP Unit operating record. For containment buildings units in Permit Table III.10.F.A., as modified pursuant to Permit Condition III.10.F.7.d.iv., identified as allowed to manage free liquids, the certification will include an additional demonstration that the containment building meets the requirements specified in 40 CFR 264.1101(b), in accordance with WAC 173-303-695.

III.10.F.7.c The Permittees submit to Ecology pursuant to Permit Condition III.10.C.9.f., prior to construction of the containment building unit containment system, and as appropriate, leak detection system for each containment building unit (per level, per WTP Unit building) as identified in Permit Condition III.10.F.1., Permit Tables III.10.F.A., engineering information as specified below, for incorporation, as appropriate, into Operating Unit Group 10, Appendices 8.1, 8.2, 8.3, 8.4 through 8.10, 8.13, 8.15, 9.1, 9.2, 9.4 through 9.10, 9.13, 9.18, 10.1, 10.2, 10.4 through 10.10, 10.13, and 10.18 of this Permit. At a minimum, engineering information specified below will show the following as required in accordance with WAC 173-303-695 (the information specified below will include dimensioned engineering drawings showing floors, walls, and ceilings/roof of the containment building units and other information on floor drains and sumps):

III.10.F.7.c.i Design drawings (General Arrangement Drawings in plan) and specifications for the foundation, containment, including liner/coating installation details and leak detection methodology, as appropriate [40 CFR 264.1101(a)(1) and (b), in accordance with WAC 173-303-695].

III.10.F.7.c.ii The Permittees provide the design criteria (references to codes and standards, load definitions and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the containment system. This information demonstrate the foundation will be capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift [40 CFR 264.1101(a)(2) in accordance with WAC 173-303-695, in accordance with WAC 173-303-695].

III.10.F.7.c.iii The Permittees provide documentation addressing how coatings will withstand the movement of personnel, waste, and equipment during the operating life of the containment building per 40 CFR 264.1101(a)(2), (a)(4), and (b) in accordance with WAC 173-303-695.

III.10.F.7.c.iv Containment/foundation and, as appropriate, for leak detection systems, materials selection documentation (including, but not limited to, concrete coatings and water stops, and liner materials as applicable [e.g. physical and chemical tolerances]) [40 CFR 264.1101(a)(4) and (b) in accordance with WAC 173-303-695].

III.10.F.7.c.v A detailed description of how the containment/foundation and, as appropriate, leak detection systems, will be installed.

III.10.F.7.c.vi Submit Permit Tables III.10.F.B and III.10.F.C, completed to provide for all secondary containment sumps and floor drains, the information as specified in each column heading, consistent with the information to be provided in i. through viii.

III.10.F.7.c.vii A detailed description of how fugitive emissions will be controlled such that any openings (e.g., doors, windows, vents, cracks, etc.) exhibit no visible emissions [40 CFR 264.1101(c)(1)(iv) in accordance with WAC 173-303-695].

III.10.F.7.c.viii Prior to installation, the Permittees will submit coating vendor information specific to containment buildings for incorporation into the Administrative Record [40 CFR 264.1101(a)(4) and (b) in accordance with WAC 173-303-695].

III.10.F.7.c.ix Prior to installation, leak detection system documentation (e.g. vendor information, etc.) consistent with information submitted under i. above, will be submitted for incorporation into the Administrative Record;

III.10.F.7.c.x Prior to installation, the Permittees will submit leak detection system instrumentation control logic narrative description (e.g., descriptions of fail-safe conditions, etc.);

III.10.F.7.c.xi Prior to installation, system descriptions related to leak detection systems will be submitted for incorporation into the Administrative Record;

III.10.F.7.c.xii For leak detection system instrumentation for containment buildings as identified in Permit Tables III.10.F.D., a detailed description of how the leak detection system instrumentation will be installed and tested [40 CFR 264.1101(b)(3) in accordance with WAC 173-303-695] will be submitted prior to installation.

Information pertaining to leak detection systems in Permit Conditions III.10.F.7.c.ix. through xii. Will be submitted pursuant to Permit Conditions III.10.E.9.d.vii., viii., x., and xiii.

III.10.F.7.d Prior to initial receipt of dangerous and mixed waste, in the WTP Unit, the Permittees will submit the following, as specified below, for incorporation into Operating Unit Group 10. The information specified below into Operating Unit Group 10, and incorporated pursuant to Permit Condition III.10.C.2.g. will be followed:

III.10.F.7.d.i Registered Professional Engineer certification documentation consistent with the information provided in III.10.F.7.b. and III.10.F.7.c. for incorporation in the Administrative Record. The certification must be maintained in the WTP Unit Operating Record [40 CFR 264.1101(c)(2)];

III.10.F.7.d.ii Updated Addendum C, Sections 4D.1, 4E.1, 4F.1, 4H.1, 4I.1, and the figures for containment building units identified in Permit Table III.10.F.A. (as modified pursuant to Permit Condition III.10.F.7.d.iv., consistent with Operating Unit Group 10, Appendices 8.1, 8.2, 8.4 through 8.10, 8.13, 8.15, 9.1, 9.2, 9.4 through 9.10, 9.13, 9.18, 10.1, 10.2, 10.4 through 10.10, 10.13, and 10.18, as approved pursuant Permit Conditions III.10.F.7.a. through d.);

III.10.F.7.d.iii Description of operating procedures demonstrating compliance with 40 CFR 264.1101(c) and (d) in accordance with WAC 173-303-695;

III.10.F.7.d.iv Permit Table III.10.F.A., amended as follows:

A. Under column 1, update and complete list of dangerous and mixed waste containment building units including room location and number.

B. Under column 2, update unit dimensions.

C. Under column 3, replace the 'Reserved' with the Operating Unit Group 10, Appendices 8.0, 9.0, and 10.0, subsections specific to containment building units as listed in column 1.

D. Under column 4, update and complete list of narrative description, tables, and figures.

E. Under column 5, replace the 'Reserved' to indicate if container storage is used in each containment building units (Yes or No) consistent with Permit Table III.10.D.A. updated pursuant to Permit Condition III.10.D.10.d.

F. Under column 6, replace the 'Reserved' to indicate if tank storage is used in each containment building units (Yes or No) consistent with Permit Tables III. 10.E.A-D., updated pursuant to Permit Condition III.10.E.9.e.vi.

G. Under column 7, replace the 'Reserved' with the maximum operating volume for each containment building unit, to include the container storage capacity specified in Permit Table III.10.D.A., tank capacity specified in Permit Tables III. 10.E.A-D. and update the total capacity for the containment building units.

H. Under column 8, update the status of each containment building unit.

III.10.F.7.d.v Permit Table III.10.F.D. will be completed for Containment Building leak detection system instrumentation and parameters to provide the information as specified in each column heading. Leak detection system monitors and instruments for critical systems as specified in Operating Unit Group 10, Appendix 2.0 and as updated pursuant to Permit Condition III.10.C.9.b. will be addressed.

III.10.F.7.e All information provided under Permit Condition III.10.F.7.d. must be consistent with information provided pursuant to Permit Conditions III.10.F.7.a. through d., as approved by Ecology.

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
Pretreatment Plant							
P-0123 Pretreatment Hotcell Containment Building	350x51x52	RESERVED	Section 4D.3.1; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
Pretreatment Maintenance Containment Building							
PM0124 Hotcell Crane Maintenance Mezzanine	27 x 51 x 33	RESERVED	Section 4D.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0121A Spent Resin Dewatering	28 × 18 × 28	RESERVED	Section 4D.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0122A Waste Packaging Area	26 × 51 × 28	RESERVED	Section 4D.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0123A Remote Decontamination Maintenance Cell	55 × 51 × 52	RESERVED	Section 4D.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0124 C3 Workshop	(24 × 24 × 16) + (34 x 24 x 15)	RESERVED	Section 4D.3.2; Table C-7; and	RESERVED	RESERVED	RESERVED	No

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
			Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.				
P-0124A C3 Workshop	(73 + 15 × 15) + (16 × 15 + 15)	RESERVED	Section 4D.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0125 Cask Lidding Airlock & Equipment Chase	24 × 20 × 28	RESERVED	Section 4D.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0125ACask Lidding Room	28 × 18 × 25	RESERVED	Section 4D.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0128A MSM Repair Area	24 × 18 × 28	RESERVED	Section 4D.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0128 MSM Testing Room	24 × 17 × 27	RESERVED	Section 4D.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
P-0223 Spent Filter Drum Handling Area Containment Building	54 x 18 x 26	RESERVED	Section 4D.3.3; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
P-0335 Filter Cave Containment Building	198 x 51 x 52	RESERVED	Section 4D.3.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
P-0431A General Filter Rm	RESERVED	RESERVED	Section 4D.3.5; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
LAW Vitrification Plant							
L-0112 LAW LSM Gallery Containment Building	150x62x24	RESERVED	Section 4E.3.1; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	Yes
LAW Container Finishing Containment Building		RESERVED	Section 4E.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
L-0109B Swabbing Area Line 2	21×15×24	RESERVED	Section 4E.3.2; Table C-7; and	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
			Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.				
L-0109C Decontamination Area Line 2	18×15×24	RESERVED	Section 4E.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-0109D Inert Fill Area Line 2	55×15×24	RESERVED	Section 4E.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-0115B Swabbing Area Line 1	21×15×24	RESERVED	Section 4E.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-0115C Decontamination Area Line 1	18×15×24	RESERVED	Section 4E.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-0115D Inert Fill Area Line 1	55×15×24	RESERVED	Section 4E.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
L-0109E Container/Monitoring/ Export Area	19×18×14	RESERVED	Section 4E.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-0115E Container/Monitoring/ Export Area	19×18×14	RESERVED	Section 4E.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-0119B LAW Consumable Import/Export Containment Building	30x28x17	RESERVED	Section 4E.3.3; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	Yes
L-226A LAW C3 Workshop Containment Building	34x22x19	RESERVED	Section 4E.3.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
LAW Pour Cave Containment Building		RESERVED	Section4E.3.5; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
L-B015A Melter 1 Pour Cave	16.5×20x23	RESERVED	Section 4E.3.5; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-B013C Melter 1 Pour Cave	16.5×20x23	RESERVED	Section 4E.3.5; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-B013B Melter 2 Pour Cave	16.5×20x23	RESERVED	Section 4E.3.5; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-B011C Melter 2 Pour Cave	16.5×20x23	RESERVED	Section 4E.3.5; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-B011B Future Melter 3 Pour Cave	16.5×20x23	RESERVED	Section 4E.3.5; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
L-B009B Future Melter 3 Pour Cave	16.5×20x23	RESERVED	Section 4E.3.5; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
LAW Buffer Container Containment Building		RESERVED	Section 4E.3.6; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-B025C Container Buffer Store	22x22x23	RESERVED	Section 4E.3.6; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
L-B025D Container Rework	22x14x23	RESERVED	Section 4E.3.6; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
HLW Vitrification Plant							
HLW Melter Cave 1 Containment Building: H-0117 Melter Cave 1 H-0116B Melter Cave 1 C3/C5 Airlock	 75 x 32 x 54 24 x 25 x 54 20 x 9 x 10	RESERVED	Section 4F.3.1; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
H-0310A Melter Cave 1 Equipment Decon Pit							
HLW Melter Cave 2 Containment Building: H-0106 Melter Cave 2 H-0105B Melter Cave 2 C3/C5 Airlock H-0304A Melter Cave 2 Equipment Decon Pit	75 x 32 x 54 24 x 25 x 54 20 x 9 x 10	RESERVED	Section 4F.3.1; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
H-0136 IHLW Canister Handling Cave Containment Building	18 x 140 x 54	RESERVED	Section 4F.3.2; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
H-0133 IHLW Canister Swab and Monitoring Cave Containment Building	41 x 11 x 54	RESERVED	Section 4F.3.3; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
HLW C3 Workshop Containment Building: H-0311A C3 Workshop H-0311B MSM Maintenance Workshop	19 x 30 x 22 58 x 69 x 22	RESERVED	Section 4F.3.4; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
H-0104 HLW Filter Cave Containment Building	105 x 36 x 36	RESERVED	Section 4F.3.5; Table C-7; and	RESERVED	RESERVED	RESERVED	No

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids
			Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.				
H-B032 HLW Pour Tunnel 1 Containment Building	85 x 11 x 30	RESERVED	Section 4F.3.6; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
H-B005A HLW Pour Tunnel2 Containment Building	85 x 11 x 30	RESERVED	Section 4F.3.6; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	No
HLW Waste Handling Area Containment Building: H-0410B E&I Room H-0411 Waste Handling Room	17 x 20 x 10 25 x 54 x 10	RESERVED	Section 4F.3.8; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED
HLW Drum Swabbing and Monitoring Area: H-0126A Crane Maintenance Room H-0126B Swabbing and Monitoring Room H-028 Cask Import/Export Room	15 x 20 x 31 30 x 18 x 31 15 x 45 x 43	RESERVED	Section 4F.3.7; Table C-7; and Fig. C1-59 (Sheets 1-2) of Operating Unit Group 10, Addendum C of this Permit.	RESERVED	RESERVED	RESERVED	RESERVED

Table III.10.F.A – Containment Building Unit Description

Mixed Waste Containment Building Units[a] & Systems	Dimensions (LxWxH) (in feet)	Unit Description	Narrative Description and Figures	Container Storage Areas[b]	Tank Systems[c]	Containment Building Capacity (cu ft)	Manage Free Liquids

[a]Containment Building Units include associated process systems and equipment
[b]Requirements pertaining to the containers in the Containment Building Units are specified in Section III.10.D. of this Permit.
[c]Requirements pertaining to the tanks in the Containment Building Units are specified in Section III.10.E. of this Permit.

1

Table III.10.F.B – Containment Building Primary[a] Containment Sump Systems

Sump I.D.# & Room Location	Maximum Capacity (gallons)	Dimensions[b] (feet) & Materials of Construction	Maximum Allowable Liquid Height (inches)	Secondary Containment Volume (gallons)	Unit Description Drawings
PWD-SUMP-00026 P-0123 (El. 0')	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
PWD-SUMP-00028 P-0123 (El. 0')	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
PWD-SUMP-00029 P-0123 (El. 0')	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
PWD-SUMP-00032 P-0123A	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
PWD-SUMP-00033 P-0123A (El. 0')	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a] Primary sumps are defined in Permit Section III.10.C, and must comply with dangerous waste tank system requirements for tanks as described in WAC-173-303-640.
[b]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

2

Table III.10.F.C – Containment Building Secondary Containment Systems Including Sumps and Floor Drains

Sump or Drain Line I.D.# & Room Location	Maximum Sump (gallons) or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawing Nos., Specifications No.'s, etc.)
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
[a]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).				

1

Table III.10.F.D – Containment Building Leak Detection System Instrumentation and Parameters

Containment Building Locator and Name (including P&ID)	Type of Leak Detection Instrument	Location of Leak Detection Instrument (Tag No.)	Leak Detection Instrument Range	Expected Range	Fail States	Leak Detection Instrument Accuracy	Leak Detection Instrument Calibration Method No. and Range
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
[a]Locator (including P&ID designator) is located on Permit Table III.10.F.C – Containment Building Secondary Containment Systems Including Sumps and Floor Drains.							

2

3

4

This page intentionally left blank.

III.10.G PRETREATMENT PLANT MISCELLANEOUS UNIT SYSTEMS

Unless otherwise noted in Table III.10.G.A, for purposes of Permit Section III.10.G., where reference is made to WAC 173-303-640, the following substitutions apply: substitute the terms "Pretreatment Plant Miscellaneous Unit System(s)" for "tank system(s)," "miscellaneous unit(s)" for "tank(s)," "equipment" for "ancillary equipment," and "miscellaneous unit(s) or equipment of a Pretreatment Plant Miscellaneous Unit System" for "component(s)" in accordance with WAC 173-303-680. Miscellaneous unit systems, exempt from the WAC-173-303-640 requirements in Permit Section III.10.G are noted as exempt in Table III.10.G.A.

III.10.G.1 Waste and Storage Limits

III.10.G.1.a The Permittees may process, in the Pretreatment Plant Miscellaneous Unit Systems listed in Permit Table III.10.G.A, as approved/modified pursuant to Permit Condition III.10.G.10, all dangerous and mixed waste listed in the Part A Forms, Operating Unit Group 10, Addendum A of this Permit, and in accordance with in the WAP, Operating Unit Group 10, Addendum B of this Permit, as approved pursuant to Permit Condition III.10.C.3. Total Pretreatment Plant Miscellaneous Unit dangerous and mixed waste storage at the Facility will not exceed the limits specified in Permit Table III.10.G.A.

III.10.G.1.b The Permittees may process dangerous and mixed waste only in approved Pretreatment Plant Miscellaneous Unit Systems listed in Permit Table III.10.G.A in accordance with Permit Section III.10.G and in accordance with Operating Unit Group 10, Chapters 1.0 and 4.0 of this Permit, and Operating Unit Group 10, Appendices 8.1 through 8.15 of this Permit, as approved pursuant to Permit Conditions III.10.G.10.b. through e. The Permittees will limit the total volume of wastes to quantities specified for the individual miscellaneous units listed in Permit Table III.10.G.A.

III.10.G.1.c The Permittees will manage ignitable and reactive, and incompatible waste in accordance with WAC 173-303-395(1). Any Pretreatment Plant Miscellaneous Unit System specified in Permit Tables III.10.G.A and III.10.G.B in which ignitable, reactive or incompatible waste are managed will meet the requirements specified in WAC 173-303-640(9) and (10), in accordance to WAC 173-303-680.

III.10.G.1.d The Permittees will ensure all certifications required by specialists (e.g., independent, qualified, registered professional engineer; independent corrosion expert; independent, qualified installation inspector; etc.) use the following statement or equivalent pursuant to Permit Condition III.10.C.10:

"I, (Insert Name) have (choose one or more of the following: overseen, supervised, reviewed, and/or certified) a portion of the design or installation of a new miscellaneous unit system or component located at (address), and owned/operated by (name(s)). My duties were: (e.g., installation inspector, testing for tightness, etc.), for the following miscellaneous unit system components (e.g., the venting piping, etc.), as required by the Dangerous Waste Regulations, namely, WAC 173-303-640(3) (applicable paragraphs (i.e., (a) through (g)) in accordance with WAC 173-303-680).

"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 inquiry of those individuals immediately responsible for obtaining the 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."

III.10.G.1.e In all future narrative permit submittals, the Permittees will include miscellaneous unit system names with the unit designation (e.g., Waste Feed Evaporator Separator Vessels are designated V11002A and V11002B, respectively).

III.10.G.2 Miscellaneous Unit Systems Design and Construction [WAC 173-303-640, in accordance with WAC 173-303-680(2) and WAC 173-303-340].

III.10.G.2.a The Permittees will construct the Pretreatment Plant Miscellaneous Unit Systems identified in Permit Table III.10.G.A, as specified in Operating Unit Group 10, Appendices 8.1 through 8.14 of this Permit, as approved pursuant to Permit Conditions III.10.G.10.b., III.10.G.10.c., and III.10.G.10.d.

III.10.G.2.b The Permittees will construct secondary containment systems for the Pretreatment Plant Miscellaneous Unit Systems identified in Permit Tables III.10.G.A and III.10.G.B, as specified in Operating Unit Group 10, Appendices 8.2, 8.4 through 8.14 of this Permit, as approved pursuant to Permit Conditions III.10.G.10.b., III.10.G.10.c., and III.10.G.10.d.

III.10.G.2.c Modifications to approved design, plans, and specifications in Operating Unit Group 10 of this Permit for the Pretreatment Plant Miscellaneous Unit Systems will be allowed only in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g., III.10.C.9.d., e., and h.

III.10.G.3 Miscellaneous Unit System Installation and Certification [WAC 173-303-640, in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-340].

III.10.G.3.a The Permittees must ensure that proper handling procedures are adhered to in order to prevent damage to Pretreatment Plant Miscellaneous Unit Systems during installation. Prior to covering, enclosing, or placing a new Pretreatment Plant Miscellaneous Unit System(s) or component(s) in use, an independent, qualified, installation inspector or an independent, qualified, registered professional engineer, either of whom is trained and experienced in the proper installation of similar systems or components, must inspect the system for the presence of any of the following items:

III.10.G.3.a.i Weld breaks;

III.10.G.3.a.ii Punctures;

III.10.G.3.a.iii Scrapes of protective coatings;

III.10.G.3.a.iv Cracks;

III.10.G.3.a.v Corrosion;

III.10.G.3.a.vi Other structural damage or inadequate construction/installation;

III.10.G.3.a.vii All discrepancies must be remedied before the Pretreatment Plant Miscellaneous Unit Systems are covered, enclosed, or placed in use [WAC 173-303-640(3)(c) in accordance with WAC 173-303-680(2) and (3)].

III.10.G.3.b For Pretreatment Plant Miscellaneous Unit Systems or components that are placed underground and that are back-filled, the Permittees must provide a backfill material that is a non-corrosive, porous, homogeneous substance. The backfill must be installed so that it is placed completely around the miscellaneous unit and compacted to ensure that the miscellaneous unit and piping are fully and uniformly supported [WAC 173-303-640(3)(d), in accordance with WAC 173-303-680(2) and (3)].

III.10.G.3.c The Permittees must test for tightness all new Pretreatment Plant miscellaneous units and equipment, prior to being covered, enclosed, or placed into use. If the Pretreatment Plant Miscellaneous Unit Systems are found not to be tight, all repairs necessary to remedy the

leak(s) in the system must be performed prior to the Pretreatment Plant Miscellaneous Units Systems being covered, enclosed, or placed in use [WAC 173-303-640(3)(e), in accordance with WAC 173-303-680(2) and (3)].

III.10.G.3.d The Permittees must ensure Pretreatment Plant Miscellaneous Unit Systems equipment is supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction [WAC 173-303-640(3)(f), in accordance with WAC 173-303-680(2) and (3)].

III.10.G.3.e The Permittees must provide the type and degree of corrosion protection recommended by an independent corrosion expert, based on the information provided in Operating Unit Group 10, Appendices 8.9 and 8.11 as approved pursuant to Permit Conditions III.10.G.10.b.i., III.10.G.10.b.iv., III.10.G.10.b.v., III.10.G.10.c.i., III.10.G.10.c.iv., III.10.G.10.c.v., and III.10.G.10.d.i., III.10.G.10.d.iv. III.10.G.10.d.v., or other corrosion protection if Ecology believes other corrosion protection is necessary to ensure the integrity of the Pretreatment Plant Miscellaneous Unit Systems during use of the Pretreatment Plant Miscellaneous Unit Systems. The installation of a corrosion protection system that is field fabricated must be supervised by an independent corrosion expert to ensure proper installation [WAC 173-303-640(3)(g), in accordance with WAC 173-303-680(2) and (3)].

III.10.G.3.f Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will obtain, and keep on file in the WTP Unit operating record, written statements by those persons required to certify the design of the Pretreatment Plant Miscellaneous Unit Systems and supervise the installation of the Pretreatment Plant Miscellaneous Unit Systems, as specified in WAC 173-303-640(3)(b), (c), (d), (e), (f), and (g), in accordance with WAC 173-303-680, attesting that each Pretreatment Plant Miscellaneous Unit System and corresponding containment system listed in Permit Tables III.10.G.A and III.10.G.B, as approved/modified pursuant to Permit Condition III.10.G.10., were properly designed and installed, and that repairs, in accordance with WAC 173-303-640(3)(c) and (e), were performed [WAC 173-303-640(3)(a), WAC 173-303-640(3)(h), in accordance with WAC 173-303-680(3)].

III.10.G.3.g The independent Pretreatment Plant Miscellaneous Unit System installation inspection and subsequent written statements will be certified in accordance with WAC 173-303-810(13)(a) as modified pursuant to Permit Condition III.10.G.1.d., comply with all requirements of WAC 173-303-640(3)(h), in accordance with WAC 173-303-680, and will consider, but not be limited to, the following miscellaneous unit system installation documentation:

III.10.G.3.g.i Field installation report with date of installation;

III.10.G.3.g.ii Approved welding procedures;

III.10.G.3.g.iii Welder qualifications and certification;

III.10.G.3.g.iv Hydro-test reports, as applicable, in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section VIII, Division 1, American Petroleum Institute (API) Standard 620, or Standard 650 as applicable;

III.10.G.3.g.v Tester credentials;

III.10.G.3.g.vi Field inspector credentials;

III.10.G.3.g.vii Field inspector reports;

III.10.G.3.g.viii Field waiver reports; and

III.10.G.3.g.ix Non-compliance reports and corrective action (including field waiver reports) and repair reports.

III.10.G.4 Integrity Assessments [WAC 173-303-340 and WAC 173-303-640, in accordance with WAC 173-303-680(2) and (3)].

III.10.G.4.a The Permittees will ensure periodic integrity assessments are conducted on the Pretreatment Plant Miscellaneous Unit Systems listed in Permit Table III.10.G.A, as approved/modified pursuant to Permit Condition III.10.G.10., over the term of this Permit in accordance with WAC173-303-680(2) and (3) as specified in WAC 173-303-640(3)(b), following the description of the integrity assessment program and schedule in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.G.10.e.i. and III.10.C.5.c. Results of the integrity assessments will be included in the WTP Unit operating record until ten (10) years after post-closure, or corrective action is complete and certified, whichever is later.

III.10.G.4.b The Permittees will address problems detected during Pretreatment Plant Miscellaneous Unit Systems integrity assessments specified in Permit Condition III.10.G.4.a. following the integrity assessment program in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.G.10.e.i. and III.10.C.5.c.

III.10.G.4.c The Permittees must immediately and safely remove from service any Pretreatment Plant Miscellaneous Unit System or secondary containment system which through an integrity assessment is found to be "unfit for use" as defined in WAC 173-303-040, following Permit Condition III.10.G.5.j.i. through iv., and vi. The affected Pretreatment Plant Miscellaneous Unit or secondary containment system must be either repaired or closed in accordance with Permit Condition III.10.G.5.j.v. [WAC 173-303-640(7)(e) and (f) and WAC 173-303-640(8), in accordance with WAC 173-303-680(3)].

III.10.G.5 Miscellaneous Unit Management Practices

III.10.G.5.a No dangerous and/or mixed waste will be managed in the Pretreatment Plant Miscellaneous Unit Systems unless the operating conditions, specified under Permit Condition III.10.G.5, are complied with.

III.10.G.5.b The Permittees will install and test all process and leak detection system monitoring/instrumentation, as specified in Permit Table III.10.G.C, as approved/modified pursuant to Permit Condition III.10.G.10, in accordance with Operating Unit Group 10, Appendices 8.1, 8.2, and 8.14 of this Permit, as approved pursuant to Permit Condition III.10.G.10.d.x.

III.10.G.5.c The Permittees will not place dangerous and/or mixed waste, treatment reagents, or other materials in the Pretreatment Plant Miscellaneous Unit Systems if these substances could cause the systems to rupture, leak, corrode, or otherwise fail [WAC 173-303-640(5)(a), in accordance with WAC 173-303-680(2)].

III.10.G.5.d The Permittees will operate the Pretreatment Plant Miscellaneous Unit Systems to prevent spills and overflows using the description of controls and practices, as required under WAC 173-303-640(5)(b), described in Permit Condition III.10.C.5, and Operating Unit Group 10, Appendix 8.15 of this Permit, as approved pursuant to Permit Condition

III.10.G.10.e.iv. [WAC 173-303-640(5)(b), in accordance with WAC 173-303-680(2) and (3) and WAC 173-303-806(4)(c)(ix)].

III.10.G.5.e For routinely non-accessible Pretreatment Plant Miscellaneous Unit Systems, as specified in Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.G.10.e.vi., the Permittees will mark all routinely non-accessible Pretreatment Plant Miscellaneous Unit System access points with labels or signs to identify the waste contained in the units. The label, or sign, must be legible at a distance of at least fifty (50) feet and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the miscellaneous unit system(s). For the purposes of this Permit condition, "routinely non-accessible" means personnel are unable to enter these areas while waste is being managed in them [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.G.5.f For all Pretreatment Plant Miscellaneous Unit Systems not addressed in Permit Condition III.10.G.5.e, the Permittees will mark all these miscellaneous unit systems holding dangerous and/or mixed waste with labels or signs to identify the waste contained in the unit. The labels, or sign, must be legible at a distance of at least fifty (50) feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the miscellaneous unit system(s) [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.G.5.g. The Permittees will ensure that the secondary containment systems for Pretreatment Plant Miscellaneous Unit Systems listed in Permit Tables III.10.G.A and III.10.G.B, as approved/modified pursuant to Permit Condition III.10.G.10, are free of cracks or gaps to prevent any migration of dangerous and/or mixed waste or accumulated liquid out of the system to the soil, ground water, or surface water at any time waste is in the Pretreatment Plant Miscellaneous Units System. Any indication that a crack or gap may exist in the containment systems will be investigated and repaired in accordance with Operating Unit Group 10, Appendix 8.15 of this Permit, as approved pursuant to Permit Condition III.10.G.10.e.v. [WAC 173-303–640(4)(b)(i), WAC 173-303–640(4)(e)(i)(C), and WAC 173-303-640(6) in accordance with WAC 173-303-680(2) and (3), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-320].

III.10.G.5.i. An impermeable coating, as specified in Operating Unit Group 10, Appendices 8.4, 8.5,8.7, 8.9, 8.11, and 8.12 of this Permit, as approved pursuant to Permit Condition III.10.G.10.b.v. of this Permit, will be maintained for all concrete containment systems and concrete portions of containment systems for each Pretreatment Plant Miscellaneous Unit System listed in Permit Tables III.10.G.A and III.10.G.B, as approved/modified pursuant to Permit Condition III.10.G.10 [concrete containment systems that do not have a liner pursuant to WAC-173-303-640(4)(e)(i), in accordance with WAC 173-303-680(2), and have construction joints, will meet the requirements of WAC 173-303-640(4)(e)(ii)(C), in accordance with WAC 173-303-680(2)]. The coating will prevent migration of any dangerous and mixed waste into the concrete. All coatings will meet the following performance standards:

III.10.G.5.i.i. The coating must seal the containment surface such that no cracks, seams, or other avenues through which liquid could migrate are present;

III.10.G.5.i.ii. The coating must be of adequate thickness and strength to withstand the normal operation of equipment and personnel within the given area such that degradation or physical

damage to the coating or lining can be identified and remedied before dangerous and mixed waste could migrate from the system; and

III.10.G.5.i.iii. The coating must be compatible with the dangerous and mixed waste, treatment reagents, or other materials managed in the containment system [WAC 173-303-640(4)(e)(ii)(D), in accordance with WAC 173-303-680(2) and (3) and WAC 173-303-806(4)(i)(i)(A)].

III.10.G.5.j. The Permittees will inspect all secondary containment systems for the Pretreatment Plant Miscellaneous Unit Systems listed in Permit Tables III.10.G.A and III.10.G.B., as approved/modified pursuant to Permit Condition III.10.G.10., in accordance with the Inspection Schedule specified in Operating Unit Group 10, Addendum E1 of this Permit, as approved pursuant to Permit Conditions III.10.G.10.e.i. and III.10.C.5.c., and take the following actions if a leak or spill of dangerous and/or mixed waste is detected in these containment systems [WAC 173-303-640(5)(c) and WAC 173-303-640(6), in accordance with WAC 173-303-680(2) and (3), WAC 173-303-320, and WAC 173-303-806(4)(i)(i)(B)]:

III.10.G.5.j.i. Immediately and safely stop the flow of dangerous and/or mixed waste into the miscellaneous unit system or secondary containment system;

III.10.G.5.j.ii. Determine the source of the dangerous and/or mixed waste;

III.10.G.5.j.iii. Remove the waste from the containment area in accordance with WAC 173-303-680(2) and (3), as specified in WAC 173-303-640(7)(b). The dangerous and/or mixed waste removed from containment areas of miscellaneous unit systems will be, as a minimum, managed as dangerous and/or mixed waste;

III.10.G.5.j.iv. If the cause of the release was a spill that has not damaged the integrity of the miscellaneous unit system, the Permittees may return the miscellaneous unit system to service in accordance with WAC 173-303-680(2) and (3), as specified in WAC 173-303-640(7)(e)(ii). In such a case, the Permittees will take action to ensure the incident that caused liquid to enter the containment system will not reoccur [WAC 173-303-320(3)];

III.10.G.5.j.v. If the source of the dangerous and/or mixed waste is determined to be a leak from the primary Pretreatment Plant Miscellaneous Unit System into the secondary containment system, or the system is unfit for use as determined through an integrity assessment or other inspection, the Permittees must comply with the requirements of WAC 173-303-640(7), and take the following actions:

A Close the miscellaneous unit following procedures in WAC 173-303-640(7)(e)(i) and in accordance with WAC 173-303-680, and Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8; or

B. Repair and re-certify (in accordance with WAC 173-303-810(13)(a), as modified pursuant to Permit Condition III.10.G.1.d.) the Pretreatment Plant Miscellaneous Unit System in accordance with Operating Unit Group 10, Appendix 8.15 of this Permit, as approved pursuant to Permit Condition III.10.G.10.e.v. before the Pretreatment Plant Miscellaneous Unit System is placed back into service [WAC 173-303-640(7)(e)(iii) and WAC 173-303-640(7)(f), in accordance with WAC 173-303-680].

III.10.G.5.j.vi. The Permittees will document, in the operating record, actions/procedures taken to comply with i. through v. above, as specified in WAC 173-303-640(6)(d) and in accordance with WAC 173-303-680(2) and (3).

III.10.G.5.j.vii. In accordance with WAC 173-303-680(2) and (3), the Permittees will notify and report releases to the environment to Ecology as specified in WAC 173-303-640(7)(d).

III.10.G.5.k. If liquids (e.g., Dangerous and/or mixed waste leaks and spills, precipitation, fire water, liquids from damaged or broken pipes) cannot be removed from the secondary containment system within twenty-four (24) hours, Ecology will be verbally notified within twenty-four (24) hours of discovery. The notification will provide the information in A., B., and C. listed below. The Permittees will provide Ecology with a written demonstration, within seven (7) business days, identifying at a minimum [WAC 173-303-640(4)(c)(iv) and WAC 173-303-640(7)(b)(ii), in accordance with WAC 173-303-680(3) and WAC 173-303-806(4)(i)(i)(B)]:

A. Reasons for delayed removal.

B. Measures implemented to ensure continued protection of human health and the environment.

C. Current actions being taken to remove liquids from secondary containment.

III.10.G.5.l. The Permittees will operate the Pretreatment Plant Miscellaneous Unit Systems in accordance with Operating Unit Group 10, Addendum C as updated pursuant to Permit Condition III.10.G.10.e.vi. and Appendix 8.15 of this Permit, as approved pursuant to Permit Condition III.10.G.10.e., and the following:

III.10.G.5.l.i. The Permittees will operate the Pretreatment Plant Miscellaneous Unit Systems in order to maintain the systems and process parameters listed in Permit Table III.10.G.C. as approved/modified pursuant to Permit Condition III. 10.G.10., within the operating trips and operating ranges specified in Permit Table III.10.G.C., and consistent with assumptions and basis which are reflected in Operating Unit Group 10, Appendix 6.3.1, as approved pursuant to Permit Condition III.10.C.11.b. [WAC 173-303-815(2)(b)(ii) and WAC 173-303-680(2) and (3)]. For the purposes of this Permit Condition, Operating Unit Group 10, Appendix 6.3.1. will be superseded by Appendix 6.4.1. upon its approval pursuant to either Permit Conditions III.10.C.11.c. or III.10.C.11.d.

III.10.G.5.l.ii. The Permittees will calibrate/function test the instruments listed in Permit Table III.10.G.C., in accordance with Operating Unit Group 10, Appendix 8.15, as approved pursuant to Permit Condition III.10.G.10.e.xii.

III.10.G.5.m. For any portion of the Pretreatment Plant Miscellaneous Unit Systems which have the potential for formation and accumulation of hydrogen gases, the Permittees will operate the portion to maintain hydrogen levels below the lower explosive limit [WAC 173-303-815(2)(b)(ii)].

III.10.G.5.n. For each miscellaneous unit holding dangerous waste which are acutely or chronically toxic by inhalation, the Permittees will operate the system to prevent escape of vapors, fumes, or other emissions into the air [WAC 173-303-806(4)(i)(i)(B) and WAC 173-303-640(5)(e), in accordance with WAC 173-303-680].

III.10.G.6 Air Emissions

III.10.G.6.a Treatment effectiveness, feed-rates, and operating rates for dangerous and mixed waste systems and sub-systems contained in the Pretreatment Plant (as specified in Permit Tables III.10.E.A, III.10.F.A, and III.10.G.A, as approved/modified pursuant to Permit Conditions III.10.E.9., III.10.F.5., III.10.G.10., respectively) will be as specified in Permit Sections III.10.E, III.10.F, and III.10.G, and consistent with the assumptions and basis reflected in Operating Unit Group 10, Appendix 6.3.1 of this Permit, as approved

pursuant to Permit Condition III.10.C.11.b. For the purposes of this permit condition, Operating Unit Group 10, Appendix 6.3.1 will be superseded by Appendix 6.4.1, upon its approval, pursuant to either Permit Condition III.10.C.11.c. or III.10.C.11.d. [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)].

III.10.G.6.b Compliance with Permit Condition III.10.G.6.a. of this Permit will be regarded as operating within the emission limits specified in Permit Table III.10.G.D., as approved pursuant to Permit Conditions III.10.C.11.b., III.10.C.11.c., or III.10.C.11.d. of this Permit.

III.10.G.6.c All air pollution control devices and capture systems in the Pretreatment Plant Miscellaneous Unit Systems will be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants and to minimize process upsets. Procedures for ensuring that the above equipment is properly operated and maintained so as to minimize the emission of air contaminants and process upsets will be established.

III.10.G.6.d The Permittees will ensure that for all dangerous and/or mixed waste areas, systems, and units contained in the Pretreatment Plant (as specified in Permit Tables III.10.E.A, III.10.F.A, and III.10.G.A, as approved pursuant to Permit Conditions III.10.E.9.e.xii., III.10.F.7.d.iv., and III.10.G.10.e.ix., respectively), the Pretreatment Vessel Vent Process System specified in Permit Table III.10.G.A.i will be in operation prior to waste being introduced into these dangerous and/or mixed waste areas, systems, and units contained in the Pretreatment Building. At any time the Pretreatment Vessel Vent Process System ceases to operate or produces insufficient vacuum to recover emissions from the areas, systems, or units, the Permittees will not commence new treatment activities within the dangerous and mixed waste areas, systems, or units contained in the Pretreatment Building, and take measures to minimize evolution of emissions from on-going treatment, and will not receive new dangerous and/or mixed waste shipments into the Pretreatment Building. The Permittees will not re-commence new treatment activities until the Pretreatment Vessel Vent Process System is operational and producing sufficient vacuum to recover emissions.

III.10.G.7 Inspections [WAC 173-303-680(3)]

III.10.G.7.a The Permittees will inspect the Pretreatment Plant Miscellaneous Unit Systems in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E1 of this Permit, as modified in accordance with Permit Condition III.10.C.5.c.

III.10.G.7.b The inspection data for Pretreatment Plant Miscellaneous Unit Systems will be recorded, and the records will be placed in the WTP Unit operating record for the Pretreatment Plant Miscellaneous Unit Systems, in accordance with Permit Condition III.10.C.4.

III.10.G.8 Recordkeeping

The Permittees will record and maintain in the WTP Unit operating record for the Pretreatment Plant Miscellaneous Unit Systems, all monitoring, calibration, maintenance, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Conditions III.10.C.4 and III.10.C.5.

III.10.G.9 Closure

The Permittees will close the Pretreatment Plant Miscellaneous Unit Systems in accordance with Operating Unit Group 10, Addendum H, as approved pursuant to Permit Condition III.10.C.8.

III.10.G.10 Compliance Schedule

III.10.G.10.a All information identified for submittal to Ecology in a. through e. of this compliance schedule must be signed and certified in accordance with requirements in WAC 173-303-810(12), as modified in accordance with Permit Condition III.10.G.1.d. [WAC 173-303-806(4)].

III.10.G.10.b The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to construction of each secondary containment and leak detection system for the Pretreatment Plant Miscellaneous Unit Systems (per level) as identified in Permit Tables III.10.G.A and III.10.G.B, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 8.2, 8.4, 8.5, 8.7, 8.8, 8.9, 8.11, and 8.12 of this Permit. At a minimum, engineering information specified below will show the following as described in WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings and information on sumps and floor drains):

III.10.G.10.b.i IQRPE Reports (specific to foundation, secondary containment, and leak detection system) will include review of design drawings, calculations, and other information on which the certification report is based and will include as applicable, but not limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 8.0 of this Permit may be included in the report by reference and should include drawing and document numbers. IQRPE Reports will be consistent with the information separately provided in ii. through ix. below [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)];

III.10.G.10.b.ii Design drawings (General Arrangement Drawings, in plan) and specifications for the foundation, secondary containment, including, liner installation details, and leak detection methodology [Note: leak detection systems for areas where daily, direct, or remote visual inspection is not feasible, will be continuous in accordance with WAC 173-303-640(4)(e)(iii)(C)]. These items should show the dimensions, volume calculations, and location of the secondary containment system, and should include items such as floor/pipe slopes to sumps, tanks, floor drains [WAC 173-303-640(4)(b) through (f) and WAC 173-303-640(3)(a), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)];

III.10.G.10.b.iii The Permittees will provide the design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the secondary containment system. This information will demonstrate the foundation will be capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift [WAC 173-303-640(4)(c)(ii), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.b.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.G.10.b.v Secondary containment/foundation and leak detection systems materials selection documentation (including, but not limited to, concrete coatings and water stops, and liner materials), as applicable [WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.G.10.b.vi Detailed description of how the secondary containment for each miscellaneous unit system will be installed in compliance with WAC 173-303-640(3)(c), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B);

III.10.G.10.b.vii Submit Permit Table III.10.G.B. completed to provide for all secondary containment sumps and floor drains, the information as specified in each column heading, consistent with information to be provided in i. through vi. above;

III.10.G.10.b.viii Documentation that secondary containment and leak detection systems will not accumulate hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.b.ix A detailed description of how miscellaneous unit design provides access for conducting future miscellaneous unit integrity assessments [WAC 173-303-640(3)(b) and WAC 173-303-806(4)(i)(i)(B)].

III.10.G.10.c The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to installation of each Pretreatment Plant Miscellaneous Unit System as identified in Permit Tables III.10.G.A and III.10.G.B, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendix 8.1 through 8.14 of this Permit. At a minimum, engineering information specified below will show the following as required pursuant to WAC 173-303-640 and in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings):

III.10.G.10.c.i IQRPE Reports (specific to miscellaneous unit) will include review of design drawings, calculations, and other information on which the certification report is based and will include as applicable, but not limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 8.0 of this Permit may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information separately provided in ii. through xi. below and the IQRPE Report specified in Permit Condition III.10.G.10.b.i. [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)];

III.10.G.10.c.ii Design drawings (General Arrangement Drawings in plan , Process Flow Diagrams, Piping and Instrumentation Diagrams [including pressure control systems], and Mechanical Drawings) and specifications, and other information specific to miscellaneous units (to show location and physical attributes of each miscellaneous unit), [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)];

III.10.G.10.c.iii Miscellaneous unit design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the miscellaneous unit(s). Structural support calculations specific to off-specification, non-standard, and field fabricated miscellaneous units will be submitted for incorporation into the

Administrative Record [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.c.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with water, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.G.10.c.v Miscellaneous unit materials selection documentation (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.G.10.c.vi Miscellaneous unit vendor information (including, but not limited to, required performance warranties, as available), consistent with information submitted under ii. above, will be submitted for incorporation into the Administrative Record [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.c.vii System Description related to miscellaneous units will be submitted for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)].

III.10.G.10.c.viii Mass and energy balance for normal projected operating conditions used in developing the Piping and Instrumentation Diagrams and the Process Flow Diagrams, including assumptions and formulas used to complete the mass and energy balance, so that they can be independently verified for incorporation into the Administrative Record [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.c.ix A detailed description of how the miscellaneous unit will be installed in compliance with WAC 173-303-640(3)(c), (d), and (e), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B);

III.10.G.10.c.x Documentation that miscellaneous units are designed to prevent the accumulation of hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.c.xi Documentation that miscellaneous units are designed to prevent escape of vapors and emissions of acutely or chronically toxic (upon inhalation) EHW, for incorporation into the Administrative Record [WAC 173-303-640(5)(e), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.d The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to installation of equipment as identified in Permit Tables III.10.G.A and III.10.G.B, not addressed in Permit Condition III.10.G.10.c., engineering information as specified below for incorporation into Operating Unit Group 10, Appendices 8.1through 8.14 of this Permit. At a minimum, engineering information specified below will show the following as required pursuant to WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings):

III.10.G.10.d.i IQRPE Reports (specific to equipment) will include a review of design drawings, calculations, and other information as applicable, on which the certification report is based. The reports will include, but not be limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 8.0 of this Permit may be included in the report

by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information provided separately in ii. through xiii. below and the IQRPE Reports specified in Permit Conditions III.10.G.10.b. and III.10.G.10.c.,[WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.G.10.d.ii Design drawings (Process Flow Diagrams, Piping and Instrumentation Diagrams [including pressure control systems]) specifications and other information specific to equipment (these drawings should include all equipment such as pipe, valves, fittings, pumps, instruments, etc.) [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.G.10.d.iii The Permittees will provide the design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the equipment [WAC 173-303-640(3)(a) and WAC 173-303-640(3)(f), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.d.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil and water, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.G.10.d.v Materials selection documentation for equipment (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.G.10.d.vi Vendor information (including, but not limited to, required performance warranties, as available), consistent with information submitted under ii. above, for equipment will be submitted for incorporation into the Administrative Record [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(iv)];

III.10.G.10.d.vii Miscellaneous unit, equipment, and leak detection system instrument control logic narrative description (e.g., descriptions of fail-safe conditions, etc.) [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)].

III.10.G.10.d.viii System Descriptions related to equipment and system descriptions related to leak detection systems, for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.d.ix A detailed description of how the equipment will be installed and tested [WAC 173-303-640(3)(c) through (e) and WAC 173-303-640(4)(b) and (c), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.d.x For process monitoring, control, and leak detection system instrumentation for the WTP Unit Miscellaneous Unit Systems as identified in Permit Table III.10.G.C, a detailed description of how the process monitoring, control, and leak detection system instrumentation will be installed and tested [WAC 173-303-640(3)(c) through (e), WAC 173-303-640(4)(b) and (c), WAC 173-303-806(4)(c)(vi), and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.d.xi Mass and energy balance for projected normal operating conditions, used in developing the Piping and Instrumentation Diagrams and Process Flow Diagrams,

including assumptions and formulas used to complete the mass and energy balance, so that they can be independently verified, for incorporation into the Administrative Record [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.d.xii Documentation that miscellaneous units are designed to prevent the accumulation of hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)].

III.10.G.10.d.xiii Leak detection system documentation (e.g. vendor information, etc.) consistent with information submitted under Permit Condition III.10.G.10.c.ii. and Permit Conditions III.10.G.10.d.ii., vii., viii., and x. above, will be submitted for incorporation into the Administrative Record.

III.10.G.10.e Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., the following as specified below for incorporation into Operating Unit Group 10, Appendix 8.15, except Permit Condition III.10.G.10.e.i., which will be incorporated into Operating Unit Group 10, Addendum E, of this Permit. All information provided under this permit condition must be consistent with information provided pursuant to Permit Conditions III.10.G.10.b., c., d., and e., III.10.C.3.e., and III.10.C.11.b., as approved by Ecology.

III.10.G.10.e.i Integrity assessment program and schedule for the Pretreatment Plant Miscellaneous Unit Systems will address the conducting of periodic integrity assessments on the Pretreatment Plant Miscellaneous Unit Systems over the life of the systems, as specified in Permit Condition III.10.G.10.b.ix. and WAC 173-303-640(3)(b), in accordance with WAC 173-303-680, and descriptions of procedures for addressing problems detected during integrity assessments. The schedule must be based on past integrity assessments, age of the system, materials of construction, characteristics of the waste, and any other relevant factors [WAC 173-303-640(3)(b), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.e.ii Detailed plans and descriptions, demonstrating the leak detection system is operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of dangerous and/or mixed waste or accumulated liquid in the secondary containment system within twenty-four (24) hours WAC 173-303-640(4)(c)(iii). Detection of a leak of at least 0.1 gallons per hour within twenty-four (24) hours is defined as being able to detect a leak within twenty-four (24) hours. Any exceptions to this criteria must be approved by Ecology in accordance with WAC 173-303-680, WAC 173-303-640(4)(c)(iii), and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.e.iii Detailed operational plans and descriptions, demonstrating that spilled or leaked waste and accumulated liquids can be removed from the secondary containment system within twenty-four (24) hours [WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.e.iv Descriptions of operational procedures demonstrating appropriate controls and practices are in place to prevent spills and overflows from the Pretreatment Plant Miscellaneous Unit Systems, or containment systems, in compliance with WAC 173-303-640(5)(b)(i) through (iii), in accordance with WAC 173-303-680 [WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.e.v Description of procedures for investigation and repair of the Pretreatment Plant Miscellaneous Unit Systems [WAC 173-303–640(6) and WAC 173-303-640(7)(e)

and (f), in accordance with WAC 173-303-680, WAC 173-303-320, WAC 173-303-806(4)(a)(v), and WAC 173-303-806(4)(i)(i)(B)];

III.10.G.10.e.vi Updated Addendum C, Narrative Descriptions, Tables and Figures as identified in Permit Tables III.10.G.A and III.10.G.B., as modified pursuant to Permit Condition III.10.G.10.e.ix., and updated to identify routinely non-accessible Pretreatment Plant Miscellaneous Unit Systems [WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.G.10.e.vii Descriptions of procedures for management of ignitable and reactive, and incompatible dangerous and/or mixed waste, in accordance with WAC 173-303-640(9) and (10), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B).

III.10.G.10.e.viii A description of the tracking system used to track dangerous and/or mixed waste generated throughout the Pretreatment Plant Miscellaneous Unit Systems, pursuant to WAC 173-303-380.

III.10.G.10.e.ix Permit Table III.10.G.A, amended as follows [WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B)]:

A. Under column 1, update and complete list of dangerous and mixed waste Pretreatment Plant Miscellaneous Unit Systems, including plant items which comprise each system (listed by item number).

B. Under column 2, update and complete system designations.

C. Under column 3, replace the 'Reserved' with the Operating Unit Group 10, Appendix 8.0 subsections specific to miscellaneous unit systems as listed in column 1.

D. Under column 4, update and complete list of narrative description tables and figures.

E. Under column 5, update and complete maximum operating volume for each miscellaneous unit, as applicable.

F. Permit Table III.10.G.A.i., amended as follows:

1. Under column 1, update and complete list of plant items that comprise the Pretreatment Plant Vessel Vent System (listed by item number).
2. Under column 2, update and complete designations.
3. Under column 3, replace the 'Reserved' with the Operating Unit Group 10, Appendix 8.0, subsections (e.g., 9.1, 9.2, etc.) specific to systems as listed in column 1.
4. Under column 4, update and complete list of narrative description tables and figures.

III.10.G.10.e.x Permit Table III.10.G.C. will be completed for Pretreatment Plant Miscellaneous Unit System process and leak detection system monitors and instruments (to include, but not be limited to: instruments and monitors measuring and/or controlling flow, pressure, temperature, density, pH, level, humidity, and emissions) to provide the information as specified in each column heading. Process and leak detection system monitors and instruments for critical systems as specified in Operating Unit Group 10, Appendix 2.0 and as updated pursuant to Permit Condition III.10.C.9.b.and for operating parameters as required to comply with Permit Condition III.10.C.3.e.iii. will be addressed. Process monitors and instruments for non-waste management operations (e.g., utilities, raw chemical storage, non-contact cooling waters, etc.) are

excluded from this permit condition [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.e.xi Supporting documentation for operating trips and expected operating range as specified in Permit Table III.10.G.C., as approved pursuant to Permit Condition III.10.G.10.e.x. [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(B), WAC 173-303-806(4)(i)(iv), and WAC 173-303-806(4)(i)(v)];

III.10.G.10.e.xii Documentation of process and leak detection instruments and monitors (as listed in Permit Table III.10.G.C.) for the Pretreatment Plant Miscellaneous Unit Systems to include, but not be limited to, the following [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)]:

A. Procurement Specifications.

B. Location used.

C. Range, precision, and accuracy.

D. Detailed descriptions of calibration/functionality test procedures (e.g., method number [ASTM]) or provide a copy of manufacturer's recommended calibration procedures.

E. Calibration/functionality test, inspection, and routine maintenance schedules and checklists, including justification for calibration, inspection and maintenance frequencies, criteria for identifying instruments found to be significantly out of calibration, and corrective action to be taken for instruments found to be significantly out of calibration (e.g., increasing frequency of calibration, instrument replacement, etc.).

F. Equipment instrument control logic narrative description (e.g., descriptions of fail-safe conditions, etc.) [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)].

This page intentionally left blank.

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
Waste Feed Evaporation Process System FEP-SEP-00001A (Waste Feed Evaporator Separator Vessel) FEP-SEP-00001B (Waste Feed Evaporator Separator Vessel)	FEP	**24590-PTF** -3PS-MEVV-T0001, Rev 2 -M5-V17T-00004001, Rev 3 -M5-V17T-00004002, Rev 3 -M6-FEP-00001001, Rev 1 -M6-FEP-00001002, Rev 0 -M6-FEP-00001003, Rev 0 -M6-FEP-00002001, Rev 0 -M6-FEP-00002002, Rev 1 -M6-FEP-00002003, Rev 0 -M6-FEP-00003001, Rev 0 -M6-FEP-00003002, Rev 0 -M6-FEP-00004001, Rev 0 -M6-FEP-00004002, Rev 1 -M6-FEP-00004003, Rev 0 -M6-FEP-00005001, Rev 0 -MVD-FEP-P0001, Rev 2 -MVD-FEP-P0002, Rev 2 -MVD-FEP-P0003, Rev 1 -MVD-FEP-00006, Rev 5 -MVD-FEP-00007, Rev 5 -MV-FEP-P0001, Rev 0 -MV-FEP-P0002, Rev 0 -N1D-FEP-00002, Rev 6	Section 4D.2.2.; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	FEP-SEP-00001A = 14,512 FEP-SEP-00001B = 14, 512

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
		-N1D-FEP-P0003, Rev 1 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7		
Waste Feed Evaporation Process System (Cont.) FEP-COND-00001A (Waste Evaporator Primary Condenser) FEP-COND-00001B (Waste Evaporator Primary Condenser) FEP-COND-00002A (Waste Evaporator Intercondenser) FEP-COND-00002B (Waste Evaporator Intercondenser) FEP-COND-00003A (Waste Evaporator Aftercondenser) FEP-COND-00003B (Waste Evaporator Aftercondenser)	FEP	**24590-PTF** -3PS-MEVV- T0001, Rev 2 -M5-V17T-00004001, Rev 3 -M5-V17T-00004002, Rev 3 -M6-FEP-00003002, Rev 0 -M6-FEP-00005001, Rev 0 -MED-FEP-P0003, Rev 0 -MED-FEP-P0004, Rev 0 -MED-FEP-P0005, Rev 0 -MED-FEP-P0006, Rev 0 -MED-FEP-P0007, Rev 0 -MED-FEP-P0008, Rev 0 -N1D-FEP-P0008, Rev 0 -N1D-FEP-00009, Rev 3 -N1D-FEP-00010, Rev 3 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7	Section 4D.2.2.; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	N/A
Waste Feed Evaporation Process System (Cont.) FEP-RBLR-00001A (Waste Feed Evaporator Reboiler)	FEP	**24590-PTF** -3PS-MEVV-T0001, Rev 2 -M5-V17T-00004001, Rev 3 -M5-V17T-00004002, Rev 3	Section 4D.2.2.; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit	N/A

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
FEP-RBLR-00001B (Waste Feed Evaporator Reboiler)		-MED-FEP-P0010, Rev 0 -N1D-FEP-P0008, Rev 0 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7	Group 10, Addendum C of this Permit.	
Cesium Nitric Acid Recovery Process System CNP-EVAP-00001 (Cesium Evaporator Separator Vessel)	CNP	**24590-PTF** -3PS-MEVV-T0002, Rev 4 -M5-V17T-00014, Rev 2 -M6-CNP-00001001, Rev 0 -M6-CNP-00001002, Rev. 0 -M6-CNP-00001003, Rev. 0 -M6-CNP-00002001, Rev 0 -M6-CNP-00002002, Rev 0 -M6-CNP-00002003, Rev 0 -M6-CNP-00008001, Rev 0 -M6-CNP-00008002, Rev 0 -M6-CNP-00010001, Rev 0 -M6-CNP-00010002, Rev 0 -MV-CNP-P0001, Rev 0 -MV-CNP-P0002, Rev 1 -MV-CNP-P0005, Rev 0 -MVD-CNP-P0003, Rev 1 -MVD-CNP-P0010, Rev 0 -MVD-CNP-00006, Rev 6 -N1D-CNP-P0005, Rev 1	Section 4D.2.6.; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	CNP-EVAP-00001 = RESERVED

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
		-N1D-CNP-P0006, Rev 3 -N1D-CNP-P0009, Rev 1 -N1D-CNP-P0011, Rev 1 -P1-P01T-00001, Rev 8 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6		
Cesium Nitric Acid Recovery Process System (Cont.) CNP-HX-00001 (Cesium Evaporator Concentrate Reboiler	CNP	**24590-PTF** -3PS-MEVV-T0002, Rev 4 -M5-V17T-P0014, Rev 2 -M6-CNP-00001001, Rev 0 -M6-CNP-00001002, Rev 0 -M6-CNP-00001003, Rev 0 -M6-CNP-00002001, Rev 0 -M6-CNP-00002002, Rev 0 -M6-CNP-00002003, Rev 0 -M6-CNP-00008, Rev 2 -MED-CNP-00003, Rev 4 -MED-CNP-00004, Rev 5 -MED-CNP-00010, Rev 3 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4D.2.6.; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	N/A

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
Cesium Nitric Acid Recovery Process System (Cont.) CNP-DISTC-00001 (Cesium Evaporator Nitric Acid Rectifier Column)	CNP	**24590-PTF** -M5-V17T-00014, Rev 2 -M6-CNP-00010, Rev 2 -N1D-CNP-00001, Rev 1 -P1-P01T-00003, Rev 4 -3PS-MEVV-T0002, Rev 4	Section 4D.2.6.; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	RESERVED
Cesium Nitric Acid Recovery Process System (Cont.) CNP-HX-00002 (Cesium Evaporator Primary Condenser) CNP-HX-00003 (Cesium Evaporator Inter-Condenser) CNP-HX-00004 (Cesium Evaporator After-Condenser)	CNP	**24590-PTF** -M5-V17T-00014, Rev 2 -M6-CNP-00001001, Rev 0 -M6-CNP-00001002, Rev 0 -M6-CNP-00001003, Rev 0 -M6-CNP-00002001, Rev 0 -M6-CNP-00002002, Rev 0 -M6-CNP-00002003, Rev 0 -M6-CNP-00008001, Rev 0 -M6-CNP-00010, Rev 2 -MED-CNP-00003, Rev 4 -MED-CNP-00004, Rev 5 -MED-CNP-00005, Rev 4 -MED-CNP-00010, Rev 3 -N1D-CNP-P0002, Rev 1 -N1D-CNP-P0003, Rev 1 -N1D-CNP-P0012, Rev 1	Section 4D.2.6; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	N/A N/A N/A

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
		-P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6 -3PS-MEVV-T0002, Rev 4		
Treated LAW Evaporation Process System TLP-SEP-00001 (Treated LAW Evaporator Separator Vessel)	TLP	**24590-PTF** -3PS-MEVV- T0001, Rev 2 -M5-V17T-00005, Rev 2 -M6-TLP-00001, Rev 3 -M6-TLP-00002001, Rev 0 -M6-TLP-00002002, Rev 0 -M6-TLP-00002003, Rev 0 -M6-TLP-00002004, Rev 0 -M6-TLP-00003001, Rev 0 -M6-TLP-00003002, Rev 0 -M6-TLP-00003003, Rev 0 -M6-TLP-00003004, Rev 0 -M6-TLP-00005001, Rev 0 -M6-TLP-00005002, Rev 0 -M6-TLP-00005003, Rev 0 -M6-TLP-00005004, Rev 0 -M6-TLP-00005005, Rev 0 -M6-TLP-00006001, Rev 0 -M6-TLP-00006002, Rev 0	Section 4D.2.11; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	TLP-SEP-00001 = 13,359

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
		-M6-TLP-00006003, Rev 0 -M6-TLP-00006004, Rev 0 -M6-TLP-00006005, Rev 0 -MVD-TLP-P0001, Rev 2 -MVD-TLP-P0002, Rev 2 -MVD-TLP-P0004, Rev 1 -MVD-TLP-00005, Rev 7 -MV-TLP-P0001, Rev 1 -MV-TLP-P0002, Rev 1 -N1D-TLP-P0001, Rev 2 -N1D-TLP-P0005, Rev 3 -N1D-TLP-P0006, Rev 1 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4		
Treated LAW Evaporation Process System (Cont.) TLP-COND-00001 (Treated LAW Primary Condenser) TLP-COND-00002 (Treated LAW Inter-condenser) TLP-COND-00003 (Treated LAW After-condenser)	TLP	**24590-PTF** -3PS-MEVV- T0001, Rev 2 -M5-V17T-00005, Rev 2 -M6-TLP-00002001, Rev 0 -M6-TLP-00002002, Rev 0 -M6-TLP-00002003, Rev 0 -M6-TLP-00002004, Rev 0 -M6-TLP-00003001, Rev 0 -M6-TLP-00003002, Rev 0	Section 4D.2.11; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	N/A

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
		-M6-TLP-00003003, Rev 0 -M6-TLP-00003004, Rev 0 -M6-TLP-00005001, Rev 0 -M6-TLP-00005002, Rev 0 -M6-TLP-00005003, Rev 0 -M6-TLP-00005004, Rev 0 -M6-TLP-00005005, Rev 0 -M6-TLP-00006001, Rev 0 -M6-TLP-00006002, Rev 0 -M6-TLP-00006003, Rev 0 -M6-TLP-00006004, Rev 0 -M6-TLP-00006005, Rev 0 -MED-TLP-P0001, Rev 0 -MED-TLP-00002, Rev 4 -MED-TLP-00003, Rev 4 -MV-TLP-P0001, Rev 1 -MV-TLP-P0002, Rev 1 -N1D-TLP-P0002, Rev 0 -N1D-TLP-P0003, Rev 4 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4		
Treated LAW Evaporation Process System (Cont.)	TLP	**24590-PTF** -3PS-MEVV- T0001, Rev 2	Section 4D.2.11; Table C-8; and Figures C1-1,	N/A

Table III.10.G.A – Pretreatment Plant Miscellaneous Unit Systems

Miscellaneous Unit System Description[a]	Miscellaneous Unit System Designation	Description Drawings	Narrative Description, Tables, & Figures	Maximum Capacity (gallons)
TLP-RBLR-00001 (Treated LAW Evaporator Reboiler)		-M5-V17T-00005, Rev 5 -MV-TLP-P0001, Rev 1 -MV-TLP-P0002, Rev 1 -N1D-TLP-P0011, Rev 1 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4	C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	
Spray Decontamination and Sizing System PIH-TTBL-00001 (Spray Decontamination Turntable) PIH-TTBL-00002 (Remote Repair Turntable PIH-BENCH-00003 (Size Reduction Table) This miscellaneous unit is exempt from the requirements of WAC-173-303-640.	PIH	RESERVED	Section 4D.3.2.1; Table 4-8; and Figure 4A-128 of Operating Unit 10, Chapter 4 of this Permit.	N/A
Hotcell Waste Management Unit Hotcell Floor This miscellaneous unit is exempt from the requirements of WAC-173-303-640.	NA	RESERVED	Section 4D.3.1; Table 4-8; and Figure 4A-128 of Operating Unit 10, Chapter 4 of this Permit.	RESERVED

[a] The Pretreatment Vessel Vent Process (PVP), Process Vessel Vent Systems (PVV), Pulse Jet Mixer Exhaust System (PJV), and Pretreatment Treated LAW Evaporator Separator Vessel System (TLP) specified in Permit Table III.10.G.A.i is shared between the Pretreatment Plant Miscellaneous Unit Systems. Any references in this Permit to the individual Pretreatment Plant Miscellaneous Unit Systems are also a reference to the Pretreatment Vessel Vent Process (PVP), Process Vessel Vent Systems (PVV), Pulse Jet Mixer Exhaust System (PJV), and Pretreatment Treated LAW Evaporator Separator Vessel System (TLP) Systems. Any reference in this Permit to Permit Table III.10.G.A is also a reference to Permit Table III.10.G.A.i.

Table III.10.G.A.i – Pretreatment Plant Vessel Vent Systems Associated with Pretreatment Plant Miscellaneous Unit Systems

Description	Designation	Description Drawings	Narrative Description, Tables & Figures
Pretreatment Vessel Vent Process System PVP-SCB-00002 (Vessel Vent Caustic Scrubber)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021004, Rev 2 -M6-PVP-00002, Rev 3 -M6-PVP-00017001, Rev 0 -M6-PVP-00017002, Rev 0 -M6-PVP-00017003, Rev 0 -M6-PWD-00044, Rev 3 -MKD-PVP-P0002, Rev 2 -MVD-PVP-P0001, Rev 0 -MV-PVP-P0002, Rev 0 -N1D-PVP-P0001, Rev 1 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4D.4.2; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.
Pretreatment Vessel Vent Process System (Cont.) PVP-HEME-00001A (Vessel Vent HEME, Mist eliminator) PVP-HEME-00001B (Vessel Vent HEME, Mist Eliminator) PVP-HEME-00001C (Vessel Vent HEME, Mist Eliminator)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021004, Rev 2 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4D.4.2; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.

Table III.10.G.A.i – Pretreatment Plant Vessel Vent Systems Associated with Pretreatment Plant Miscellaneous Unit Systems

Description	Designation	Description Drawings	Narrative Description, Tables & Figures
Pretreatment Vessel Vent Process System (Cont.) PVP-HX-00002 (Vessel Vent Scrubbing Liquid Cooler)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M6-PVP-00017001, Rev 0 -M6-PVP-00017002, Rev 0 -M6-PVP-00017003, Rev 0 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4D.4.2; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.
Pretreatment Vessel Vent Process System (Cont.) PVP-OXID-00001 (Vessel Vent VOC Oxidizer Unit)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021004, Rev 2 -M6-PVP-00017001, Rev 0 -M6-PVP-00017002, Rev 0 -M6-PVP-00017003, Rev 0 -M6-PVP-000018001, Rev 1 -M6-PVP-000018002, Rev 0 -N1D-PVP-P0002, Rev 1 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4D.4.2; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.
Pretreatment Vessel Vent Process System (Cont.) PVP-CLR-00001 (Vessel Vent Aftercooler)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021004, Rev 2 -P1-P01T-00001, Rev 7	Section 4D.4.2; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.

Table III.10.G.A.i – Pretreatment Plant Vessel Vent Systems Associated with Pretreatment Plant Miscellaneous Unit Systems

Description	Designation	Description Drawings	Narrative Description, Tables & Figures
		-P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	
Pretreatment Vessel Vent Process System (Cont.) PVP-ADBR-00001A (Vessel Vent Carbon Bed Absorber) PVP-ADBR-00001B (Vessel Vent Carbon Bed Absorber)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021004, Rev 2 -P1-P01T-00001, Rev 7 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4D.4.2; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.
Pretreatment Vessel Vent Process System (Cont.) PVP-FILT-00001 (Vessel Vent Adsorber Outlet Filter)	PVP	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021004, Rev 2 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4D.4.2; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.
Process Vessel Vent System PVV-HEPA-00001A (Vessel Vent Primary HEPA Filter) PVV-HEPA-00001B (Vessel Vent Primary HEPA Filter)	PVV	**24590-PTF** -M5-V17T-00021001, Rev 2 -P1-P01T-P0002, Rev 7	Section 4D.4.2; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.

Table III.10.G.A.i – Pretreatment Plant Vessel Vent Systems Associated with Pretreatment Plant Miscellaneous Unit Systems

Description	Designation	Description Drawings	Narrative Description, Tables & Figures
PVV-HEPA-00002A (Vessel Vent Secondary HEPA Filter) PVV-HEPA-00002B (Vessel Vent Secondary HEPA Filter)			
Process Vessel Vent System (Cont.) PVV-FAN-00001A (Vessel Vent Exhaust Fan) PVV-FAN-00001B (Vessel Vent Exhaust Fan)	PVV	**24590-PTF** -M5-V17T-00021001, Rev 2 -M5-V17T-00021004, Rev 2 -P1-P01T-P0002, Rev 7 -P1-P01T-00003, Rev 4 -P1-P01T-00004, Rev 6	Section 4D.4.2; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.
Pretreatment Pulse Jet Mixer Exhaust Vent System PJV-HEPA-00001A (PJV Primary Exhaust HEPA Filter) PJV-HEPA-00001B (PJV Primary Exhaust HEPA Filter) PJV-HEPA-00001C (PJV Primary Exhaust HEPA Filter) PJV-HEPA-00001D (PJV Primary Exhaust HEPA Filter)	PJV	**24590-PTF** -M5-V17T-00021002, Rev 2 -M6-PJV-00001, Rev 3 -M6-PJV-00002, Rev 3 -M6-PJV-00004001, Rev 0 -N1D-PJV-P0001, Rev 1 -P1-P01T-00001, Rev 7	Section 4D.4.3; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.

Table III.10.G.A.i – Pretreatment Plant Vessel Vent Systems Associated with Pretreatment Plant Miscellaneous Unit Systems

Description	Designation	Description Drawings	Narrative Description, Tables & Figures
PJV-HEPA-00001E (PJV Primary Exhaust HEPA Filter) PJV-HEPA-00001F (PJV Primary Exhaust HEPA Filter) PJV-HEPA-00001G (PJV Primary Exhaust HEPA Filter) PJV-HEPA-00002A (PJV Secondary Exhaust HEPA Filter) PJV-HEPA-00002B (PJV Secondary Exhaust HEPA Filter) PJV-HEPA-00002C (PJV Secondary Exhaust HEPA Filter) PJV-HEPA-00002D (PJV Secondary Exhaust HEPA Filter) PJV-HEPA-00002E (PJV Secondary Exhaust HEPA Filter) PJV-HEPA-00002F (PJV Secondary Exhaust HEPA Filter)			

Table III.10.G.A.i – Pretreatment Plant Vessel Vent Systems Associated with Pretreatment Plant Miscellaneous Unit Systems

Description	Designation	Description Drawings	Narrative Description, Tables & Figures
Pretreatment Pulse Jet Mixer Exhaust Vent System (Cont.) PJV-FAN-00001A (PJV Exhaust Fan) PJV-FAN-00001B (PJV Exhaust Fan) PJV-FAN-00001C (PJV Exhaust Fan)	PJV	**24590-PTF** -M5-V17T-00021002, Rev 2 -M6-PJV-00001, Rev 3 -M6-PJV-00002, Rev 3 -M6-PJV-00004001, Rev 0 -N1D-PJV-P0001, Rev 1 -P1-P01T-00001, Rev 7	Section 4D.4.3; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.
Pretreatment Pulse Jet Mixer Exhaust Vent System (Cont.) PJV-DMST-00002A (PJV Demister) PJV-DMST-00002B (PJV Demister) PJV-DMST-00002C (PJV Demisters)	PJV	**24590-PTF** -M5-V17T-00021002, Rev 2 -M6-PJV-00001, Rev 3 -M6-PJV-00002, Rev 3 -M6-PJV-00004001, Rev 0 -N1D-PJV-P0001, Rev 1 -P1-P01T-00003, Rev 4	Section 4D.4.3; Table C-8; and Figures C1-1, C1-2 and C1-02A of Operating Unit Group 10, Addendum C of this Permit.

[a] The Pretreatment Vessel Vent Process (PVP), Process Vessel Vent Systems (PVV), and Pulse Jet Mixer Exhaust System (PJV) specified in Permit Table III.10.G.A.i are shared between the Pretreatment Plant Miscellaneous Unit Systems. Any references in this Permit to the individual Pretreatment Plant Miscellaneous Unit Systems are also a reference to the Pretreatment Vessel Vent Process (PVP), Process Vessel Vent Systems (PVV), and Pulse Jet Mixer Exhaust System (PJV) Systems. Any reference in this Permit to Permit Table III.10.G.A is also a reference to Permit Table III.10.G.A.i.

Table III.10.G.B – Pretreatment Plant Miscellaneous Unit Secondary Containment Systems Including Sumps, Bulges, and Floor Drains

Sump, Bulge or Floor Drain I.D.# & Room Location	Maximum Sump/Bulge (gallons), or Drain Line (gallons per minute) Capacity	Sump Type/Nominal Operating Volume (gallons)	Sump, Bulge or Drain Line Dimensions[a] (inches) & Materials of Construction	Engineering Description (Drawings No.'s, Specification No.'s etc.)
PVP-ZY-00037-S11B-03, P-0105 (PVP-BULGE-00001, El. 0')			3" Stainless Steel	**24590-PTF** -M6-PVP-00017002, Rev 0
PVP-ZY-00036-S11B-03, P-0101A (PVP-BULGE-00002, El. 0')			3" Stainless Steel	**24590-PTF** -M6-PVP-00018002, Rev 0
PVP-ZY-00056-S11B-03, P-0302 (PVP-BULGE-00014, El. 56')			3" Stainless Steel	**24590-PTF** -M6-PVP-00017003, Rev 0
PWD-FD-00323P-0304 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00324 P-0304 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00325 P-0304 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00326 P-0304 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00327 P-0304 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00044, Rev 3
PWD-FD-00512 P-0320 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00513 P-0320 Drain, El. 56'	140	N/A	6" Dia 316L	**24590-PTF** -M6-PWD-00043, Rev 3

PWD-FD-00514 P-0320 Drain, El. 56’	140	N/A	6” Dia 316L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00515 P-0325 Drain, El. 56’	140	N/A	6” Dia 316L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00516 P-0325 Drain, El. 56’	140	N/A	6” Dia 316L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00517 P-0325 Drain, El. 56’	655	N/A	8” Dia 316L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00557 P-0430 Drain, El. 77’	140	N/A	6” Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
PWD-FD-00561 P-0430 Drain, El. 77’	140	N/A	6” Dia 304L	**24590-PTF** -M6-PWD-00043, Rev 3
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
[a]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).				

Table III.10.G.C. – Pretreatment Plant Miscellaneous Unit System Process and Leak Detection Instruments and Parameters

Miscellaneous Unit System Locator and Name (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Failure State	Expected Range	Instrument Accuracy	Operating Trips (Descrip-tion & Numerical Limits)	Instrument Calibration Method No. and Range
PVP-BULGE-00001[a]	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
PVP-BULGE-00014[a]	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
[a]Sump locator (including P&ID designator) is located on Permit Table III.10.G.B – Pretreatment Plant Miscellaneous Unit Secondary Containment Systems Including Sumps, Bulges, and Floor Drains.									

1

Table III.10.G.D. – Pretreatment Plant Miscellaneous Unit Systems Estimated Emission Rates

Chemicals	CAS Number	Emission Rates (grams/second)
RESERVED	RESERVED	RESERVED

2

III.10.H LAW VITRIFICATION SYSTEM – SHORT TERM MISCELLANEOUS THERMAL TREATMENT UNIT-SHAKEDOWN, DEMONSTRATION TEST, AND POST DEMONSTRATION TEST

For purposes of Permit Section III.10.H, where reference is made to WAC 173-303-640, the following substitutions apply: substituting the terms "LAW Vitrification System" for "tank system(s)," "sub-system(s)" for "tank(s)," "sub-system equipment" for "ancillary equipment," and "sub-system(s) or sub-system equipment of a LAW Vitrification System" for "component(s)" in accordance with WAC 173-303-680.

III.10.H.1 General Conditions During Shakedown, Demonstration Test, and Post-Demonstration Test for LAW Vitrification System

III.10.H.1.a Construction and Maintenance [WAC 173-303-640, in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-340].

III.10.H.1.a.i The Permittees will construct the LAW Vitrification System (listed in Permit Tables III.10.H.A and B., as approved/modified pursuant to Permit Condition III.10.H.5.) as specified in Permit Condition III.10.H.1. and Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 9.1 through 9.15 and 9.17 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.a. through d., and III.10.H.5.f.

III.10.H.1.a.ii The Permittees will construct all containment systems for the LAW Vitrification System as specified in Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 9.2 and 9.4 through 9.14 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.a. through d.

III.10.H.1.a.iii The Permittees will ensure all certifications required by specialists (e.g., independent, qualified registered professional engineer, independent corrosion expert, independent, qualified installation inspector, etc.) use the following statement or equivalent pursuant to Permit Condition III.10.C.10.:

"I, (Insert Name) have (choose one or more of the following: overseen, supervised, reviewed, and/or certified) a portion of the design or installation of a new LAW Vitrification System or component located at (address), and owned/operated by (name(s)). My duties were: (e.g., installation inspector, testing for tightness, etc.), for the following LAW Vitrification System components (e.g., the venting piping, etc.), as required by the Dangerous Waste Regulations, namely, WAC 173-303-640(3) (applicable paragraphs (i.e., (a) through (g)) in accordance with WAC 173-303-680).

"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 inquiry of those individuals immediately responsible for obtaining the 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."

III.10.H.1.a.iv The Permittees must ensure that proper handling procedures are adhered to in order to prevent damage to the LAW Vitrification System during installation. Prior to covering, enclosing, or placing the new LAW Vitrification System or component in use, an independent, qualified, installation inspector or an independent, qualified, registered professional engineer, either of whom is trained and experienced in the proper installation of similar systems or components, must inspect the system for the presence of any of the following items:

A. Weld breaks.
B. Punctures.
C. Scrapes of protective coatings.
D. Cracks.
E. Corrosion.
F. Other structural damage or inadequate construction/installation.

All discrepancies must be remedied before the LAW Vitrification System is covered, enclosed, or placed in use [WAC 173-303-640(3)(c), in accordance with WAC 173-303-680(2) and (3)].

III.10.H.1.a.v For the LAW Vitrification System or components that are placed underground and that are back-filled, the Permittees must provide a backfill material that is a non-corrosive, porous, homogeneous substance. The backfill must be installed so that it is placed completely around the LAW Vitrification System and compacted to ensure that the LAW Vitrification System is fully and uniformly supported [WAC 173-303-640(3)(d), in accordance with WAC 173-303-680(2) and (3)].

III.10.H.1.a.vi The Permittees must test for tightness the LAW Vitrification System or components, prior to being covered, enclosed, or placed into use. If the LAW Vitrification System or components are found not to be tight, all repairs necessary to remedy the leak(s) in the system must be performed prior to the LAW Vitrification System being covered, enclosed, or placed in use [WAC 173-303-640(3)(e), in accordance with WAC 173-303-680(2) and (3)].

III.10.H.1.a.vii The Permittees must ensure the LAW Vitrification System equipment is supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction [WAC 173-303-640(3)(f), in accordance with WAC 173-303-680(2) and (3)].

III.10.H.1.a.viii The Permittees must provide the type and degree of corrosion protection recommended by an independent corrosion expert, based on the information provided in Operating Unit Group 10, Appendices 9.9 and 9.11 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.b.i., III.10.H.5.b.iv., III.10.H.5.b.v., III.10.H.5.c.i., III.10.H.5.c.iv., III.10.H.5.c.v., III.10.H.5.d.i., III.10.H.5.d.iv., and III.10.H.5.d.v., or other corrosion protection if Ecology believes other corrosion protection is necessary to ensure the integrity of the LAW Vitrification System during use of the LAW Vitrification System. The installation of a corrosion protection system that is field fabricated must be supervised by an independent corrosion expert to ensure proper installation [WAC 173-303-640(3)(g), in accordance with WAC 173-303-680(2) and (3)].

III.10.H.1.a.ix Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will obtain and keep on file in the WTP Unit operating record, written statements by those persons required to certify the design of the LAW Vitrification System and supervise the installation of the LAW Vitrification System, as specified in WAC 173-303-640(3)(b), (c), (d), (e), (f), and (g), in accordance with WAC 173-303-680, attesting that the LAW Vitrification System and corresponding containment system listed in Permit Tables III.10.H.A and III.10.H.B, as approved/modified pursuant to Permit Condition III.10.H.5., were properly designed and installed, and that repairs, in accordance with WAC 173-303-640(3)(c) and (e) were performed [WAC 173-303-640(3)(a) and WAC 173-303-640(3)(h), in accordance with WAC 173-303-680(3)].

III.10.H.1.a.x The independent LAW Vitrification System installation inspection and subsequent written statements will be certified in accordance with WAC 173-303-810(13)(a), as modified pursuant to Permit Condition III.10.H.1.a.iii., comply with all requirements of WAC 173-303-640(3)(h) in accordance with WAC 173-303-680, and will consider, but not be limited to, the following LAW Vitrification System installation documentation:

A. Field installation report with date of installation.

B. Approved welding procedures.

C. Welder qualification and certifications.

D. Hydro-test reports, as applicable, in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section VIII, Division 1; American Petroleum Institute (API) Standard 620, or Standard 650, as applicable.

E. Tester credentials.

F. Field inspector credentials.

G. Field inspector reports.

H. Field waiver reports.

I. Non-compliance reports and corrective action (including field waiver reports) and repair reports.

III.10.H.1.a.xi The Permittees will ensure periodic integrity assessments are conducted on the LAW Vitrification System, listed in Permit Table III.10.H.A, as approved/modified pursuant to Permit Condition III.10.H.5., over the term of this Permit in accordance with WAC 173-303-680(2) and (3) as specified in WAC 173-303-640(3)(b), following the description of the integrity assessment program and schedule in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.H.5.e.i. and III.10.C.5.c. Results of the integrity assessments will be included in the WTP Unit operating record until ten (10) years after post-closure, or corrective action is complete and certified, whichever is later.

III.10.H.1.a.xii The Permittees will address problems detected during the LAW Vitrification System integrity assessments specified in Permit Condition III.10.H.1.a.xi. following the integrity assessment program in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.H.5.e.i. and III.10.C.5.c.

III.10.H.1.a.xiii All process monitors/instruments, as specified in Permit Table III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5., will be equipped with operational alarms to warn of deviation, or imminent deviation from the limits specified in Permit Table III.10.H.F.

III.10.H.1.a.xiv The Permittees will install and test all process and leak detection system monitors/instrumentation as specified in Permit Tables III.10.H.C and III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5, in accordance with Operating Unit Group 10, Appendices 9.1, 9.2, and 9.14 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.d.x. and III.10.H.5.f.xvi.

III.10.H.1.a.xv Except during periods of LAW Vitrification System startup and shutdown, no dangerous and/or mixed waste will be treated in the LAW Vitrification System unless

the operating conditions, specified under Permit Condition III.10.H.1.c. are complied with.

III.10.H.1.a.xvi The Permittees will not place dangerous and/or mixed waste, treatment reagents, or other materials in the LAW Vitrification System if these substances could cause the subsystem, subsystem equipment, or the containment system to rupture, leak, corrode, or otherwise fail [WAC 173-303-640(5)(a), in accordance with WAC 173-303-680(2)]. This condition is not applicable to corrosion of LAW Vitrification System sub-system or sub-system equipment that are expected to be replaced as part of normal operations (e.g., melters).

III.10.H.1.a.xvii The Permittees will operate the LAW Vitrification System to prevent spills and overflows using controls and practices as required under WAC 173-303-640(5)(b) described in Permit Condition III.10.C.5 and Operating Unit Group 10, Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e. [WAC 173-303-640(5)(b), in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-806(4)(c)(ix)].

III.10.H.1.a.xviii For routinely non-accessible LAW Vitrification System sub-systems, as specified in Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.H.5.e.vi., the Permittees will mark all routinely non-accessible LAW Vitrification System sub-systems access points with labels, or signs, to identify the waste contained in each LAW Vitrification System sub-system. The label, or sign, must be legible at a distance of at least fifty (50) feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the LAW Vitrification System sub-systems. For the purposes of this permit condition, "routinely non-accessible" means personnel are unable to enter these areas while waste is being managed in them [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.H.1.a.xix For all LAW Vitrification System sub-systems not addressed in Permit Condition III.10.H.1.a.xviii., the Permittees will mark all these LAW Vitrification System sub-systems holding dangerous and/or mixed waste with labels, or signs, to identify the waste contained in the LAW Vitrification System sub-systems. The labels, or signs, must be legible at a distance of at least fifty (50) feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the LAW Vitrification System sub-systems [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.H.1.a.xx The Permittees will ensure that the secondary containment systems for the LAW Vitrification System sub-systems listed in Permit Tables III.10.H.A. and III.10.H.B, as approved/modified pursuant to Permit Condition III.10.H.5, are free of cracks or gaps to prevent any migration of dangerous and/or mixed waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during use of the LAW Vitrification System sub-systems. Any indication that a crack or gap may exist in the containment systems will be investigated and repaired in accordance with Operating Unit Group 10, Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e.v. [WAC 173-303–640(4)(b)(i), WAC 173-303–640(4)(e)(i)(C), and WAC 173-303-640(6), in accordance with

WAC 173-303-680(2) and (3), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-320].

III.10.H.1.a.xxi The Permittees must immediately, and safely, remove from service any LAW Vitrification System or secondary containment system which through an integrity assessment is found to be "unfit for use" as defined in WAC 173-303-040, following Permit Conditions III.10.H.1.a.xxiii.,A. through D., and F. The affected LAW Vitrification System or secondary containment system must be either repaired or closed in accordance with Permit Condition III.10.H.1.a.xxiii.E. [WAC 173-303-640(7)(e) and (f), WAC 173-303-640(8), in accordance with WAC 173-303-680(3)].

III.10.H.1.a.xxii .An impermeable coating, as specified in Operating Unit Group 10, Appendices 9.4, 9.5, 9.7, 9.9, 9.11, and 9.12 of this Permit, as approved pursuant to Permit Condition III.10.H.5.b.v. will be maintained for all concrete containment systems and concrete portions of containment systems for each LAW Vitrification System sub-systems listed in Permit Tables III.10.H.A and III.10.H.B, as approved/modified pursuant to Permit Condition III.10.H.5 (concrete containment systems that do not have a liner, pursuant to WAC 173-303-640(4)(e)(i), in accordance with WAC 173-303-680(2), and have construction joints, will meet the requirements of WAC 173-303-640(4)(e)(ii)(C), in accordance with WAC 173-303-680(2). The coating will prevent migration of any dangerous and mixed waste into the concrete. All coatings will meet the following performance standards:

A. The coating must seal the containment surface such that no cracks, seams, or other avenues through which liquid could migrate are present;

B. The coating must be of adequate thickness and strength to withstand the normal operation of equipment and personnel within the given area such that degradation or physical damage to the coating or lining can be identified and remedied before dangerous and mixed waste could migrate from the system; and

C. The coating must be compatible with the dangerous and mixed waste, treatment reagents, or other materials managed in the containment system [WAC 173-303-640(4)(e)(ii)(D), in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-806(4)(i)(i)(A)].

III.10.H.1.a.xxiii The Permittees will inspect all secondary containment systems for the LAW Vitrification System sub-systems listed in Permit Tables III.10.H.A and III.10.H.B, as approved/modified pursuant to Permit Condition III.10.H.5., in accordance with the Inspection Schedule specified in Operating Unit Group 10, Addendum E1 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.e.i. and III.10.C.5.c., and take the following actions if a leak or spill of dangerous and/or mixed waste is detected in these containment systems [WAC 173-303-640(5)(c) and WAC 173-303-640(6), in accordance with WAC 173-303-680(2) and (3), WAC 173-303-320, and WAC 173-303-806(4)(i)(i)(B)]:

A. Immediately, and safely, stop the flow of dangerous and/or mixed waste into the LAW Vitrification System sub-systems or secondary containment system.

B. Determine the source of the dangerous and/or mixed waste.

C. Remove the dangerous and/or mixed waste from the containment area in accordance with WAC 173-303-680(2) and (3) as specified in WAC 173-303-640(7)(b). The dangerous and/or mixed waste removed from containment areas

of the LAW Vitrification System sub-systems will be, as a minimum, managed as mixed waste.

D. If the cause of the release was a spill that has not damaged the integrity of the LAW Vitrification System sub-system, the Permittees may return the LAW Vitrification System sub-system to service in accordance with WAC 173-303-680(2) and (3) as specified in WAC 173-303-640(7)(e)(ii). In such case, the Permittees will take action to insure the incident that caused the dangerous and/or mixed waste to enter the containment system will not reoccur [WAC 173-303-320(3)].

E. If the source of the dangerous and/or mixed waste is determined to be a leak from the primary LAW Vitrification System into the secondary containment system, or the system is unfit for use as determined through an integrity assessment or other inspection, the Permittees will comply with the requirements of WAC 173-303-640(7) and take the following actions:

1. Close the LAW Vitrification System sub-system following procedures in WAC 173-303-640(7)(e)(i), in accordance with WAC 173-303-680 and Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8., or

2. Repair and re-certify (in accordance with WAC 173-303-810(13)(a), as modified pursuant to Permit Condition III.10.H.1.a.iii.) the LAW Vitrification System, in accordance with Operating Unit Group 10, Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e.v., before the LAW Vitrification System is placed back into service [WAC 173-303-640(7)(e)(iii) and WAC 173-303-640(7)(f), in accordance with WAC 173-303-680].

F. The Permittees will document in the operating record actions/procedures taken to comply with A. through E. above as specified in WAC 173-303-640(6)(d), in accordance with WAC 173-303-680(2) and (3).

G. In accordance with WAC 173-303-680(2) and WAC 173-303-680 (3), the Permittees will notify and report releases to the environment to Ecology as specified in WAC 173-303-640(7)(d).

III.10.H.1.a.xxiv If liquids (e.g., dangerous and/or mixed waste leaks and spills, precipitation, fire water, liquids from damaged or broken pipes) cannot be removed from the secondary containment system within twenty-four (24) hours, Ecology will be verbally notified within twenty-four (24) hours of discovery. The notification will provide the information in A, B, and C, listed below. The Permittees will provide Ecology with a written demonstration within seven (7) business days, identifying at a minimum [WAC 173-303-640(4)(c)(iv) and WAC 173-303-640(7)(b)(ii), in accordance with WAC 173-303-680(3) and WAC 173-303-806(4)(i)(i)(B)]:

A. Reasons for delayed removal.

B. Measures implemented to ensure continued protection of human health and the environment.

C. Current actions being taken to remove liquids from secondary containment.

III.10.H.1.a.xxv All air pollution control devices and capture systems in the LAW Vitrification System will be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants and to minimize process upsets. Procedures for ensuring that the air pollution control devices and capture systems in the LAW

Vitrification System are properly operated and maintained so as to minimize the emission of air contaminants and process upsets will be established.

III.10.H.1.a.xxvi In all future narrative permit submittals, the Permittees will include LAW Vitrification sub-system names with the sub-system designation.

III.10.H.1.a.xxvii Modifications to approved design, plans, and specifications in Operating Unit Group 10 of this Permit for the LAW Vitrification System will be allowed only in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g., III.10.C.9.d., III.10.C.9.e., and III.10.C.9.h.

III.10.H.1.a.xxviii For any portion of the LAW Vitrification System which has the potential for formation and accumulation of hydrogen gases, the Permittees will operate the portion to maintain hydrogen levels below the lower explosive limit [WAC 173-303-815(2)(b)(ii)].

III.10.H.1.a.xxix For each LAW Vitrification System sub-system holding dangerous waste which are acutely or chronically toxic by inhalation, the Permittees will operate the system to prevent escape of vapors, fumes or other emissions into the air [WAC 173-303-806(4)(i)(i)(B) and WAC 173-303-640(5)(e), in accordance with WAC 173-303-680].

III.10.H.1.b Performance Standards

III.10.H.1.b.i The LAW Vitrification System must achieve a destruction and removal efficiency (DRE) of 99.99% for the principal organic dangerous constituents (PODCs) listed below [40 CFR §63.1203(c)(1), 40 CFR §63.1203(c)(2), in accordance with WAC 173-303-680(2)]:

RESERVED

DRE in this permit condition will be calculated in accordance with the formula given below:

$DRE=[1-(W_{out}/W_{in})] \times 100\%$

Where:

W_{in}=mass feed-rate of one principal organic dangerous constituent (PODC) in a waste feed stream; and

W_{out}=mass emission rate of the same PODC present in exhaust emissions prior to release to the atmosphere.

III.10.H.1.b.ii Particulate matter emissions from the LAW Vitrification System will not exceed 34 mg/dscm (0.015 grains/dscf) [40 CFR §63.1203(b)(7), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.iii Hydrochloric acid and chlorine gas emissions from the LAW Vitrification System will not exceed 21 ppmv, combined [40 CFR §63.1203(b)(6), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.iv Dioxin and Furan TEQ emissions from the LAW Vitrification System will not exceed 0.2 nanograms (ng)/dscm [40 CFR §63.1203(b)(1), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.v Mercury emissions from the LAW Vitrification System will not exceed 45 µg/dscm [40 CFR §63.1203(b)(2), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.vi Lead and cadmium emissions from the LAW Vitrification System will not exceed 120 µg/dscm, combined [40 CFR §63.1203(b)(3), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.vii Arsenic, beryllium, and chromium emissions from the LAW Vitrification System will not exceed 97 µg/dscm, combined [40 CFR §63.1203(b)(4), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.viii Carbon monoxide (CO) emission from the LAW Vitrification System will not exceed 100 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system), dry basis [40 CFR §63.1203(b)(5)(i), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.ix Hydrocarbon emission from the LAW Vitrification System will not exceed 10 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system during demonstration testing required by this Permit), dry basis, and reported as propane [40 CFR §63.1203(b)(5)(ii), in accordance with WAC 173-303-680(2)].

III.10.H.1.b.x If the emissions from the LAW Vitrification System exceed the emission rates listed in Permit Table III.10.H.E, as approved pursuant to Permit Condition III.10.C.11.b., the Permittees will notify Ecology in accordance with Permit Condition III.10.H.3.d.vii. [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)].

The emission limits specified in Permit Conditions III.10.H.1.b.i. through III.10.H.1.b.ix. above, will be met for the LAW Vitrification System by limiting feed-rates as specified in Permit Tables III.10.H.D. and III.10.H.F., as approved/modified pursuant to Permit Condition III.10.H.5., compliance with operating conditions specified in Permit Condition III.10.H.1.c. (except as specified in Permit Condition III.10.H.1.b.xii.), and compliance with Permit Condition III.10.H.1.b.xi.

III.10.H.1.b.xi Treatment effectiveness, feed-rates and operating rates for dangerous and mixed waste management units contained in the LAW Building, but not included in Permit Table III.10.H.A, as approved/modified pursuant to Permit Condition III.10.H.5., will be as specified in Permit Sections III.10.D, III.10.E, III.10.F and consistent with assumptions and basis which are reflected in Operating Unit Group 10, Appendix 6.3.1 of this Permit, as approved pursuant to Permit Condition III.10.C.11.b. For the purposes of this permit condition, Operating Unit Group 10, Appendix 6.3.1 will be superseded by Appendix 6.4.1 upon its approval pursuant to either Permit Conditions III.10.C.11.c. or III.10.C.11.d. [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)].

III.10.H.1.b.xii Except during periods of LAW Vitrification System startup and shutdown, compliance with the operating conditions specified in Permit Condition III.10.H.1.c.,will be regarded as compliance with the required performance standards identified in Permit Conditions III.10.H.1.b.i. through x. However, if it is determined that during the effective period of this Permit that compliance with the operating conditions in Permit Condition III.10.H.1.c. is not sufficient to ensure compliance with the performance standards specified in Permit Conditions III.10.H.1.b.i. through x., the Permit may be modified, revoked, or reissued pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f., or III.10.C.2.g.

III.10.H.1.c Operating Conditions [WAC 173-303-670(6), in accordance with WAC 173-303-680(2) and (3)].

The Permittees will operate the LAW Vitrification System in accordance with Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.H.5.e.vi., Operating Unit Group 10, Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e., and Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., except as modified pursuant to Permit Conditions III.10.H.1.b.xii., III.10.H.2., III.10.H.3., III.10.H.4., and in accordance with the following:

III.10.H.1.c.i The Permittees will operate the LAW Vitrification System in order to maintain the systems and process parameters listed in Permit Tables III.10.H.C and III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5., within the set-points specified in Permit Table III.10.H.F.

III.10.H.1.c.ii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5., to automatically cut-off and/or lock-out the dangerous and mixed waste feed to the LAW Vitrification System when the monitored operating conditions deviate from the set-points specified in Permit Table III.10.H.F.

III.10.H.1.c.iii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5., to automatically cut-off and/or lock-out the dangerous and mixed waste feed to the LAW Vitrification System when all instruments specified on Permit Table III.10.H.F for measuring the monitored parameter fail or exceed its span value.

III.10.H.1.c.iv The Permittees will operate the AWFCO systems, specified in Permit Table III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5., to automatically cut-off and/or lock out the dangerous and/or mixed waste feed to the LAW Vitrification System when any portion of the LAW Vitrification System is bypassed. The terms “bypassed” and “bypass event” as used in Permit Sections III.10.H and III.10.I will mean if any portion of the LAW Vitrification System is bypassed so that gases are not treated as during the Demonstration Test.

III.10.H.1.c.v In the event of a malfunction of the AWFCO systems listed in Permit Table III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5., the Permittees will immediately, manually cut-off the dangerous and mixed waste feed to the LAW Vitrification System. The Permittees will not restart the dangerous and/or mixed waste feed until the problem causing the malfunction has been identified and corrected.

III.10.H.1.c.vi The Permittees will manually cut-off the dangerous and mixed waste feed to the LAW Vitrification System when the operating conditions deviate from the limits specified in Permit Condition III.10.H.1.c.i., unless the deviation automatically activates the waste feed cut-off sequence specified in Permit Conditions III.10.H.1.c.ii., III.10.H.1.c.iii., and/or III.10.H.1.c.iv.

III.10.H.1.c.vii If greater than thirty (30) dangerous and mixed waste feed cut-off, combined, to the LAW Vitrification System occur due to deviations from Permit Table III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5., within a sixty (60) day period, the Permittees will submit a written report to Ecology within five (5) calendar days of the thirty-first exceedance including the information specified below. These dangerous and mixed waste feed cut-offs to the LAW Vitrification System, whether

automatically or manually activated, are counted if the specified set points are deviated from while dangerous waste, mixed waste, and waste residues continue to be processed in the LAW Vitrification System. A cascade event is counted at a frequency of one (1) towards the first waste feed cut-off parameter, specified on Permit Table III.10.H.F, from which the set-point is deviated:

A. The parameter(s) that deviated from the set-point(s) in Permit Table III.10.H.F.

B. The magnitude, dates, and duration of the deviations.

C. Results of the investigation of the cause of the deviations.

D. Corrective measures taken to minimize future occurrences of the deviations.

III.10.H.1.c.viii If any portion of the LAW Vitrification System is bypassed while treating dangerous and/or mixed waste it will be regarded as non-compliance with the operating conditions specified in Permit Condition III.10.H.1.c. and the performance standards specified in Permit Condition III.10.H.1.b. After such a bypass event, the Permittees will perform the following actions:

A. Investigate the cause of the bypass event.

B. Take appropriate corrective measures to minimize future bypasses.

C. Record the investigation findings and corrective measures in the operating record.

D. Submit a written report to Ecology within five (5) days of the bypass event documenting the result of the investigation and corrective measures.

III.10.H.1.c.ix The Permittees will control fugitive emissions from the LAW Vitrification System by maintaining the melters under negative pressure.

III.10.H.1.c.x Except during periods of vitrification system startup and shutdown, compliance with the operating conditions specified in Permit Condition III.10.H.1.c. will be regarded as compliance with the required performance standards identified in Permit Condition III.10.H.1.b. However, evidence that compliance with these operating conditions is insufficient to ensure compliance with the performance standards, will justify modification, revocation, or re-issuance of this Permit, in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2.f., or III.10.C.2.g.

III.10.H.1.d Inspection Requirements [WAC 173-303-680(3)]

III.10.H.1.d.i The Permittees will inspect the LAW Vitrification System in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E1 of this Permit, as modified in accordance with Permit Condition III.10.C.5.c.

III.10.H.1.d.ii The inspection data for LAW Vitrification System will be recorded, and the records will be placed in the WTP Unit operating record for the LAW Vitrification System, in accordance with Permit Condition III.10.C.4.

III.10.H.1.d.iii The Permittees will comply with the inspection requirements specified in Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., and as modified by Permit Conditions III.10.H.1.b.xii., III.10.H.2., III.10.H.3., and III.10.H.4.

III.10.H.1.e Monitoring Requirements [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7) and WAC 173-303-807(2), in accordance with WAC 173-303-680(3)]

III.10.H.1.e.i Upon receipt of a written request from Ecology, the Permittees will perform sampling and analysis of the dangerous and mixed waste and exhaust emissions to verify that

the operating requirements established in the Permit achieve the performance standards delineated in this Permit.

III.10.H.1.e.ii The Permittees will comply with the monitoring requirements specified in Operating Unit Group 10, Appendices 9.2, 9.3, 9.7, 9.13, 9.15 and 9.18 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.c., III.10.H.5.d., III.10.H.5.e., and III.10.H.5.f., as modified by Permit Conditions III.10.H.1.b.xii., III.10.H.2., III.10.H.3., and III.10.H.4.

III.10.H.1.e.iii The Permittees will operate, calibrate, and maintain the carbon monoxide and hydrocarbon continuous emission monitors (CEM) specified in this Permit in accordance with Performance Specification 4B and 8A of 40 CFR Part 60, Appendix B, in accordance with Appendix to Subpart EEE of 40 CFR Part 63, and Operating Unit Group 10 Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., and as modified by Permit Conditions III.10.H.1.b.xii., III.10.H.2., III.10.H.3., and III.10.H.4.

III.10.H.1.e.iv The Permittees will operate, calibrate, and maintain the instruments specified on Permit Tables III.10.H.C, and F, as approved/modified pursuant to Permit Condition III.10.H.5., in accordance with Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., and as modified by Permit Conditions III.10.H.1.b.xii., III.10.H.2., III.10.H.3., and III.10.H.4.

III.10.H.1.f Recordkeeping Requirements [WAC 173-303-380 and WAC 173-303-680(3)]

III.10.H.1.f.i The Permittees will record and maintain in the WTP Unit operating record for the LAW Vitrification System, all monitoring, calibration, maintenance, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Conditions III.10.C.4. and III.10.C.5., as modified by Permit Conditions III.10.H.1.b.xii., III.10.H.2., III.10.H.3., and III.10.H.4.

III.10.H.1.f.ii The Permittees will record in the WTP Unit operating record the date, time, and duration of all automatic waste feed cutoffs and/or lockouts, including the triggering parameters, reason for the deviation, and recurrence of the incident. The Permittees will also record all incidents of AWFCO system function failures, including the corrective measures taken to correct the condition that caused the failure.

III.10.H.1.f.iii The Permittees will submit to Ecology a report semi-annually the first calendar year, and annually thereafter each calendar year within ninety (90) days following the end of the year. The report will include the following information:

A. Total dangerous and mixed waste feed processing time for the LAW Vitrification System;

B. Date/Time of all LAW Vitrification System startups and shutdowns;

C. Date/Time/Duration/Cause/Corrective Action taken for all LAW Vitrification System shutdowns caused by malfunction of either process or control equipment; and

D. Date/Time/Duration/Cause/Corrective Action taken for all instances of dangerous and/or mixed waste feed cut-off due to deviations from Permit Table III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5.

III.10.H.1.f.iv The Permittees will submit an annual report to Ecology each calendar year within ninety (90) days following the end of the year of all quarterly CEM Calibration Error and Annual CEM Performance Specification Tests conducted in accordance with Permit Condition III.10.H.1.e.iii.

III.10.H.1.g Closure

The Permittees will close the LAW Vitrification System in accordance with Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

III.10.H.2 Shakedown Period [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)].

III.10.H.2.a The shakedown period for the LAW Vitrification System will be conducted in accordance with Permit Condition III.10.H.1., Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., and as modified in accordance with Permit Conditions III.10.H.1.b.xii., III.10.H.2., and III.10.H.3.

III.10.H.2.b Duration of the Shakedown Period

III.10.H.2.b.i The shakedown period for the LAW Vitrification System will begin with the initial introduction of dangerous waste in the LAW Vitrification System following construction and will end with the start of the demonstration test.

III.10.H.2.b.ii The shakedown period will not exceed the following limits, as defined by hours, when the LAW Vitrification System is processing dangerous waste. The Permittees may petition Ecology for one extension of each shakedown phase for seven hundred and twenty (720) additional operating hours in accordance with Permit modification procedures specified in Permit Conditions III.10.C.2.e. and III.10.C.2.f.

Shakedown Phase 1: 720 hours

Shakedown Phase 2: 720 hours

III.10.H.2.b.iii Shakedown Phase 2 will not be commenced until documentation has been submitted to Ecology verifying that the LAW Vitrification System has operated at a minimum of 75% of the shakedown Phase 1 feed-rate limit for two (2) separate eight (8) consecutive hour periods with no AWFCOs.

III.10.H.2.c Allowable Waste Feed During the Shakedown Period

III.10.H.2.c.i The Permittees may feed the dangerous waste specified for the LAW Vitrification System on the Part A Forms (Operating Unit Group 10, Addendum A of this Permit), except for those wastes outside the waste acceptance criteria specified in the WAP, Attachment 1, Addendum B of this Permit, as approved pursuant to Permit Condition III.10.C.3., except Permit Conditions III.10.H.2.c.ii. through v. also apply.

III.10.H.2.c.ii The Permittees will not feed the following wastes to the LAW Vitrification System during Shakedown Phase 1:

A. Acutely toxic dangerous waste listed in WAC 173-303-081(a)(2)(a)(i).

B. Mixed waste

III.10.H.2.c.iii The Permittees will not feed the following waste to the LAW Vitrification System during Shakedown Phase 2:

A. Mixed waste

III.10.H.2.c.iv The feed-rates to the LAW Vitrification System will not exceed the limits in Permit Tables III.10.H.D and III.10.H.F, as approved/modified pursuant to Permit Condition III.10.H.5.

III.10.H.2.c.v The Permittees will conduct sufficient analysis of the dangerous waste treated in the LAW Vitrification System to verify that the waste feed is within the physical and chemical composition limits specified in this Permit.

III.10.H.3 Demonstration Test Period [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)].

III.10.H.3.a Demonstration Test Period

III.10.H.3.a.i The Permittees will operate, monitor, and maintain the LAW Vitrification System as specified in Permit Condition III.10.H.1., and Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., except as modified in accordance with Permit Conditions III.10.H.1.b.xii., and III.10.H.3.

III.10.H.3.a.ii Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., will be resubmitted to Ecology for approval by the Permittees as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f. at least one hundred and eighty (180) days prior to the start date of the demonstration test. The revised Demonstration Test Plan will include applicable EPA promulgated test methods and procedures in effect at the time of the re-submittal and projected commencement and completion dates for the Demonstration Test.

III.10.H.3.a.iii The Permittees will not commence the demonstration test period until documentation has been submitted to Ecology verifying that the LAW Vitrification System has operated at a minimum of 75% of the demonstration test period feed-rate limit for a minimum of an eight (8) consecutive hours period on two (2) consecutive days.

III.10.H.3.b Performance Standards

The Permittees will demonstrate compliance with the performance standards specified in Permit Condition III.10.H.1.b. during the Demonstration Test Period.

III.10.H.3.c Allowable Waste Feed During the Demonstration Test Period

III.10.H.3.c.i The Permittees may feed the dangerous waste specified for the LAW Vitrification System in Part A Forms (Operating Unit Group 10, Addendum A of this Permit), except for those waste outside the waste acceptance criteria specified in the WAP, Operating Unit Group 10, Addendum B of this Permit, as approved pursuant to Permit Condition III.10.C.3., except Permit Conditions III.10.H.3.c.ii. through iv. also apply.

III.10.H.3.c.ii The Permittees will not feed mixed waste to the LAW Vitrification System.

III.10.H.3.c.iii The dangerous waste feed-rates to the LAW Vitrification System will not exceed the limits in Permit Tables III.10.H.D and F, as approved/modified pursuant to Permit Condition III.10.H.5.

III.10.H.3.c.iv The Permittees will conduct sufficient analysis of the dangerous waste treated in the LAW Vitrification System to verify that the dangerous waste is within the physical and chemical composition limits specified in this Permit.

III.10.H.3.d Demonstration Data Submissions and Certifications

III.10.H.3.d.i The Permittees will submit to Ecology a complete demonstration test report within one-hundred eighty (180) calendar days of completion of the Demonstration Test

including all data collected during the Demonstration Test and updated Permit Tables III.10.I.D, III.10.I.E and III.10.I.F.

III.10.H.3.d.ii The Permittees must submit the following information to Ecology prior to receiving Ecology's approval to commence feed of dangerous waste and mixed waste to the LAW Vitrification System:

A. The Permittees will submit a summary of data collected as required by the Demonstration Test Plan to Ecology upon completion of the Demonstration Test.

B. A certification that the Demonstration Test has been carried out in accordance with the approved Demonstration Test Plan and approved modifications within thirty (30) days of the completion of the Demonstration Test [WAC 173-303-807(8)].

C. Calculations and analytical data showing compliance with the performance standards specified in Permit Conditions III.10.H.1.b.i, III.10.H.1.b.iv, III.10.H.1.b.v, III.10.H.1.b.vi, and III.10.H.1.b.vii

D. Laboratory data QA/QC summary for the information provided in III.10.H.3.d.ii.C.

III.10.H.3.d.iii After successful completion of the Demonstration Test and receipt of Ecology's approval, the Permittees will be authorized to commence feed of dangerous waste and mixed waste to the LAW Vitrification System for the post-demonstration test period indicated in Permit Tables III.10.H.D and F, as approved/modified pursuant to Permit Condition III.10.H.5., in compliance with the operating requirements specified in Permit Condition III.10.H.1.c. and within the limitations specified in Permit Condition.III.10.C.14.

III.10.H.3.d.iv RESERVED

III.10.H.3.d.v After successful completion of the Demonstration Test, Permittees submittal of the following to Ecology and the Permittees receipt of approval of the following in writing, the Permittees will be authorized to feed dangerous waste and mixed waste to the LAW Vitrification System pursuant to Permit Section III.10.I.

A. A complete Demonstration Test Report for the LAW Vitrification System and updated Permit Tables III.10.I.D, III.10.I.E, and III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.C.11.c or III.10.C.11.d. The test report will be certified in accordance with WAC 173-303-807(8), in accordance with WAC 173-303-680(2) and (3).

B. A Final Risk Assessment Report completed pursuant to Permit Conditions III.10.C.11.c. or III.10.C.11.d.

III.10.H.3.d.vi If any calculations or testing results show that one or more of the performance standards listed in Permit Condition III.10.H.1.b., with the exception of Permit Condition III.10.H.1.b.x., for the LAW Vitrification System were not met during the Demonstration Test, the Permittees will perform the following actions:

A. Immediately stop dangerous and mixed waste feed to the LAW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s).

B. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s) as specified in Permit Condition I.E.21.

C. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s).

D. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s), documentation supporting a mode of operation where all performance standards listed in Permit Condition III.10.H.1.b., with the exception of Permit Condition III.10.H.1.b.x., for the LAW Vitrification System were met during the demonstration test, if any such mode was demonstrated.

E. Based on the information provided to Ecology by the Permittees pursuant to Permit Conditions III.10.H.3.d.vi.A through D above, and any additional information, Ecology may provide in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of a compliance schedule and/or revised Demonstration Test Plan pursuant to Permit Conditions III.10.H.3.d.vi.F and G.

F. If the performance standard listed in Permit Condition III.10.H.1.b.i. was not met during the Demonstration Test, the Permittees will submit within one hundred and twenty (120) days of discovery of not meeting the performance standard, a revised Demonstration Test Plan (if appropriate), and a compliance schedule for Ecology approval to address this deficiency. If a revised Demonstration Test Plan is submitted, it will be accompanied by a request for approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f. The revised Demonstration Test Plan (if submitted) must include substantive changes to prevent failure from reoccurring.

G. If any of the performance standards listed in Permit Condition III.10.H.1.b., with the exception of Permit Conditions III.10.H.1.b.i. or III.10.H.1.b.x., were not met during the Demonstration Test the Permittees will submit to Ecology within one hundred twenty (120) days of discovery of not meeting the performance standard(s), a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring.

III.10.H.3.d.vii If any calculations or testing results show that any emission rate for any constituent listed in Permit Table III.10.H.E, as approved pursuant to Permit Condition III.10.C.11.b., is exceeded for LAW Vitrification System during the Demonstration Test, the Permittees will perform the following actions:

A. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s) as specified in Permit Condition I.E.21.

B. Submit to Ecology additional risk information to indicate that the increased emissions impact is offset by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance of the emission rate(s) and submit a report of the investigation findings to Ecology within fifteen (15) days of the discovery of exceeding the emission rate(s); and

C. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and

III.10.C.2.f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring.

III.10.H.4 Post Demonstration Test Period [WAC 173-303-670(5), WAC 173-303-670(6), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)].

III.10.H.4.a The Permittees will operate, monitor, and maintain the LAW Vitrification System as specified in Permit Condition III.10.H.1. and Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5., except as modified in accordance with Permit Conditions III.10.H.1.b.xii., III.10.H.3., and III.10.H.4.

III.10.H.4.b Allowable Waste Feed During the Post-Demonstration Test Period

III.10.H.4.b.i The Permittees may feed the dangerous and/or mixed waste specified for the LAW Vitrification System on the Part A Forms (Operating Unit Group 10, Addendum A of this Permit), except for those wastes outside the waste acceptance criteria specified in the WAP, Operating Unit Group 10, Addendum B of this Permit, as approved pursuant to Permit Condition III.10.C.3., and except Permit Conditions III.10.H.4.b.ii. and III.10.H.4.b.iii. also apply.

III.10.H.4.b.ii The dangerous waste and mixed waste feed-rates to the LAW Vitrification System will not exceed the limits in Permit Tables III.10.H.D and F, as approved/modified pursuant to Permit Condition III.10.H.5., or in Permit Condition III.10.H.3

III.10.H.4.b.iii The Permittees will conduct sufficient analysis of the dangerous waste and mixed waste treated in LAW Vitrification System to verify that the waste feed is within the physical and chemical composition limits specified in this Permit.

III.10.H.5 Compliance Schedules

III.10.H.5.a All information identified for submittal to Ecology in a. through f. of this compliance schedule must be signed and certified in accordance with requirements in WAC 173-303-810(12), as modified in accordance with Permit Condition III.10.H.1.a.iii. [WAC 173-303-806(4)].

III.10.H.5.b The Permittees will submit to Ecology, pursuant to Permit Condition III. 10.C.9.f., prior to construction of each secondary containment and leak detection system for the LAW Vitrification System (per level) as identified in Permit Tables III.10.H.A and III.10.H.B, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 9.2 , 9.4, 9.5, 9.7, 9.8, 9.9, 9.11, and 9.12 of this Permit. At a minimum, engineering information specified below will show the following as described in WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings and information on sumps and floor drains):

III.10.H.5.b.i IQRPE Reports (specific to foundation, secondary containment, and leak detection system) will include review of design drawings, calculations, and other information on which the certification report is based and will include as applicable, but not limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 9.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. IQRPE Reports will be consistent with the information separately provided in ii. through ix. below [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)];

III.10.H.5.b.ii Design drawings (General Arrangement Drawings, in plan) and specifications for the foundation, secondary containment including liner installation details, and leak detection methodology. These items should show the dimensions, volume calculations, and location of the secondary containment system, and should include items such as floor/pipe slopes to sumps, tanks, floor drains [WAC 173-303-640(4)(b) through (f) and WAC 173-303-640(3)(a), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)];

III.10.H.5.b.iii The Permittees will provide the design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the secondary containment system. This information will demonstrate the foundation will be capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift [WAC 173-303-640(4)(c)(ii), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.H.5.b.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.H.5.b.v Secondary containment/foundation, and leak detection system, materials selection documentation (including, but not limited to, concrete coatings and water stops, and liner materials) as applicable [WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.H.5.b.vi Detailed description of how the secondary containment for the LAW Vitrification System will be installed in compliance with WAC 173-303-640(3)(c), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B);

III.10.H.5.b.vii Submit Permit Tables III.10.H.B and III.10.I.B completed to provide for all secondary containment sumps and floor drains the information as specified in each column heading consistent with information to be provided in i. through vi., above;

III.10.H.5.b.viii Documentation that secondary containment and leak detection systems will not accumulate hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.b.ix A detailed description of how LAW Vitrification System design provides access for conducting future LAW Vitrification System integrity assessments [WAC 173-303-640(3)(b) and WAC 173-303-806(4)(i)(i)(B)].

III.10.H.5.c The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f, prior to installation of each sub-system as identified in Permit Table III.10.H.A, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 9.1 through 9.14, and 9.17 of this Permit. At a minimum, engineering information specified below will show the following, as required pursuant to WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings):

III.10.H.5.c.i IQRPE Reports (specific to sub-system) will include review of design drawings, calculations, and other information on which the certification report is based and will include as applicable, but not limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group

10, Appendix 9.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information separately provided in ii. through xii. below, and the IQRPE Report specified in Permit Condition III.10.H.5.b. [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)];

III.10.H.5.c.ii Design drawings [General Arrangement Drawings in plan and, Process Flow Diagrams, Piping and Instrumentation Diagrams (including pressure control systems), Mechanical Drawings, and specifications, and other information specific to subsystems (to show location and physical attributes of each subsystem)] [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)];

III.10.H.5.c.iii Sub-system design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details to support the subsystems. Structural support calculations specific to off-specification, non-standard and field fabricated subsystems will be submitted for incorporation into the Administrative Record. Documentation will include but not limited to, supporting specifications, test data, treatment effectiveness report, etc. supporting projected operational capability (e.g., WESP projected removal efficiency for individual metals, halogens, particulates, etc.) and compliance with performance standards specified in Permit Condition III.10.H.1.b [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.H.5.c.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with water, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.H.5.c.v Sub-system materials selection documentation (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.H.5.c.vi Sub-system vendor information (including, but not limited to, required performance warranties, as available), consistent with information submitted under ii. above, will be submitted for incorporation into the Administrative Record [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.c.vii System descriptions related to sub-system units will be submitted for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.c.viii Mass and energy balance for normal projected operating conditions used in developing the Piping and Instrumentation Diagrams and Process Flow Diagrams, including assumptions and formulas used to complete the mass and energy balance, so that they can be independently verified for incorporation into the Administrative

Record [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.c.ix Detailed description of all potential LAW Vitrification System bypass events including:

A. A report which includes an analysis of credible potential bypass events and recommendations for prevention/minimization of the potential, impact, and frequency of the bypass event to include at a minimum:

1. Operating procedures
2. Maintenance procedures
3. Redundant equipment
4. Redundant instrumentation
5. Alternate equipment
6. Alternate materials of construction

III.10.H.5.c.x A detailed description of how the sub-systems will be installed in compliance with WAC 173-303-640(3)(c), (d), and (e), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B);

III.10.H.5.c.xi Sub-system design to prevent escape of vapors and emissions of acutely or chronically toxic (upon inhalation) EHW, for incorporation into the Administrative Record [WAC 173-303-640(5)(e), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.H.5.c.xii Documentation that sub-systems are designed to prevent the accumulation of hydrogen gases levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)].

III.10.H.5.d The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f, prior to installation of equipment for each sub-system as identified in Permit Tables III.10.H.A and III.10.H.B, not addressed in Permit Conditions III.10.H.5.b. or III.10.H.5.c., engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 9.1 through 9.14 of this Permit. At a minimum, engineering information specified below will show the following as required pursuant to WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings):

III.10.H.5.d.i IQRPE Reports (specific to sub-system equipment) will include a review of design drawings, calculations, and other information as applicable on which the certification report is based. The reports will include, but not be limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 9.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information provided separately in ii. through xiii. below and the IQRPE Reports specified in Permit Conditions III.10.H.5.b. and III.10.H.5.c. [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.H.5.d.ii Design drawings [Process Flow Diagrams, Piping and Instrumentation Diagrams (including pressure control systems), specifications and other information specific to

equipment (these drawings should include all equipment such as pipes, valves, fittings, pumps, instruments, etc.)] [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.H.5.d.iii Sub-system equipment design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the sub-system equipment [WAC 173-303-640(3)(a) and WAC 173-303-640(3)(f), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.H.5.d.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil and water, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.H.5.d.v Materials selection documentation for equipment for each sub-system (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.H.5.d.vi Vendor information (including, but not limited to, required performance warranties, as available), consistent with information submitted under ii. above, for sub-system equipment will be submitted for incorporation into the Administrative Record. [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(iv)];

III.10.H.5.d.vii Sub-system, sub-system equipment, and leak detection system instrument control logic narrative description (e.g., descriptions of fail-safe conditions, etc.) [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)].

III.10.H.5.d.viii System description related to sub-system equipment, and system descriptions related to leak detection systems, for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.d.ix A detailed description of how the sub-system equipment will be installed and tested [WAC 173-303-640(3)(c) through (e), WAC 173-303-640(4)(b) and (c), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.H.5.d.x For process monitoring, control, and leak detection system instrumentation for the LAW Vitrification System as identified in Permit Tables III.10.H.C. and III.10.H. F., a detailed description of how the process monitoring, control, and leak detection system instrumentation, will be installed and tested [WAC 173-303-640(3)(c) through (e), WAC 173-303-640(4)(b) and (c), WAC 173-303-806(4)(c)(vi), and WAC 173-303-806(4)(i)(i)(B)];

III.10.H.5.d.xi Mass and energy balance for projected normal operating conditions used in developing the Piping and Instrumentation Diagrams and Process Flow Diagrams, including assumptions and formulas used to complete the mass and energy balance, so that they can be independently verified, for incorporation into the Administrative Record [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.d.xii Documentation that sub-systems equipment are designed to prevent the accumulation of hydrogen gas levels above the lower explosive limit for incorporation into the

Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.d.xiii Leak detection system documentation (e.g. vendor information, etc.) consistent with information submitted under Permit Condition III.10.H.5.c.ii. and Permit Conditions III.10.H.5.d.ii., vii., viii., and x. above, will be submitted for incorporation into the Administrative Record.

III.10.H.5.e Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., the following as specified below for incorporation into Operating Unit Group 10, Appendix 9.18 of this Permit, except Permit Condition III.10.H.5.e.i., which will be incorporated into Operating Unit Group 10, Addendum E of this Permit. All information provided under this permit condition must be consistent with information provided pursuant to Permit Conditions III.10.H.5.b., c., d., e., and f., III.10.C.3.e. and III.10.C.11.b., as approved by Ecology:

III.10.H.5.e.i Integrity assessment program and schedule for the LAW Vitrification System will address the conducting of periodic integrity assessments on the LAW Vitrification System over the life of the system, as specified in Permit Condition III.10.H.5.b.ix. and WAC 173-303-640(3)(b), in accordance with WAC 173-303-680, and descriptions of procedures for addressing problems detected during integrity assessments. The schedule must be based on past integrity assessments, age of the system, materials of construction, characteristics of the waste, and any other relevant factors [WAC 173-303-640(3)(b), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)].

III.10.H.5.e.ii Detailed plans and descriptions, demonstrating the leak detection system is operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of dangerous and/or mixed waste or accumulated liquid in the secondary containment system within twenty-four (24) hours [WAC 173-303-640(4)(c)(iii)]. Detection of a leak of at least 0.1 gallons per hour within twenty-four (24) hours is defined as being able to detect a leak within twenty-four (24) hours. Any exceptions to this criteria must be approved by Ecology in accordance with WAC 173-303-680, WAC 173-303-640(4)(c)(iii), and WAC 173-303-806(4)(i)(i)(b).

A. Dangerous waste pipe penetrations that require a penetration seal in accordance with the International Building Code (IBC) and DOE-STD-1066, DOE Standard for Fire Protection Design Criteria, or meet ventilation sealing requirements identified in Table III.10.H.G, are not required to meet the 0.1 gallons per hour within twenty-four (24) hours leak detection rate for those sections of piping that are in contact with approved silicone or equivalent low-permeability seal material.

B. Piping on either side of the penetration seal must meet the requirements of III.10.H.5.e.ii.

C. Revisions (including additions or deletions) to Table III.10.H.G will be submitted to Ecology for review and approval pursuant to Conditions III.10.C.2.e and III.10.C.2.f. Addition of penetration seal locations to Table III.10.H.G. will be approved by Ecology prior to installation of the penetration seal.

1 **Table III.10.H.G LAW Plant Penetration Seal Location**

Row Number	Room Number	Orientation	Discipline	Sequence Number
1.	L0000112	E	PD	02097
2.	L0000123	E	PD	01823
3.	L0000123	E	PD	01834
4.	L0000123	E	PD	01828
5.	L0000123	E	PD	01837
6.	L0000123	E	PD	01822
7.	L0000123	E	PD	01824
8.	L0000123	E	PD	01826
9.	L0000123	E	PD	01821
10.	L0000123	E	PD	01825
11.	L0000123	E	PD	01827
12.	L0000123	E	PD	01836
13.	L0000123	E	PD	01820
14.	L0000123	E	PD	01832
15.	L0000123	S	PD	01797
16.	L0000124	E	PD	01843
17.	L0000124	E	PD	01844
18.	L0000124	E	PD	01845
19.	L0000124	E	PD	01842
20.	L0000124	E	PD	01847
21.	L0000124	E	PD	01841
22.	L0000124	E	PD	01846
23.	L0000124	E	PD	01850
24.	L0000124	E	PD	01848
25.	L0000124	E	PD	01852
26.	L0000124	E	PD	01840
27.	L0000124	E	PD	01839
28.	L0000124	E	PD	01849
29.	L0000124	S	PD	01801
30.	L0000125	E	PD	01858
31.	L0000125	E	PD	01859
32.	L0000125	E	PD	01860
33.	L0000125	E	PD	01857
34.	L0000125	E	PD	01862
35.	L0000125	E	PD	01856
36.	L0000125	E	PD	01861
37.	L0000125	E	PD	01865
38.	L0000125	E	PD	01863

Row Number	Room Number	Orientation	Discipline	Sequence Number
39.	L0000125	E	PD	01867
40.	L0000125	E	PD	01855
41.	L0000125	E	PD	01854
42.	L0000125	E	PD	01864
43.	L0000126	S	PD	01807
44.	L0000201	F	PD	02405
45.	L0000201	S	PD	02406
46.	L0000202	F	PD	02495
47.	L0000216	W	PD	02674
48.	L0000220	E	PD	02709
49.	L0000301	F	PD	03319
50.	L0000301	S	PD	03437
51.	L0000301	S	PD	04149
52.	L0000301	S	PD	04141
53.	L000101A	F	PD	01291
54.	L000101A	F	PD	01292
55.	L000101A	W	PD	01971
56.	L000226B	F	PD	02445
57.	L000226B	F	PD	02444
58.	L000304F	F	PD	03278
59.	L000304F	F	PD	03277
60.	LB00001B	E	EQ	80908
61.	LB00001B	S	PD	00196
62.	LB00001B	S	PD	00201
63.	LC000201	F	PD	02430

III.10.H.5.e.iii Detailed operational plans and descriptions, demonstrating that spilled or leaked waste and accumulated liquids can be removed from the secondary containment system within twenty-four (24) hours [WAC 173-303-806(4)(i)(i)(B)].

III.10.H.5.e.iv Descriptions of operational procedures demonstrating appropriate controls and practices are in place to prevent spills and overflows from the LAW Vitrification System or containment systems in compliance with WAC 173-303-640(5)(b)(i) through (iii), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B);

III.10.H.5.e.v Description of procedures for investigation and repair of the LAW Vitrification System [WAC 173-303–640(6) and WAC 173-303-640(7)(e) and (f), in accordance with WAC 173-303-680, WAC 173-303-320, WAC 173-303-806(4)(a)(v), and WAC 173-303-806(4)(a)(ii)(B)].

III.10.H.5.e.vi Updated Addendum C, Narrative Description, Tables and Figures as identified in Permit Tables III.10.H.A and III.10.H.B, as modified pursuant to Permit Condition

III.10.H.5.e.x. and updated to identify routinely non-accessible LAW Vitrification sub-systems.

III.10.H.5.e.vii Description of procedures for management of ignitable and reactive, and incompatible dangerous and/or mixed waste as specified in WAC 173-303-640(9) and (10), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B).

III.10.H.5.e.viii A description of the tracking system used to track dangerous and/or mixed waste generated throughout the LAW Vitrification system, pursuant to WAC 173-303-380.

III.10.H.5.e.ix Permit Tables III.10.H.C and III.10.I.C will be completed for LAW Vitrification System process and leak detection system monitors and instruments (to include, but not be limited to: instruments and monitors measuring and/or controlling flow, pressure, temperature, density, pH, level, humidity, and emissions) to provide the information as specified in each column heading. Process and leak detection system monitors and instruments for critical systems as specified in Operating Unit Group 10, Appendix 2.0 and as updated pursuant to Permit Condition III.10.C.9.b., and for operating parameters as required to comply with Permit Condition III.10.C.3.e.iii. will be addressed. Process monitors and instruments for non-waste management operations (e.g., utilities, raw chemical storage, non-contact cooling waters, etc.) are excluded from this permit condition [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.H.5.e.x Permit Tables III.10.H.A and III.10.I.A amended as follows [WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B)]:

A. Under column 1, update and complete list of dangerous and mixed waste LAW Vitrification System sub-systems, including plant items that comprise each system (listed by item number).

B. Under column 2, update and complete system designations.

C. Under column 3, replace the 'Reserved' with Operating Unit Group 10, Appendix 9.0 subsections (e.g., 9.1, 9.2, etc.) designated in Permit Conditions III.10.H.5.b., c., and d. specific to LAW Vitrification System sub-system as listed in column 1.

D. Under column 4, update and complete list of narrative description, tables, and figures.

III.10.H.5.f One hundred and eighty (180) days prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit for review and receive approval for incorporation into Operating Unit Group 10, Appendix 9.15 of this Permit, a Demonstration Test Plan for the LAW Vitrification System to demonstrate that the LAW Vitrification Systems meets the performance standards specified in Permit Condition III.10.H.1.b. In order to incorporate the Demonstration Test Plan for the LAW Vitrification System into Operating Unit Group 10, Appendix 9.15, Permit Condition III.10.C.2.g. process will be followed. The Demonstration Test Plan will include, but not be limited to, the following information. The Demonstration Test Plan will also be consistent with the information provided pursuant to Permit Conditions III.10.H.5.b., c., d., and e., III.10.C.3.e., and III.10.C.11.b., as approved by Ecology and consistent with the schedule described in Operating Unit Group 10, Appendix 1.0 of this Permit. The documentation required pursuant to Permit Condition III.10.H.5.f.x., in addition to being incorporated into Operating Unit Group 10, Appendix 9.15, will be incorporated by reference in Operating Unit Group 10, Addendum E of this Permit.

Notes: (1) The following should be consulted to prepare this Demonstration Test Plan: "Guidance on Setting Permit Conditions and Reporting Trial Burn Results Volume II of

the Hazardous Waste Incineration Guidance Series," (EPA/625/6-89/019) and Risk Burn Guidance For Hazardous Waste Combustion Facilities," (EPA-R-01-001, July 2001), WAC 173-303-807(2), WAC 173-303-670(5), WAC-173-303-670(6), 40 CFR §63.1207(f)(2), 40 CFR §63.1209, and Appendix to 40 CFR Part 63 EEE.

(2) Cross-referencing to the information provided pursuant to permit Conditions III.H.5.b., c., d., e., and III.10.C.3.e.v., as approved by Ecology, that are redundant to elements of the Demonstration Test Plan for the LAW Vitrification System is acceptable.

III.10.H.5.f.i Analysis of each feed-stream to be fed during the demonstration test, including dangerous waste, glass formers and reductants, process streams (e.g., volumes of air leakage including control air, process air, steam, sparge bubbler air, air in-leakage from melter cave, and gases from LAW Vitrification Vessel Ventilation System, process water, etc.) that includes:

A. Levels of ash, metals, total chlorine (organic and inorganic), other halogens and radionuclide surrogates.

B. Description of the physical form of the feed-streams.

C. An identification and quantification of organics that are present in the feed-stream, including constituents proposed for DRE demonstration.

A comparison of the proposed demonstration test feed streams to the mixed waste feed envelopes to be processed in the melters must be provided that documents that the proposed demonstration test feed streams will serve as worst case surrogates for organic destruction, formation of products of incomplete oxidation, and metals, total chlorine (organic and inorganic), other halogens, particulate formation, and radionuclides.

III.10.H.5.f.ii Specification of trial principal organic dangerous constituents (PODCs) for which destruction and removal efficiencies are proposed to be calculated during the demonstration test and for inclusion in Permit Conditions III.10.H.1.b.i. and III.10.I.1.b.i. These trial PODCs will be specified based on destructibility, concentration or mass in the waste and the dangerous waste constituents or constituents in WAC 173-303-9905;

III.10.H.5.f.iii A description of the blending procedures, prior to introducing the feed-streams into the melter, including analysis of the materials prior to blending, and blending ratios;

III.10.H.5.f.iv A description of how the surrogate feeds are to be introduced for the demonstration. This description should clearly identify the differences and justify how any of differences would impact the surrogate feed introduction as representative of how mixed waste feeds will be introduced;

III.10.H.5.f.v A detailed engineering description of the LAW Vitrification System, including:

A. Manufacturer's name and model number for each sub-system.

B. Design capacity of each sub-system including documentation (engineering calculations, manufacturer/vendor specifications, operating data, etc.) supporting projected operational efficiencies (e.g., WESP projected removal efficiency for individual metals, halogens, particulates, etc.) and compliance with performance standards specified in Permit Condition III.10.H.1.b.

C. Detailed scaled engineering drawings, including Process Flow Diagrams, Piping and Instrumentation Diagrams, Vessel Drawings (plan, and elevation with cross sections) and General Arrangement Drawings.

D. Process Engineering Descriptions.

E. Mass and energy balance for each projected operating condition and each demonstration test condition, including assumptions and formulas used to complete the mass and energy balance, so that they can be independently verified for incorporation into the Administrative Record.

F. Engineering Specifications/data sheets (materials of construction, physical and chemical tolerances of equipment, and fan curves).

G. Detailed Description of Automatic Waste Feed Cutoff System addressing critical operating parameters for all performance standards specified in Permit Condition III.10.H.1.b.

H. Documentation to support compliance with performance standards specified in Permit Condition III.10.H.1.b., including engineering calculations, test data, and manufacturer/vendor's warranties, etc..

I. Detailed description of the design, operation, and maintenance practices for air pollution control system.

J. Detailed description of the design, operation, and maintenance practices of any stack gas monitoring and pollution control monitoring system.

III.10.H.5.f.vi Detailed description of sampling and monitoring procedures including sampling and monitoring locations in the system, the equipment to be used, sampling and monitoring frequency, and planned analytical procedures for sample analysis including, but not limited to:

A. A short summary narrative description of each stack sample method should be included within the main body of the demonstration test plan, which references an appendix to the plan that would include for each sampling train: (1) detailed sample method procedures, (2) sampling train configuration schematic, (3) sampling recovery flow sheet, (4) detailed analytical method procedures, and (5) sampling preparation and analysis flow sheet. The detailed procedures should clearly flag where the method has provided decision points (e.g., choices of equipment materials of construction, choices of clean-up procedures or whether additional clean-up procedures will be incorporated, whether pretest surveys or laboratory validation work will be performed, enhancements to train to accommodate high moisture content in stack gas, etc.) and what is being proposed along with the basis for the decision.

B. A short summary narrative description of the feed and residue sampling methods should be included within the main body of the demonstration test plan, which references an appendix that would include for each sample type: (1) detailed sample method procedures, (2) sampling recovery/compositing procedures, and (3) detailed analytical method procedures. The detailed procedures should clearly flag where the method has provided decision points (e.g., choices of equipment materials of construction, choices of clean-up procedures or whether additional clean-up procedures will be incorporated, whether pretest surveys or laboratory validation work will be performed, etc.) and what is being proposed along with the basis for the decision.

III.10.H.5.f.vii A detailed test schedule for each condition for which the demonstration test is planned, including projected date(s), duration, quantity of dangerous waste to be fed, and other relevant factors.

III.10.H.5.f.viii A detailed test protocol including, for each test condition, the ranges of feed-rate for each feed system, and all other relevant parameters that may affect the ability of the LAW Vitrification System to meet performance standards specified in Permit Condition III.10.H.1.b.

III.10.H.5.f.ix A detailed description of planned operating conditions for each demonstration test condition, including operating conditions for shakedown, demonstration test, post-demonstration test and normal operations. This information will also include submittal of Permit Tables III.10.H.D, III.10.H.F, III.10.I.D, and III.10.I.F completed with the information as specified in each column heading for each LAW Vitrification System waste feed cutoff parameter and submittal of supporting documentation for Permit Tables III.10.H.D, III.10.H.F, III.10.I.D, and III.10.I.F set-point values.

III.10.H.5.f.x The test conditions proposed must demonstrate meeting the performance standards specified in Permit Condition III.10.H.1.b. with the simultaneous operation of both melters at capacity and input from the LAW Vitrification Vessel Ventilation System at capacity to simulate maximum loading to the LAW Vitrification System off-gas treatment system and to establish the corresponding operating parameter ranges. To the extent that operation of one (1) melter or two (2) melters cannot be sustained within the operating parameter range established at this maximum load, additional demonstration test conditions must be included in the plan and performed to establish operating parameter ranges for each proposed operating mode while demonstrating meeting the performance standards specified in Permit Condition III.10.H.1.b..

III.10.H.5.f.xi Detailed description of procedures for start-up and shutdown of waste feed and controlling emissions in the event of an equipment malfunction, including off-normal and emergency shutdown procedures.

III.10.H.5.f.xii A calculation of waste residence time.

III.10.H.5.f.xiii Any request to extrapolate metal feed-rate limits from Demonstration Test levels must include:

A. A description of the extrapolation methodology and rationale for how the approach ensures compliance with the performance standards as specified in Permit Condition III.10.H.1.b.

B. Documentation of the historical range of normal metal feed-rates for each feed stream.

C. Documentation that the level of spiking recommended during the demonstration test will mask sampling and analysis imprecision and inaccuracy to the extent that extrapolation of feed-rates and emission rates from the Demonstration Test data will be as accurate and precise as if full spiking were used.

III.10.H.5.f.xiv Documentation of the expected levels of constituents in LAW Vitrification System input streams including, but not limited to, waste feed, glass former and reactants, control air, process air, steam, sparge bubbler air, air in-Leakage from melter cave, gases from LAW Vitrification Vessel Ventilation System, and process water.

III.10.H.5.f.xv Documentation justifying the duration of the conditioning required to ensure the LAW Vitrification System had achieved steady-state operations under Demonstration Test operating conditions.

III.10.H.5.f.xvi Documentation of LAW Vitrification System process and leak detection system instruments and monitors as listed on Permit Tables III.10.H.C, III.10.H.F, III.10.I.C, and III.10.I.F to include:

A. Procurement specifications.

B. Location used.

C. Range, precision, and accuracy.

D. Detailed descriptions of calibration/functionality test procedures (either method number ASTM) or provide a copy of manufacturer's recommended calibration procedures.

E. Calibration/functionality test, inspection, and routine maintenance schedules and checklists, including justification for calibration, inspection and maintenance frequencies, criteria for identifying instruments found to be significantly out of calibration, and corrective action to be taken for instruments found to be significantly out of calibration (e.g., increasing frequency of calibration, instrument replacement, etc.).

F. Equipment instrument control logic narrative description (e.g., descriptions of failsafe conditions, etc.) [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)].

III.10.H.5.f.xvii Outline of demonstration test report.

Table III.10.H.A - LAW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables and Figures
LAW Melter Process System LMP-MLTR-00001 (LAW Melter 1) LMP-MLTR-00002 (LAW Melter 2)	LMP	**24590-LAW** -CM-HC4-HXYG-00240-02-00014. Rev/ - -M0D-LMP-00001, Rev. 3 -M0D-LMP-00002, Rev. 3 -M6-LMP-00001001, Rev 0 -M6-LMP-00002001, Rev 0 -M6-LMP-00002002, Rev 0 -M6-LMP-00031001, Rev 0 -M6-LMP-00032001, Rev 0 -M6-LMP-00032002, Rev 0 -MF-LMP-00001, Rev. 0 -MF-LMP-00002, Rev. 0 -MF-LMP-00003, Rev. 0 -MF-LMP-00004, Rev. 0 -3PS-AE00-T0001, Rev. 6 -3PN-LMP-00002 -N1D-LMP-00001, Rev. 1 -P1-P01T-00002, Rev 7	Section 4E.2.2, Table C-8, and Figures C1-1, C1-3 and C1-21 in Operating Unit Group 10, Addendum C of this Permit.
LAW Primary Offgas Process System LOP-FCLR-00001 (Melter 1 Primary Film Cooler) LOP-FCLR-00002 (Melter 1 Standby Film Cooler No. 2) LOP-FCLR-00003 (Melter 2 Primary Film Cooler)	LOP	**24590-LAW** -P1-P01T-00002, Rev 7 -M6-LOP-00004001, Rev 0 -M6-LOP-00004002, Rev 0 -M6-LOP-00005001, Rev 0 -M6-LOP-00005002, Rev 0	Section 4E.4.2.1, Table C-8, and Figures C1-1, C1-3 and C1-21 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.H.A - LAW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables and Figures
LOP-FCLR-00004 (Melter 2 Standby Film Cooler)			
LAW Primary Offgas Process System (Cont.) LOP-SCB-00001 (Melter 1 Submerged Bed Scrubber) LOP-SCB-00002 (Melter 2 Submergered Bed Scrubber)	LOP	**24590-LAW** -M5-V17T-P0007, Rev 0 -M5-V17T-P0008, Rev 0 -M6-LOP-00001001, Rev 0 -M6-LOP-00002001, Rev 0 -MK-LOP-P0001001, Rev 0 -MK-LOP-P0001002, Rev 0 -MK-LOP-P0001003, Rev 0 -MKD-LOP-P0008, Rev 0 -NID-LOP-P0001, Rev 1 -P1-P01T-00002, Rev 7	Section 4E.4.2.1, Table C-8, and Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.
LAW Primary Offgas Process System (Cont.) LOP-WESP-00001 (Melter 1 Wet Electrostatic Precipitator - WESP) LOP-WESP-00002 (Melter 2 Wet Electrostatic Precipitator -WESP)	LOP	**24590-LAW** -M5-V17T-P0007, Rev 0 -M5-V17T-P0008, Rev 0 -M6-LOP-00001004, Rev 1 -M6-LOP-00002004, Rev 1 -NID-LOP-00003, Rev 3 -P1-P01T-00002, Rev 7 **24590-WTP** -3PS-MKE0-T0001, Rev 5	Section 4E.4.2.1, Table C-8, and Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.
LAW Secondary Offgas/Vessel Vent Process System LVP-HEPA-00001A (Melter Offgas HEPA Filter)	LVP	**24590-LAW** -M5-V17T-00010, Rev 4 -M6-LVP-00001003, Rev 0	Section 4E.4.2.2, Table C-8, Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.H.A - LAW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables and Figures
LVP-HEPA-00001B (Melter Offgas HEPA Filter) LVP-HEPA-00002A (Melter Offgas HEPA Filter) LVP-HEPA-00002B (Melter Offgas HEPA Filter) LVP-HEPA-00003A (Melter Offgas HEPA Filter)		-P1-P01T-00005, Rev 6	
LAW Secondary Offgas/Vessel Vent Process System (Cont.) LVP-SCO-00001 (Thermal Catalytic Oxidizer – located on LVP-SKID-00002)	LVP	**24590-LAW** -M6-LVP-00005002, Rev 3	Section 4E.4.2.2, Table C-8, Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.
LAW Secondary Offgas/Vessel Vent Process System (Cont.) LVP-SCR-00001 (NOx Selective Catalytic Reduction Unit – located on LVP-SKID-00002) LVP-HX-00001 (Catalytic Oxidizer Heat Exchanger – located on LVP-SKID-00002) LVP-HTR-00002 (Catalytic Oxidizer Electric Heater – located on LVP-SKID-00002)	LVP	**24590-LAW** -M6-LVP-00005002, Rev 3	Section 4E.4.2.2, Table C-8, and Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.
LAW Secondary Offgas/Vessel Vent Process System (Cont.) LVP-ADBR-00001A (Offgas Mercury Adsorber – located on LVP-SKID-00001) LVP-ADBR-00001B (Offgas Mercury Adsorber – located on LVP-SKID-00001)	LVP	**24590-LAW** -M5-V17T-00011, Rev 5 -M6-LVP-00004003, Rev 0 -P1-P01T-00005, Rev 6	Section 4E.4.2.2, Table C-8, and Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.H.A - LAW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables and Figures
LAW Secondary Offgas/Vessel Vent Process System (Cont.) LVP-SCB-00001 (Melter Offgas Caustic Scrubber)	LVP	**24590-LAW** -P1-P01T-00005, Rev 6 -M6-LVP-00002002, Rev 0	Section 4E.4.2.2, Table C-8, and Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.
LAW Secondary Offgas/Vessel Vent Process System (Cont.) LVP-HTR-00001A (Melter Offgas HEPA Preheater) LVP-HTR-00001B (Melter Offgas HEPA Preheater)	LVP	**24590-LAW** -M5-V17T-00010, Rev 4 -M6-LVP-00001002, Rev 0 -P1-P01T-00005, Rev. 6	Section 4E.4.2.2, Table C-8, and Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.
LAW Secondary Offgas/Vessel Vent Process System (Cont.) LVP-EXHR-00001A (Melter Offgas Exhauster) LVP-EXHR-00001B (Melter Offgas Exhauster) LVP-EXHR-00001C (Melter Offgas Exhauster)	LVP	**24590-LAW** -M5-V17T-00010, Rev 4 -M6-LVP-00001004, Rev 0 -M6-LVP-00001005, Rev 0 -M6-LVP-00001006, Rev 0 -P1-P01T-00005, Rev 6	Section 4E.4.2.2, Table C-8, and Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.H.B - LAW Vitrification Miscellaneous Unit System Secondary Containment Sumps and Floor Drains

Sump/Floor Drain I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[a] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specification Nos., etc.)
RLD-SUMP-00029 L-0123 (Process Cell, El. +3')	37	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002, Rev 2 -P1-P01T-00002
RLD-SUMP-00030 L-0123 (Process Cell, El. +3')	37	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002, Rev 2 -P1-P01T-00002
RLD-SUMP-00031 L-0124 (Process Cell Sump, El. +3')	37	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002, Rev 2 -P1-P01T-00002
RLD-SUMP-00032 L-0124 (Process Cell, El. +3')	37	30" Dia. By 12" deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002, Rev 2 -P1-P01T-00002
LOP-FD-00001 L-0123 (LOP-BULGE-00001 Drain El. +3')	N/A	2" Dia. 6% Mo	**24590-LAW** -M6-LOP-00001003
RLD-WS-20037-S11B-01 L-0123 (Melter 1 Encasement Assembly Drain, El. +3')	N/A	1" Dia. 316L	**24590-LAW** -M6-LMP-00012001
LOP-FD-00002 L-0124 (LOP-BULGE-00002 Drain, El. +3')	N/A	2" Dia. 6% Mo	**24590-LAW** -M6-LOP-00002003
RLD-WS-20033-S11B-01 L-0124 (Melter 2 Encasement Assembly Drain, El. +3')	N/A	1" Dia. 316L	**24590-LAW** -M6-LMP-00042001
RLD-FD-00025 L-0304F (Curb Floor Drain for Caustic Scrubber, El. 48')	N/A	4" Dia. 316L	**24590-LAW** -M6-RLD-00003001

Table III.10.H.B - LAW Vitrification Miscellaneous Unit System Secondary Containment Sumps and Floor Drains

Sump/Floor Drain I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[a] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specification Nos., etc.)
[a]Dimensions listed are based on permitted design. Actual dimensions may vary within acceptable design tolerances.			

1

Table III.10.H.C - LAW Vitrification System Process and Leak Detection System Instruments and Parameters

Sub-system Locator and Name (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Failure State	Expected Range	Instrument Accuracy	Instrument Calibration Method No. and Range
24590-LAW-M6-LMP-00005001	Melter 1 Plenum Temperature Average	Temperature Element	TE-1267C, 1272C, 1280C	TBD	TBD	TBD	TBD	TBD
		Temperature Transmitter	TT-1267B					
		Temperature Indicator	TI-1267C, 1272C, 1280C					
24590-LAW-M6-LMP-00035001	Melter 2 Plenum Temperature Average	Temperature Element	TE-2267C, 2272C, 2280C	TBD	TBD	TBD	TBD	TBD
		Temperature Transmitter	TT-2267B					
		Temperature Indicator	TI-2267C, 2272C, 2280C					

24590-LAW-M6-LMP-00002002	Melter 1 Glass Pool Density	Density Transmitter	DT-1404	TBD	TBD	TBD	TBD	TBD
		Density Indicator	DI-1404					
24590-LAW-M6-LMP-00032002	Melter 2 Glass Pool Density	Density Transmitter	DT-2404	TBD	TBD	TBD	TBD	TBD
		Density Indicator	DI-2404					
24590-LAW-M6-LMP-00002002	Melter 1 Glass Pool Level	Level Transmitter	LT-1405	TBD	TBD	TBD	TBD	TBD
		Level Indicator	LI-1405					
24590-LAW-M6-LMP-00032002	Melter 2 Glass Pool Level	Level Transmitter	LT-2405	TBD	TBD	TBD	TBD	TBD
		Level Indicator	LI-2405					
24590-LAW-M6-LMP-00002002	Melter 1 Plenum Pressure	Pressure Differential Transmitter	PDT-1410 / PDI-1410* or	TBD	TBD	TBD	TBD	TBD
		Pressure Differential Indicator	PDT-1411 / PDI-1411*					
24590-LAW-M6-LMP-00032002	Melter 2 Plenum Pressure	Pressure Differential Transmitter	PDT-2410 / PDI-2410* or	TBD	TBD	TBD	TBD	TBD
		Pressure Differential Indicator	PDT-2411 / PDI-2411*					
		Level Element	LE-1466	TBD	TBD	TBD	TBD	TBD

24590-LAW-M6-LMP-00007002	Melter 1 West Canister Level	(IR Camera)						
		Level Transmitter	LT-1466					
		Level Indication	LI-1466B					
24590-LAW-M6-LMP-00007001	Melter 1 East Canister Level	Level Element (IR Camera)	LE-1511	TBD	TBD	TBD	TBD	TBD
		Level Transmitter	LT-1511					
		Level Indication	LI-1511B					
24590-LAW-M6-LMP-00037002	Melter 2 West Canister Level	Level Element (IR Camera)	LE-2466	TBD	TBD	TBD	TBD	TBD
		Level Transmitter	LT-2466					
		Level Indication	LI-2466B					
24590-LAW-M6-LMP-00037001	Melter 2 East Canister Level	Level Element (IR Camera)	LE-2511	TBD	TBD	TBD	TBD	TBD
		Level Transmitter	LT-2511					
		Level Indication	LI-2511B					
24590-LAW-M6-LMP-00010001	Melter 1 West Discharge Air Lift	On/Off Plug Valve	YV-1125	TBD	TBD	TBD	TBD	TBD
		Valve Control	YC-1125					
24590-LAW-M6-LMP-00008001	Melter 1 East Discharge Air Lift	On/Off Plug Valve	YV-1047	TBD	TBD	TBD	TBD	TBD
		Valve Control	YC-1047					

24590-LAW-M6-LMP-00040001	Melter 2 West Discharge Air Lift	On/Off Plug Valve	YV-2125	TBD	TBD	TBD	TBD	TBD
		Valve Control	YC-2125					
24590-LAW-M6-LMP-00038001	Melter 2 East Discharge Air Lift	On/Off Plug Valve	YV-2047	TBD	TBD	TBD	TBD	TBD
		Valve Control	YC-2047					
24590-LAW-M6-LMP-00012001	Melter 1 Feed Encasement Assembly Leak Detection	Cable Type Conductivity Element	LE-1632	TBD	TBD	TBD	TBD	TBD
			LAH 1632					
24590-LAW-M6-LMP-00042001	Melter 2 Feed Encasement Assembly Leak Detection	Cable Type Conductivity Element	LE-2632	TBD	TBD	TBD	TBD	TBD
			LAH-2632					
24590-LAW-M6-LMP-00013002 and 24590-LAW-M6-LMP-00005	Melter 1 Lid Cooling	Temperature Element	TE-1640	TBD	TBD	TBD	TBD	TBD
		Temperature Transmitter	TT-1293					
		Temperature Indicator	TI-1640					

24590-LAW-M6-LMP-00043 and 24590-LAW-M6-LMP-00035001	Melter 2 Lid Cooling	Temperature Element	TE-2640	TBD	TBD	TBD	TBD	TBD
		Temperature Transmitter	TT-2293					
		Temperature Indicator	TI-2640					
*These instrument sets are duplicates. Only one instrument set is required to remain functioning during waste feed operations.								

Table III.10.H.D - Maximum Feed-rates to LAW Vitrification System (RESERVED)

Description of Waste	Shakedown 1 and Post Demonstration Test	Shakedown 2 and Demonstration Test
Dangerous and Mixed Waste Feed-rate	RESERVED	RESERVED
Total Chlorine/Chloride Feed-rate	RESERVED	RESERVED
Total Metal Feed-rates	RESERVED	RESERVED
Total Ash Feed-rate	RESERVED	RESERVED

Table III.10.H.E - LAW Vitrification System Estimated Emission Rates (RESERVED)

Chemicals	CAS Number	Emission Rates (grams /second)
RESERVED	RESERVED	RESERVED

TABLE III.10.H.F - LAW Vitrification System Waste Feed Cutoff Parameters* 1 (RESERVED)

Sub-system Designation	Instrument Tag Number	Parameter Description	Setpoints During Shakedown 1 and Post Demonstration Test	Setpoints During Shakedown 2 and Demonstration Test
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

*A continuous monitoring system will be used as defined in Permit Section III.10.C.1.

[1]Maximum Feed-rate will be set based on not exceeding any of the constituent (e.g., ash, metals, and chlorine/chloride) feed limits specified on Table III.10.H.D. of this Permit.

1

This page intentionally left blank.

III.10.I LAW VITRIFICATION SYSTEM – LONG TERM MISCELLANEOUS THERMAL TREATMENT UNIT

For purposes of Permit Section III.10.I, where reference is made to WAC 173-303-640, the following substitutions apply: substitute the terms "LAW Vitrification System" for "tank system(s)," "sub-system(s)" for "tank(s)," "sub-system equipment" for "ancillary equipment," and "sub-system(s) or sub-system equipment of a LAW Vitrification System" for "component(s)," in accordance with WAC 173-303-680.

III.10.I.1 Requirements For LAW Vitrification System Beginning Normal Operation

Prior to commencing normal operations provided in Permit Section III.10.I, all requirements in Permit Section III.10.H will have been met by the Permittees and approved by Ecology, including the following: The LAW Vitrification System Demonstration Test results and the revised Final Risk Assessment provided for in Permit Condition III.10.C.11.c. or III.10.C.11.d. and Permit Section III.10.H, will have been evaluated and approved by Ecology, Permit Tables III.10.I.D and F, as approved/modified pursuant to Permit Condition III.10.H.5., will have been completed, submitted and approved pursuant to Permit Condition III.10.H.3.d.v. and Permit Table III.10.I.E, as approved/modified pursuant to Permit Condition III.10.H.5, will have been completed, submitted and approved pursuant to Permit Condition III.10.C.11.c. or d.

III.10.I.1.a Construction and Maintenance [WAC 173-303-640, in accordance with WAC 173-303-680(2) and (3) and WAC 173-303-340].

III.10.I.1.a.i The Permittees will maintain the design and construction of the LAW Vitrification System as specified in Permit Condition III.10.I.1., Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 9.1 through 9.17 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.a. through d. and III.10.H.5.f.

III.10.I.1.a.ii The Permittees will maintain the design and construction of all containment systems for the LAW Vitrification System, as specified in Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 9.2 and 9.4 through 9.14 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.a. through d.

III.10.I.1.a.iii Modifications to approved design, plans, and specifications in Operating Unit Group 10 of this Permit for the LAW Vitrification System will be allowed only in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g., III.10.C.9.d., e., and h.

III.10.I.1.a.iv The Permittees will ensure all certifications required by specialists (e.g., independent, qualified, registered professional engineer; registered professional engineer; independent corrosion expert; independent, qualified installation inspector; installation inspector; etc.) use the following statement or equivalent pursuant to Permit Condition III.10.C.10:

"I, (Insert Name) have (choose one or more of the following: overseen, supervised, reviewed, and/or certified) a portion of the design or installation of a new LAW Vitrification system or component located at (address), and owned/operated by (name(s)). My duties were: (e.g., installation inspector, testing for tightness, etc.), for the following LAW Vitrification System components (e.g., the venting piping, etc.), as required by the Dangerous Waste Regulations, namely, WAC 173-303-640(3) (applicable paragraphs [i.e., (a) through (g)], in accordance with WAC 173-303-680.

"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 inquiry of those individuals immediately responsible for obtaining the 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."

III.10.I.1.a.v The Permittees will ensure periodic integrity assessments are conducted on the LAW Vitrification System listed in Permit Table III.10.I.A, as approved/modified pursuant to Permit Condition III.10.H.5, over the term of this Permit in accordance with WAC 173-303-680(2) and (3) as specified in WAC 173-303-640(3)(b), following the description of the integrity assessment program and schedule in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.H.5.e.i. and III.10.C.5.c. Results of the integrity assessments will be included in the WTP Unit operating record until ten (10) years after post closure, or corrective action is complete and certified, whichever is later.

III.10.I.1.a.vi The Permittees will address problems detected during the LAW Vitrification System integrity assessments specified in Permit Condition III.10.I.1.a.v. following the description of the integrity assessment program in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.H.5.e.i. and III.10.C.5.c.

III.10.I.1.a.vii All process monitors/instruments as specified in Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., will be equipped with operational alarms to warn of deviation, or imminent deviation from the limits specified in Permit Table III.10.I.F.

III.10.I.1.a.viii The Permittees will install and test all process and leak detection system monitors/instruments, as specified in Permit Tables III.10.I.C and III.10.I.F, as approved/modified pursuant to Permit Condition III.10.H.5 and III.10.H.3.d.v., in accordance with Operating Unit Group 10, Appendices 9.1, 9.2, and 9.14 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.d.x. and III.10.H.5.f..xvi.

III.10.I.1.a.ix No dangerous and/or mixed waste will be treated in the LAW Vitrification System unless the operating conditions, specified under Permit Condition III.10.I.1.c. are complied with.

III.10.I.1.a.x The Permittees will not place dangerous and/or mixed waste, treatment reagents, or other materials in the LAW Vitrification System if these substances could cause the sub-system, sub-system equipment, or the containment system to rupture, leak, corrode, or otherwise fail [WAC 173-303-640(5)(a), in accordance with WAC 173-303-680(2)]. This condition is not applicable to corrosion of LAW Vitrification System sub-system or sub-system equipment that are expected to be replaced as part of normal operations (e.g., melters).

III.10.I.1.a.xi The Permittees will operate the LAW Vitrification System to prevent spills and overflows using description of controls and practices as required under WAC 173-303-640(5)(b), described in Permit Condition III.10.C.5 and Operating Unit Group 10, Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e. [WAC 173-303-640(5)(b), in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-806(4)(c)(ix)].

III.10.I.1.a.xii For routinely non-accessible LAW Vitrification System sub-systems, as specified in Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.H.5.e.vi., the Permittees will mark all routinely non-accessible LAW Vitrification System sub-systems access points with labels or signs to identify the waste contained in each LAW Vitrification System sub-system. The label, or sign, must be legible at a distance of at least fifty (50) feet and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the LAW Vitrification System sub-systems. For the purposes of this permit condition, "routinely non-accessible" means personnel are unable to enter these areas while waste is being managed in them [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.I.1.a.xiii For the LAW Vitrification System sub-systems not addressed in Permit Condition III.10.I.1.a.xii., the Permittees will mark these LAW Vitrification System sub-systems holding dangerous and/or mixed waste with labels or signs to identify the waste contained in the LAW Vitrification System sub-systems. The labels, or signs, must be legible at a distance of at least fifty (50) feet and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the LAW Vitrification System sub-systems [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.I.1.a.xiv The Permittees will ensure that the secondary containment systems for the LAW Vitrification System sub-systems listed in Permit Tables III.10.I.A and III.10.I.B, as approved/modified pursuant to Permit Condition III.10.H.5, are free of cracks or gaps to prevent any migration of dangerous and/or mixed waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during use of the LAW Vitrification System sub-systems. Any indication that a crack or gap may exist in the containment systems will be investigated and repaired in accordance with Operating Unit Group 10, Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e.v. [WAC 173-303–640(4)(b)(i), WAC 173-303-640(4)(e)(i)(C), and WAC 173-303-640(6), in accordance with WAC 173-303-680(2) and (3), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-320].

III.10.I.1.a.xv The Permittees must immediately, and safely, remove from service any LAW Vitrification System or secondary containment system which through an integrity assessment is found to be "unfit for use" as defined in WAC 173-303-040, following Permit Condition III.10.I.1.a.xvii. A through D, and F. The affected LAW Vitrification System or secondary containment system must be either repaired or closed in accordance with Permit Condition III.10.I.1.a.xvii.E [WAC 173-303-640(7)(e) and (f) and WAC 173-303-640(8), in accordance with WAC 173-303-680(3)].

III.10.I.1.a.xvi An impermeable coating, as specified in Operating Unit Group 10, Appendices 9.4, 9.5, 9.7, 9.9, 9.11, and 9.12 of this Permit, as approved pursuant to Permit Condition III.10.H.5.b.v., will be maintained for all concrete containment systems and concrete portions of containment systems for the LAW Vitrification System sub-systems listed in Permit Tables III.10.I.A and III.10.I.B, as approved/modified pursuant to Permit Condition III.10.H.5 (concrete containment systems that do not have a liner, pursuant to WAC 173-303-640(4)(e)(i), in accordance with WAC 173-303-680(2), and have construction joints, will meet the requirements of WAC 173-303-640(4)(e)(ii)(C), in

accordance with WAC 173-303-680(2). The coating will prevent migration of any dangerous and/or mixed waste into the concrete. All coatings will meet the following performance standards:

A. The coating must seal the containment surface such that no cracks, seams, or other avenues through which liquid could migrate are present.

B. The coating must be of adequate thickness and strength to withstand the normal operation of equipment and personnel within the given area such that degradation or physical damage to the coating or lining can be identified and remedied before dangerous and mixed waste could migrate from the system.

C. The coating must be compatible with the dangerous and/or mixed waste, treatment reagents, or other materials managed in the containment system [WAC 173-303-640(4)(e)(ii)(D), in accordance with WAC 173-303-680(2) and (3) and WAC 173-303-806(4)(i)(i)(A)].

III.10.I.1.a.xvii The Permittees inspect all secondary containment systems for the LAW Vitrification System sub-systems listed in Permit Tables III.10.I.A and III.10.I.B, as approved/modified pursuant to Permit Condition III.10.H.5, in accordance with the Inspection Schedule specified in Operating Unit Group 10, Addendum E1 of this Permit, as approved pursuant to Permit Conditions III.10.H.5.e.i. and III.10.C.5.c., and take the following actions if a leak or spill of dangerous and/or mixed waste is detected in these containment systems [WAC 173-303-640(5)(c) and WAC 173-303-640(6), in accordance with WAC 173-303-680(2) and (3), WAC 173-303-320, and WAC 173-303-806(4)(i)(i)(B)].

A. Immediately, and safely, stop the flow of dangerous and/or mixed waste into the LAW Vitrification System sub-systems or secondary containment system.

B. Determine the source of the dangerous and/or mixed waste.

C. Remove the waste from the containment area in accordance with WAC 173-303-680(2) and (3) as specified in WAC 173-303-640(7)(b). The waste removed from containment areas of the LAW Vitrification System sub-systems will be, as a minimum, managed as dangerous and/or mixed waste.

D. If the cause of the release was a spill that has not damaged the integrity of the LAW Vitrification System sub-system, the Permittees may return the LAW Vitrification System sub-system to service in accordance with WAC 173-303-680(2) and (3) as specified in WAC 173-303-640(7)(e)(ii). In such case, the Permittees will take action to ensure the incident that caused the dangerous and/or mixed waste to enter the containment system will not reoccur.

E. If the source of the dangerous and/or mixed waste is determined to be a leak from the primary LAW Vitrification System into the secondary containment system, or the system is unfit for use as determined through an integrity assessment or other inspection, the Permittees will comply with the requirements of WAC 173-303-640(7) and take the following actions:

1. Close the LAW Vitrification System sub-system following procedures in WAC 173-303-640(7)(e)(i), in accordance with WAC 173-303-680 and Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

2. Repair and re-certify (in accordance with WAC 173-303-810(13)(a), as modified pursuant to Permit Condition III.10.I.1.a.iii.) the LAW Vitrification System in accordance with Operating Unit Group 10,

Appendix 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5.e.v., before the LAW Vitrification System is placed back into service [WAC 173-303-640(7)(e)(iii) and WAC 173-303-640(7)(f), in accordance with WAC 173-303-680].

F. The Permittees will document in the WTP Unit operating record actions/procedures taken to comply with A through E above, as specified in WAC 173-303-640(6)(d), in accordance with WAC 173-303-680(2) and (3).

G. In accordance with WAC 173-303-680(2) and (3), the Permittees will notify and report releases to the environment to Ecology, as specified in WAC 173-303-640(7)(d).

III.10.I.1.a.xviii If liquids (e.g., dangerous and/or mixed waste, leaks and spills, precipitation, fire water, liquids from damaged or broken pipes) cannot be removed from the secondary containment system within twenty-four (24) hours, Ecology will be verbally notified within twenty-four (24) hours of discovery. The notification will provide the information in A, B, and C, listed below. The Permittees will provide Ecology with a written demonstration within seven (7) business days, identifying at a minimum [WAC 173-303-640(4)(c)(iv) and WAC 173-303-640(7)(b)(ii), in accordance with WAC 173-303-680(3) and WAC 173-303-806(4)(i)(i)(B)]:

A. Reasons for delayed removal.

B. Measures implemented to ensure continued protection of human health and the environment.

C. Current actions being taken to remove liquids from secondary containment.

III.10.I.1.a.xix All air pollution control devices and capture systems in the LAW Vitrification System will be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants and to minimize process upsets. Procedures for ensuring that the air pollution control devices and capture systems in the LAW Vitrification System are properly operated and maintained so as to minimize the emission of air contaminants and process upsets will be established.

III.10.I.1.a.xx In all future narrative permit submittals, the Permittees will include LAW Vitrification sub-system names with the sub-system designation.

III.10.I.1.a.xxi For any portion of the LAW Vitrification System that has the potential for formation and accumulation of hydrogen gases, the Permittees will operate the portion to maintain hydrogen levels below the lower explosive limit [WAC 173-303-815(2)(b)(ii)].

III.10.I.1.a.xxii For each LAW Vitrification System sub-system holding dangerous and/or mixed waste that are acutely or chronically toxic by inhalation, the Permittees will operate the system to prevent escape of vapors, fumes, or other emissions into the air [WAC 173-303-806(4)(i)(i)(B) and WAC 173-303-640(5)(e), in accordance with WAC 173-303-680].

III.10.I.1.a.xxiii The existing LAW building will retain capability to install the third melter before or after hot start-up. No permanent systems, structures, or components shall be installed in the melter cell, pour cave or wet process cell for the third melter that would preclude future installation of the third melter.

III.10.I.1.b Performance Standards

III.10.I.1.b.i The LAW Vitrification System must achieve a destruction and removal efficiency (DRE) of 99.99% for the principal organic dangerous constituents (PODCs) listed below [40 CFR §63.1203(c)(1) and 40CFR §63.1203(c)(2), in accordance with WAC 173-303-680(2)]:

RESERVED

DRE in this permit condition will be calculated in accordance with the formula given below:

DRE=[1-(Wout/Win)] x 100%

Where:

Win=mass feed rate of one principal organic dangerous constituent (PODC) in a waste feed stream; and

Wout=mass emission rate of the same PODC present in exhaust emissions prior to release to the atmosphere.

III.10.I.1.b.ii Particulate matter emissions from the LAW Vitrification System will not exceed 34 mg/dscm (0.015 grains/dscf) [40 CFR §63.1203(b)(7), in accordance with WAC 173-303-680(2)];

III.10.I.1.b.iii Hydrochloric acid and chlorine gas emissions from the LAW Vitrification System will not exceed 21 ppmv, combined [40 CFR §63.1203(b)(6), in accordance with WAC 173-303-680(2)];

III.10.I.1.b.iv Dioxin and Furan TEQ emissions from the LAW Vitrification System will not exceed 0.2 nanograms (ng)/dscm, [40 CFR §63.1203(b)(1), in accordance with WAC 173-303-680(2)];

III.10.I.1.b.v Mercury emissions from the LAW Vitrification System will not exceed 45 µg/dscm [40 CFR §63.1203(b)(2), in accordance with WAC 173-303-680(2)];

III.10.I.1.b.vi Lead and cadmium emissions from the LAW Vitrification System will not exceed 120 µg/dscm, combined [40 CFR §63.1203(b)(3), in accordance with WAC 173-303-680(2)];

III.10.I.1.b.vii Arsenic, beryllium, and chromium emissions from the LAW Vitrification System will not exceed 97 µg/dscm, combined [40 CFR §63.1203(b)(4), in accordance with WAC 173-303-680(2)];

III.10.I.1.b.viii Carbon monoxide (CO) emission from the LAW Vitrification System will not exceed 100 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system), dry basis [40 CFR §63.1203(b)(5)(i), in accordance with WAC 173-303-680(2) and (3)];

III.10.I.1.b.ix Hydrocarbon emission from the LAW Vitrification System will not exceed 10 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system during demonstration testing required by this Permit), dry basis and reported as propane [40 CFR §63.1203(b)(5)(ii), in accordance with WAC 173-303-680(2) and (3)];

III.10.I.1.b.x If the emissions from the LAW Vitrification System exceed the emission rates listed in Permit Table III.10.I.E, as approved pursuant to Permit Condition III.10.C.11.c.

or d., the Permittees will perform the following actions [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)]:

A. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s) as specified in Permit Condition I.E.21.

B. Submit to Ecology additional risk information to indicate that the increased emissions impact is offset by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance of the emission rate(s) and submit a report of the investigation findings to Ecology within fifteen (15) days of the discovery of exceeding the emission rate(s).

C. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. through g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring.

The emission limits specified in Permit Conditions III.10.I.1.b.i. through III.10.I.1.b.ix. above, will be met for the LAW Vitrification System by limiting feed rates as specified in Permit Tables III.10.I.D and III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5. and III.10.H.3.d.v., compliance with operating conditions specified in Permit Condition III.10.I.1.c. (except as specified in Permit Condition III.10.I.1.b.xii.), and compliance with Permit Condition III.10.I.1.b.xi.;

III.10.I.1.b.xi Treatment effectiveness, feed-rates and operating rates for dangerous and/or mixed waste management units contained in the LAW Building, but not included in Permit Table III.10.I.A, as approved/modified pursuant to Permit Condition III.10.H.5, will be as specified in Permit Sections III.10.D through F and consistent with assumptions and basis which are reflected in Operating Unit Group 10, Appendix 6.3.1 of this Permit, as approved pursuant to Permit Condition III.10.C.11.b. For the purposes of this permit condition, Operating Unit Group 10, Appendix 6.3.1 will be superseded by Appendix 6.4.1 upon its approval pursuant to either Permit Condition III.10.C.11.c or III.10.C.11.d. [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)];

III.10.I.1.b.xii Except during periods of LAW Vitrification System startup and shutdown, compliance with the operating conditions specified in Permit Condition III.10.I.1.c., will be regarded as compliance with the required performance standards identified in Permit Conditions III.10.I.1.b.i. through x. However, if it is determined that during the effective period of this Permit that compliance with the operating conditions in Permit Condition III.10.I.1.c. is not sufficient to ensure compliance with the performance standards specified in Permit Conditions III.10.I.1.b.i. through x., the Permit may be modified, revoked, or reissued pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g.

III.10.I.1.c Operating Conditions [WAC 173-303-670(6), in accordance with WAC 173-303-680(2) and (3)]

The Permittees will operate the LAW Vitrification System in accordance with Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.H.5.e.vi. and Operating Unit Group 10, Appendix 9.18 of this Permit, as approved

pursuant to Permit Condition III.10.H.5.e., and Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., except as modified pursuant to Permit Conditions III.10.H.3, III.10.I.1.b.x., III.10.I.1.b.xii., III.10.I.1.h., and in accordance with and the following:

III.10.I.1.c.i The Permittees will operate the LAW Vitrification System in order to maintain the systems and process parameters listed in Permit Tables III.10.I.C and III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., within the set-points specified in Permit Table III.10.I.F.

III.10.I.1.c.ii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., to automatically cut-off and/or lock-out the dangerous and/or mixed waste feed to LAW Vitrification System when the monitored operating conditions deviate from the set-points specified in Permit Table III.10.I.F.

III.10.I.1.c.iii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., to automatically cut-off and/or lock-out the dangerous and/or mixed waste feed to LAW Vitrification System when all instruments specified in Permit Table III.10.H.F for measuring the monitored parameters fails or exceeds its span value.

III.10.I.1.c.iv The Permittees will operate the AWFCO systems, specified in Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., to automatically cut-off and/or lock out the dangerous waste and/or mixed waste feed to the LAW Vitrification System when any portion of the LAW Vitrification System is bypassed. The terms “bypassed” and “bypass event,” as used in Permit Sections III.10.H and III.10.I, will mean if any portion of the LAW Vitrification System is bypassed so that gases are not treated as during the Demonstration Test.

III.10.I.1.c.v In the event of a malfunction of the AWFCO systems listed in Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., the Permittees will immediately, manually cut-off the dangerous and/or mixed waste feed to the LAW Vitrification System. The Permittees will not restart the dangerous and/or mixed waste feed until the problem causing the malfunction has been identified and corrected.

III.10.I.1.c.vi The Permittees will manually cut-off the dangerous and/or mixed waste feed to the LAW Vitrification System when the operating conditions deviate from the limits specified in Permit Condition III.10.I.1.c.i., unless the deviation automatically activates the waste feed cut-off sequence specified in Permit Conditions III.10.I.1.c.ii., iii., and/or iv.

III.10.I.1.c.vii If greater than thirty (30) dangerous and/or mixed waste feed cut-off, combined, to the LAW Vitrification System occur due to deviations from Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., within a sixty (60) day period, the Permittees will submit a written report to Ecology within five (5) calendar days of the thirty-first exceedance, including the information specified below. These dangerous and/or mixed waste feed cut-offs to the LAW Vitrification System, whether automatically or manually activated, are counted if the specified set-points are deviated from while dangerous and/or mixed waste and waste residues continue to be processed in the LAW Vitrification System. A cascade event

is counted at a frequency of one (1) towards the first waste feed cut-off parameter, specified in Permit Table III.10.I.F, from which the set-point is deviated:

A. The parameter(s) that deviated from the set-point(s) in Permit Table III.10.I.F.

B. The magnitude, dates, and duration of the deviations.

C. Results of the investigation of the cause of the deviations.

D. Corrective measures taken to minimize future occurrences of the deviations.

III.10.I.1.c.viii If greater than thirty (30) dangerous and/or mixed waste feed cut-off, combined, to the LAW Vitrification System occur due to deviations from Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., within a thirty (30) day period, the Permittees will submit the written report required to be submitted pursuant to Permit Condition III.10.I.1.c.vii. to Ecology on the first business day following the thirty-first exceedance. These dangerous and/or mixed waste feed cut-offs to the LAW Vitrification System, whether automatically or manually activated, are counted if the specified set-points are deviated from while dangerous and/or mixed waste and waste residues continue to be processed in the LAW Vitrification System. A cascade event is counted at a frequency of one (1) towards the first waste feed cut-off parameter, specified on Permit Table III.10.I.F, from which the set-point is deviated:

In accordance with WAC 173-303-680(2) and (3), the Permittees may not resume dangerous and/or mixed waste feed to the LAW Vitrification System until this written report has been submitted, and

A. Ecology has authorized the Permittees, in writing, to resume dangerous and/or mixed waste feed, or

B. Ecology has not, within seven (7) days, notified the Permittees in writing of the following:

1. The Permittees written report does not document that the corrective measures taken will minimize future exceedances.
2. The Permittees must take further corrective measures and document that these further corrective measures will minimize future exceedances.

III.10.I.1.c.ix If any portion of the LAW Vitrification System is bypassed while treating dangerous and/or mixed waste, it will be regarded as non-compliance with the operating conditions specified in Permit Condition III.10.I.1.c. and the performance standards specified in Permit Condition III.10.I.1.b. After such a bypass event, the Permittees will perform the following actions:

A. Investigate the cause of the bypass event.

B. Take appropriate corrective measures to minimize future bypasses.

C. Record the investigation findings and corrective measures in the WTP Unit operating record.

D. Submit a written report to Ecology within five (5) days of the bypass event documenting the result of the investigation and corrective measures.

III.10.I.1.c.x The Permittees will control fugitive emissions from the LAW Vitrification System by maintaining the melters under negative pressure.

III.10.I.1.c.xi Except during periods of vitrification system startup and shutdown, compliance with the operating conditions specified in Permit Condition III.10.I.1.c. will be regarded as compliance with the required performance standards identified in Permit Condition

III.10.I.1.b. However, evidence that compliance with these operating conditions is insufficient to ensure compliance with the performance standards, will justify modification, revocation, or re-issuance of this Permit, in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g.

III.10.I.1.d Inspection Requirements [WAC 173-303-680(3)]

III.10.I.1.d.i The Permittees will inspect the LAW Vitrification System in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E1 of this Permit, as modified in accordance with Permit Condition III.10.C.5.c.

III.10.I.1.d.ii The inspection data for LAW Vitrification System will be recorded, and the records will be placed in the WTP Unit operating record for LAW Vitrification System, in accordance with Permit Condition III.10.C.4.

III.10.I.1.d.iii The Permittees will comply with the inspection requirements specified in Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f. and as modified by Permit Conditions III.10.H.3, III.10.I.1.b.x., III.10.I.1.b.xii., and III.10.I.1.h.

III.10.I.1.e Monitoring Requirements [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(3)]

III.10.I.1.e.i Upon receipt of a written request from Ecology, the Permittees will perform sampling and analysis of the dangerous and/or mixed waste and exhaust emissions to verify that the operating requirements established in the Permit achieve the performance standards delineated in this Permit.

III.10.I.1.e.ii The Permittees will comply with the monitoring requirements specified in the Operating Unit Group 10, Appendices 9.2, 9.3, 9.7, 9.13, 9.15 and 9.18 of this Permit, as approved pursuant to Permit Condition III.10.H.5, and as modified by Permit Conditions III.10.H.3, III.10.I.1.h., III.10.I.1.b.x., and III.10.I.1.b.xii.

III.10.I.1.e.iii The Permittees will operate, calibrate, and maintain the carbon monoxide and hydrocarbon continuous emission monitors (CEM) specified in this Permit in accordance with Performance Specifications 4B and 8A of 40 CFR Part 60, Appendix B, in accordance with Appendix to Subpart EEE of 40 CFR Part 63, and Operating Unit Group 10 Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., and as modified by Permit Conditions III.10. H.3, III.10.I.1.h., III.10.I.1.b.x., and III.10.I.1.b.xii.

III.10.I.1.e.iv The Permittees will operate, calibrate, and maintain the instruments specified in Permit Tables III.10.I.C and F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v., in accordance with Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.5.f., and as modified by Permit Conditions III.10.H.3, III.10.I.1.h., III.10.I.1.b.x., and III.10.I.1.b.xii.

III.10.I.1.e.v The Permittees shall calibrate, inspect, and maintain or replace the following Melter 1 and Melter 2 cooling water flow and temperature instruments in accordance with manufacturer's recommendations, or as specified in this permit, or otherwise agreed to by Ecology (Melter 1: FT/TI&FI-1206, FT/TI&FI-1209, FT/TI&FI-1215, FT/TI&FI-1218, FT/TI&FI-1221, FT/TI&FI-1224, FT/TI&FI-1227, FT/TI&FI-1233, FT/TI&FI-1236, FT/TI&FI-1536, FT/TI&FI-1539; Melter 2: FT/TI&FI-2206, FT/TI&FI-2209, FT/TI&FI-2215, FT/TI&FI-2218, FT/TI&FI-2221, FT/TI&FI-2224,

FT/TI&FI-2227, FT/TI&FI-2233, FT/TI&FI-2236, FT/TI&FI-2536, FT/TI&FI-2539).

III.10.I.1.f Recordkeeping Requirements [WAC 173-303-380 and WAC 173-303-680(3)]

III.10.I.1.f.i The Permittees will record and maintain in the WTP Unit operating record for the LAW Vitrification System, all monitoring, calibration, maintenance, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Conditions III.10.C.4 and 5, as modified by Permit Conditions III.10.H.3, III.10.I.1.h., III.10.I.1.b.x., and III.10.I.1.b.xii.

III.10.I.1.f.ii The Permittees will record in the WTP Unit operating record the date, time, and duration of all automatic waste feed cutoffs and/or lockouts, including the triggering parameters, reason for the deviation, and recurrence of the incident.
The Permittees will also record all incidents of AWFCO system function failures, including the corrective measures taken to correct the condition that caused the failure.

III.10.I.1.f.iii The Permittees will submit to Ecology an annual report each calendar year within ninety (90) days following the end of the year. The report will include the following information:

A. Total dangerous and/or mixed waste feed processing time for the LAW Vitrification System.

B. Date/Time of all LAW Vitrification System startups and shutdowns.

C. Date/Time/Duration/Cause/Corrective Action taken for all LAW Vitrification System shutdowns caused by malfunction of either process or control equipment.

D. Date/Time/Duration/Cause/Corrective Action taken for all instances of dangerous and/or mixed waste feed cut-off due to deviations from Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v.

III.10.I.1.f.iv The Permittees will submit an annual report to Ecology each calendar year within ninety (90) days following the end of the year of all quarterly CEM Calibration Error and Annual CEM Performance Specification Tests conducted, in accordance with Permit Condition III.10.I.1.e.iii.

III.10.I.1.f.v The Permittees shall maintain operating and calibration/maintenance records for Ecology's inspection for the following Melter 1 and Melter 2 cooling water flow and temperature instruments (Melter 1: FT/TI&FI-1206, FT/TI&FI-1209, FT/TI&FI-1215, FT/TI&FI-1218, FT/TI&FI-1221, FT/TI&FI-1224, FT/TI&FI-1227, FT/TI&FI-1233, FT/TI&FI-1236, FT/TI&FI-1536, FT/TI&FI-1539; Melter 2: FT/TI&FI-2206, FT/TI&FI-2209, FT/TI&FI-2215, FT/TI&FI-2218, FT/TI&FI-2221, FT/TI&FI-2224, FT/TI&FI-2227, FT/TI&FI-2233, FT/TI&FI-2236, FT/TI&FI-2536, FT/TI&FI-2539).

III.10.I.1.f.vi The Permittees shall maintain refractory thermocouple temperature data for Ecology inspection.

III.10.I.1.g Closure

The Permittees will close the LAW Vitrification System in accordance with Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

III.10.I.1.h Periodic Emission Re-testing Requirements [WAC 173-303-670(5), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)]

III.10.I.1.h.i Dioxin and Furan Emission Testing

A. Within eighteen (18) months of commencing operation pursuant to Permit Section III.10.I, the Permittees will submit to Ecology for approval, a Dioxin and Furan Emission Test Plan (DFETP) for the performance of emission testing of the LAW Vitrification System gases for dioxin and furans during "Normal Operating Conditions" as a permit modification in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2.f. The DFETP will include all elements applicable to dioxin and furan emission testing included in the "Previously Approved Demonstration Test Plan," applicable EPA promulgated test methods and procedures in effect at the time of the submittal, and projected commencement and completion dates for dioxin and furan emission test. "Normal Operating Conditions" will be defined for the purposes of this permit condition as follows:

1. Carbon monoxide emissions, dangerous and/or mixed waste feed-rate, and automatic waste feed cut-off parameters specified in Permit Table III.10.I.F (as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v.), that were established to maintain compliance with Permit Condition III.10.I.1.b.iv. as specified in Operating Unit Group 10, Appendix 9.15 of this Permit (as approved pursuant to Permit Condition III.10.H.3.d., and in accordance with III.10.I.1.b.xii. and III.10.I.1.c.xi.), are held within the range of the average value over the previous twelve (12) months and the set-point value specified in Permit Table III.10.I.F. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include calibration data, malfunction data, and data obtained when not processing dangerous and/or mixed waste.
2. Feed-rate of metals, ash, and chlorine/chloride are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.I.D (as approved/modified pursuant to Permit Conditions III.10.H.5 and III.10.H.3.d.v.). Feed-rate of organics as measured by TOC are held within the range of the average value over the previous twelve (12) months. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include data obtained when not processing dangerous and/or mixed waste.

For purposes of this permit condition, the "Previously Approved Demonstration Test Plan" is defined to include the Demonstration Test Plan approved pursuant to Permit Condition III.10.H.5.f.

B. Within sixty (60) days of Ecology's approval of the DFETP, or within thirty-one (31) months of commencing operation pursuant to Permit Section III.10.I, whichever is later, the Permittees will implement the DFETP approved pursuant to Permit Condition III.10.I.1.h.i.A.

C. The Permittees will resubmit the DFETP, approved pursuant to Permit Condition III.10.I.1.h.i.A, revised to include applicable EPA promulgated test methods and

procedures in effect at the time of the submittal, and projected commencement and completion dates for dioxin and furan emission test as a permit modification in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2.f. at twenty-four (24) months from the implementation date of the testing required pursuant to Permit Condition III.10.I.1.h.i.A and at reoccurring eighteen (18) month intervals from the implementation date of the previously approved DFETP. The Permittees will implement these newly approved revised DFETPs, every thirty-one (31) months from the previous approved DFETP implementation date or within sixty (60) days of the newly Ecology approved revised DFETP, whichever is later, for the duration of this Permit.

D. The Permittees will submit a summary of operating data collected pursuant to the DFETPs in accordance with Permit Conditions III.10.I.1.h.i.A and C to Ecology upon completion of the tests. The Permittees will submit to Ecology the complete test report within ninety (90) calendar days of completion of the testing. The test reports will be certified as specified in WAC 173-303-807(8), in accordance with WAC 173-303-680(2) and (3).

E. If any calculations or testing results collected pursuant to the DFETPs in accordance with Permit Conditions III.10.I.1.h.i.A and C. show that one or more of the performance standards listed in Permit Condition III.10.I.1.b., with the exception of Permit Condition III.10.I.1.b.x., for the LAW Vitrification System were not met during the emission test, the Permittees will perform the following actions:

1. Immediately stop dangerous and/or mixed waste feed to the LAW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s).
2. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s), as specified in Permit Condition I.E.21.
3. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s).
4. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s) documentation supporting a mode of operation where all performance standards listed in Permit Condition III.I.1.b., with the exception of Permit Condition III.10.I.1.b.x., for the LAW Vitrification System were met during the demonstration test, if any such mode was demonstrated.
5. Based on the information provided to Ecology by the Permittees pursuant to Permit Conditions III.10.I.1.h.i.E.1 through 4 above, and any additional information, Ecology may provide in writing, direction to the Permittees to stop dangerous waste and mixed waste feed to the LAW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of the revised Demonstration Test Plan pursuant to Permit Condition III.10. I.1.h.i.E.6.
6. Submit to Ecology within one hundred and twenty (120) days of discovery of not meeting the performance standard(s) a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e.and III.10.C.2.f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring

reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.I.D and F.

F. If any calculations or testing results collected pursuant to the DFETPs in accordance with Permit Conditions III.10.I.1.h.i.A and C show that any emission rate for any constituent listed in Permit Table III.10.I.E, as approved/modified pursuant to Permit Conditions III.10.C.11.c. or d. is exceeded for LAW Vitrification System during the emission test, the Permittees will perform the following actions:

1. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s), as specified in Permit Condition I.E.21.
2. Submit to Ecology additional risk information to indicate that the increased emissions impact is off-set by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance and submit a report of the investigation findings to Ecology within fifteen (15) days of this discovery of exceeding the emission rate(s).
3. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.I.D and III.10.I.F.

III.10.I.1.h.ii Non-organic Emission Testing

A. Within forty-eight (48) months of commencing operation pursuant to Permit Section III.10.I, the Permittees will resubmit to Ecology for approval the "Previously Approved Demonstration Test Plan" revised as a permit modification in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2f. The revised Demonstration Test Plan (RDTP) will include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, projected commencement and completion dates for emission testing to demonstrate performance standards specified in Permit Conditions III.10.I.1.b.ii., iii., v., vi., and vii., and non-organic emissions as specified in Permit Table III.10.I.E, as approved/modified pursuant to Permit Conditions III.10.H.3.d. and III.10.C.11.c. or d., under "Normal Operating Conditions." "Normal Operating Conditions" will be defined for the purposes of this permit condition as follows:

1. Carbon monoxide emissions, dangerous and/or mixed waste feed-rate, and automatic waste feed cut-off parameters specified in Permit Table III.10.I.F, as approved/modified pursuant to Permit Conditions III.10.H.3.d. and III.10.C.11.c. or d., that were established to maintain compliance with Permit Conditions III.10.I.1.b.ii., iii., v., vi., and vii., and non-organic emissions, as specified in Permit Table III.10.I.E, as specified in Operating Unit Group 10, Appendix 9.15 of this Permit (as approved pursuant to Permit Conditions III.10.H.3.d. and III.10.C.11.c. or d.), are held within the range of the average value over the previous twelve (12) months and the set-point value specified in Permit Table III.10.I.F. The average value is

defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include calibration data, malfunction data, and data obtained when not processing dangerous or mixed waste.

2. Feed-rate of metals, ash, and chlorine/chloride are held within the range of the average value over the previous twelve (12) months and the set-point value specified in Permit Table III.10.I.D, as approved/modified pursuant to Permit Conditions III.10.H.3.d. and III.10.C.11.c. or d. The average value is defined as the sum of all rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include data obtained when not processing dangerous or mixed waste.

For purposes of this permit condition, the "Previously Approved Demonstration Test Plan" is defined to include the Demonstration Test Plan approved pursuant to Permit Condition III.10.H.5.f.

B. Within sixty (60) days of Ecology's approval of the RDTP, or within sixty (60) months of commencing operation pursuant to Permit Section III.10.I, whichever is later, the Permittees will implement the RDTP approved pursuant to Permit Condition III.10.I.1.h.ii.A.

C. The Permittees will resubmit the RDTP, approved pursuant to Permit Condition III.10.I.1.h.ii.A, revised to include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, and projected commencement and completion dates for emission test as a permit modification in accordance with Permit Conditions III.10.C.2.e. and f. at forty-eight (48) months from the implementation date of the testing required pursuant to Permit Condition III.10.I.1.h.ii.A and at reoccurring forty-eight (48) month intervals from the implementation date of the previously approved RDTP. The Permittees will implement these newly approved revised RDTP, every sixty (60) months from the previous approved RDTP implementation date or within sixty (60) days of the newly Ecology approved revised RDTP, whichever is later, for the duration of this Permit.

D. The Permittees will submit a summary of operating data collected pursuant to the RDTPs in accordance with Permit Conditions III.10.I.1.h.ii.A and C to Ecology upon completion of the tests. The Permittees will submit to Ecology the complete test report within ninety (90) calendar days of completion of the testing. The test reports will be certified pursuant to WAC 173-303-807(8), in accordance with WAC 173-303-680(2) and (3).

E. If any calculations or testing results collected pursuant to the RDTPs in accordance with Permit Conditions III.10.I.1.h.ii.A and C show that any emission rate for any constituent listed in Permit Table III.10.I.E, as approved/modified pursuant to Permit Conditions III.10.H.3.d. and III.10.C.11.c. or d., is exceeded for LAW Vitrification System during the emission test, the Permittees will perform the following actions:

1. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s), as specified in Permit condition I.E.21;

2. Submit to Ecology additional risk information to indicate that the increased emissions impact is off-set by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the

cause and impact of the exceedance and submit a report of the investigation findings to Ecology within fifteen (15) days of this discovery of exceeding the emission rate(s); and

3. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.I.D and III.10.I.F.

F. If any calculations or testing results collected pursuant to the RDTPs in accordance with Permit Conditions III.10.I.1.h.ii.A and C show that one or more of the performance standards listed in Permit Condition III.10.I.1.b., with the exception of Permit Condition III.10.I.1.b.x., for the LAW Vitrification System were not met during the emission test, the Permittees will perform the following actions:

1. Immediately stop dangerous and/or mixed waste feed to the LAW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s);
2. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s), as specified in Permit condition I.E.21;
3. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s);
4. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s) documentation supporting a mode of operation where all performance standards listed in Permit Condition III.I.1.b., with the exception of Permit Condition III.10.I.1.b.x., for the LAW Vitrification System were met during the demonstration test, if any such mode was demonstrated;
5. Based on the information provided to Ecology by the Permittees pursuant to Permit Conditions III.10.I.1.h.ii.F.1 through 4 above, and any additional information, Ecology may provide in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of the revised Demonstration Test Plan pursuant to Permit Condition III.10.I.1.h.ii.F.6; and
6. Submit to Ecology within one hundred and twenty (120) days of discovery of not meeting the performance standard(s) a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.I.D and F.

III.10.I.1.h.iii Other Emission Testing

A. Within seventy-eight (78) months of commencing operation pursuant to Permit Section III.10.I, the Permittees will resubmit to Ecology for approval the "Previously Approved Demonstration Test Plan" revised as a permit modification in accordance with Permit Conditions III.10.C.2.e. and f. The Revised Demonstration Test Plan (RDTP) will include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, projected commencement and completion dates for emission testing to demonstrate performance standards as specified in Permit Conditions III.10.I.1.b.viii. and ix., and emissions as specified in Permit Table III.10.I.E, as approved/modified pursuant to Permit Conditions III.10.H.3.d. and III.10.C.11.c. or d., not addressed under Permit Conditions III.10.I.1.h.i. or ii. under "Normal Operating Conditions." "Normal Operating Conditions" will be defined for the purposes of this permit condition as follows:

1. Carbon monoxide emissions, dangerous and/or mixed waste feed-rate, and automatic waste feed cut-off parameters specified in Permit Table III.10.I.F, as approved/modified pursuant to Permit Condition III.10.H.3.d. and III.10.C.11.c. or d., that were established to maintain compliance with Permit Conditions III.10.I.1.b.viii. and ix., and emissions as specified in Permit Table III.10.I.E, not addressed under Permit Conditions III.10.I.1.h.i. or ii. as specified in Operating Unit Group 10, Appendix 9.15 of this Permit, as approved pursuant to Permit Condition III.10.H.3.d., and in accordance with Permit Conditions III.10.I.1.b.xii. and III.10.I.1.c.xi. are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.I.F. The average value is defined as the sum of all rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include calibration data, malfunction data, and data obtained when not processing dangerous and/or mixed waste.
2. Feed-rate of metals, ash, and chlorine/chloride are held within the range of the average value over the previous twelve (12) months and the set-point value specified in Permit Table III.10.I.D, as approved/modified pursuant to Permit Conditions III.10.H.3.d. and III.10.C.11.c. or d. Feed-rate of organics as measured by TOC are held within the range of the average value over the previous twelve (12) months. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include data obtained when not processing dangerous and/or mixed waste.

For purposes of this permit condition, the "Previously Approved Demonstration Test Plan" is defined to include the Demonstration Test Plan approved pursuant to Permit Condition III.10.H.5.f.

B. Within sixty (60) days of Ecology's approval of the RDTP, or within ninety-one (91) months of commencing operation pursuant to Permit Section III.10.I, whichever is later, the Permittees will implement the RDTP approved pursuant to Permit Condition III.10.I.1.h.iii.A.

C. The Permittees will submit a summary of operating data collected pursuant to the RDTPs in accordance with Permit Condition III.10.I.1.h.iii.A to Ecology upon

completion of the tests. The Permittees will submit to Ecology the complete test report within ninety (90) calendar days of completion of the testing. The test reports will be certified as specified in WAC 173-303-807(8), in accordance with Permit Condition WAC 173-303-680(2) and (3).

D. If any calculations or testing results show that one or more of the performance standards listed in Permit Condition III.10.I.1.b., with the exception of Permit Condition III.10.I.1.b.x., for the LAW Vitrification System were not met during the emission test, the Permittees will perform the following actions:

1. Immediately stop dangerous and/or mixed waste feed to the LAW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s);
2. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s), as specified in Permit Condition I.E.21.
3. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s).
4. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s) documentation supporting a mode of operation where all performance standards listed in Permit Condition III.I.1.b., with the exception of Permit Condition III.10.I.1.b.x., for the LAW Vitrification System were met during the demonstration test, if any such mode was demonstrated.
5. Based on the information provided to Ecology by the Permittees pursuant to Permit Conditions III.10.I.1.h.iii.D.1 through 4 above, and any additional information, Ecology may provide in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of the revised Demonstration Test Plan, pursuant to Permit Condition III.10. I.h.1.iii.D.6.
6. Submit to Ecology within one hundred and twenty (120) days of discovery of not meeting the performance standard(s) a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.I.D and III.10.I.F.

E. If any calculations or testing results show that any emission rate for any constituent listed in Permit Table III.10.I.E, as approved/modified pursuant to Permit Conditions III.10.C.11.c. or d., is exceeded for LAW Vitrification System during the emission test, the Permittees will perform the following actions:

1. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s), as specified in Permit Condition I.E.21.
2. Submit to Ecology additional risk information to indicate that the increased emissions impact is off-set by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance of the emission rate(s) and submit a

report of the investigation findings to Ecology within fifteen (15) days of the discovery of the exceedance of the emission rate(s).

3. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.I.D and F.

This page intentionally left blank.

Table III.10.I.A - LAW Vitrification System Description[a]

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables and Figures
RESERVED	RESERVED	RESERVED	RESERVED

[a]Permit Table III.10.I.A will be completed in accordance with Permit Condition III.10.H.5.e x., prior to initiating Permit Condition III.10.I.1. See Permit Table III.10.H.A for the current LAW Vitrification System Description.

1

Table III.10.I.B - LAW Vitrification System Secondary Containment Systems Including Sumps and Floor Drains

Sump/Floor Drain I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[b] (feet) & Materials of Construction	Engineering Description (Drawing Nos, Specification Nos, etc.)
RESERVED	RESERVED	RESERVED	RESERVED

[a]Permit Table III.10.I.B will be completed in accordance with Permit Condition III.10.H.5.b.vii., prior to initiating Permit Condition III.10.I.1. See Permit Table III.10.H.B for the current LAW Vitrification System Secondary Containment Systems Including Sumps and Floor Drains.

[b]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).

2

Table III.10.I.C - LAW Vitrification Systems Process and Leak Detection System Instruments and Parameters

Sub-system Locator and Name (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Failure State	Expected Range	Instrument Accuracy	Instrument Calibration Method No. and Range
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

[a]Permit Table III.10.I.C will be completed in accordance with Permit Condition III.10.H.5.e.ix., prior to initiating Permit Condition III.10.I.1 See Permit Table III.10.H.C for the current LAW Vitrification Systems Process and Leak Detection System Instruments and Parameters.

3

Table III.10.I.D - Maximum Feed-rates to LAW Vitrification System (RESERVED)

Description of Waste	Normal Operation
Dangerous and/or Mixed Waste Feed Rate	RESERVED
Ash Feed Rate	RESERVED
Total Chlorine/Chloride Feed Rate	RESERVED
Total Metal Feedrates	RESERVED

Table III.10.I.E - LAW Vitrification System Estimated Emission Rates (RESERVED)

Chemicals	CAS Number	Emission Rates (grams /second)
RESERVED	RESERVED	RESERVED

TABLE III.10.I.F - LAW Vitrification System Waste Feed Cut-off Parameters* [1](RESERVED)

Sub-system Designation	Instrument Tag Number	Parameter Description	Set-points During Normal Operation
RESERVED	RESERVED	RESERVED	RESERVED
*A continuous monitoring system will be used as defined in Permit Section III.10.C.1. [1]Maximum Feed-rate will be set based on not exceeding any of the constituent (e.g., metals, ash, and chlorine/chloride) feed limits specified on Table III.10.I.D. of this Permit			

III.10.J HLW VITRIFICATION SYSTEM – SHORT TERM MISCELLANEOUS THERMAL TREATMENT UNIT-SHAKEDOWN, DEMONSTRATION TEST, AND POST DEMONSTRATION TEST

For purposes of Permit Section III.10.J, where reference is made to WAC 173-303-640, the following substitutions apply: substituting the terms "HLW Vitrification System" for "tank system(s)," "sub-system(s)" for "tank(s)," "sub-system equipment" for "ancillary equipment," and "sub-system(s) or sub-system equipment of a HLW Vitrification System" for "component(s)," in accordance with WAC 173-303-680.

III.10.J.1 General Conditions During Shakedown, Demonstration Test, and Post-Demonstration Test for HLW Vitrification System

III.10.J.1.a Construction and Maintenance [WAC 173-303-640, in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-340].

III.10.J.1.a.i The Permittees will construct the HLW Vitrification System (listed in Permit Tables III.10.J.A and III.10.J.B, as approved/modified pursuant to Permit Condition III.10.J.5.) as specified in Permit Condition III.10.J.1. and Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 10.1 through 10.15 and 10.17 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.a. through d., and III.10.J.5.f.

III.10.J.1.a.ii The Permittees will construct all containment systems for the HLW Vitrification System as specified in Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 10.2, 10.4, through 10.14 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.a. through d.

III.10.J.1.a.iii The Permittees will ensure all certifications required by specialists (e.g., independent, qualified, registered professional engineer, independent corrosion expert, independent qualified installation inspector, etc.) use the following statement or equivalent pursuant to Permit Condition III.10.C.10.:

"I, (Insert Name) have (choose one or more of the following: overseen, supervised, reviewed, and/or certified) a portion of the design or installation of a new HLW Vitrification system or component located at (address), and owned/operated by (name(s)). My duties were: (e.g., installation inspector, testing for tightness, etc.), for the following HLW Vitrification system components (e.g., the venting piping, etc.), as required by the Dangerous Waste Regulations, namely, WAC 173-303-640(3) (applicable paragraphs (i.e., (a) through (g)) in accordance with WAC 173-303-680).

"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 inquiry of those individuals immediately responsible for obtaining the 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."

III.10.J.1.a.iv The Permittees must ensure that proper handling procedures are adhered to in order to prevent damage to the HLW Vitrification System during installation. Prior to covering, enclosing, or placing the new HLW Vitrification System or component in use, an independent, qualified, installation inspector or an independent, qualified, registered professional engineer, either of whom is trained and experienced in the

proper installation of similar systems or components, must inspect the system for the presence of any of the following items:

A. Weld breaks
B. Punctures
C. Scrapes of protective coatings
D. Cracks
E. Corrosion
F. Other structural damage or inadequate construction/installation

All discrepancies must be remedied before the HLW Vitrification system is covered, enclosed, or placed in use [WAC 173-303-640(3)(c), in accordance with WAC 173-303-680(2) and (3)].

III.10.J.1.a.v For the HLW Vitrification System or components that are placed underground and that are back-filled, the Permittees must provide a backfill material that is a non-corrosive, porous, homogeneous substance. The backfill must be installed so that it is placed completely around the HLW Vitrification System and compacted to ensure that the HLW Vitrification System is fully and uniformly supported [WAC 173-303-640(3)(d), in accordance with WAC 173-303-680(2) and (3)].

III.10.J.1.a.vi The Permittees must test for tightness the HLW Vitrification System or components, prior to being covered, enclosed, or placed into use. If the HLW Vitrification System or components are found not to be tight, all repairs necessary to remedy the leak(s) in the system must be performed prior to the HLW Vitrification System being covered, enclosed, or placed in use [WAC 173-303-640(3)(e), in accordance with WAC 173-303-680(2) and (3)].

III.10.J.1.a.vii The Permittees must ensure the HLW Vitrification System equipment is supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction [WAC 173-303-640(3)(f), in accordance with WAC 173-303-680(2) and (3)].

III.10.J.1.a.viii The Permittees must provide the type and degree of corrosion protection recommended by an independent corrosion expert, based on the information provided in Operating Unit Group 10, Appendices 10.9 and 10.11 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.b.i., III.10.J.5.b.iv., III.10.J.5.b.v., III.10.J.5.c.i., III.10.J.5.c.iv., III.10.J.5.c.v., III.10.J.5.d.i., III.10.J.5.d.iv., and III.10.J.5.d.v., or other corrosion protection if Ecology believes other corrosion protection is necessary to ensure the integrity of the HLW Vitrification System during use of the HLW Vitrification System. The installation of a corrosion protection system that is field fabricated must be supervised by an independent corrosion expert to ensure proper installation [WAC 173-303-640(3)(g), in accordance with WAC 173-303-680(2) and (3)].

III.10.J.1.a.ix Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will obtain and keep on file in the WTP Unit operating record, written statements by those persons required to certify the design of the HLW Vitrification System and supervise the installation of the HLW Vitrification System, as specified in WAC 173-303-640(3)(b), (c), (d), (e), (f), and (g), in accordance with WAC 173-303-680, attesting that the HLW Vitrification system and corresponding containment system listed in Permit Tables III.10.J.A and III.10.J.B, as approved/modified pursuant to Permit Condition III.10.J.5., were properly designed

and installed, and that repairs, in accordance with WAC 173-303-640(3)(c) and (e), were performed [WAC 173-303-640(3)(a) and WAC 173-303-640(3)(h), in accordance with WAC 173-303-680(3)].

III.10.J.1.a.x The independent HLW Vitrification System installation inspection and subsequent written statements will be certified in accordance with WAC 173-303-810(13)(a), as modified pursuant to Permit Condition III.10.J.1.a.iii., comply with all requirements of WAC 173-303-640(3)(h) in accordance with WAC 173-303-680, and will consider, but not be limited to, the following LAW Vitrification System installation documentation:

A. Field installation report with date of installation.

B. Approved welding procedures.

C. Welder qualification and certifications.

D. Hydro-test reports, as applicable, in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section VIII, Division 1; American Petroleum Institute (API) Standard 620, or Standard 650, as applicable.

E. Tester credentials.

F. Field inspector credentials.

G. Field inspector reports.

H. Field waiver reports.

I. Non-compliance reports and corrective action (including field waiver reports) and repair reports.

III.10.J.1.a.xi The Permittees will ensure periodic integrity assessments are conducted on the HLW Vitrification System, listed in Permit Table III.10.J.A, as approved/modified pursuant to Permit Condition III.10.J.5., over the term of this Permit, in accordance with WAC 173-303-680(2) and (3) as specified in WAC 173-303-640(3)(b), following the description of the integrity assessment program and schedule in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.J.5.e.i. and III.10.C.5.c. Results of the integrity assessments will be included in the WTP Unit operating record until ten (10) years after post-closure, or corrective action is complete and certified, whichever is later.

III.10.J.1.a.xii The Permittees will address problems detected during the HLW Vitrification System integrity assessments specified in Permit Condition III.10.J.1.a.xi. following the integrity assessment program in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.J.5.e.i. and III.10.C.5.c.

III.10.J.1.a.xiii All process monitors/instruments as specified in Permit Table III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., will be equipped with operational alarms to warn of deviation, or imminent deviation from the limits specified in Permit Table III.10.J.F.

III.10.J.1.a.xiv The Permittees will install and test all process and leak detection system monitors/instrumentation as specified in Permit Tables III.10.J.C and III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5, in accordance with Operating Unit Group 10, Appendices 10.1, 10.2, and 10.14 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.d.x. and III.10.J.5.f.xvi.

III.10.J.1.a.xv Except during periods of HLW Vitrification System start up and shut down, no dangerous and/or mixed waste will be treated in the HLW Vitrification System unless

the operating conditions specified under Permit Condition III.10.J.1.c. are complied with.

III.10.J.1.a.xvi The Permittees will not place dangerous and/or mixed waste, treatment reagents, or other materials in the HLW Vitrification System if these substances could cause the subsystem, subsystem equipment, or the containment system to rupture, leak, corrode, or otherwise fail [WAC 173-303-640(5)(a), in accordance with WAC 173-303-680(2)]. This condition is not applicable to corrosion of HLW Vitrification System sub-system and sub-system equipment that are expected to be replaced as part of normal operations (e.g., melters).

III.10.J.1.a.xvii The Permittees will operate the HLW Vitrification System to prevent spills and overflows using description of controls and practices as required under WAC 173-303-640(5)(b) described in Permit Condition III.10.C.5, and Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5.e. [WAC 173-303-640(5)(b), in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-806(4)(c)(ix)].

III.10.J.1.a.xviii For routinely non-accessible HLW Vitrification System sub-systems, as specified in Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.J.5.e.vi., the Permittees will mark all routinely non-accessible HLW Vitrification System sub-systems access points with labels or signs to identify the waste contained in each HLW Vitrification System sub-system. The label, or sign, must be legible at a distance of at least fifty (50) feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the HLW Vitrification System sub-systems. For the purposes of this permit condition, "routinely non-accessible" means personnel are unable to enter these areas while waste is being managed in them [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.J.1.a.xix For all HLW Vitrification System sub-systems not addressed in Permit Condition III.10.J.1.a.xviii., the Permittees will mark all these HLW Vitrification System sub-systems holding dangerous and/or mixed waste with labels or signs to identify the waste contained in the HLW Vitrification System sub-systems. The labels, or signs, must be legible at a distance of at least fifty (50) feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the HLW Vitrification System sub-systems [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.J.1.a.xx The Permittees will ensure that the containment systems for the HLW Vitrification System sub-systems listed in Permit Tables III.10.J.A. and III.10.J.B, as approved/modified pursuant to Permit Condition III.10.J.5, are free of cracks or gaps to prevent any migration of dangerous and/or mixed waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during use of the HLW Vitrification System sub-systems. Any indication that a crack or gap may exist in the containment systems will be investigated and repaired in accordance with Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5.e.v. [WAC 173-303–640(4)(b)(i), WAC 173-303–640(4)(e)(i)(C), and WAC 173-303-640(6), in accordance with

WAC 173-303-680(2) and (3), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-320].

III.10.J.1.a.xxi The Permittees must immediately, and safely, remove from service any HLW Vitrification System or secondary containment system which, through an integrity assessment, is found to be "unfit for use" as defined in WAC 173-303-040, following Permit Conditions III.10.J.1.a.xxiii.A. through D., and F. The affected HLW Vitrification System, or secondary containment system, must be either repaired or closed in accordance with Permit Condition III.10.J.1.a.xxiii.E. [WAC 173-303-640(7)(e) and (f), and WAC 173-303-640(8), in accordance with WAC 173-303-680(3)].

III.10.J.1.a.xxii An impermeable coating, as specified in Operating Unit Group 10, Appendices 10.4, 10.5, 10.7, 10.9, 10.11, and 10.12 of this Permit, as approved pursuant to Permit Condition III.10.J.5.b.v., will be maintained for all concrete containment systems and concrete portions of containment systems for each HLW Vitrification System sub-systems listed in Permit Tables III.10.J.A and III.10.J.B as approved/modified pursuant to Permit Condition III.10.J.5 (concrete containment systems that do not have a liner, pursuant to WAC 173-303-640(4)(e)(i), in accordance with WAC 173-303-680(2), and have construction joints, will meet the requirements of WAC 173-303-640(4)(e)(ii)(C), in accordance with WAC 173-303-680(2). The coating will prevent migration of any dangerous and mixed waste into the concrete. All coatings will meet the following performance standards:

A. The coating must seal the containment surface such that no cracks, seams, or other avenues through which liquid could migrate, are present;

B. The coating must be of adequate thickness and strength to withstand the normal operation of equipment and personnel within the given area such that degradation or physical damage to the coating or lining can be identified and remedied before dangerous and mixed waste could migrate from the system; and

C. The coating must be compatible with the dangerous and mixed waste, treatment reagents, or other materials managed in the containment system [WAC 173-303-640(4)(e)(ii)(D), in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-806(4)(i)(i)(A)].

III.10.J.1.a.xxiii The Permittees will inspect all containment systems for the HLW Vitrification System sub-systems listed in Permit Tables III.10.J.A and III.10.J.B, as approved/modified pursuant to Permit Condition III.10.J.5., in accordance with the Inspection Schedule specified in Operating Unit Group 10, Addendum E1 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.e.i. and III.10.C.5.c., and take the following actions if a leak or spill of dangerous and/or mixed waste is detected in these containment systems [WAC 173-303-640(5)(c) and WAC 173-303-640(6), in accordance with WAC 173-303-680(2) and (3), WAC 173-303-320, and WAC 173-303-806(4)(i)(i)(B)]:

A. Immediately, and safely, stop the flow of dangerous and/or mixed waste into the HLW Vitrification System sub-systems or secondary containment system.

B. Determine the source of the dangerous and/or mixed waste.

C. Remove the dangerous and/or mixed waste from the containment area in accordance with WAC 173-303-680(2) and (3), as specified in WAC 173-303-640(7)(b). The dangerous and/or mixed waste removed from containment areas

of the HLW Vitrification System sub-systems will be, as a minimum, managed as mixed waste.

D. If the cause of the release was a spill has not damaged the integrity of the HLW Vitrification System sub-system, the Permittees may return the HLW Vitrification System sub-system to service in accordance with WAC 173-303-680(2) and (3), as specified in WAC 173-303-640(7)(e)(ii). In such case, the Permittees will take action to ensure the incident that caused the dangerous and/or mixed waste to enter the containment system will not re-occur [WAC 173-303-320(3)].

E. If the source of the dangerous and/or mixed waste is determined to be a leak from the primary HLW Vitrification System into the secondary containment system, or the system is unfit for use as determined through an integrity assessment or other inspection, the Permittees will comply with the requirements of WAC 173-303-640(7) and take the following actions:

1. Close the HLW Vitrification System Sub-system following procedures in WAC 173-303-640(7)(e)(i), in accordance with WAC 173-303-680 and Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8., or

2. Repair and re-certify (in accordance with WAC 173-303-810(13)(a), as modified pursuant to Permit Condition III.10.J.1.a.iii.) the HLW Vitrification System in accordance with Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5.e.v., before the HLW Vitrification System is placed back into service [WAC 173-303-640(7)(e)(iii) and WAC 173-303-640(7)(f), in accordance with WAC 173-303-680].

F. The Permittees will document, in the WTP Unit operating record, actions/procedures taken to comply with A. through E. above, as specified in WAC 173-303-640(6)(d), in accordance with WAC 173-303-680(2) and (3).

G. In accordance with WAC 173-303-680(2) and WAC 173-303-680 (3), the Permittees will notify and report releases to the environment to Ecology, as specified in WAC 173-303-640(7)(d).

III.10.J.1.a.xxiv If liquids (e.g., dangerous and/or mixed waste leaks and spills, precipitation, fire water, liquids from damaged or broken pipes) cannot be removed from the secondary containment system within twenty-four (24) hours, Ecology will be verbally notified within twenty-four (24) hours of discovery. The notification will provide the information in A, B, and C, listed below. The Permittees will provide Ecology with a written demonstration within seven (7) business days, identifying at a minimum [WAC 173-303-640(4)(c)(iv) and WAC 173-303-640(7)(b)(ii), in accordance with WAC 173-303-680(3) and WAC 173-303-806(4)(i)(i)(B)]:

A. Reasons for delayed removal;

B. Measures implemented to ensure continued protection of human health and the environment;

C. Current actions being taken to remove liquids from secondary containment.

III.10.J.1.a.xxv All air pollution control devices and capture systems in the HLW Vitrification System will be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants and to minimize process upsets. Procedures for ensuring that the air pollution control devices and capture systems in the HLW

Vitrification System are properly operated and maintained so as to minimize the emission of air contaminants and process upsets will be established.

III.10.J.1.a.xxvi In all future narrative permit submittals, the Permittees will include HLW Vitrification sub-system names with the sub-system designation.

III.10.J.1.a.xxvii Modifications to approved design, plans, and specifications in Operating Unit Group 10 of this Permit for the HLW Vitrification System will be allowed only in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g., III.10.C.9.d., e., and h.

III.10.J.1.a.xxviii For any portion of the HLW Vitrification System that has the potential for formation and accumulation of hydrogen gases, the Permittees will operate the portion to maintain hydrogen levels below the lower explosive limit [WAC 173-303-815(2)(b)(ii)].

III.10.J.1.a.xxix For each HLW Vitrification System sub-system holding dangerous waste which are acutely or chronically toxic by inhalation, the Permittees will operate the system to prevent escape of vapors, fumes or other emissions into the air [WAC 173-303-806(4)(i)(i)(B) and WAC 173-303-640(5)(e) in accordance with WAC 173-303-680].

III.10.J.1.b Performance Standards

III.10.J.1.b.i The HLW Vitrification System must achieve a destruction and removal efficiency (DRE) of 99.99% for the principal organic dangerous constituents (PODCs) listed below [40 CFR §63.1203(c)(1) and 40-CFR 63.1203(c)(2), in accordance with WAC 173-303-680(2)].

RESERVED

DRE in this Permit condition will be calculated in accordance with the formula given below:

DRE=[1-(Wout/Win)] x 100%

Where:

Win=mass feed rate of one principal organic dangerous constituent (PODC) in a waste feed stream; and

Wout=mass emission rate of the same PODC present in exhaust emissions prior to release to the atmosphere.

III.10.J.1.b.ii Particulate matter emissions from the HLW Vitrification System will not exceed 34 mg/dscm (0.015 grains/dscf) [40 CFR §63.1203(b)(7), in accordance with WAC 173-303-680(2)]:

III.10.J.1.b.iii Hydrochloric acid and chlorine gas emissions from the HLW Vitrification System will not exceed 21 ppmv, combined [40 CFR §63.1203(b)(6), in accordance with WAC 173-303-680(2)]:

III.10.J.1.b.iv Dioxin and Furan TEQ emissions from the HLW Vitrification System will not exceed 0.2 nanograms (ng)/dscm [40 CFR §63.1203(b)(1), in accordance with WAC 173-303-680(2)]:

III.10.J.1.b.v Mercury emissions from the HLW Vitrification System will not exceed 45 µg/dscm, [40 CFR §63.1203(b)(2), in accordance with WAC 173-303-680(2)].

III.10.J.1.b.vi Lead and cadmium emissions from the HLW Vitrification System will not exceed 120 µg/dscm, combined [40 CFR §63.1203(b)(3), in accordance with WAC 173-303-680(2)].

III.10.J.1.b.vii Arsenic, beryllium, and chromium emissions from the HLW Vitrification System will not exceed 97 µg/dscm, combined [40 CFR §63.1203(b)(4), in accordance with WAC 173-303-680(2)].

III.10.J.1.b.viii Carbon monoxide (CO) emission from the HLW Vitrification System will not exceed 100 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system), dry [40 CFR §63.1203(b)(5)(i), in accordance with WAC 173-303-680(2)].

III.10.J.1.b.ix Hydrocarbon emission from the HLW Vitrification System will not exceed 10 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system during demonstration testing required by this Permit), dry basis, and reported as propane [40 CFR §63.1203(b)(5)(ii), in accordance with WAC 173-303-680(2)]:

III.10.J.1.b.x If the emissions from the HLW Vitrification System exceed the emission rates listed in Permit Table III.10.J.E, as approved pursuant to Permit Condition III.10.C.11.b., the Permittees will notify Ecology, in accordance with Permit Condition III.10.J.3.d.vii. [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)].

The emission limits specified in Permit Conditions III.10.J.1.b.i. through III.10.J.1.b.ix. above, will be met for the HLW Vitrification System by limiting feed rates as specified in Permit Tables III.10.J.D and III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., compliance with operating conditions specified in Permit Condition III.10.J.1.c. (except as specified in Permit Condition III.10.J.1.b.xii.), and compliance with Permit Condition III.10.J.1.b.xi.

III.10.J.1.b.xi Treatment effectiveness, feed-rates and operating rates for dangerous and mixed waste management units contained in the HLW Building, but not included in Permit Table III.10.J.A, as approved/modified pursuant to Permit Condition III.10.J.5., will be as specified in Permit Sections III.10.D, III.10.E, III.10.F and consistent with assumptions and basis which are reflected in Operating Unit Group 10, Appendix 6.3.1 of this Permit, as approved pursuant to Permit Condition III.10.C.11.b. For the purposes of this permit condition, Operating Unit Group 10, Appendix 6.3.1 will be superseded by Appendix 6.4.1 upon its approval pursuant to either Permit Conditions III.10.C.11.c. or III.10.C.11.d. [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)].

III.10.J.1.b.xii Except during periods of HLW Vitrification System startup and shutdown, compliance with the operating conditions specified in Permit Condition III.10.J.1.c., will be regarded as compliance with the required performance standards identified in Permit Conditions III.10.J.1.b.i. through x. However, if it is determined that during the effective period of this Permit that compliance with the operating conditions in Permit Condition III.10.J.1.c. is not sufficient to ensure compliance with the performance standards specified in Permit Conditions III.10.J.1.b.i. through x., the Permit may be modified, revoked, or reissued pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f., or III.10.C.2.g.

III.10.J.1.c Operating Conditions [WAC-303-670(6), in accordance with WAC 173-303-680(2) and (3)].

The Permittees will operate the HLW Vitrification System in accordance with Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.J.5.e.vi., and Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5.e., and Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., except as modified pursuant to Permit Conditions III.10.J.1.b.xii., III.10.J.2., III.10.J.3., III.10.J.4., and in accordance with the following:

III.10.J.1.c.i The Permittees will operate the HLW Vitrification System in order to maintain the systems and process parameters listed in Permit Tables III.10.J.C and III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., within the set-points specified in Permit Table III.10.J.F.

III.10.J.1.c.ii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., to automatically cut-off and/or lock-out the dangerous and mixed waste feed to the HLW Vitrification System when the monitored operating conditions deviate from the set-points specified in Permit Table III.10.J.F.

III.10.J.1.c.iii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., to automatically cut-off and/or lock-out the dangerous and mixed waste feed to the HLW Vitrification System when all instruments specified on Permit Table III.10.H.F for measuring the monitored parameters fails or exceeds its span value

III.10.J.1.c.iv The Permittees will operate the AWFCO systems, specified in Permit Table III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., to automatically cut-off and/or lock out the dangerous and/or mixed waste feed to the HLW Vitrification System when any portion of the HLW Vitrification System is bypassed. The terms “bypassed” and “bypass event” as used in Permit Sections III.10.J and III.10.K will mean if any portion of the HLW Vitrification System is bypassed so that gases are not treated as during the Demonstration Test.

III.10.J.1.c.v In the event of a malfunction of the AWFCO systems listed in Permit Table III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., the Permittees will immediately, manually cut-off the dangerous and mixed waste feed to the HLW Vitrification System. The Permittees will not restart the dangerous and/or mixed waste feed until the problem causing the malfunction has been identified and corrected.

III.10.J.1.c.vi The Permittees will manually cut-off the dangerous and mixed waste feed to the HLW Vitrification System when the operating conditions deviate from the limits specified in Permit Condition III.10.J.1.c.i., unless the deviation automatically activates the waste feed cut-off sequence specified in Permit Conditions III.10.J.1.c.ii., III.10.J.1.c.iii., and/or III.10.J.1.c.iv.

III.10.J.1.c.vii If greater than thirty (30) dangerous and mixed waste feed cut-offs, combined, to the HLW Vitrification System occur due to deviations from Permit Table III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5., within a sixty (60) day period, the Permittees will submit a written report to Ecology within five (5) calendar days of the thirty-first exceedance including the information specified below. These dangerous and mixed waste feed cut-offs to the HLW Vitrification System, whether automatically or manually activated, are counted if the specified set-points are deviated from while dangerous waste, mixed waste, and waste residues continue to

be processed in the HLW Vitrification System. A cascade event is counted at a frequency of one (1) towards the first waste feed cut-off parameter, specified on Permit Table III.10.J.F, from which the set-point is deviated:

A. The parameter(s) that deviated from the set-point(s) in Permit Table III.10.J.F.

B. The magnitude, dates, and duration of the deviations.

C. Results of the investigation of the cause of the deviations.

D. Corrective measures taken to minimize future occurrences of the deviations.

III.10.J.1.c.viii If any portion of the HLW Vitrification System is bypassed while treating dangerous and/or mixed waste, it will be regarded as non-compliance with the operating conditions specified in Permit Condition III.10.J.1.c. and the performance standards specified in Permit Condition III.10.J.1.b. After such a bypass event, the Permittees will perform the following actions:

A. Investigate the cause of the bypass event.

B. Take appropriate corrective measures to minimize future bypasses.

C. Record the investigation findings and corrective measures in the operating record.

D. Submit a written report to Ecology within five (5) days of the bypass event documenting the result of the investigation and corrective measures.

III.10.J.1.c.ix The Permittees will control fugitive emissions from the HLW Vitrification System by maintaining the melter under negative pressure.

III.10.J.1.c.x Except during periods of HLW Vitrification System startup and shutdown, compliance with the operating conditions specified in Permit Condition III.10.J.1.c. will be regarded as compliance with the required performance standards identified in Permit Condition III.10.J.1.b. However, evidence that compliance with these operating conditions is insufficient to ensure compliance with the performance standards, will justify modification, revocation, or re-issuance of this Permit, in accordance with Permit Conditions III.10.C.2.e. and III.10.C.2.f., or III.10.C.2.g.

III.10.J.1.d Inspection Requirements [WAC 173-303-680(3)].

III.10.J.1.d.i The Permittees will inspect the HLW Vitrification System in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E1 of this Permit, as modified in accordance with Permit Condition III.10.C.5.c.

III.10.J.1.d.ii The inspection data for HLW Vitrification System will be recorded, and the records will be placed in the WTP Unit operating record for the HLW Vitrification System, in accordance with Permit Condition III.10.C.4.

III.10.J.1.d.iii The Permittees will comply with the inspection requirements specified in Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., and as modified by Permit Conditions III.10.J.1.b.xii., III.10.J.2., III.10.J.3., and III.10.J.4.

III.10.J.1.e Monitoring Requirements [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(3)]

III.10.J.1.e.i Upon receipt of a written request from Ecology, the Permittees will perform sampling and analysis of the dangerous and mixed waste and exhaust emissions to verify that

the operating requirements established in the Permit achieve the performance standards delineated in this Permit.

III.10.J.1.e.ii The Permittees will comply with the monitoring requirements specified in Operating Unit Group 10, Appendices 10.2, 10.3, 10.7, 10.13, 10.15, and 10.18 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.c., III.10.J.5.d., III.10.J.5.e., and III.10.J.5.f., as modified by Permit Conditions III.10.J.1.b.xii., III.10.J.2., III.10.J.3., and III.10.J.4.

III.10.J.1.e.iii The Permittees will operate, calibrate, and maintain the carbon monoxide and hydrocarbon continuous emission monitors (CEM) specified in this Permit in accordance with Performance Specification 4B and 8A of 40 CFR Part 60, Appendix B, in accordance with Appendix to Subpart EEE of 40 CFR Part 63, and Operating Unit Group 10 Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., and as modified by Permit Conditions III.10.J.1.b.xii., III.10.J.2., III.10.J.3., and III.10.J.4.

III.10.J.1.e.iv The Permittees will operate, calibrate, and maintain the instruments specified on Permit Tables III.10.J.C and F, as approved/modified pursuant to Permit Condition III.10.J.5., in accordance with Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., and as modified by Permit Conditions III.10.J.1.b.xii., III.10.J.2., III.10.J.3., and III.10.J.4.

III.10.J.1.f Recordkeeping Requirements [WAC 173-303-380 and WAC 173-303-680(3)]

III.10.J.1.f.i The Permittees will record and maintain in the WTP Unit operating record for the HLW Vitrification System, all monitoring, calibration, maintenance, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Conditions III.10.C.4. and III.10.C.5., as modified by Permit Conditions III.10.J.1.b.xii., III.10.J.2., III.10.J.3., and III.10.J.4.

III.10.J.1.f.ii The Permittees will record in the WTP Unit operating record the date, time, and duration of all automatic waste feed cut-offs and/or lockouts, including the triggering parameters, reason for the deviation, and recurrence of the incident. The Permittees will also record all incidents of AWFCO system function failures, including the corrective measures taken to correct the condition that caused the failure.

III.10.J.1.f.iii The Permittees will submit to Ecology a report semi-annually the first calendar year, and annually thereafter each calendar year within ninety (90) days following the end of the year. The report will include the following information:

A. Total dangerous and mixed waste feed processing time for the HLW Vitrification System.

B. Date/Time of all HLW Vitrification System startups and shutdown.

C. Date/Time/Duration/Cause/Corrective Action taken for all HLW Vitrification System shutdowns caused by malfunction of either process or control equipment.

D. Date/Time/Duration/Cause/Corrective Action taken for all instances of dangerous and/or mixed waste feed cut-off due to deviations from Permit Table III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5.

III.10.J.1.f.iv The Permittees will submit an annual report to Ecology each calendar year within ninety (90) days following the end of the year of all quarterly CEM Calibration Error

and Annual CEM Performance Specification Tests conducted in accordance with Permit Condition III.10.J.1.e.iii.

III.10.J.1.g Closure

The Permittees will close the HLW Vitrification System in accordance with Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

III.10.J.2 Shakedown Period [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)].

III.10.J.2.a The shakedown period for the HLW Vitrification System will be conducted in accordance with Permit Condition III.10.J.1., Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., and as modified in accordance with Permit Conditions III.10.J.1.b.xii., III.10.J.2., and III.10.J.3.

III.10.J.2.b Duration of the Shakedown Period

III.10.J.2.b.i The shakedown period for the HLW Vitrification System will begin with the initial introduction of dangerous waste in the HLW Vitrification System following construction and will end with the start of the demonstration test.

III.10.J.2.b.ii The shakedown period will not exceed the following limits, as defined by hours of operation, when the HLW Vitrification System is processing dangerous waste. The Permittees may petition Ecology for one (1) extension of each shakedown phase for seven hundred and twenty (720) additional operating hours in accordance with permit modification procedures specified in Permit Conditions III.10.C.2.e. and III.10.C.2.f.

Shakedown Phase 1: 720 hours

Shakedown Phase 2: 720 hours

III.10.J.2.b.iii Shakedown Phase 2 will not be commenced until documentation has been submitted to Ecology verifying that the HLW Vitrification System has operated at a minimum of 75% of the shakedown Phase 1 feed-rate limit for two (2) separate eight (8) consecutive hour periods with no AWFCOs.

III.10.J.2.c Allowable Waste Feed During the Shakedown Period

III.10.J.2.c.i The Permittees may feed the dangerous waste specified for the HLW Vitrification System on the Part A Forms (Operating Unit Group 10, Addendum A of this Permit), except for those waste outside the waste acceptance criteria specified in the WAP, Operating Unit Group 10, Addendum B of this Permit, as approved pursuant to Permit Condition III.10.C.3., except Permit Conditions III.10.J.2.c.ii. through v. also apply.

III.10.J.2.c.ii The Permittees will not feed the following waste to the HLW Vitrification System during Shakedown Phase 1:

A. Acutely toxic dangerous waste listed in WAC 173-303-081(a)(2)(a)(i).

B. Mixed waste

III.10.J.2.c.iii The Permittees will not feed the following waste to the HLW Vitrification System during Shakedown Phase 2:

A. Mixed waste

III.10.J.2.c.iv The feed-rates to the HLW Vitrification System will not exceed the limits in Permit Tables III.10.J.D and III.10.J.F, as approved/modified pursuant to Permit Condition III.10.J.5.

III.10.J.2.c.v The Permittees will conduct sufficient analysis of the dangerous waste treated in the HLW Vitrification System to verify that the waste feed is within the physical and chemical composition limits specified in this Permit.

III.10.J.3 Demonstration Test Period [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)]

III.10.J.3.a Demonstration Test Period

III.10.J.3.a.i The Permittees will operate, monitor, and maintain the HLW Vitrification System as specified in Permit Condition III.10.J.1., and Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., except as modified in accordance with Permit Conditions III.10.J.1.b.xii. and III.10.J.3.

III.10.J.3.a.ii Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., will be re-submitted to Ecology for approval by the Permittees as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f. at least one hundred and eighty (180) days prior to the start date of the demonstration test. The revised Demonstration Test Plan will include applicable EPA promulgated test methods and procedures in effect at the time of the re-submittal and projected commencement and completion dates for the Demonstration Test.

III.10.J.3.a.iii The Permittees will not commence the demonstration test period until documentation has been submitted to Ecology verifying that the HLW Vitrification System has operated at a minimum of 75% of the demonstration test period feed-rate limit for a minimum of an eight (8) consecutive hours period on two (2) consecutive days.

III.10.J.3.b Performance Standards

The Permittees will demonstrate compliance with the performance standards specified in Permit Condition III.10.J.1.b. during the Demonstration Test Period.

III.10.J.3.c Allowable Waste Feed During the Demonstration Test Period

III.10.J.3.c.i The Permittees may feed the dangerous waste specified for the HLW Vitrification System in Part A Forms (Operating Unit Group 10, Addendum A of this Permit), except for those waste outside the waste acceptance criteria specified in the WAP, Operating Unit Group 10, Addendum B of this Permit, as approved pursuant to Permit Condition III.10.C.3., except Permit Conditions III.10.J.3.c.ii. through iv. also apply.

III.10.J.3.c.ii The Permittees will not feed mixed waste to the HLW Vitrification System.

III.10.J.3.c.iv. The dangerous waste feed-rates to the HLW Vitrification System will not exceed the limits in Permit Tables III.10.J.D and F, as approved/modified pursuant to Permit Condition III.10.J.5.

III.10.J.3.c.v. The Permittees will conduct sufficient analysis of the dangerous waste treated in the HLW Vitrification System to verify that the dangerous waste is within the physical and chemical composition limits specified in this Permit.

III.10.J.3.d Demonstration Data Submissions and Certifications

III.10.J.3.d.i The Permittees will submit to Ecology a complete demonstration test report within one hundred and eighty (180) calendar days of completion of the Demonstration Test including all data collected during the Demonstration Test and updated Permit Tables III.10.K.D, III.10.K.E, and III.10.K.F.

III.10.J.3.d.ii The Permittees must submit the following information to Ecology prior to receiving Ecology's approval to commence feed of dangerous waste and mixed waste to the HLW Vitrification System:

A. The Permittees will submit a summary of data collected as required during the Demonstration Test to Ecology upon completion of the Demonstration Test.

B. A certification that the Demonstration Test has been carried out in accordance with the approved Demonstration Test Plan and approved modifications within thirty (30) days of the completion of the Demonstration Test [WAC 173-303-807(8)].

C. Calculations and analytical data showing compliance with the performance standards specified in Permit Conditions III.10.J.1.b.i, III.10.J.1.b.iv, III.10.J.1.b.v, III.10.J.1.b.vi, and III.10.J.1.b.vii

D. Laboratory data QA/QC summary for the information provided in III.10.J.3.d.ii.C.

III.10.J.3.d.iii After successful completion of the Demonstration Test and receipt of Ecology's approval, the Permittees will be authorized to commence feed of dangerous waste and mixed waste to the HLW Vitrification System for the post-demonstration test period indicated in Permit Tables III.10.J.D and F, as approved/modified pursuant to Permit Condition III.10.J.5., in compliance with the operating requirements specified in Permit Condition III.10.J.1.c. and within the limitations specified in Permit Condition.III.10.C.14.

III.10.J.3.d.iv RESERVED

III.10.J.3.d.v After successful completion of the Demonstration Test, Permittees submittal of the following to Ecology, and Permittees receipt of Ecology approval of the following in writing, the Permittees will be authorized to feed dangerous waste and mixed waste to the HLW Vitrification System pursuant to Permit Section III.10.K.

A. A complete Demonstration Test Report for the HLW Vitrification System and updated Permit Tables III.10.K.D, III.10.K.E, and III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.10.C.11.c. or III.10.C.11.d., the test report will be certified in accordance with WAC 173-303-807(8), in accordance with WAC 173-303-680(2) and (3).

B. A Final Risk Assessment Report completed pursuant to Permit Conditions III.10.C.11.c. or III.10.C.11.d.

III.10.J.3.d.vi If any calculations or testing results show that one or more of the performance standards listed in Permit Condition III.10.J.1.b., with the exception of Permit Condition III.10.J.1.b.x., for the HLW Vitrification System were not met during the Demonstration Test, the Permittees will perform the following actions:

A. Immediately stop dangerous and mixed waste feed to the HLW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s).

B. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s) as specified in Permit Condition I.E.21.

C. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s).

D. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s), documentation supporting a mode of operation where all performance standards listed in Permit Condition III.10.J.1.b., with the exception of Permit Condition III.10.J.1.b.x., for the HLW Vitrification System were met during the demonstration test, if any such mode was demonstrated.

E. Based on the information provided to Ecology by the Permittees, pursuant to Permit Conditions III.10.J.3.d.vi.A through D above, and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the LAW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of a compliance schedule and/or revised Demonstration Test Plan, pursuant to Permit Conditions III.10.J.3.d.vi.F and G.

F. If the performance standard listed in Permit Condition III.10.J.1.b.i. was not met during the Demonstration Test, the Permittees will submit within one hundred and twenty (120) days of discovery of not meeting the performance standard, a revised Demonstration Test Plan (if appropriate) and a compliance schedule for Ecology approval to address this deficiency. If a revised Demonstration Test Plan is submitted, it will be accompanied by a request for approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f. The revised Demonstration Test Plan (if submitted) must include substantive changes to prevent failure from reoccurring.

G. If any of the performance standards listed in Permit Condition III.10.J.1.b., with the exception of Permit Conditions III.10.J.1.b.i. or III.10.J.1.b.x., were not met during the Demonstration Test, the Permittees will submit to Ecology within one hundred and twenty (120) days of discovery of not meeting the performance standard(s), a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring.

III.10.J.3.d.vii If any calculations or testing results show that any emission rate for any constituent listed in Permit Table III.10.J.E, as approved pursuant to Permit Condition III.10.C.11.b., is exceeded for HLW Vitrification System during the Demonstration Test, the Permittees will perform the following actions:

A. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s) as specified in Permit Condition I.E.21.

B. Submit to Ecology additional risk information to indicate that the increased emissions impact is offset by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance of the emission rate(s) and submit a report of the investigation findings to Ecology within fifteen (15) days of the discovery of exceeding the emission rate(s).

C. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed

to the HLW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and III.10.C.2.f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring.

III.10.J.4 Post-Demonstration Test Period [WAC 173-303-670(5), WAC 173-303-670(6), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)].

III.10.J.4.a The Permittees will operate, monitor, and maintain the HLW Vitrification System as specified in Permit Condition III.10.J.1. and Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5., except as modified in accordance with Permit Conditions III.10.J.1.b.xii., III.10.J.3., and III.10.J.4.

III.10.J.4.b Allowable Waste Feed During the Post-Demonstration Test Period

III.10.J.4.b.i The Permittees may feed the dangerous and/or mixed waste specified for the HLW Vitrification System on the Part A Forms (Operating Unit Group 10, Addendum A of this Permit), except for those waste outside the waste acceptance criteria specified in the WAP, Operating Unit Group 10, Addendum B of this Permit, as approved pursuant to Permit Condition III.10.C.3., and except Permit Conditions III.10.J.4.b.ii. and III.10.J.4.b.iii. also apply.

III.10.J.4.b.ii The dangerous waste and mixed waste feed rates to the HLW Vitrification System will not exceed the limits in Permit Tables III.10.J.D and F, as approved/modified pursuant to Permit Condition III.10.J.5., or in Permit Condition III.10.J.3.

III.10.J.4.b.iii The Permittees will conduct sufficient analysis of the dangerous waste and mixed waste treated in HLW Vitrification System to verify that the waste feed is within the physical and chemical composition limits specified in this Permit.

III.10.J.5 Compliance Schedules

III.10.J.5.a All information identified for submittal to Ecology in a. through f. of this compliance schedule must be signed and certified in accordance with requirements in WAC 173-303-810(12), as modified in accordance with Permit Condition III.10.J.1.a.iii. [WAC 173-303-806(4)].

III.10.J.5.b The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to construction of each secondary containment and leak detection system for the HLW Vitrification System (per level) as identified in Permit Tables III.10.J.A and III.10.J.B, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 10.2, 10.4, 10.5, 10.7, 10.8, 10.9, 10.11, and 10.12 of this Permit. At a minimum, engineering information specified below will show the following as described in WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings and information on sumps and floor drains):

III.10.J.5.b.i IQRPE Reports (specific to foundation, secondary containment, and leak detection system) will include review of design drawings, calculations, and other information on which the certification report is based and will include, but not limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 10.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. IQRPE Reports will be consistent with the information separately provided

in ii. through ix. below [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)];

III.10.J.5.b.ii Design drawings (General Arrangement Drawings, plan) and specifications for the foundation, secondary containment including liner installation details, and leak detection methodology. These items should show the dimensions, volume calculations, and location of the secondary containment system, and should include items such as floor/pipe slopes to sumps, tanks, floor drains [WAC 173-303-640(4)(b) through (f) and WAC 173-303-640(3)(a), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)];

III.10.J.5.b.iii The Permittees will provide the design criteria (references to codes and standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the secondary containment system. This information will demonstrate the foundation will be capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift [WAC 173-303-640(4)(c)(ii), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.b.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.J.5.b.v Secondary containment/foundation, and leak detection system, materials selection documentation (including, but not limited to, concrete coatings and water stops, and liner materials), as applicable [WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.J.5.b.vi Detailed description of how the secondary containment for the HLW Vitrification System will be installed in compliance with WAC 173-303-640(3)(c), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B);

III.10.J.5.b.vii Submit Permit Tables III.10.J.B and III.10.K.B completed to provide for all secondary containment sumps and floor drains the information, as specified in each column heading consistent with information to be provided in i. through vi., above;

III.10.J.5.b.viii Documentation that secondary containment and leak detection systems will not accumulate hydrogen gas levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.b.ix A detailed description of how HLW Vitrification System design provides access for conducting future HLW Vitrification System integrity assessments [WAC 173-303-640(3)(b) and WAC 173-303-806(4)(i)(i)(B)].

III.10.J.5.c The Permittees will submit to Ecology pursuant to Permit Condition III.10.C.9.f., prior to installation of each sub-system as identified in Permit Table III.10.J.A, engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 10.1 through 10.14 and 10.17 of this Permit. At a minimum, engineering information specified below will show the following, as required pursuant to WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings):

III.10.J.5.c.i IQRPE Reports (specific to sub-system) will include review of design drawings, calculations, and other information on which the certification report is based and will

include as applicable, but not limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 10.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information separately provided in ii. through xii. below and the IQRPE Report specified in Permit Condition III.10.J.5.b. [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)];

III.10.J.5.c.ii Design drawings [General Arrangement Drawings in plan, Process Flow Diagrams, Piping and Instrumentation Diagrams, (including pressure control systems), Mechanical Drawings, and specifications, and other information specific to subsystems (to show location and physical attributes of each subsystem specific to miscellaneous units)] [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)];

III.10.J.5.c.iii Sub-system design criteria (references to codes and, standards, load definitions, and load combinations, materials of construction, and analysis/design methodology) and typical design details to support the sub-systems. Structural support calculations specific to off-specification, non-standard, and field-fabricated subsystems will be submitted for incorporation into the Administrative Record. Documentation will include, but not be limited to, supporting specifications (test data, treatment effectiveness report, etc.), supporting projected operational capability (e.g., WESP projected removal efficiency for individual metals, halogens, particulates, etc.), and compliance with performance standards specified in Permit Condition III.10.J.1.b [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.c.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with water, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.J.5.c.v Sub-system materials selection documentation (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.J.5.c.vi Sub-system vendor information (including, but not limited to, required performance warranties, as available), consistent with information submitted under ii. above, will be submitted for incorporation into the Administrative Record WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.c.vii System descriptions related to sub-system units will be submitted for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.c.viii Mass and energy balance for normal projected operating conditions used in developing the Piping and Instrumentation Diagrams and Process Flow Diagrams, including assumptions and formulas used to complete the mass and energy balance, so that they can be independently verified for incorporation into the Administrative

Record [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.c.ix Detailed description of all potential HLW Vitrification System bypass events including:

A. A report which includes an analysis of credible potential bypass events and recommendations for prevention/minimization of the potential, impact, and frequency of the bypass event to include at a minimum:

1. Operating procedures
2. Maintenance procedures
3. Redundant equipment
4. Redundant instrumentation
5. Alternate equipment
6. Alternate materials of construction

III.10.J.5.c.x A detailed description of how the sub-systems will be installed in compliance with WAC 173-303-640(3)(b), (c), (d), and (e), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B);

III.10.J.5.c.xi Sub-system design to prevent escape of vapors and emissions of acutely or chronically toxic (upon inhalation) EHW, for incorporation into the Administrative Record [WAC 173-303-640(5)(e), in accordance with WAC 173-303-680, (2), and WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.c.xii Documentation that sub-systems are designed to prevent the accumulation of hydrogen gases levels above the lower explosive limit for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.d The Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., prior to installation of equipment for each sub-system as identified in Permit Tables III.10.J.A and III.10.J.B, not addressed in Permit Conditions III.10.J.5.b. or III.10.J.5.c., engineering information as specified below, for incorporation into Operating Unit Group 10, Appendices 10.1 through 10.14 of this Permit. At a minimum, engineering information specified below will show the following as required pursuant to in WAC 173-303-640, in accordance with WAC 173-303-680 (the information specified below will include dimensioned engineering drawings):

III.10.J.5.d.i IQRPE Reports (specific to sub-system equipment) will include a review of design drawings, calculations, and other information as applicable on which the certification report is based. The reports will include, but not be limited to, review of such information described below. Information (drawings, specifications, etc.) already included in Operating Unit Group 10, Appendix 10.0 of this Permit, may be included in the report by reference and should include drawing and document numbers. The IQRPE Reports will be consistent with the information provided separately in ii. through xiii. below and the IQRPE Reports specified in Permit Conditions III.10.J.5.b. and III.10.J.5.c. [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(I)(I)(A) through (B)];

III.10.J.5.d.ii Design drawings [Process Flow Diagrams, Piping and Instrumentation Diagrams (including pressure control systems), and specifications, and other information specific to equipment (these drawings should include all equipment such as pipes,

valves, fittings, pumps, instruments, etc.)] [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A) through (B)];

III.10.J.5.d.iii Sub-system equipment design criteria (references to codes and standards, load definitions and load combinations, materials of construction, and analysis/design methodology) and typical design details for the support of the sub-system equipment. [WAC 173-303-640(3)(a) and WAC 173-303-640(3)(f), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.d.iv A description of materials and equipment used to provide corrosion protection for external metal components in contact with soil and water, including factors affecting the potential for corrosion [WAC 173-303-640(3)(a)(iii)(B), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.J.5.d.v Materials selection documentation for equipment for each sub-system (e.g., physical and chemical tolerances) [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(A)];

III.10.J.5.d.vi Vendor information (including, but not limited to, required performance warranties, as available), consistent with information submitted under ii. above, for sub-system equipment will be submitted for incorporation into the Administrative Record [WAC 173-303-640(3)(a), in accordance with WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(iv)];

III.10.J.5.d.vii Sub-system, sub-system equipment, and leak detection system instrument control logic narrative description (e.g., descriptions of fail-safe conditions, etc.) [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.d.viii System description related to sub-system equipment, and system descriptions related to leak detection systems, for incorporation into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.d.ix A detailed description of how the sub-system equipment will be installed and tested [WAC 173-303-640(3)(c) through (e) and WAC 173-303-640(4)(b) and (c), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.d.x For process monitoring, control, and leak detection system instrumentation for the HLW Vitrification System as identified in Permit Tables III.10.J.C. and III.10.J. F., a detailed description of how the process monitoring, control, and leak detection system instrumentation will be installed and tested [WAC 173-303-640(3)(c) through (e), WAC 173-303-640(4)(b) and (c), WAC 173-303-806(4)(c)(vi), and WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.d.xi Mass and energy balance for projected normal operating conditions used in developing the Piping and Instrumentation Diagrams and Process Flow Diagrams, including assumptions and formulas used to complete the mass and energy balance, so that they can be independently verified, for incorporation into the Administrative Record [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.d.xii Documentation that sub-systems equipment are designed to prevent the accumulation of hydrogen gas levels above the lower explosive limit into the Administrative Record [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A), and WAC 173-303-806(4)(i)(v)] [WAC 173-303-815(2)(b)(ii)];

III.10.J.5.d.xiii Leak Detection system documentation (e.g. vendor information etc.) consistent with information submitted under Permit Condition III.10.J.5.c.ii. and Permit Conditions III.10.J.5.d.ii., vii., viii., and x. above, will be submitted for incorporation into the Administrative Record.

III.10.J.5.e Prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit to Ecology, pursuant to Permit Condition III.10.C.9.f., the following as specified below for incorporation into Operating Unit Group 10, Appendix 10.18 of this Permit, except Permit Condition III.10.J.5.e.i., which will be incorporated into Operating Unit Group 10, Addendum E of this Permit. All information provided under this permit condition must be consistent with information provided pursuant to Permit Conditions III.10.J.5.b., c., d., e., and f., III.10.C.3.e.v., and III.10.C.11.b., as approved by Ecology:

III.10.J.5.e.i Integrity assessment program and schedule for the HLW Vitrification System will address the conducting of periodic integrity assessments on the HLW Vitrification System over the life of the system, as specified in Permit Condition III.10.J.5.b.ix. and as specified in WAC 173-303-640(3)(b), in accordance with WAC 173-303-680, and descriptions of procedures for addressing problems detected during integrity assessments. The schedule must be based on past integrity assessments, age of the system, materials of construction, characteristics of the waste, and any other relevant factors [WAC 173-303-640(3)(b), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.e.ii Detailed plans and descriptions, demonstrating the leak detection system is operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of dangerous and/or mixed waste or accumulated liquid in the secondary containment system within twenty-four (24) hours [WAC 173-303-640(4)(c)(iii)]. Detection of a leak of at least 0.1 gallons per hour within twenty-four (24) hours is defined as being able to detect a leak within twenty-four (24) hours. Any exceptions to this criteria must be approved by Ecology in accordance with WAC 173-303-680, WAC 173-303-640(4)(c)(iii), and WAC 173-303-806(4)(i)(i)(b);

III.10.J.5.e.iii Detailed operational plans and descriptions, demonstrating that spilled or leaked waste and accumulated precipitation liquids can be removed from the secondary containment system within twenty-four (24) hours [WAC 173-303-806(4)(i)(i)(B)];

III.10.J.5.e.iv Descriptions of operational procedures demonstrating appropriate controls and practices are in place to prevent spills and overflows from the HLW Vitrification System or containment systems in compliance with WAC 173-303-640(5)(b)(i) through (iii), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B);

III.10.J.5.e.v Description of procedures for investigation and repair of the HLW Vitrification System [WAC 173-303–640(6) and WAC 173-303-640(7)(e) and (f), in accordance with WAC 173-303-680, WAC 173-303-320, WAC 173-303-806(4)(ia)(iv), and WAC 173-303-806(4)(a)(ii)(B)];

III.10.J.5.e.vi Updated Addendum C, Narrative Description, Tables and Figures as identified in Permit Tables III.10.J.A and III.10.J.B, as modified pursuant to Permit Condition III.10.H.5.e.x. and updated to identify routinely non-accessible LAW Vitrification sub-systems.

III.10.J.5.e.vii Description of procedures for management of ignitable and reactive, and incompatible dangerous and/or mixed waste as specified in accordance with

WAC 173-303-640(9) and (10), in accordance with WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(B).

III.10.J.5.e.viii A description of the tracking system used to track dangerous and/or mixed waste generated throughout the HLW Vitrification System, pursuant to WAC 173-303-380.

III.10.J.5.e.ix Permit Table III.10.J.C and III.10.K.C will be revised and/or completed for HLW Vitrification System process and leak detection system monitors and instruments (to include, but not be limited to: instruments and monitors measuring and/or controlling flow, pressure, temperature, density, pH, level, humidity, and emissions) to provide the information as specified in each column heading. Process and leak detection system monitors and instruments for critical systems, as specified in Operating Unit Group 10, Appendix 2.0 and as updated pursuant to Permit Condition III.10.C.9.b.and for operating parameters as required to comply with Permit Condition III.10.C.3.e.iii., will be addressed. Process monitors and instruments for non-waste management operations (e.g., utilities, raw chemical storage, non-contact cooling waters, etc.) are excluded from this permit condition [WAC 173-303-680, WAC 173-303-806(4)(i)(i)(A) through (B), and WAC 173-303-806(4)(i)(v)];

III.10.J.5.e.x Permit Tables III.10.J.A and III.10.K.A amended as follows [WAC 173-303-680 and WAC 173-303-806(4)(i)(i)(A) through (B)]:

A. Under column 1, update and complete list of dangerous and mixed waste HLW Vitrification System sub-systems, including plant items that comprise each system (listed by item number).

B. Under column 2, update and complete system designations.

C. Under column 3, replace the 'Reserved' with Operating Unit Group 10, Appendix 10.0 sub-sections (e.g., 10.1, 10.2, etc.) designated in Permit Conditions III.10.J.5.b., c., and d. specific to HLW Vitrification System sub-system, as listed in column 1.

D. Under column 4, update and complete list of narrative description, tables, and figures.

III.10.J.5.f One hundred and eighty (180) days prior to initial receipt of dangerous and/or mixed waste in the WTP Unit, the Permittees will submit for review and receive approval for incorporation into Operating Unit Group 10, Appendix 10.15 of this Permit, a Demonstration Test Plan for the HLW Vitrification System to demonstrate that the HLW Vitrification Systems meets the performance standards specified in Permit Condition III.10.J.1.b. In order to incorporate the Demonstration Test Plan for the HLW Vitrification System into Operating Unit Group 10, Appendix 10.15, Permit Condition III.10.C.2.g. process will be followed. The Demonstration Test Plan will include, but not be limited to, the following information. The Demonstration Test Plan will also be consistent with the information provided pursuant to Permit Conditions III.10.J.5.b., c., d. and e., III.10.C.3.e.v. and III.10.C.11.b., as approved by Ecology and consistent with the schedule described in Operating Unit Group 10, Appendix 1.0 of this Permit. The documentation required pursuant to Permit Condition III.10.J.5.f.xvi., in addition to being incorporated into Operating Unit Group 10, Appendix 10.15, will be incorporated by reference in Operating Unit Group 10, Addendum E of this Permit.

Notes: (1) The following should be consulted to prepare this Demonstration Test Plan: "Guidance on Setting Permit Conditions and Reporting Trial Burn Results Volume II of the Hazardous Waste Incineration Guidance Series", and EPA/625/6-89/019 and Risk Burn Guidance For Hazardous Waste Combustion Facilities", EPA-R-01-001, July 2001,

WAC 173-303-807(2), WAC 173-303-670(5), WAC-173-303-670(6), 40 CFR §63.1207(f)(2), 40 CFR §63.1209 and Appendix to 40 CFR Part 63 EEE.

(2) Cross-referencing to the information provided pursuant to permit Conditions III.H.5.b., c., d., e. and III.10.C.3.e.v., as approved by Ecology, that are redundant to elements of the Demonstration Test Plan for the HLW Vitrification System is acceptable.

III.10.J.5.f.i Analysis of each feed-stream to be fed during the demonstration test, including dangerous waste, glass formers and reductants, process streams (e.g., control air, process air, steam, sparge bubbler air, air in-leakage from melter cave, and gases from HLW Vitrification Vessel Ventilation System, process water, etc.) that includes:

A. Levels of ash, levels of metals, total chlorine (organic and inorganic), other halogens and radionuclide surrogates.

B. Description of the physical form of the feed-streams;

C. An identification and quantification of organics that are present in the feed-stream, including constituents proposed for DRE demonstration;

A comparison of the proposed demonstration test feed streams to the mixed waste feed envelopes to be processed in the melter must be provided that documents that the proposed demonstration test feed streams will serve as worst case surrogates for organic destruction, formation of products of incomplete oxidation, and metals, total chlorine (organic and inorganic), other halogens, particulate formation, and radionuclides;

III.10.J.5.f.ii Specification of trial principal organic dangerous constituents (PODCs) for which destruction and removal efficiencies are proposed to be calculated during the demonstration test and for inclusion in Permit Conditions III.10.J.1.b.i. and III.10.K.1.b.i. These trial PODCs will be specified based on destructibility, concentration or mass in the waste and the dangerous waste constituents or constituents in WAC 173-303-9905;

III.10.J.5.f.iii A description of the blending procedures, prior to introducing the feed-streams into the melter, including analysis of the materials prior to blending, and blending ratios;

III.10.J.5.f.iv A description of how the surrogate feeds are to be introduced for the demonstration. This description should clearly identify the differences and justify how any of differences would impact the surrogate feed introduction as representative of how mixed waste feeds will be introduced;

III.10.J.5.f.v A detailed engineering description of the HLW Vitrification System, including:

A. Manufacturer's name and model number for each sub-system.

B. Design capacity of each sub-system including documentation (engineering calculations, manufacturer/vendor specifications, operating data, etc.) supporting projected operational efficiencies (e.g., WESP projected removal efficiency for individual metals, halogens, particulates, etc.) and compliance with performance standards specified in Permit Condition III.10.J.1.b.

C. Detailed scaled engineering drawings, including Process Flow Diagrams, Piping and Instrumentation Diagrams, Vessel Drawings (plan, and elevation with cross sections) and General Arrangement Drawings.

D. Process Engineering Descriptions.

E. Mass and energy balances for each projected operating condition and each demonstration test condition, including assumptions and formulas used to

complete mass and energy balances so that they can be independently verified for incorporation into the Administrative Record.

F. Engineering Specifications/data sheets (materials of construction, physical and chemical tolerances of equipment, equipment performance warranties, and fan curves).

G. Detailed Description of Automatic Waste Feed Cut-off System addressing critical operating parameters for all performance standards specified in Permit Condition III.10.J.1.b.

H. Documentation to support compliance with performance standards specified in Permit Condition III.10.J.1.b., including engineering calculations, test data, and manufacturer/vendor's warranties, etc.

I. Detailed description of the design, operation and maintenance practices for air pollution control system.

J. Detailed description of the design, operation, and maintenance practices of any stack gas monitoring and pollution control monitoring system.

III.10.J.5.f.vi Detailed description of sampling and monitoring procedures including sampling and monitoring locations in the system, the equipment to be used, sampling and monitoring frequency, and planned analytical procedures for sample analysis including, but not limited to:

A. A short summary narrative description of each stack sample method should be included within the main body of the demonstration test plan, which references an appendix to the plan that would include for each sampling train: (1) detailed sample method procedures, (2) sampling train configuration schematic, (3) sampling recovery flow sheet, (4) detailed analytical method procedures, and (5) sampling preparation and analysis flow sheet. The detailed procedures should clearly flag where the method has provided decision points (e.g., choices of equipment materials of construction, choices of clean-up procedures or whether additional clean-up procedures will be incorporated, whether pretest surveys or laboratory validation work will be performed, enhancements to train to accommodate high moisture content in stack gas, etc.) and what is being proposed along with the basis for the decision.

B. A short summary narrative description of the feed and residue sampling methods should be included within the main body of the demonstration test plan, which references an appendix that would include for each sample type: (1) detailed sample method procedures, (2) sampling recovery/compositing procedures, and (3) detailed analytical method procedures. The detailed procedures should clearly flag where the method has provided decision points (e.g., choices of equipment materials of construction, choices of clean-up procedures or whether additional clean-up procedures will be incorporated, whether pretest surveys or laboratory validation work will be performed, etc.) and what is being proposed along with the basis for the decision.

III.10.J.5.f.vii A detailed test schedule for each condition for which the demonstration test is planned, including projected date(s), duration, quantity of dangerous waste to be fed, and other relevant factors;

III.10.J.5.f.viii A detailed test protocol including, for each test condition, the ranges of feed-rate for each feed system, and all other relevant parameters that may affect the ability of the

HLW Vitrification System to meet performance standards specified in Permit Condition III.10.J.1.b.;

III.10.J.5.f.ix A detailed description of planned operating conditions for each demonstration test condition, including operating conditions for shakedown, demonstration test, post-demonstration test and normal operations. This information will also include submittal of Permit Tables III.10.J.D, III.10.J.F, III.10.K.D, and III.10.K.F completed with the information as specified in each column heading for each HLW Vitrification System waste feed cut-off parameter and submittal of supporting documentation for Permit Tables III.10.J.D, III.10.J.F, III.10.K.D, and III.10.K.F set-point values.

III.10.J.5.f.x The test conditions proposed must demonstrate meeting the performance standards specified in Permit Condition III.10.J.1.b. with the simultaneous operation of the melter at capacity and input from the HLW Vitrification Vessel Ventilation System at capacity to simulate maximum loading to the HLW Vitrification System off-gas treatment system and to establish the corresponding operating parameter ranges.

III.10.J.5.f.xi A detailed description of procedures for start-up and shutdown of waste feed and controlling emissions in the event of an equipment malfunction, including off-normal and emergency shutdown procedures;

III.10.J.5.f.xii A calculation of waste residence time;

III.10.J.5.f.xiii Any request to extrapolate metal feed-rate limits from Demonstration Test levels must include:

A. A description of the extrapolation methodology and rationale for how the approach ensures compliance with the performance standards, as specified in Permit Condition III.10.J.1.b.

B. Documentation of the historical range of normal metal feed-rates for each feed stream.

C. Documentation that the level of spiking recommended during the demonstration test will mask sampling and analysis imprecision and inaccuracy to the extent that extrapolation of feed-rates and emission rates from the Demonstration Test data will be as accurate and precise as if full spiking were used.

III.10.J.5.f.xiv Documentation of the expected levels of constituents in HLW Vitrification System input streams, including, but not limited to, waste feed, glass former and reactants, control air, process air, steam, sparge bubbler air, air in-leakage from melter cave, gases from HLW Vitrification Vessel Ventilation System, and process water.

III.10.J.5.f.xv Documentation justifying the duration of the conditioning required to ensure the HLW Vitrification System had achieved steady-state operations under Demonstration Test operating conditions.

III.10.J.5.f.xvi Documentation of HLW Vitrification System process and leak detection system instruments and monitors as listed on Permit Tables III.10.J.C, III.10.J.F, III.10.K.C, and III.10.K.F to include:

A. Procurement specifications.

B. Location used.

C. Range, precision, and accuracy.

D. Calibration/functionality test procedures (either method number ASTM) or provide a copy of manufacturer's recommended calibration procedures.

E. Calibration/functionality test, inspection, and routine maintenance schedules and checklists, including justification for calibration, inspection and maintenance frequencies, criteria for identifying instruments found to be significantly out of calibration, and corrective action to be taken for instruments found to be significantly out of calibration (e.g., increasing frequency of calibration, instrument replacement, etc.).

F. Equipment instrument control logic narrative description (e.g., descriptions of failsafe conditions, etc.) [WAC 173-303-680(2), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-806(4)(i)(v)]

III.10.J.5.f.xvii Outline of demonstration test report.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
HLW Melter Process System HMP-MLTR-00001 (HLW Melter 1) HMP-MLTR-00002 (HLW Melter 2)	HMP	-M6-HMP-00001001, Rev 0 -M6-HMP-00001002, Rev 1 -M6-HMP-00003001, Rev 0 -M6-HMP-00004001, Rev 1 -M6-HMP-00006001, Rev 1 -M6-HMP-00006002, Rev 0 -M6-HMP-00007001, Rev 0 -M6-HMP-00008001, Rev 0 -M6-HMP-00013002, Rev 1 -M6-HMP-00013003, Rev 0 -M6-HMP-20001001, Rev 0 -M6-HMP-20001002, Rev 0 -M6-HMP-20003001, Rev 0 -M6-HMP-20004001, Rev 0 -M6-HMP-20006001, Rev 0 -M6-HMP-20008001, Rev 0 -M6-HMP-20013002, Rev 0 -M6-HMP-20013003, Rev 0 -M5-V17T-P0002, Rev 1 -M5-V17T-P20002, Rev 1 -M0D-HMP-00001, Rev 2 -M0D-HMP-00002, Rev 2 -MF-HMP-00001, Rev 0 -MF-HMP-00002, Rev 0 -MF-HMP-00003, Rev 0 -N1D-HMP-P0001, Rev 0 -P1-P01T-00002, Rev 7 -3PS-AE00-T0001, Rev 5	Section 4F.2.2; Table C-8; and Figures C1-1, C1-4, C1-27 and C1-54 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System HOP-FCLR-00001 (Melter 1 Offgas Film Cooler) HOP-FCLR-00002 (Melter 2 Offgas Film Cooler)	HOP	**24590-HLW** -M5-V17T-P0002, Rev1 -M5-V17T-P20002, Rev 1 -M6-HMP-00002001, Rev 0 -M6-HMP-00002002, Rev 0 -M6-HMP-20002001, Rev 0 -M6-HMP-20002001, Rev 0	Section 4F.4.2; Table C-8; and Figures C1-1, C1-4 and C1-27-in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
HOP-FCLR-00003 (Melter 1 Standby Offgas Insert) HOP-FCLR-00004 (Melter 2 Standby Offgas Insert)		-3YD-HOP-00001[a]	
Melter Offgas Treatment Process System (Cont.) HOP-SCB-00001 (Melter 1 Submerged Bed Scrubber, SBS) HOP-SCB-00002 (Melter 2 Submerged Bed Scrubber, SBS)	HOP	**24590-HLW** -M5-V17T-P0003, Rev 1 -M5-V17T-P20003, Rev 1 -M6-HOP-00001001, Rev 0 -M6-HOP-00001002, Rev 0 -M6-HOP-00001003, Rev 0 -M6-HOP-20001001, Rev 0 -M6-HOP-20001002, Rev 0 -M6-HOP-20001003, Rev 0 -MKD-HOP-P0016, Rev 0 -MK-HOP-P0001001, Rev 0 -MK-HOP-P0001002, Rev 0 -MK-HOP-P0001003, Rev 0 -MK-HOP-P0001004, Rev 0 -N1D-HOP-P0010, Rev 0 -P1-P01T-00002, Rev 7 -3YD-HOP-00001[a] **24590-WTP** -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3	Section 4F.4.2; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System (Cont.) HOP-WESP-00001 (Melter 1 Wet Electrostatic Precipitator, WESP) HOP-WESP-00002 (Melter 2 Wet Electrostatic Precipitator, WESP)	HOP	**24590-HLW** -M5-V17T-P0003, Rev 1 -M5-V17T-P20003, Rev 1 -M6-HOP-00002, Rev 5 -M6-HOP-20002, Rev 6 -N1D-HOP-P0002, Rev 0 -P1-P01T-00004, Rev 7 -P1-P01T-00005, Rev 6 -3YD-HOP-00001[a]	Section 4F.4.2; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
		24590-WTP -3PS-MKE0-T0001, Rev 5	
Melter Offgas Treatment Process System (Cont.) HOP-HEPA-00001A (Melter 1 Primary Offgas HEPA Filter) HOP-HEPA-00001B (Melter 1 Primary Offgas HEPA Filter) HOP-HEPA-00002A (Melter 1 Secondary Offgas HEPA Filter) HOP-HEPA-00002B (Melter 1 Secondary Offgas HEPA Filter) HOP-HEPA-00007A (Melter 2 Primary Offgas HEPA Filter) HOP-HEPA-00007B (Melter 2 Primary Offgas HEPA Filter) HOP-HEPA-00008A (Melter 2 Secondary Offgas HEPA Filter) HOP-HEPA-00008B (Melter 2 Secondary Offgas HEPA Filter)	HOP	**24590-HLW** -M5-V17T-P0003, Rev 1 -M5-V17T-P20003, Rev 1 -M6-HOP-00010, Rev 3 -M6-HOP-20010, Rev 4 -MAD-HOP-00010, Rev 5 -MAD-HOP-00011, Rev 5 -MAD-HOP-00012, Rev 5 -MAD-HOP-00013, Rev 5 -MAD-HOP-00014, Rev 5 -MAD-HOP-00015, Rev 5 -MAD-HOP-00016, Rev 5 -MAD-HOP-00017, Rev 5 -P1-P01T-00002, Rev 7 -3YD-HOP-00001[a] **24590-WTP** -3PS-MKH0-T0002, Rev 4	Section 4F.4.2; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System (Cont.) HOP-ADBR-00001A (Melter 1 Activated Carbon Adsorber – located on Activated Carbon Adsorber Skid HOP-ADBR-00001) HOP-ADBR-00001B (Melter 1 Activated Carbon Adsorber – located	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00003001, Rev 0 -M6-HOP-00003002, Rev 0 -M6-HOP-20003001, Rev 0 -M6-HOP-20003002, Rev 0 -MVD-HOP-00015, Rev 3 -MVD-HOP-00016, Rev 3	Section 4F.4.2; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
on Activated Carbon Adsorber Skid HOP-ADBR-00001) HOP-ADBR-00002A (Melter 2 Activated Carbon Adsorber – located on Activated Carbon Adsorber Skid HOP-ADBR-00002) HOP-ADBR-00002B (Melter 2 Activated Carbon Adsorber – located on Activated Carbon Adsorber Skid HOP-ADBR-00002)		-N1D-HOP-00003, Rev 1 -P1-P01T-00002, Rev 7 **<u>24590-WTP</u>** -3PS-MWK0-T0001, Rev 5	
<u>Melter Offgas Treatment Process System (Cont.)</u> HOP-HEME-00001A (Melter 1 High Efficiency Mist Eliminator, HEME) HOP-HEME-00001B (Melter 1 High Efficiency Mist Eliminator, HEME) HOP-HEME-00002A (Melter 2 High Efficiency Mist Eliminator, HEME) HOP-HEME-00002B (Melter 2 High Efficiency Mist Eliminator, HEME)	HOP	**<u>24590-HLW</u>** -M5-V17T-P0003, Rev 1 -M5-V17T-P20003, Rev 1 -M6-HOP-00009001, Rev 0 -M6-HOP-00009002, Rev 0 -M6-HOP-20009001, Rev 0 -M6-HOP-20009002, Rev 0 -MVD-HOP-00007, Rev 5 -MV-HOP-P0002001, Rev 0 -MV-HOP-P0002002, Rev 0 -MV-HOP-P0002003, Rev 0 -N1D-HOP-P0001, Rev 0 -P1-P01T-00002, Rev 7 -3YD-HOP-00001[a]	Section 4F.4.2; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
<u>Melter Offgas Treatment Process System (Cont.)</u> HOP-SCO-00001 (Thermal Catalytic Oxidizer – located on Catalyst SkidHOP-SKID-00005) HOP-SCO-00004 (Thermal Catalytic Oxidizer – located on Catalyst Skid HOP-SKID-00007)	HOP	**<u>24590-HLW</u>** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00008001,Rev 0 -M6-HOP-00008002,Rev 0 -M6-HOP-00008003,Rev 0 -M6-HOP-20008001, Rev 0 -M6-HOP-20008002, Rev 0 -M6-HOP-20008003, Rev 0 -MKD-HOP-P0019, Rev 0 -MKD-HOP-P0020, Rev 0	Section 4F.4.2; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
		-N1D-HOP-00004, Rev 5 -NID-HOP-00005, Rev 5 -P1-PO1T-00002, Rev 7 -3PS-MBTV-T0002, Rev 1 **24590-LAW** -3PS-MBTV-T0001, Rev 5	
Melter Offgas Treatment Process System (Cont.) HOP-SCR-00001 (NOx Selective Catalytic Reducer – located on Catalyst Skid HOP-SKID-00005) HOP-SCR-00002 (NOx Selective Catalytic Reducer – located on Catalyst Skid HOP-SKID-00007)	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00008001, Rev 0 -M6-HOP-00008002, Rev 0 -M6-HOP-00008003, Rev 0 -M6-HOP-20008001, Rev 0 -M6-HOP-20008002, Rev 0 -M6-HOP-20008003, Rev 0 -MKD-HOP-P0019, Rev 0 -MKD-HOP-P0020, Rev 0 -N1D-HOP-00004, Rev 5 -N1D-HOP-00005, Rev 5 -P1-PO1T-00002, Rev 7 -3PS-MBTV-T0002, Rev 1 **24590-LAW** -3PS-MBTV-T0001, Rev 5	Section 4F.4.2; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System (Cont.) HOP-HX-00001 (Catalyst Skid Preheater – located on Catalyst Skid HOP-SKID-00005) HOP-HX-00003 (Catalyst Skid Preheater – located on Catalyst Skid HOP-SKID-00007)	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00008001, Rev 0 -M6-HOP-00008002, Rev 0 -M6-HOP-00008003, Rev 0 -M6-HOP-20008001, Rev 0 -M6-HOP-20008002, Rev 0 -M6-HOP-20008003, Rev 0 -MKD-HOP-P0019, Rev 0 -MKD-HOP-P0020, Rev 0 -N1D-HOP-00008, Rev 2 -P1-PO1T-P0002, Rev 7	Section 4F.4.2; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
		-3PS-MBTV-T0002, Rev 1 **24590-LAW** -3PS-MBTV-T0001, Rev 5	
Melter Offgas Treatment Process System (Cont.) HOP-HTR-00001 (Catalyst Skid Electric Heater – located on Catalyst Skid HOP-SKID-00005) HOP-HTR-00007 (Catalyst Skid Electric Heaters – located on Catalyst Skid HOP-SKID-00007)	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00008001, Rev 0 -M6-HOP-00008002, Rev 0 -M6-HOP-00008003, Rev 0 -M6-HOP-20008001, Rev 0 -M6-HOP-20008002, Rev 0 -M6-HOP-20008003, Rev 0 -MKD-HOP-P0019, Rev 0 -MKD-HOP-P0020, Rev 0 -P1-PO1T-00002, Rev 7 -3PS-MBTV-T0002, Rev 1 -N1D-HOP-00011, Rev 0 **24590-LAW** -3PS-MBTV-T0001, Rev 5	Section 4F.4.2; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System (Cont.) HOP-ABS-00002 (Silver Mordenite Column) HOP-ABS-00003 (Silver Mordenite Column)	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00008001, Rev 0 -M6-HOP-00008002, Rev 0 -M6-HOP-00008003, Rev 0 -M6-HOP-20008001, Rev 0 -M6-HOP-20008002, Rev 0 -M6-HOP-20008003, Rev 0 -MKD-HOP-00014, Rev 5 -MKD-HOP-00017, Rev 7 -NID-HOP-P0006, Rev 1 -P1-P01T-00001, Rev 9 -3PS-MBT0-TP001, Rev 2	Section 4F.4.2; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
Melter Offgas Treatment Process System (Cont.) HOP-HTR-00001B (HEPA Preheater) HOP-HTR-00002A (HEPA Preheater) HOP-HTR-00005A (HEPA Preheater) HOP-HTR-00005B (HEPA Preheater)	HOP	**24590-HLW** -M5-V17T-P0003, Rev 1 -M5-V17T-P20003, Rev 1 -M6-HOP-00010, Rev 3 -M6-HOP-20010, Rev 4 -MED-HOP-00013, Rev 4 -3PS-MEE0-T0001, Rev 1	Section 4F.4.2; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System (Cont.) HOP-HX-00002 (Silver Mordenite Preheater) HOP-HX-00004 (Silver Mordenite Preheater)	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00003001, Rev 0 -M6-HOP-00003002, Rev 0 -M6-HOP-20003001, Rev 0 -M6-HOP-20003002, Rev 0 -N1D-HOP-00007, Rev 1 -P1-P01T-00002, Rev 7	Section 4F.4.2; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System (Cont.) HOP-FAN-00001A (Booster Extraction Fan) HOP-FAN-00001B (Booster Extraction Fan) HOP-FAN-00001C (Booster Extraction Fan) HOP-FAN-00009A (Booster Extraction Fan)	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00003001, Rev 0 -M6-HOP-00003002, Rev 0 -M6-HOP-20003001, Rev 0 -M6-HOP-20003002, Rev 0 -MAD-HOP-P0018, Rev 2 -P1-P01T-00001, Rev 9 **24590-WTP** -3PS-MACS-TP004, Rev 0	Section 4F.4.2; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
HOP-FAN-00009B (Booster Extraction Fan) HOP-FAN-00009C (Booster Extraction Fan)			
Melter Offgas Treatment Process System (Cont.) HOP-FAN-00008A (Stack Extraction Fan) HOP-FAN-00008B (Stack Extraction Fan) HOP-FAN-00008C (Stack Extraction Fan) HOP-FAN-000010A (Stack Extraction Fan) HOP-FAN-000010B (Stack Extraction Fan) HOP-FAN-000010C (Stack Extraction Fan)	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00008001, Rev 0 -M6-HOP-00008002, Rev 0 -M6-HOP-00008003, Rev 0 -M6-HOP-20008001, Rev 0 -M6-HOP-20008002, Rev 0 -M6-HOP-20008003, Rev 0 -MAD-HOP-00038, Rev 5 -P1-P01T-00005, Rev 6 **24590-WTP** -3PS-MACS-TP004, Rev 0	Section 4F.4.2; Table C-8; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Melter Offgas Treatment Process System (Cont.) HLW Stack	HOP	**24590-HLW** -M5-V17T-00004, Rev 5 -M5-V17T-20004, Rev 1 -M6-HOP-00008001, Rev 0 -M6-HOP-00008002, Rev 0 -M6-HOP-00008003, Rev 0 -M6-HOP-20008001, Rev 0 -M6-HOP-20008002, Rev 0 -M6-HOP-20008003, Rev 0	Section 4F.4.2; and Figures C1-1 and C1-4 in Operating Unit Group 10, Addendum C of this Permit.
Pulse Jet Ventilation System PJV-HTR-00002 (Pulse Jet Ventilation HEPA Electric Preheater)	PJV	**24590-HLW** -M6-PJV-00001001, Rev 0 -M6-PJV-00002001, Rev 0	

Table III.10.J.A – HLW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables, and Figures
PJV-HEPA-00004B (PJV System HEPA Filter (Standby Primary)) PJV-HEPA-00005B (PJV System HEPA Filter (Standby Secondary)) PJV-HEPA-00004A (PJV System HEPA Filter (Primary)) PJV-HEPA-00005A (PJV System HEPA Filter (Secondary)) PJV-FAN-00002A (Pulse Jet Vent Extraction Fan) PJV-FAN-00002B (Pulse Jet Vent Extraction Fan)			
Process Vessel Vent Extraction System PVV system contains ancillary equipment only.	PVV	**24590-HLW** -M6-PVV-00001, Rev 4 -M6-PVV-20001, Rev 2	
[a]System Descriptions are maintained in the Administrative Record, and are listed here for information only.			

This page intentionally left blank.

Table III.10.J.B – HLW Vitrification Systems Secondary Containment Systems Including Sumps and Floor Drains

Sump/Floor Drain I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[a] (feet) & Materials of Construction	Maximum Allowable Liquid Height (inches)	Secondary Containment Volume (gallons)	Engineering Description (Drawing Nos., Specification Nos., etc.)
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
[a]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).					

1

Table III.10.J.C – HLW Vitrification System Process and Leak Detection System Instruments and Parameters

P&ID	Monitoring or Control Parameter	Type of Instrument or Control Device	Instrument or Control Device Tag No.	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Instrument Calibration Method No. and Range
24590-HLW-M6-HMP-00004001, Rev 1	Melter 1 plenum temperature, 62”	TBD	(TE-0920A + TT-0920A + TI-0920A)* Or (TE-0920C + TT-0921A + TI-0921F)*	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-00004001, Rev 1	Melter 1 plenum temperature, 59”	TBD	(TE-0920B + TT-920A + TI-0920B)* Or (TE-920D + TT-0921A+ TI-0921E)*	TBD	TBD	TBD	TBD	TBD

Table III.10.J.C – HLW Vitrification System Process and Leak Detection System Instruments and Parameters

P&ID	Monitoring or Control Parameter	Type of Instrument or Control Device	Instrument or Control Device Tag No.	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Instrument Calibration Method No. and Range
24590-HLW-M6-HMP-20004001, Rev 0	Melter 2 plenum temperature, 62”	TBD	(TE-2920A + TT-2920A + TI-2920A)* Or (TE-2920C + TT-2921A + TI-2920C)*	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-20004001, Rev 0	Melter 2 plenum temperature, 59”	TBD	(TE-2920B + TT-2920A + TI-2920B)* Or (TE-2920D + TT-2921A + TI-2920D)*	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-00013002, Rev 1 24590-HLW-M6-HMP-00013003, Rev 0	Melter 1 glass pool density	TBD	DT-0132 DI-0132	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-00013002, Rev 1 24590-HLW-M6-HMP-00013003, Rev 0	Melter 1 glass pool level	TBD	LT-0131 LI-0131	TBD	TBD	TBD	TBD	TBD

Table III.10.J.C – HLW Vitrification System Process and Leak Detection System Instruments and Parameters

P&ID	Monitoring or Control Parameter	Type of Instrument or Control Device	Instrument or Control Device Tag No.	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Instrument Calibration Method No. and Range
24590-HLW-M6-HMP-20013002, Rev 0 24590-HLW-M6-HMP-20013003, Rev 0	Melter 2 glass pool density	TBD	DT-2132 DI-2132	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-20013002, Rev 0 24590-HLW-M6-HMP-20013003, Rev 0	Melter 2 glass pool level	TBD	LT-2131 LI-2131	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-00013002, Rev 1 24590-HLW-M6-HMP-00013003, Rev 0	Melter 1 plenum pressure	TBD	(PDT-0139A + PDI-0139A)* Or (PDT-0139B + PDI-0139B)*	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-20013002, Rev 0 24590-HLW-M6-HMP-20013003, Rev 0	Melter 2 plenum pressure	TBD	(PDT-2139A + PDI-2139A)* Or (PDT-2139B + PDI-2139B)*	TBD	TBD	TBD	TBD	TBD

Table III.10.J.C – HLW Vitrification System Process and Leak Detection System Instruments and Parameters

P&ID	Monitoring or Control Parameter	Type of Instrument or Control Device	Instrument or Control Device Tag No.	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Instrument Calibration Method No. and Range
24590-HLW-M6-HMP-00008001, Rev 0 24590-HLW-M6-HMP-00008002, Rev 0	Melter 1 West canister level	TBD	LT-0816 (LI-0816A Or LI-0816B)**	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-00007001, Rev 0	Melter 1 West Discharge Air Lift	TBD	YC-0761 YV-0761	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-00008001, Rev 0 24590-HLW-M6-HMP-00008002, Rev 0	Melter 1 East canister level	TBD	LT-0820 (LI-0820A Or LI-0820B)**	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-00006001, Rev 1 24590-HLW-M6-HMP-00006002, Rev 0	Melter 1 East Discharge Air Lift	TBD	YC-0664 YV-0664	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-20008001, Rev 0 24590-HLW-M6-HMP-20008002, Rev 0	Melter 2 West canister level	TBD	LT-2816 (LI-2816A Or LI-2816B)**	TBD	TBD	TBD	TBD	TBD

Table III.10.J.C – HLW Vitrification System Process and Leak Detection System Instruments and Parameters

P&ID	Monitoring or Control Parameter	Type of Instrument or Control Device	Instrument or Control Device Tag No.	Instrument Range	Expected Range	Fail States	Instrument Accuracy	Instrument Calibration Method No. and Range
24590-HLW-M6-HMP-20007001, Rev 0	Melter 2 West Discharge Air Lift	TBD	YC-2761 YV-2761	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-20008001, Rev 0 24590-HLW-M6-HMP-20008002, Rev 0	Melter 2 East canister level	TBD	LT-2820 (LI-2820A Or LI-2820B)**	TBD	TBD	TBD	TBD	TBD
24590-HLW-M6-HMP-20006001, Rev 0	Melter 2 East Discharge Air Lift	TBD	YC-2664 YV-2664	TBD	TBD	TBD	TBD	TBD
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

*These instrument sets are duplicates. Only one instrument set is required to remain functioning during waste feed operations.

**These instruments are duplicates. Only one instrument is required to remain functioning during waste feed operations.

This page intentionally left blank.

Table III.10.J.D – Maximum Feed-Rates to HLW Vitrification System (RESERVED)

Description of Waste	Shakedown 1	Shakedown 2, Demonstration Test and Post Demonstration Test
Dangerous and Mixed Waste Feed Rate	RESERVED	RESERVED
Ash Feed Rate	RESERVED	RESERVED
Total Chlorine/Chloride Feed Rate	RESERVED	RESERVED
Total Metal Feedrates	RESERVED	RESERVED

1

Table III.10.J.E – HLW Vitrification System Estimated Emission Rates (RESERVED)

Chemicals	CAS Number	Emission Rates (grams/second)
RESERVED	RESERVED	RESERVED

2

Table III.10.J.F. - HLW Vitrification System Waste Feed Cut-off Parameters* (RESERVED)

Subsystem Designation	Instrument Tag Number	Parameter Description	Setpoints During Shakedown 1 and Post Demonstration Test	Setpoints During Shakedown 2 and Demonstration Test
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED

*A continuous monitoring system will be used as defined in Permit Section III.10.C.1.

[1]Maximum Feed-rate will be set based on not exceeding any of the constituent (e.g., metals, ash, and chlorine/chloride) feed limits specified on Table III.10.J.D. of this Permit

3

III.10.K HLW VITRIFICATION SYSTEM – LONG TERM MISCELLANEOUS THERMAL TREATMENT UNIT

For purposes of Permit Section III.10.K, where reference is made to WAC 173-303-640, the following substitutions apply: substitute the terms "HLW Vitrification System" for "tank system(s)," "sub-system(s)" for "tank(s)," "sub-system equipment" for "ancillary equipment," and "sub-system(s) or sub-system equipment of a HLW Vitrification System" for "component(s)," in accordance with WAC 173-303-680.

III.10.K.1 Requirements For HLW Vitrification System Beginning Normal Operation

Prior to commencing normal operations provided in Permit Section III.10.K, all requirements in Permit Section III.10.J will have been met by the Permittees and approved by Ecology, including the following: The HLW Vitrification System Demonstration Test results and the revised Final Risk Assessment provided for in Permit Conditions III.10.C.11.c. or d. and Permit Section III.10.J, will have been evaluated and approved by Ecology, Permit Tables III.10.K.D and F, as approved/modified pursuant to Permit Condition III.10.J.5, will have been completed, submitted and approved pursuant to Permit Condition III.10.J.3.d.v. and Permit Table III.10.K.E, as approved/modified pursuant to Permit Condition III.10.J.5, will have been completed, submitted and approved pursuant to Permit Conditions III.10.C.11.c. or d.

III.10.K.1.a Construction and Maintenance [WAC 173-303-640, in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-340]

III.10.K.1.a.i The Permittees will maintain the design and construction of the HLW Vitrification System as specified in Permit Condition III.10.K.1, Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 10.1 through 10.17 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.a. through d. and III.10.J.5.f.

III.10.K.1.a.ii The Permittees will maintain the design and construction of all containment systems for the HLW Vitrification System as specified in Operating Unit Group 10, Addendum C of this Permit, and Operating Unit Group 10, Appendices 10.2 and 10.4 through 10.14 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.a. through d.

III.10.K.1.a.iii Modifications to approved design, plans, and specifications in Operating Unit Group 10, of this Permit, for the HLW Vitrification System will be allowed only in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g., III.10.C.9.d., e., and h.

III.10.K.1.a.iv The Permittees will ensure all certifications required by specialists (e.g., independent, qualified, registered professional engineer; registered, professional engineer; independent corrosion expert; independent, qualified installation inspector; installation inspector; etc.) use the following statement or equivalent pursuant to Permit Condition III.10.C.10:

"I, (Insert Name) have (choose one or more of the following: overseen, supervised, reviewed, and/or certified) a portion of the design or installation of a new HLW Vitrification system or component located at (address), and owned/operated by (name(s)). My duties were: (e.g., installation inspector, testing for tightness, etc.), for the following HLW Vitrification system components (e.g., the venting piping, etc.), as required by the Dangerous Waste Regulations, namely, WAC 173-303-640(3) (applicable paragraphs [i.e., (a) through (g)]), in accordance with WAC 173-303-680.

"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 inquiry of those individuals immediately responsible for obtaining the 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."

III.10.K.1.a.v The Permittees will ensure periodic integrity assessments are conducted on the HLW Vitrification System listed in Permit Table III.10.I.A, as approved/modified pursuant to Permit Condition III.10.J.5, over the term of this Permit, in accordance with WAC 173-303-680(2) and (3), as specified in WAC 173-303-640(3)(b) following the description of the integrity assessment program and schedule in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.J.5.e.i. and III.10.C.5.c. Results of the integrity assessments will be included in the WTP Unit operating record until ten (10) years after post-closure, or corrective action is complete and certified, whichever is later.

III.10.K.1.a.vi The Permittees will address problems detected during the HLW Vitrification System integrity assessments specified in Permit Condition III.10.K.1.a.v. following the description of the integrity assessment program in Operating Unit Group 10, Addendum E of this Permit, as approved pursuant to Permit Conditions III.10.J.5.e.i. and III.10.C.5.c.

III.10.K.1.a.vii All process monitors/instruments as specified in Permit Table III.10.K.F, as approved/modified pursuant to Permit Condition III.10.J.5 and III.10.J.3.d.v., will be equipped with operational alarms to warn of deviation, or imminent deviation from the limits specified in Permit Table III.10.K.F.

III.10.K.1.a.viii The Permittees will install and test all process and leak detection system monitors/instruments, as specified in Permit Tables III.10.K.C and III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.10.J.3.d.v., in accordance with Operating Unit Group 10, Appendices 10.1, 10.2, and 10.14 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.d.x. and III.10.J.5.f.xvi.

III.10.K.1.a.ix No dangerous and/or mixed waste will be treated in the HLW Vitrification System unless the operating conditions, specified under Permit Condition III.10.K.1.c. are complied with.

III.10.K.1.a.x The Permittees will not place dangerous and/or mixed waste, treatment reagents, or other materials in the HLW Vitrification System if these substances could cause the sub-system, sub-system equipment, or the containment system to rupture, leak, corrode, or otherwise fail [WAC 173-303-640(5)(a), in accordance with WAC 173-303-680(2)]. This condition is not applicable to corrosion of HLW Vitrification System sub-system or sub-system equipment that are expected to be replaced as part of normal operations (e.g., melter).

III.10.K.1.a.xi The Permittees will operate the HLW Vitrification System to prevent spills and overflows using the description of controls and practices as required under WAC 173-303-640(5)(b), described in Permit Condition III.10.C.5, and Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5.e. [WAC 173-303-640(5)(b), in accordance with WAC 173-303-680(2) and (3), WAC-173-303-806(4)(c)(ix)].

III.10.K.1.a.xii For routinely non-accessible HLW Vitrification System sub-systems, as specified in Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit

Condition III.10.J.5.e.vi., the Permittees will mark all routinely non-accessible HLW Vitrification System sub-systems access points with labels or signs to identify the waste contained in each HLW Vitrification System sub-system. The label, or sign, must be legible at a distance of at least fifty (50) feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the HLW Vitrification System sub-systems. For the purposes of this permit condition, "routinely non-accessible" means personnel are unable to enter these areas while waste is being managed in them [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.K.1.a.xiii For all the HLW Vitrification System sub-systems not addressed in Permit Condition III.10.K.1.a.xii., the Permittees will mark all these HLW Vitrification System sub-systems holding dangerous and/or mixed waste with labels or signs to identify the waste contained in the HLW Vitrification System sub-systems. The labels, or signs, must be legible at a distance of at least fifty (50) feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the HLW Vitrification System sub-systems [WAC 173-303-640(5)(d), in accordance with WAC 173-303-680(2)].

III.10.K.1.a.xiv The Permittees will ensure that the secondary containment systems for the HLW Vitrification System sub-systems listed in Permit Tables III.10.K.A and III.10.K.B, as approved/modified pursuant to Permit Condition III.10.J.5, are free of cracks or gaps to prevent any migration of dangerous and/or mixed waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time during the use of the HLW Vitrification System sub-systems. Any indication that a crack or gap may exist in the containment systems will be investigated and repaired in accordance with Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5.e.v. [WAC 173-303–640(4)(b)(i), WAC 173-303-640(4)(e)(i)(C), and WAC 173-303-640(6), in accordance with WAC 173-303-680(2) and (3), WAC 173-303-806(4)(i)(i)(B), and WAC 173-303-320].

III.10.K.1.a.xv The Permittees must immediately and safely remove from service any HLW Vitrification System or secondary containment system which through an integrity assessment is found to be "unfit for use" as defined in WAC 173-303-040, following Permit Condition III.10.K.1.a.xvii.A through D, and F. The affected HLW Vitrification System or secondary containment system must be either repaired or closed in accordance with Permit Condition III.10.K.1.a.xvii.E. [WAC 173-303-640(7)(e) and (f) and WAC 173-303-640(8), in accordance with WAC 173-303-680(3)].

III.10.K.1.a.xvi An impermeable coating, as specified in Operating Unit Group 10, Appendices 10.4, 10.5, 10.7, 10.9, 10.11, and 10.12 of this Permit, as approved pursuant to Permit Condition III.10.J.5.b.v., will be maintained for all concrete containment systems and concrete portions of containment systems for the HLW Vitrification System sub-systems listed in Permit Tables III.10. K.A and III.10.K.B, as approved/modified pursuant to Permit Condition III.10.J.5 (concrete containment systems that do not have a liner, pursuant to WAC 173-303-640(4)(e)(i), in accordance with WAC 173-303-680(2), and have construction joints, will meet the requirements of WAC 173-303-640(4)(e)(ii)(C), in accordance with WAC 173-303-680(2).

The coating will prevent migration of any dangerous and/or mixed waste into the concrete. All coatings will meet the following performance standards:

A. The coating must seal the containment surface such that no cracks, seams, or other avenues through which liquid could migrate are present;

B. The coating must be of adequate thickness and strength to withstand the normal operation of equipment and personnel within the given area such that degradation or physical damage to the coating or lining can be identified and remedied before dangerous and/or mixed waste could migrate from the system; and

C. The coating must be compatible with the dangerous and/or mixed waste, treatment reagents, or other materials managed in the containment system [WAC 173-303-640(4)(e)(ii)(D), in accordance with WAC 173-303-680(2) and (3), and WAC 173-303-806(4)(i)(i)(A)].

III.10.K.1.a.xvii The Permittees will inspect all secondary containment systems for the HLW Vitrification System sub-systems listed in Permit Tables III.10.K.A and III.10.K.B, as approved/modified pursuant to Permit Condition III.10.J.5., in accordance with the Inspection Schedule specified in Operating Unit Group 10, Addendum E1 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.e.i. and III.10.C.5.c., and take the following actions if a leak or spill of dangerous and/or mixed waste is detected in these containment systems [WAC 173-303-640(5)(c), WAC 173-303-640(6) in accordance with WAC 173-303-680(2) and (3), WAC 173-303-320, and WAC 173-303-806(4)(i)(i)(B)]:

A. Immediately, and safely, stop the flow of dangerous and/or mixed waste into the HLW Vitrification System sub-systems or secondary containment system.

B. Determine the source of the dangerous and/or mixed waste.

C. Remove the dangerous and/or mixed waste from the containment area in accordance with WAC 173-303-680(2) and (3), as specified in WAC 173-303-640(7)(b). The dangerous and/or mixed waste removed from containment areas of the HLW Vitrification System will be, at a minimum, managed as mixed waste.

D. If the cause of the release was a spill that has not damaged the integrity of the HLW Vitrification System sub-system, the Permittees may return the HLW Vitrification System sub-system to service in accordance with WAC 173-303-680(2) and (3), as specified in WAC 173-303-640(7)(e)(ii). In such case, the Permittees will take action to ensure the incident that caused the dangerous and/or mixed waste to enter the containment system will not reoccur.

E. If the source of the dangerous and/or mixed waste is determined to be a leak in from the primary HLW Vitrification System into the secondary containment system, or the system is unfit for use as determined through an integrity assessment or other inspection, the Permittees will comply with the requirements of WAC 173-303-640(7) and take the following actions:

1. Close the HLW Vitrification System sub-system following procedures in WAC 173-303-640(7)(e)(i), in accordance with WAC 173-303-680, and Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

2. Repair and re-certify (in accordance with WAC 173-303-810(13)(a), as modified pursuant to Permit Condition III.10.K.1.a.iii.) the HLW Vitrification System, in accordance with Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5.e.v., before the

HLW Vitrification System is placed back into service [WAC 173-303-640(7)(e)(iii) and WAC 173-303-640(7)(f), in accordance with WAC 173-303-680].

F. The Permittees will document in the operating record actions/procedures taken to comply with A through E above, as specified in WAC 173-303-640(6)(d), in accordance with WAC 173-303-680(2) and (3).

G. In accordance with WAC 173-303-680(2) and (3), the Permittees will notify and report releases to the environment to Ecology as specified in WAC 173-303-640(7)(d).

III.10.K.1.a.xviii If liquids (e.g., dangerous and/or mixed waste, leaks and spills, precipitation, fire water, liquids from damaged or broken pipes) cannot be removed from the secondary containment system within twenty-four (24) hours; Ecology will be verbally notified within twenty-four (24) hours of discovery. The notification will provide the information in A, B, and C, listed below. The Permittees will provide Ecology with a written demonstration within seven (7) business days, identifying at a minimum [WAC 173-303-640(4)(c)(iv) and WAC 173-303-640(7)(b)(ii), in accordance with WAC 173-303-680(3) and WAC 173-303-806(4)(i)(i)(B)]:

A. Reasons for delayed removal.

B. Measures implemented to ensure continued protection of human health and the environment.

C. Current actions being taken to remove liquids from secondary containment.

III.10.K.1.a.xix All air pollution control devices and capture systems in the HLW Vitrification System will be maintained and operated at all times in a manner so as to minimize the emissions of air contaminants and to minimize process upsets. Procedures for ensuring that the air pollution control devices and capture systems in the HLW Vitrification System are properly operated and maintained so as to minimize the emission of air contaminants and process upsets will be established.

III.10.K.1.a.xx In all future narrative permit submittals, the Permittees will include HLW Vitrification sub-system names with the sub-system designation.

III.10.K.1.a.xxi For any portion of the HLW Vitrification System which has the potential for formation and accumulation of hydrogen gases, the Permittees will operate the portion to maintain hydrogen levels below the lower explosive limit [WAC 173-303-815(2)(b)(ii)].

III.10.K.1.a.xxii For each HLW Vitrification System sub-system holding dangerous waste which are acutely or chronically toxic by inhalation, the Permittees will operate the system to prevent escape of vapors, fumes, or other emissions into the air [WAC 173-303-806(4)(i)(i)(B) and WAC 173-303-640(5)(e), in accordance with WAC 173-303-680].

III.10.K.1.b Performance Standards

III.10.K.1.b.i The HLW Vitrification System must achieve a destruction and removal efficiency (DRE) of 99.99% for the principal organic dangerous constituents (PODCs) listed below [40 CFR §63.1203(c)(1) and 40CFR §63.1203(c)(2), in accordance with WAC 173-303-680(2)]:

RESERVED

DRE in this Permit Condition will be calculated in accordance with the formula given below:

$DRE=[1-(W_{out}/W_{in})] \times 100\%$

Where:

W_{in}=mass feed-rate of one principal organic dangerous constituent (PODC) in a waste feed stream; and

W_{out}=mass emission rate of the same PODC present in exhaust emissions prior to release to the atmosphere.

III.10.K.1.b.ii Particulate matter emissions from the HLW Vitrification System will not exceed 34 mg/dscm (0.015 grains/dscf) [40 CFR §63.1203(b)(7), in accordance with WAC 173-303-680(2)];

III.10.K.1.b.iii Hydrochloric acid and chlorine gas emissions from the HLW Vitrification System will not exceed 21 ppmv, combined [40 CFR §63.1203(b)(6), in accordance with WAC 173-303-680(2)];

III.10.K.1.b.iv Dioxin and Furan TEQ emissions from the HLW Vitrification System will not exceed 0.2 nanograms (ng)/dscm [40 CFR §63.1203(b)(1), in accordance with WAC 173-303-680(2)];

III.10.K.1.b.v Mercury emissions from the HLW Vitrification System will not exceed 45 µg/dscm [40 CFR §63.1203(b)(2), in accordance with WAC 173-303-680(2)];

III.10.K.1.b.vi Lead and cadmium emissions from the HLW Vitrification System will not exceed 120 µg/dscm, combined [40 CFR §63.1203(b)(3), in accordance with WAC 173-303-680(2)];

III.10.K.1.b.vii Arsenic, beryllium, and chromium emissions from the HLW Vitrification System will not exceed 97 µg/dscm, combined [40 CFR §63.1203(b)(4), in accordance with WAC 173-303-680(2)];

III.10.K.1.b.viii Carbon monoxide (CO) emission from the HLW Vitrification System will not exceed 100 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system), dry basis [40 CFR §63.1203(b)(5)(i), in accordance with WAC 173-303-680(2) and (3)];

III.10.K.1.b.ix Hydrocarbon emission from the HLW Vitrification System will not exceed 10 parts per million (ppm) by volume, over an hourly rolling average (as measured and recorded by the continuous monitoring system during demonstration testing required by this Permit), dry basis and reported as propane [40 CFR §63.1203(b)(5)(ii), in accordance with WAC 173-303-680(2) and (3)];

III.10.K.1.b.x If the emissions from the HLW Vitrification System exceed the emission rates listed in Permit Table III.10.K.E, as approved pursuant to Permit Condition III.10.C.11.c. or d., the Permittees will perform the following actions [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)]:

A. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s) as specified in Permit Condition I.E.21.

B. Submit to Ecology additional risk information to indicate that the increased emissions impact is off-set by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance of the emission rate(s) and submit a report of the

investigation findings to Ecology within fifteen (15) days of the discovery of exceeding the emission rate(s).

C. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the HLW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring.

The emission limits specified in Permit Conditions III.10.K.1.b.i. through III.10.K.1.b.ix. above, will be met for the HLW Vitrification System by limiting feed rates as specified in Permit Tables III.10.K.D and III.10.K.F, as approved/modified pursuant to Permit Condition III.10.J.5 and III.10.J.3.d.v., compliance with operating conditions specified in Permit Condition III.10.K.1.c. (except as specified in Permit Condition III.10.K.1.b.xii.), and compliance with Permit Condition III.10.K.1.b.xi.

III.10.K.1.b.xi Treatment effectiveness, feed-rates, and operating rates for dangerous and/or mixed waste management units contained in the HLW Building, but not included in Permit Table III.10.K.A, as approved/modified pursuant to Permit Condition III.10.J.5, will be as specified in Permit Sections III.10.D, III.10.E, III.10.F and consistent with the assumptions and basis which are reflected in Operating Unit Group 10, Appendix 6.3.1 of this Permit, as approved pursuant to Permit Condition III.10.C.11.b. For the purposes of this permit condition, Operating Unit Group 10, Appendix 6.3.1 will be superseded by Appendix 6.4.1 upon its approval pursuant to either Permit Conditions III.10.C.11.c. or d. [WAC 173-303-680(2) and (3), and WAC 173-303-815(2)(b)(ii)].

III.10.K.1.b.xii Compliance with the operating conditions specified in Permit Condition III.10.K.1.c., will be regarded as compliance with the required performance standards identified in Permit Conditions III.10.K.1.b.i. through x. However, if it is determined that during the effective period of this Permit that compliance with the operating conditions in Permit Condition III.10.K.1.c. is not sufficient to ensure compliance with the performance standards specified in Permit Conditions III.10.K.1.b.i. through x., the Permit may be modified, revoked, or reissued pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g.

III.10.K.1.c Operating Conditions [WAC 173-303-670(6), in accordance with WAC 173-303-680(2)and (3)]

The Permittees will operate the HLW Vitrification System in accordance with Operating Unit Group 10, Addendum C of this Permit, as updated pursuant to Permit Condition III.10.J.5.e.vi., Operating Unit Group 10, Appendix 10.18 of this Permit, as approved pursuant to Permit Conditions III.10.J.5.e. and f., and Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., except as modified pursuant to Permit Conditions III.10.J.3, III.10.K.1.b.x., III.10.K.1.b.xii., III.10.K.1.h., and in accordance with and the following:

III.10.K.1.c.i The Permittees will operate the HLW Vitrification System in order to maintain the systems and process parameters listed in Permit Tables III.10.K.C and III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., within the set-points specified in Permit Table III.10.K.F.

III.10.K.1.c.ii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., to automatically cut-off and/or lock-out the dangerous and/or mixed

waste feed to HLW Vitrification System when the monitored operating conditions deviate from the set-points specified in Permit Table III.10.K.F.

III.10.K.1.c.iii The Permittees will operate the AWFCO systems, specified in Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., to automatically cut-off and/or lock-out the dangerous and/or mixed waste feed to HLW Vitrification System when all instruments specified on Permit Table III.10.I.F for measuring the monitored parameters fails or exceeds its span value.

III.10.K.1.c.iv The Permittees will operate the AWFCO systems, specified in Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., to automatically cut-off and/or lock out the dangerous and/or mixed waste feed to the HLW Vitrification System when any portion of the HLW Vitrification System is bypassed. The terms "bypassed" and "bypass event" as used in Permit Sections III.10.J and K will mean if any portion of the HLW Vitrification System is bypassed so that gases are not treated as during the Demonstration Test.

III.10.K.1.c.v In the event of a malfunction of the AWFCO systems listed in Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., the Permittees will immediately, manually, cut-off the dangerous and/or mixed waste feed to the HLW Vitrification System. The Permittees will not restart the dangerous and/or mixed waste feed until the problem causing the malfunction has been identified and corrected.

III.10.K.1.c.vi The Permittees will manually cut-off the dangerous and/or mixed waste feed to the HLW Vitrification System when the operating conditions deviate from the limits specified in Permit Condition III.10.K.1.c.i., unless the deviation automatically activates the waste feed cut-off sequence specified in Permit Conditions III.10.K.1.c.ii., iii., and/or iv.

III.10.K.1.c.vii If greater than thirty (30) dangerous and/or mixed waste feed cut-off, combined, to the HLW Vitrification System occur due to deviations from Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., within a sixty (60) day period, the Permittees will submit a written report to Ecology within five (5) calendar days of the thirty-first (31) exceedance including the information specified below. These dangerous and/or mixed waste feed cut-offs to the HLW Vitrification System, whether automatically or manually activated, are counted if the specified set-points are deviated from while dangerous and/or mixed waste and waste residues continue to be processed in the HLW Vitrification System. A cascade event is counted at a frequency of one (1) towards the first waste feed cut-off parameter, specified on Permit Table III.10.K.F, from which the set-point is deviated:

A. The parameter(s) that deviated from the set-point(s) in Permit Table III.10.K.F;

B. The magnitude, dates, and duration of the deviations;

C. Results of the investigation of the cause of the deviations; and

D. Corrective measures taken to minimize future occurrences of the deviations.

III.10.K.1.c.viii If greater than thirty (30) dangerous and/or mixed waste feed cut-offs, combined, to the HLW Vitrification System occ ur due to deviations from Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., within a thirty (30) day period, the Permittees will submit the written report required to be submitted pursuant to Permit Condition III.10.K.1.c.vii. to Ecology, on the first business day following the thirty-first exceedance. These dangerous and/or mixed

waste feed cut-offs to the HLW Vitrification System, whether automatically or manually activated, are counted if the specified set-points are deviated from while dangerous and/or mixed waste and waste residues continue to be processed in the HLW Vitrification System. A cascade event is counted at a frequency of one (1) towards the first waste feed cut-off parameter, specified on Permit Table III.10.K.F, from which the set-point is deviated:

In accordance with WAC 173-303-680(2) and (3), the Permittees may not resume dangerous and/or mixed waste feed to the HLW Vitrification System until this written report has been submitted; and

A. Ecology has authorized the Permittees, in writing, to resume dangerous and/or mixed waste feed, or

B. Ecology has not, within seven (7) days, notified the Permittees in writing of the following:

1. The Permittees written report does not document that the corrective measures taken will minimize future exceedances.

2. The Permittees must take further corrective measures and document that these further corrective measures will minimize future exceedances.

III.10.K.1.c.ix If any portion of the HLW Vitrification System is bypassed while treating dangerous and/or mixed waste, it will be regarded as non-compliance with the operating conditions specified in Permit Condition III.10.K.1.c. and the performance standards specified in Permit Condition III.10.K.1.b. After such a bypass event, the Permittees will perform the following actions:

A. Investigate the cause of the bypass event.

B. Take appropriate corrective measures to minimize future bypasses.

C. Record the investigation findings and corrective measures in the operating record.

D. Submit a written report to Ecology within five (5) days of the bypass event documenting the result of the investigation and corrective measures.

III.10.K.1.c.x The Permittees will control fugitive emissions from the HLW Vitrification System by maintaining the melter under negative pressure.

III.10.K.1.c.xi Compliance with the operating conditions specified in Permit Condition III.10.K.1.c. will be regarded as compliance with the required performance standards identified in Permit Condition III.10.K.1.b. However, evidence that compliance with these operating conditions is insufficient to ensure compliance with the performance standards, will justify modification, revocation, or re-issuance of this Permit, in accordance with Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g.

III.10.K.1.d Inspection Requirements [WAC 173-303-680(3)]

III.10.K.1.d.i The Permittees will inspect the HLW Vitrification System in accordance with the Inspection Schedules in Operating Unit Group 10, Addendum E1 of this Permit, as modified in accordance with Permit Condition III.10.C.5.c.

III.10.K.1.d.ii The inspection data for HLW Vitrification System will be recorded, and the records will be placed in the WTP Unit operating record for HLW Vitrification System, in accordance with Permit Condition III.10.C.4.

III.10.K.1.d.iii The Permittees will comply with the inspection requirements specified in Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit

Condition III.10.J.5.f., and as modified by Permit Conditions III.10.J.3, III.10.K.1.b.x., III.10.K.1.b.xii., and III.10.K.1.h.

III.10.K.1.e Monitoring Requirements [WAC 173-303-670(5), WAC 173-303-670(6), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(3)]

III.10.K.1.e.i Upon receipt of a written request from Ecology, the Permittees will perform sampling and analysis of the dangerous and/or mixed waste and exhaust emissions to verify that the operating requirements established in the permit achieve the performance standards delineated in this Permit.

III.10.K.1.e.ii The Permittees will comply with the monitoring requirements specified in the Operating Unit Group 10, Appendices 10.2, 10.3, 10.7, 10.13, 10.15, and 10.18 of this Permit, as approved pursuant to Permit Condition III.10.J.5, and as modified by Permit Conditions III.10.J.3, III.10.K.1.h., and III.10.K.1.b.x. and xii.

III.10.K.1.e.iii The Permittees will operate, calibrate, and maintain the carbon monoxide and hydrocarbon continuous emission monitors (CEM) specified in this Permit in accordance with Performance Specifications 4B and 8A of 40 CFR Part 60, Appendix B, in accordance with Appendix to Subpart EEE of 40 CFR Part 63, and Operating Unit Group 10 Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., and as modified by Permit ConditionsIII.10.J.3, III.10.K.1.h., and III.10.K.1.b.x. and xii.

III.10.K.1.e.iv The Permittees will operate, calibrate, and maintain the instruments specified on Permit Tables III.10.K.C and F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.J.3.d.v., in accordance with Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.5.f., and as modified by Permit Conditions III.10.J.3, III.10.K.1.h., and III.10.K.1.b.x. and xii.

III.10.K.1.e.v The Permittees shall calibrate, inspect, and maintain or replace the following cooling water flow and temperature instruments: (Melter 1: FT/FI-0306, FT/FI-0316, FT/FI-0321, FT/FI-0326, FT/FI-0336, TE/TT/TI-0352; Melter 2: FT/FI-2306, FT/FI-2316, FT/FI-2321, FT/FI-2326, FT/FI-2336, TE/TT/TI-2352) in accordance with manufacturer's recommendations.

III.10.K.1.f Recordkeeping Requirements [WAC 173-303-380 and WAC 173-303-680(3)]

III.10.K.1.f.i The Permittees will record and maintain in the WTP Unit operating record for the HLW Vitrification System, all monitoring, calibration, maintenance, test data, and inspection data compiled under the conditions of this Permit, in accordance with Permit Conditions III.10.C.4 and 5 as modified by Permit Conditions III.10.J.3, III.10.K.1.h., and III.10.K.1.b.x. and xii.

III.10.K.1.f.ii The Permittees will record in the WTP Unit operating record the date, time, and duration of all automatic waste feed cut-offs and/or lockouts, including the triggering parameters, reason for the deviation, and recurrence of the incident. The Permittees will also record all incidents of AWFCO system function failures, including the corrective measures taken to correct the condition that caused the failure.

III.10.K.1.f.iii The Permittees will submit to Ecology an annual report each calendar year within ninety (90) days following the end of the year. The report will include the following information:

A. Total dangerous and/or mixed waste feed processing time for the HLW Vitrification System.

B. Date/Time of all HLW Vitrification System startups and shutdowns.

C. Date/Time/Duration/Cause/Corrective Action taken for all HLW Vitrification System shutdowns caused by malfunction of either process or control equipment.

D. Date/Time/Duration/Cause/Corrective Action taken for all instances of dangerous and/or mixed waste feed cut-off due to deviations from Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.5 and III.10J.3.d.v.

III.10.K.1.f.iv The Permittees will submit an annual report to Ecology each calendar year within ninety (90) days following the end of the year of all quarterly CEM Calibration Error and Annual CEM Performance Specification Tests conducted in accordance with Permit Condition III.10.K.1.e.iii.

III.10.K.1.f.v The Permittees shall maintain operating and calibration/maintenance records for Ecology's inspection for the following cooling water flow and temperature instruments (Melter 1: FT/FI-0306, FT/FI-0316, FT/FI-0321, FT/FI-0326, FT/FI-0336, TE/TT/TI-0352; Melter 2: FT/FI-2306, FT/FI-2316, FT/FI-2321, FT/FI-2326, FT/FI-2336, TE/TT/TI-2352).

III.10.K.1.f.vi The Permittees shall maintain refractory thermocouple temperature data for Ecology inspection.

III.10.K.1.g Closure

The Permittees will close the HLW Vitrification System in accordance with Operating Unit Group 10, Addendum H of this Permit, as approved pursuant to Permit Condition III.10.C.8.

III.10.K.1.h Periodic Emission Re-testing Requirements [WAC 173-303-670(5), WAC 173-303-670(7), and WAC 173-303-807(2), in accordance with WAC 173-303-680(2) and (3)].

III.10.K.1.h.i Dioxin and Furan Emission Testing

A. Within eighteen (18) months of commencing operation pursuant to Permit Section III.10.K, the Permittees will submit to Ecology for approval, a Dioxin and Furan Emission Test Plan (DFETP) for the performance of emission testing of the HLW Vitrification System gases for dioxin and furans during "Normal Operating Conditions" as a permit modification in accordance with Permit Conditions III.10.C.2.e. and f. The DFETP will include all elements applicable to dioxin and furan emission testing included in the "Previously Approved Demonstration Test Plan," applicable EPA promulgated test methods and procedures in effect at the time of the submittal, and projected commencement and completion dates for dioxin and furan emission test. "Normal Operating Conditions" will be defined for the purposes of this permit condition as follows:

1. Carbon monoxide emissions, dangerous and/or mixed waste feed-rate, and automatic waste feed cut-off parameters specified on Permit Table III.10.K.F (as approved/modified pursuant to Permit Conditions III.10.J.5 and III.10.J.3.d.v), that were established to maintain compliance with Permit

Condition III.10.K.1.b.iv., as specified in Operating Unit Group 10, Appendix 10.15 of this Permit (as approved pursuant to Permit Condition III.10.J.3.d. and in accordance with III.10.K.1.b.xii. and III.10.K.1.c.xi.), are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.K.F. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include calibration data, malfunction data, and data obtained when not processing dangerous and/or mixed waste.

2. Feed-rate of metals, ash, and chlorine/chloride are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.K.D (as approved/modified pursuant to Permit Conditions III.10.J.5 and III.10.J.3.d.v). Feed-rate of organics as measured by TOC are held within the range of the average value over the previous twelve (12) months. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include data obtained when not processing dangerous and/or mixed waste.

For purposes of this permit Condition, the "Previously Approved Demonstration Test Plan" is defined to include the Demonstration Test Plan approved pursuant to Permit Condition III.10.J.5.f.

B. Within sixty (60) days of Ecology's approval of the DFETP, or within thirty-one (31) months of commencing operation pursuant to Permit Section III.10.K, whichever is later, the Permittees will implement the DFETP approved, pursuant to Permit Condition III.10.K.1.h.i.A.

C. The Permittees will resubmit the DFETP, approved pursuant to Permit Condition III.10.K.1.h.i.A, revised to include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, and projected commencement and completion dates for dioxin and furan emission test as a permit modification in accordance with Permit Conditions III.10.C.2.e. and f. at twenty-four (24) months from the implementation date of the testing required pursuant to Permit Condition III.10.K.1.h.i.A.and at reoccurring eighteen (18) month intervals from the implementation date of the previously approved DFETP. The Permittees will implement these newly approved revised DFETPs every thirty-one (31) months from the previous approved DFETP implementation date or within sixty (60) days of the newly Ecology approved revised DFETP, whichever is later, for the duration of this Permit.

D. The Permittees will submit a summary of operating data collected pursuant to the DFETPs in accordance with Permit Conditions III.10.K.1.h.i.A and C to Ecology upon completion of the tests. The Permittees will submit to Ecology the complete test report within ninety (90) calendar days of completion of the testing. The test reports will be certified as specified in WAC 173-303-807(8), in accordance with WAC 173-303-680(2) and (3).

E. If any calculations or testing results collected pursuant to the DFETPs in accordance with Permit Conditions III.10.K.1.h.i.A and C show that one or more of the performance standards listed in Permit Condition III.10.K.1.b., with the exception of Permit Condition III.10.K.1.b.x., for the HLW Vitrification System

were not met during the emission test, the Permittees will perform the following actions:

1. Immediately stop dangerous and/or mixed waste feed to the HLW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s).
2. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s) as specified in Permit Condition I.E.21.
3. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s).
4. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s) documentation supporting a mode of operation where all performance standards listed in Permit Condition III.K.1.b., with the exception of Permit Condition III.10.K.1.b.x., for the HLW Vitrification System were met during the demonstration test, if any such mode was demonstrated.
5. Based on the information provided to Ecology by the Permittees, pursuant to Permit Conditions III.10.K.1.h.i.E.1 through 4 above, and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the HLW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of the revised Demonstration Test Plan pursuant to Permit Condition III.10. K.1.h.i.E.6.
6. Submit to Ecology within one hundred and twenty (120) days of discovery of not meeting the performance standard(s) a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.K.D and F.

F. If any calculations or testing results collected pursuant to the DFETPs in accordance with Permit Conditions III.10.K.1.h.i.A and C show that any emission rate for any constituent listed in Permit Table III.10.K.E, as approved/modified pursuant to Permit Conditions III.10.C.11.c. or d., is exceeded for HLW Vitrification System during the emission test, the Permittees will perform the following actions:

1. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s) as specified in Permit Condition I.E.21;
2. Submit to Ecology additional risk information to indicate that the increased emissions impact is off-set by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance and submit a report of the investigation findings to Ecology within fifteen (15) days of this discovery of exceeding the emission rate(s); and
3. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or

mixed waste feed to the HLW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.K.D and F.

III.10.K.1.h.ii Non-organic Emission Testing

A. Within forty-eight (48) months of commencing operation pursuant to Permit Section III.10.K, the Permittees will resubmit to Ecology for approval the "Previously Approved Demonstration Test Plan" revised as a permit modification in accordance with Permit Conditions III.10.C.2.e. and f. The revised Demonstration Test Plan (RDTP) will include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, projected commencement and completion dates for emission testing to demonstrate performance standards specified in Permit Conditions III.10.K.1.b.ii., iii., v., vi., and vii., and non-organic emissions as specified in Permit Table III.10.K.E, as approved/modified pursuant to Permit Conditions III.10.J.3.d. and III.10.C.11.c. or d., under "Normal Operating Conditions." "Normal Operating Conditions" will be defined for the purposes of this permit condition as follows:

1. Carbon monoxide emissions, dangerous and/or mixed waste feed-rate, and automatic waste feed cut-off parameters specified in Permit Table III.10.K.F, as approved/modified pursuant to Permit Conditions III.10.J.3.d. and III.10.C.11.c. or d., that were established to maintain compliance with Permit Conditions III.10.K.1.b.ii., iii., v., vi., and vii., and non-organic emissions, as specified in Permit Table III.10.K.E, as specified in Operating Unit Group 10, Appendix 10.15 of this Permit (as approved pursuant to Permit Conditions III.10.J.3.d. and III.10.C.11.c. or d.), are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.K.F. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include calibration data, malfunction data, and data obtained when not processing dangerous and/or mixed waste; and

2. Feed-rate of metals, ash, and chlorine/chloride are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.K.D, as approved/modified pursuant to Permit Conditions III.10.J.3.d. and III.10.C.11.c. or d. The average value is defined as the sum of all rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include data obtained when not processing dangerous and/or mixed waste.

For purposes of this permit Condition, the "Previously Approved Demonstration Test Plan" is defined to include the Demonstration Test Plan approved pursuant to Permit Condition III.10.J.5.f.

B. Within sixty (60) days of Ecology's approval of the RDTP, or within sixty (60) months of commencing operation pursuant to Permit Section III.10.K, whichever

is later, the Permittees will implement the RDTP approved pursuant to Permit Condition III.10.K.1.h.ii.A.

C. The Permittees will resubmit the RDTP, approved pursuant to Permit Condition III.10.K.1.h.ii.A, revised to include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, and projected commencement and completion dates for emission test as a permit modification in accordance with Permit Conditions III.10.C.2.e. and f. at forty-eight (48) months from the implementation date of the testing required pursuant to Permit Condition III.10.K.1.h.ii.A. and at reoccurring forty-eight (48) month intervals from the implementation date of the previously approved RDTP. The Permittees will implement these newly approved revised RDTP, every sixty (60) months from the previous approved RDTP implementation date or within sixty (60) days of the newly Ecology approved revised RDTP, whichever is later, for the duration of this Permit.

D. The Permittees will submit a summary of operating data collected pursuant to the RDTPs in accordance with Permit Conditions III.10.K.1.h.ii.A and C to Ecology upon completion of the tests. The Permittees will submit to Ecology the complete test report within ninety (90) calendar days of completion of the testing. The test reports will be certified pursuant to WAC 173-303-807(8), in accordance with WAC 173-303-680(2) and (3).

E. If any calculations or testing results collected pursuant to the DFETPs in accordance with Permit Conditions III.10.K.1.h.ii.A and C show that any emission rate for any constituent listed in Permit Table III.10.K.E, as approved/modified pursuant to Permit Conditions III.10.J.3.d. and III.10.C.11.c. or d., is exceeded for HLW Vitrification System during the emission test, the Permittees will perform the following actions:

1. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s) as specified in Permit Condition I.E.21.
2. Submit to Ecology additional risk information to indicate that the increased emissions impact is off-set by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance and submit a report of the investigation findings to Ecology within fifteen (15) days of this discovery of exceeding the emission rate(s).
3. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the HLW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.K.D and III.10.K.F.

F. If any calculations or testing results collected pursuant to the DFETPs in accordance with Permit Conditions III.10.K.1.h.ii.A and C show that one or more of the performance standards listed in Permit Condition III.10.K.1.b., with the exception of Permit Condition III.10.K.1.b.x., for the HLW Vitrification System were not met during the emission test, the Permittees will perform the following actions:

1. Immediately stop dangerous and/or mixed waste feed to the HLW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s).
2. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s), as specified in Permit Condition I.E.21.
3. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s).
4. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s) documentation supporting a mode of operation where all performance standards listed in Permit Condition III.K.1.b., with the exception of Permit Condition III.10.K.1.b.x., for the HLW Vitrification System were met during the demonstration test, if any such mode was demonstrated.
5. Based on the information provided to Ecology by the Permittees pursuant to Permit Conditions III.10.K.1.h.ii.F.1 through 4 above, and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the HLW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of the revised Demonstration Test Plan pursuant to Permit Condition III.10.K.1.h.ii.F.6.
6. Submit to Ecology within one hundred and twenty (120) days of discovery of not meeting the performance standard(s) a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.K.D and F.

III.10.K.1.h.iii Other Emission Testing

A. Within seventy-eight (78) months of commencing operation pursuant to Permit Section III.10.K, the Permittees will resubmit to Ecology for approval the "Previously Approved Demonstration Test Plan" revised as a permit modification in accordance with Permit Conditions III.10.C.2.e. and f. The revised Demonstration Test Plan (RDTP) will include applicable EPA promulgated test methods and procedures in effect at the time of the submittal, projected commencement and completion dates for emission testing to demonstrate performance standards as specified in Permit Conditions III.10.K.1.b.viii. and ix., and emissions as specified on Permit Table III.10.K.E, as approved/modified pursuant to Permit Conditions III.10.J.3.d. and III.10.C.11.c. or d., not addressed under Permit Conditions III.10.K.1.h.i. or ii. under "Normal Operating Conditions." "Normal Operating Conditions" will be defined for the purposes of this permit Condition as follows:

1. Carbon monoxide emissions, dangerous and/or mixed waste feed-rate, and automatic waste feed cut-off parameters specified on Permit Table III.10.K.F, as approved/modified pursuant to Permit Condition III.10.J.3.d. and III.10.C.11.c. or d., that were established to maintain compliance with Permit Conditions III.10.K.1.b.viii. and ix., and emissions as specified on Permit Table III.10.K.E, not addressed under Permit Conditions III.10.K.1.h.i. or ii.

as specified in Operating Unit Group 10, Appendix 10.15 of this Permit, as approved pursuant to Permit Condition III.10.J.3.d., and in accordance with Permit Conditions III.10.K.1.b.xii. and III.10.K.1.c.xi. are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.K.F.
The average value is defined as the sum of all rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time. The average value will not include calibration data, malfunction data, and data obtained when not processing dangerous and/or mixed waste; and

2. Feed-rate of metals, ash, and chlorine/chloride are held within the range of the average value over the previous twelve (12) months and the set-point value specified on Permit Table III.10.K.D, as approved/modified pursuant to Permit Conditions III.10.J.3.d. and III.10.C.11.c. or d. Feed-rate of organics as measured by TOC are held within the range of the average value over the previous twelve (12) months. The average value is defined as the sum of the rolling average values recorded over the previous twelve (12) months divided by the number of rolling averages recorded during that time.
The average value will not include data obtained when not processing dangerous and/or mixed waste.

For purposes of this permit Condition, the "Previously Approved Demonstration Test Plan" is defined to include the Demonstration Test Plan approved pursuant to Permit Condition III.10.J.5.f.

B. Within sixty (60) days of Ecology's approval of the RDTP, or within ninety-one (91) months of commencing operation pursuant to Permit Section III.10.K, whichever is later, the Permittees will implement the RDTP approved pursuant to Permit Condition III.10.K.1.h.iii.A.

C. The Permittees will submit a summary of operating data collected pursuant to the RDTPs in accordance with Permit Condition III.10.K.1.h.iii.A to Ecology upon completion of the tests. The Permittees will submit to Ecology the complete test report within ninety (90) calendar days of completion of the testing. The test reports will be certified as specified in WAC 173-303-807(8), in accordance with Permit Condition WAC 173-303-680(2) and (3).

D. If any calculations or testing results show that one or more of the performance standards listed in Permit Condition III.10.K.1.b., with the exception of Permit Condition III.10.K.1.b.x., for the HLW Vitrification System were not met during the emission test, the Permittees will perform the following actions:

1. Immediately stop dangerous and/or mixed waste feed to the HLW Vitrification System under the mode of operation that resulted in not meeting the performance standard(s).
2. Verbally notify Ecology within twenty-four (24) hours of discovery of not meeting the performance standard(s), as specified Permit Condition I.E.21.
3. Investigate the cause of the failure and submit a report of the investigation findings to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s).
4. Submit to Ecology within fifteen (15) days of discovery of not meeting the performance standard(s) documentation supporting a mode of operation where all performance standards listed in Permit Condition III.10.K.1.b., with the exception of Permit Condition III.10.K.1.b.x., for the HLW Vitrification

System were met during the demonstration test, if any such mode was demonstrated.

5. Based on the information provided to Ecology by the Permittees pursuant to Permit Conditions III.10.K.1.h.iii.D.1 through 4 above, and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the HLW Vitrification System and/or amend the mode of operation the Permittees are allowed to continue operations prior to Ecology approval of the revised Demonstration Test Plan, pursuant to Permit Condition III.10.K.1.h.iii.D.6.
6. Submit to Ecology within one hundred and twenty (120) days of discovery of not meeting the performance standard(s) a revised Demonstration Test Plan requesting approval to retest as a permit modification pursuant to Permit Conditions II.10.C.2.e. and f. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.K.D and F.

E. If any calculations or testing results show that any emission rate for any constituent listed in Permit Table III.10.K.E, as approved/modified pursuant to Permit Condition III.10.C.11.c. or d., is exceeded for HLW Vitrification System during the emission test, the Permittees will perform the following actions:

1. Verbally notify Ecology within twenty-four (24) hours of the discovery of exceeding the emission rate(s) as specified in Permit Condition I.E.21;
2. Submit to Ecology additional risk information to indicate that the increased emissions impact is off-set by decreased emission impact from one or more constituents expected to be emitted at the same time, and/or investigate the cause and impact of the exceedance of the emission rate(s) and submit a report of the investigation findings to Ecology within fifteen (15) days of the discovery of the exceedance of the emission rate(s); and
3. Based on the notification and any additional information, Ecology may provide, in writing, direction to the Permittees to stop dangerous and/or mixed waste feed to the HLW Vitrification System and/or to submit a revised Demonstration Test Plan as a permit modification pursuant to Permit Conditions III.10.C.2.e. and f., or III.10.C.2.g. The revised Demonstration Test Plan must include substantive changes to prevent failure from reoccurring reflecting performance under operating conditions representative of the extreme range of normal conditions, and include revisions to Permit Tables III.10.K.D and F.

This page intentionally left blank.

Table III.10.K.A - HLW Vitrification System Description

Sub-system Description	Sub-System Designation	Engineering Description (Drawing Nos., etc.)	Narrative Description, Tables, and Figures
RESERVED	RESERVED	RESERVED	RESERVED
[a]Permit Table III.10.K.A will be completed in accordance with Permit Condition III.10.J.5.e x., prior to initiating Permit Condition III.10.K.1. See Permit Table III.10.J.A for the current HLW Vitrification System Description.			

1

Table III.10.K.B - HLW Vitrification System Secondary Containment Systems Including Sumps and Floor Drains

Sump/Floor Drain I.D.# & Room Location	Maximum Sump Capacity (gallons)	Sump Dimensions[b] (feet) & Materials of Construction	Engineering Description (Drawing Nos., Specification Nos., etc.)
RESERVED	RESERVED	RESERVED	RESERVED
[a]Permit Table III.10.K.B will be completed in accordance with Permit Condition III.10.J.5.b.vii., prior to initiating Permit Condition III.10.K.1. See Permit Table III.10.J.B for the current HLW Vitrification System Secondary Containment Systems Including Sumps and Floor Drains. [b]Dimensions listed are based on permitted design. Actual dimensions may vary within plus or minus (TBD).			

2

Table III.10.K.C - HLW Vitrification System Process and Leak Detection System Instruments and Parameters

Sub-system Locator and Name (including P&ID)	Control Parameter	Type of Measuring or Leak Detection Instrument	Location of Measuring Instrument (Tag No.)	Instrument Range	Failure State	Expected Range	Instrument Accuracy	Instrument Calibration Method No. and Range
RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED	RESERVED
[a]Permit Table III.10.K.C will be completed in accordance with Permit Condition III.10.J.5.e.ix., prior to initiating Permit Condition III.10.K.1. See Permit Table III.10.J.C for the current HLW Vitrification System Process and Leak Detection System Instruments and Parameters.								

3

This page intentionally left blank.

Table III.10.K.D – Maximum Feed-rates to HLW Vitrification System (RESERVED)

Description of Waste	Normal Operation
Dangerous and/or mixed waste Feed Rate	RESERVED
Ash Feed Rate	RESERVED
Total Chlorine/Chloride Feed Rate	RESERVED
Total Metal Feed Rates	RESERVED

Table III.10.K.E – HLW Vitrification System Estimated Emission Rates (RESERVED)

Chemicals	CAS Number	Emission Rates (grams/second)
RESERVED	RESERVED	RESERVED

TABLE III.10.K.F - HLW Vitrification System Waste Feed Cut-off Parameters* [1](RESERVED)

Sub-system Designation	Instrument Tag Number	Parameter Description	Set-points During Normal Operation
RESERVED	RESERVED	RESERVED	RESERVED

*A continuous monitoring system will be used as defined in Permit Section III.10.C.1.

[1]Maximum Feed-rate will be set based on not exceeding any of the constituent (e.g., metals, ash, and chlorine/chloride) feed limits specified on Table III.10.K.D. of this Permit

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
CHAPTER 3.0
WASTE ANALYSIS PLAN

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
06/2011	

This page intentionally left blank.

CHAPTER 3.0
WASTE ANALYSIS PLAN

This page intentionally left blank.

CHAPTER 3.0
WASTE ANALYSIS PLAN

TABLE OF CONTENTS

3.0 WASTE ANALYSIS PLAN 5

APPENDICES

Appendix 3A Waste Treatment Plant Waste Analysis Plan 3A-i
Appendix 3B Quality Assurance Project Plan for Waste Analysis Plan 3B-i

This page intentionally left blank.

3.0 WASTE ANALYSIS PLAN

The River Protection Project – Waste Treatment Plant Waste Analysis Plan addresses sampling and analysis activities necessary for compliance with the Washington State Dangerous Waste Regulations contained in Washington Administrative Code, (WAC) Chapter 173-303.

The Waste Treatment Plant Waste Analysis Plan is provided in Appendix 3A.

The Quality Assurance Project Plan for the Waste Analysis Plan is provided in Appendix 3B.

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 3A
WASTE TREATMENT PLANT WASTE ANALYSIS PLAN

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
03/2007	

This page intentionally left blank.

APPENDIX 3A
WASTE TREATMENT PLANT WASTE ANALYSIS PLAN

This page intentionally left blank.

APPENDIX 3A
WASTE TREATMENT PLANT WASTE ANALYSIS PLAN

TABLE OF CONTENTS

ACRONYMS vii
GLOSSARY ix
1.0 INTRODUCTION 11
2.0 WASTE TREATMENT PLANT UNIT DESCRIPTION 12
2.1 Pretreatment 12
2.2 Vitrification Systems 13
2.2.1 Low-Activity Waste Vitrification 13
2.3 Off-Gas Treatment Systems 14
2.3.1 Pretreatment Plant Off-gas 14
2.3.2 Low-Activity Waste Vitrification Off-gas 14
2.3.3 High-Level Waste Vitrification Off-gas 15
2.3.4 Air Emissions 15
3.0 WASTE ACCEPTANCE [C-1, C-2] 16
3.1 Waste Feed Designation 16
3.2 Waste Feed Acceptance Process [C-3a] 16
3.2.1 Waste Feed Profile [C-2a(3)] 17
3.2.2 Waste Feed Verification 17
3.2.3 Preshipment Review 17
3.2.4 Non-Conformance Action [C-3b, C-3c] 17
3.2.5 Waste Feed Transfer 18
3.2.6 Waste Feed Confirmation [C-2a, C2a(1)] 18
3.3 Waste Feed Verification Process 18
3.3.1 Verification Sampling and Frequency [C-2c, C-2d] 18
3.3.2 Verification Sampling Methods [C-2c] 19
3.3.3 Sample Preservation, Storage and Holding Times 19
3.3.4 Sampling Quality Assurance and Quality Control [C-2a(2)(b)] 19
3.3.5 Selection of Verification Analytes [C-2a] 19
3.3.6 Selection of Verification Analytical Methods [C-2a(2)] 19
3.4 Waste Acceptance Criteria 19
3.4.1 Total Organic Carbon [C-2a(1), C-2a(2)] 20

3.4.2 Polychlorinated Biphenyls [C-2a(1), C-2a(2)] 20
3.4.3 Waste Feed pH [C-2a(1), C-2a(2)] 20
3.4.4 Waste Feed Compatibility [C-2a(1), C-2a(2)] 20
3.5 Analytical Laboratory 21
3.5.1 Waste Treatment Plant Analytical Laboratory 21
3.5.2 Establishing Quality Assurance and Quality Control Procedures [C-2a(2)(b)] 21
3.5.3 Selecting Other Analytical Laboratories 22
3.6 Waste Feed Designation 22
3.6.1 Ignitable Waste 23
3.6.2 Reactive Waste 23
4.0 WASTE CHARACTERIZATION [C-1, C-2] 24
4.1 Sampling Methods and Sampling Frequency [C-2c, C-2d] 24
4.2 Sample Preservation, Storage, and Holding Times 25
4.3 Selection of Analytes [C-2a(1)] 25
4.4 Selection of Analytical Methods [C-2a(2)(a)] 25
4.5 Quality Assurance and Quality Control [C-2a(2)(b)] 25
5.0 WASTE STREAMS 25
5.1 Land Disposal Restrictions Evaluation for Immobilized Waste 25
5.1.1 Treatment Standard for the Hanford Tank Waste 26
5.2 Secondary Waste Streams 27
5.2.1 Solid Waste Streams 27
5.2.2 Liquid Waste Streams [C-2c] 30
6.0 WASTE TRANSFER DOCUMENTATION SYSTEM [C-3] 31
6.1 Solid Waste Transfer 31
6.2 Liquid Waste Transfer 31
6.3 Land Disposal Restrictions Notification and Certification 31
7.0 TRACKING SYSTEM [C-4] 31
7.1 Inventory and Batch Tracking 32
7.2 Sample Tracking 32
7.3 Secondary Waste Stream Tracking 32
8.0 RECORDKEEPING 33
9.0 REFERENCES 33
9.1 Project Documents 33
9.2 Codes and Standards 33
9.3 Other Documents 34

TABLES

Table B1-1 Summary of the Waste Feed Acceptance Process [C-3a] 36
Table B1-2 Summary of Dangerous Waste Numbers for WTP 37
Table B1-3 Waste Feed Analysis, Waste Acceptance Criteria, and Non-Conformance Actions [C-2a(2)] 38
Table B1-4 Properties for the Determination of Ignitable Waste 39
Table B1-5 Properties for the Determination of Reactive Waste 40
Table B1-6 Secondary Solid Mixed Waste Streams 40
Table B1-7 Variable Solid Waste Streams 41
Table B1-8 Liquid Mixed Waste Streams 41

FIGURES

Figure B1-1 Simplified Flow Diagram and Sampling Locations 42
Figure B1-2 Plant Information Network Data Relationships 43

This page intentionally left blank.

ACRONYMS

ALARA	as low as reasonably achievable
ASTM	American Society for Testing and Materials
BNI	Bechtel National, Inc.
CFR	*Code of Federal Regulations*
DOE	United States Department of Energy
DOE-RL	United States Department of Energy, Richland Operations Office
DST	double-shell tank
DWPA	*Dangerous Waste Permit Application for the River Protection Project – Waste Treatment and Immobilization Plant*
RDQO Optimization	*Regulatory Data Quality Objectives Optimization Report*
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ETF	Effluent Treatment Facility
HEME	high-efficiency mist eliminator
HEPA	high-efficiency particulate air (filter)
HLVIT	high-level vitrification
HLW	high-level waste
HSSWAC	*Hanford Site Solid Waste Acceptance Criteria*
HSLWAC	*Hanford Site Liquid Waste Acceptance Criteria*
ICN	integrated control network
ID	identification
IHLW	immobilized high-level waste
ILAW	immobilized low-activity waste
LAW	low-activity waste
LDR	Land Disposal Restrictions
LERF	Liquid Effluent Retention Facility
LIMS	laboratory information management system
LSM	locally-shielded melter

MSDS	material safety data sheet
NRC	Nuclear Regulatory Commission
PCB	Polychlorinated Biphenyl
PIN	plant information network
QA	quality assurance
QAPjP	*Quality Assurance Project Plan for the Waste Analysis Plan*
QC	quality control
RCRA	Resource Conservation and Recovery Act of 1976
TOC	total organic carbon
TRU	transuranic elements
TSD	treatment, storage, or disposal (facility)
WAC	*Washington Administrative Code*
WAP	waste analysis plan
WTIS	waste tracking and inventory system
WTP	River Protection Project – Waste Treatment and Immobilization Plant

GLOSSARY

This waste analysis plan (WAP) relies on the definitions of terms as contained in the *Hanford Facility Dangerous Waste Permit* (Ecology 2009) and the Dangerous Waste Permit Application for the River Protection Project – Waste Treatment and Immobilization Plant (DWPA) (Chapter 1.0), except as supplemented or amended below.

Batch	Retrievable waste staged in a single double-shell tank (DST) designated as mixed waste for transfer to the Waste Treatment Plant (WTP) for treatment.
Feed verification	The activities the WTP will perform to verify that the staged waste feed meets the WTP acceptance criteria.
Feed confirmation	The activities the WTP will perform after receiving the waste feed, to confirm that the waste feed received is the same as the waste feed accepted for delivery.
Immobilization	The act or process of reducing the mobility of waste constituents to limit their potential for long-term transport in the biosphere and subsequent exposure to humans, animals, and plants. Vitrification is an example of an immobilization process.

This page intentionally left blank.

1.0 INTRODUCTION

This Waste Analysis Plan (WAP) describes the sampling and analysis for dangerous waste constituents for the River Protection Project – Waste Treatment and Immobilization Plant (WTP) to comply with the Washington State Dangerous Waste Regulations contained in Chapter 173-303 of the *Washington Administrative Code* (WAC). It was prepared in accordance with the requirements of WAC 173-303-110, "Sampling and Testing Methods," WAC 173-303-300, "General Waste Analysis," WAC 173-303-806, "Final Facility Permits," and the *Hanford Facility Dangerous Waste Permit* (Ecology 1994). Some non-dangerous constituents are also discussed in this plan if they support compliance activities or if the discussion provides a more complete description of a particular sampling strategy. The descriptions in this plan of the waste feed stored at the Hanford Site double-shell and single-shell tank system units (collectively referred to as Hanford tank waste) and the planned process streams are based on available chemical and physical information and process knowledge.

Reactor fuel reprocessing is the primary source of waste material stored in the Hanford double-shell and single-shell tanks. Minor amounts of other radioactive and mixed waste (such as low-level and transuranic waste) are also included in the double-shell tanks; however, the tank waste is managed as high-level waste (HLW) prior to treatment and vitrification. The waste feed to the WTP will consist of staged transfers of mixed waste from the double shell tank (DST) system unit. This waste is composed of sludge, salt cake, and liquids, and is considered mixed waste as defined by WAC 173-303; that is, it contains both radioactive and dangerous waste.

HLW is defined by the United States Nuclear Regulatory Commission (NRC) in the *Code of Federal Regulations*, 10 CFR 72.3, as:

> "(1) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and (2) other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation."

Hanford tank waste is consistent with the HLW definition. The treatment of the Hanford tank waste is required under the Hanford Federal Facility Agreement and Consent Order (Ecology, EPA, and DOE 1996), signed by the Washington State Department of Ecology (Ecology), the United States Environmental Protection Agency (EPA), and the United States Department of Energy (DOE).

In a letter to the Richland DOE Operations Office (DOE-RL) (Paperiello, 1997), the NRC documented an agreement with DOE to classify a portion of the Hanford tank waste as "incidental waste" in accordance with the incidental waste classification criteria specified in an earlier letter from the NRC to DOE (Bernero, 1993). The lower activity portion of the tank waste, referred to as low-activity waste (LAW) feed, generally refers to the supernatant portion of the tank waste. Following radionuclide removal and vitrification, the immobilized low-activity waste (ILAW) will be considered incidental waste, disposed of onsite at Hanford as low-level waste, and will not be subject to the licensing authority of the NRC, consistent with the NRC incidental waste determination. The ILAW will be managed as mixed waste for disposal.

The higher activity and higher solids portion of the tank waste is designated as HLW feed in the Dangerous Waste Permit Application for the River Protection Project – Waste Treatment and Immobilization Plant (DWPA). The two different terms describing the Hanford tank waste are used because the LAW and HLW fractions of the waste feed are processed differently in the WTP, as described in Section 2 of this WAP.

The DST system unit will provide a waste profile and, upon request, a split sample aliquot for each waste feed that is staged for transfer to the WTP. The WTP will perform verification analysis on the aliquot to determine if the waste feed meets WTP acceptance criteria. The WTP will also compare the volume of

waste feed transferred from the DST feed staging tank with the volume received into the feed receipt tanks at the WTP, to confirm that the waste feed received corresponds to the waste feed accepted for transfer.

The WTP will characterize the DST waste feed in conformance with the *Regulatory Data Quality Objectives Optimization Report* (RDQO Optimization) process (24590-WTP-RPT-MGT-04-001). Characterization of the DST waste feed will be completed prior to transfer to the WTP.

Simplified process flow figures of the operations at the WTP are included in Appendix 4A.

Controlled copies of this WAP will be kept at the WTP facility. The Project Document Control Manager, or equivalent title, will be responsible for ensuring that controlled copies of the WAP are kept current when revisions to the WAP are made.

2.0 WASTE TREATMENT PLANT UNIT DESCRIPTION

The WTP is a waste treatment unit described under the unit-specific portion of the *Hanford Facility Dangerous Waste Permit* (Ecology 1994). A plan view of the WTP is located in Chapter 1.0. This section briefly describes the WTP processes and activities. More detailed process information is provided in Chapter 4.0.

Figure B1-1 is a simplified diagram of the treatment components, showing the relationship between:

- Waste feed.
- Pretreatment.
- LAW vitrification.
- HLW vitrification.

Plant equipment will include:

- Pipelines, tanks, and ancillary equipment.
- Evaporation units.
- Ultrafiltration units.
- Ion-exchange columns.
- Chemical addition equipment.
- LAW and HLW melters.
- Service and utility units.
- Container management units.
- Storage facilities.
- Off-gas treatment systems.

The pretreatment and vitrification of the waste feed and the management of off-gas from these processes are described in the following sections. The applicability of air emissions standards to the WTP is also discussed.

2.1 Pretreatment

Pretreatment will prepare the DST waste feed for vitrification. An overview of the pretreatment processes is provided below and illustrated in Figure B1-1. Descriptions of the feed receipt tanks and pretreatment equipment are provided in Chapter 4.0.

Pretreatment of the waste feed will consist of the following processes:

- Concentration of the waste feed by evaporation.
- Separation of entrained solids by ultrafiltration.
- Separation of strontium and transuranic elements (TRU) by precipitation and ultrafiltration.
- Separation of cesium in an ion exchange unit.
- Final concentration by evaporation for the LAW feed.

The following paragraphs provide a description of these processes.

After the receipt of the waste feed from the DST system unit, the waste feed evaporator, a forced-circulation vacuum evaporator, will concentrate the waste feed prior to ultrafiltration. Ultrafiltration will remove entrained solids from the concentrated waste feed. The solids will be washed and will either be transferred to the HLW feed or returned to the DST system unit. For certain waste feed, strontium and TRU will be precipitated by adding reagents to the waste feed. The precipitate containing strontium and TRU will be concentrated and washed in the ultrafiltration system before incorporation into the HLW feed.

Condensate from the evaporator off-gas streams will be collected and transferred to condensate tanks for discharge to the Liquid Effluent Retention Facility (LERF) or the Effluent Treatment Facility (ETF), or both, for subsequent treatment. Non-condensable gases that are extracted from the evaporator system will be routed to the pretreatment process tank ventilation off-gas treatment system. Refer to Section 2.3.1 for a description of the pretreatment off-gas treatment systems.

The liquid separated by ultrafiltration will become the LAW feed. The LAW feed will pass through the cesium ion exchange system to separate cesium from the LAW feed. The cesium will be blended with the HLW feed.

The LAW feed leaving the ion exchange unit will be concentrated by evaporation in the LAW melter feed evaporator. The operation of the LAW melter feed evaporator will be similar to that of the waste feed evaporator. The pretreated LAW feed will be transferred to the LAW vitrification plant for vitrification into the ILAW glass product.

The HLW feed will then consist of washed solids, strontium and TRU precipitates for certain feed streams, and the cesium ion exchange product. The blended HLW feed will be transferred to the HLW vitrification plant for vitrification into the immobilized high-level waste (IHLW) glass product.

2.2 Vitrification Systems

After pretreatment, LAW feed will be transferred to the LAW vitrification plant, and HLW feed will be transferred to the HLW vitrification plant, for conversion to the immobilized glass product.

2.2.1 Low-Activity Waste Vitrification

The pretreated and concentrated LAW feed exiting the LAW melter feed evaporator will be combined with necessary glass-forming additives (for example, Silica, Alumina, Boric Acid, and Calcium Silicate) and reductants. The slurry of waste feed and glass formers will be transferred to the LAW melter feed tanks in a manner to provide a continuous feed to each of the two LAW melters. The electric-powered, joule-heated LAW melters will operate in parallel. The temperature of the molten glass in the melters will be approximately 950° C to 1,250° C.

In the melter, the feed components will be converted to their respective oxides and dissolved in the melt, destroyed by the high temperatures, or partitioned to the off-gas. As these materials are heated, superheated gases will be released into the melter off-gas system. Here, most of the solids entrained in the off-gas will be captured and returned to the waste feed stream for treatment. The LAW off-gas treatment system will treat the volatile constituents that remain in the off-gas. LAW off-gas treatment is discussed in Section 2.3.2.

Molten glass will be discharged from the melters to stainless steel containers for cooling, solidification, and storage. The process will yield a durable glass containing the ILAW. The glass will be cooled and the container sealed, decontaminated, and temporarily stored before being transferred to an appropriate Hanford Site treatment, storage, or disposal (TSD) unit.

2.2.2 High-Level Waste Vitrification

The HLW vitrification system will receive feed slurry from the HLW pretreatment process. The feed slurry will be combined with necessary glass-forming additives (Silica, Boric Acid, Calcium Silicate, Ferric Oxide, and Lithium Carbonate) and reductants, and will then be fed to each of the two HLW melters. The temperature of the molten glass in the HLW melter will be approximately 950° C to 1,250° C.

In the melter, feed components will be converted to their respective oxides and dissolved in the melt, destroyed by the high temperatures, or partitioned to the off-gas. As these materials are heated, superheated gases, including volatile feed components, will be released into the melter off-gas system, where most of the solids entrained in the off-gas will be captured and returned to the waste feed stream for treatment. The HLW off-gas treatment system will treat the volatile constituents that remain in the off-gas. The HLW off-gas treatment system is discussed in Section 2.3.3.

Molten glass will be discharged from the HLW melters to stainless steel canisters for cooling, solidification, and storage. The process will yield a durable glass containing IHLW. The glass will be cooled and the canister sealed, decontaminated, and temporarily stored before being transferred to the Hanford Canister Storage Building unit for storage until final disposal.

2.3 Off-Gas Treatment Systems

The pretreatment plant, the LAW vitrification plant, and the HLW vitrification plant will each have a dedicated off-gas treatment system. These systems are described in the following sections. The off-gas treatment systems are illustrated in Figure B1-1. Air emissions are addressed in Section 2.3.4. Details regarding the off-gas treatment system components are discussed in Chapter 4.0.

2.3.1 Pretreatment Plant Off-gas

Figure B1-1 illustrates the pretreatment plant off-gas treatment system. The pretreatment off-gas from fluidic devices will be treated through a high-efficiency mist eliminator (HEME) and high-efficiency particulate air (HEPA) filter, and routed to the pretreatment plant stack, where it will be monitored and released to the atmosphere.

The pretreatment off-gas from vessels will be treated through the following components operating in series:

- Acid gas scrubber
- HEME
- HEPA filter
- Volatile organic compound oxidizer
- Carbon adsorber

The treated pretreatment off-gas from vessels will be monitored and released to the atmosphere through the pretreatment plant stack.

2.3.2 Low-Activity Waste Vitrification Off-gas

The LAW melter off-gas treatment system will consist of the following components operating in series, as illustrated in Figure B1-1:

- Film cooler
- Submerged bed scrubber
- Wet electrostatic precipitator
- HEPA filter
- Activated carbon adsorber
- Thermal catalytic oxidation unit
- Selective catalytic reduction unit
- Caustic scrubber

The treated LAW off-gas will be monitored and released through the LAW stack.

2.3.3 High-Level Waste Vitrification Off-gas

The HLW melter off-gas treatment system will consist of the following components operating in series, as illustrated in Figure B1-1:

- Film cooler
- Submerged bed scrubber
- Wet electrostatic precipitator
- HEME
- HEPA filter
- Activated carbon adsorber
- Silver mordenite iodine adsorption unit
- Thermal catalytic oxidation unit
- Selective catalytic reduction unit

The treated HLW off-gas will be monitored and released through the HLW stack.

2.3.4 Air Emissions

Emissions from the stacks that vent the WTP processes will be monitored according to the provisions of the WTP and Hanford Site Air Operating Permit, as required by WAC 173-303-395(2). Monitoring and sampling to address air emissions concerns under these permits will not be addressed in this application. However, the applicability of the air emissions requirements found in WAC 173-303 will be evaluated in the following sections. Details of the air emissions control systems for the WTP are provided in Chapter 4.0.

2.3.4.1 Air Emissions from Process Vents (Subpart AA)

WAC 173-303-690, commonly referred to as Subpart AA, regulates process vents that are associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air- or steam-stripping operations that manage hazardous wastes with organic concentrations of at least 10 parts per million by weight. WAC 173-303-690 incorporates the provisions of 40 CFR 264.1031 through 40 CFR 264.1036 by reference. The WTP does not employ any of these listed devices or processes; therefore, the WTP is not subject to regulation under Subpart AA.

2.3.4.2 Air Emission Standards for Equipment Leaks (Subpart BB)

WAC 173-303-691 applies to facilities that treat, store, or dispose of hazardous waste, and regulates air emissions from equipment that contains or contacts hazardous wastes with organic concentrations of at least 10 percent by weight. WAC 173-303-691 incorporates 40 CFR 264.1051 through 1065 (Subpart BB) by reference. This provision does not apply to the WTP, because the WTP will not accept wastes

with organic concentrations at or above 10 percent by weight. Compliance with this provision will be documented through analysis, as described in Section 3.4.1.

2.3.4.3 Air Emission Standards for Tanks, Impoundments, and Containers (Subpart CC)

The regulations specified under WAC 173-303-692 and 40 CFR Part 264 Subpart CC, incorporated by reference, do not apply to the WTP mixed waste tank systems and containers. These tanks and containers qualify as waste management units that are "used solely for the management of radioactive dangerous waste in accordance with all applicable regulations under the authority of the Atomic Energy Act and the Nuclear Waste Policy Act" and are excluded under WAC 173-303-692(1)(b)(vi). Containers or tanks bearing non-radioactive, dangerous waste, such as maintenance and laboratory waste, that are not excluded under WAC 173-303-692(1)(b)(ii) or 40 CFR 264.1082(c), will comply with the container and tank standards specified under 40 CFR Part 264 Subpart CC.

3.0 WASTE ACCEPTANCE [C-1, C-2]

The waste feed to be transferred from the DST system unit to the WTP will undergo several stages of review before acceptance. The DST system unit will provide the WTP with a waste profile for the feed batch staged for transfer to the WTP. If requested, the DST system unit will also provide an aliquot of the split sample of the waste feed for waste verification analysis performed by the WTP. Verification analytical data on the waste feed provided by the DST system unit will be accepted by the WTP for waste acceptance purposes. During sampling and analysis for verification, the waste feed will remain within the control and responsibility of the DST system unit.

After WTP personnel determine that the verification analysis results meet the waste acceptance criteria, the DST system unit will be authorized in writing to transfer the waste feed through double-walled pipes to feed receipt tanks located inside the WTP. After transfer, the WTP will compare the volume of waste feed transferred from the DST feed staging tank with the volume received into the WTP feed receipt tanks. This will confirm that the waste feed received corresponds to the waste feed that was accepted for transfer.

The steps involved in evaluating and accepting the waste feed into the WTP are summarized in Table B1-1, and are described in the following sections. Also discussed in the following sections is the rationale for the removal of dangerous waste numbers D001 (ignitable) and D003 (reactive) from the waste feed and the selection of analytical laboratories.

Dangerous waste will be managed in a way that will preclude adverse reaction or interference with the WTP treatment process.

3.1 Waste Feed Designation

Waste numbers described in the *Double-Shell Tank System Unit Permit, Operating Group 12, Addendum B, Waste Analysis Plan* (DOE-RL 2009) are applicable to the waste feed. A list of these dangerous waste numbers is shown in Table B1-2. Table B1-2 includes multi-source leachate (F039) as a waste derived from non-specific source wastes F001 through F005. Waste feed received from the DST system unit is not expected to exhibit the characteristics of ignitability (D001) or reactivity (D003), based on process knowledge. Section 3.6 describes the process knowledge that will be used to demonstrate that the waste feed is not ignitable or reactive.

3.2 Waste Feed Acceptance Process [C-3a]

For each waste feed batch, the waste acceptance process is summarized in Table B1-1, and is discussed in the remainder of this section.

3.2.1 Waste Feed Profile [C-2a(3)]

The DST system unit will complete a profile of the waste feed batch before making a transfer of that batch to the WTP. The content and format of the profile will be established prior to the transfer of waste feed. An example of the information that will be provided in the profile is:

- General information, such as the identification of the DST tank from which the transfer will be made and the date of the proposed transfer.
- Physical properties of the waste feed, such as the proposed volume of the transfer and the presence or absence of a separate visible organic layer.
- Historical analytical data, such as total organic carbon (TOC).
- Dangerous waste information, such as the designation of dangerous waste numbers.
- Land disposal restriction (LDR) information.

3.2.2 Waste Feed Verification

At the request of the WTP, the DST system unit will supply a split sample aliquot of the staged waste feed for verification analysis. The aliquot will be analyzed by the WTP for the waste acceptance criteria parameters. The verification process is discussed in Section 3.3, and the waste acceptance criteria for verification are discussed in Section 3.4. If the waste acceptance criteria information is provided by the DST system unit for the staged waste feed, then the WTP will not need to repeat analyses for the provided information.

3.2.3 Preshipment Review

Verification analytical information will be obtained for each waste feed batch whether provided by the DST system unit or determined by the WTP through analysis of the DST split sample aliquot. The purpose of the preshipment review is to evaluate the verification analytical results to ensure compatibility and acceptability of the waste feed before it enters the WTP. If the verification analytical results are within the waste acceptance criteria limits, then the waste will be accepted for treatment. If the verification analytical results are outside of the waste acceptance criteria, then the DST system unit will be notified that the waste feed does not conform. Actions in response to non-conformance are addressed in Section 3.2.4.

Following successful completion of the preshipment review, including the resolution of any non-conformance, a representative of the WTP will notify DST system unit personnel in writing that the WTP is ready for a waste feed transfer. The position title of the WTP representative will be provided prior to the commencement of WTP operations. The two parties will agree on the waste feed transfer date, as well as any other pertinent information.

3.2.4 Non-Conformance Action [C-3b, C-3c]

Confirmatory action, such as re-analysis and data review, will be performed for each verification analytical result that does not initially meet the acceptance criteria presented in Table B1-3. Re-analysis of a sample that fails an acceptance criteria will consist of two repeat analyses for the failed criteria. If both of the repeat analyses pass, then the sample will be considered to meet that acceptance criteria. If one or both of the repeat analyses fail, the waste will be considered non-conforming. If the waste feed is determined to be non-conforming, then the waste is returned to tank farms. The WTP, the DST system unit, or both, will determine and execute corrective actions necessary to be able to transfer back to WTP to process the waste feed.

The non-conformance decisions, corrective actions and supporting data, along with the names and titles of the individuals making these decisions, will be documented and retained as a quality assurance (QA) record, according to procedures described in the *Quality Assurance Project Plan for the Waste Analysis Plan* (QAPjP), Appendix 3B.

3.2.5 Waste Feed Transfer

Waste feed transfer will be coordinated between the DST system unit and the WTP. Prior to waste feed transfer, the WTP will ensure that waste feed transfer systems are operational. These systems include, but are not limited to:

- Pipeline interstitial leak detection.
- Feed receipt tank level measurement equipment.
- Feed receipt tank ventilation.

Once the transfer systems are confirmed as operational, the DST system unit will transfer the waste feed to the WTP feed receipt tanks through a double-walled pipeline. The DST system unit will water flush the pipeline after the transfer is complete.

3.2.6 Waste Feed Confirmation [C-2a, C2a(1)]

The purpose of confirmation is to ensure that the waste feed received into the WTP is the same waste feed that was accepted for transfer. The method used for confirmation will be a comparison of the volume removed from the DST system unit feed staging tank with the volume received into the WTP feed receipt tanks. The tank volume measurement systems for the DST system unit and the WTP are discussed in the following sections.

3.2.6.1 Confirmation Frequency [C-2d], Measurement Locations, and Measurement Methods

Volume measurements will be made from the DST system unit feed staging tank and the WTP feed receipt tanks for each waste feed transfer. The locations of the waste feed confirmation measurements are identified on Figure B1-1 as S1 for the DST system feed staging tank, and S2 for the WTP waste feed receipt tanks.

The method for volume measurement at both the DST system unit feed staging tank and the WTP feed receipt tanks will be tank level measurements taken before and after waste feed transfer. The volume is then calculated from the tank level differences, taking into account the volume of the line flush water.

3.2.6.2 Confirmation Volume Reconciliation

The WTP and the DST system unit will reconcile any differences between the measured waste volume transferred out of the DST staging tank and the measured volume received in the WTP waste feed receipt system, including top-off transfers.

3.3 Waste Feed Verification Process

The purpose of verification is to determine whether the DST waste feed staged for transfer can be properly managed in the WTP. Appropriate and reliable analytical information to make this determination will be obtained through the activities discussed in the following sections.

3.3.1 Verification Sampling and Frequency [C-2c, C-2d]

At the request of the WTP, the DST system unit will provide one split sample aliquot for each batch of waste feed prior to transfer to the WTP. The sampling location for the waste feed verification is identified on Figure B1-1 as sample point S1.

Verification analyses, which are the waste acceptance criteria, are listed in Table B1-3, and discussed in Section 3.4. Methods for selecting a laboratory and establishing laboratory quality assurance (QA) and quality control (QC) procedures are addressed in Section 3.5. Detailed QC information is provided in the QAPjP.

3.3.2 Verification Sampling Methods [C-2c]

The verification split sample aliquot of the DST waste feed staged for transfer to the WTP will be collected as described in Section 9.2 of the *Regulatory Data Quality Objectives Optimization Report (RDQO Optimization) (24590-WTP-RPT-MGT-04-001).*

3.3.3 Sample Preservation, Storage and Holding Times

Sample preservation, storage, and holding times for the sample collected from the DST staging tank for verification analysis are described in Section 9.7 of the *RDQO Optimization (24590-WTP-RPT-MGT-04-001).*

3.3.4 Sampling Quality Assurance and Quality Control [C-2a(2)(b)]

Quality assurance and quality control for verification sampling activities performed by the DST system unit are addressed in Sections 9.6 of the *RDQO Optimization (24590-WTP-RPT-MGT-04-001).* Analytical laboratory quality assurance and quality control are discussed in Section 3.5.2.1 of this WAP.

3.3.5 Selection of Verification Analytes [C-2a]

The selected analytes for waste feed verification are:

- Total organic carbon (TOC)
- Polychlorinated biphenyls (PCBs)
- pH
- Compatibility

The analytical methods and waste acceptance criteria for each of these analytes are listed in Table B1-3 and discussed in Section 3.4.

The list of analytes for waste feed verification is described in the *RDQO Optimization (24590-WTP-RPT-MGT-04-001)* and will be re-evaluated as a result of the environmental risk assessment, currently under development and scheduled to be finalized during cold commissioning LAW and HLW demo tests. The RDQO Optimization process is subject to periodic evaluation and may periodically affect the list of analytes.

3.3.6 Selection of Verification Analytical Methods [C-2a(2)]

Table B1-3 presents the currently selected SW-846 (EPA 1997a) preparation and analytical methods that will be applied to the waste feed to verify that it is acceptable for treatment by the WTP. Any applicable analytical method provided in WAC 173-303-110 may be used for analysis. If an analytical method used for regulatory purposes other than the methods provided in WAC 173-303-110 is proposed, approval of the method will be requested from Ecology, according to WAC 173-303-910(2). The proposed analytical method will not be used for regulatory purposes until Ecology authorizes the method. If modifications to a procedure are needed, they will be requested in accordance with WAC 173-303-110(4). Specific technical guidance for modification of SW-846 (EPA 1997a) methods will be obtained from *Guidance on Testing Requirements* (NRC, EPA 1997), *Preparation of Radioactive Mixed Waste Samples* (ASTM 1990), *Methods of Chemical Analysis* (PNL 1993), as well as recent publications (for example, Mong and others, 1997). The SW-846 (EPA 1997a) "method hotline" indicates that sample size is not a method modification, unless detection limits are not sufficient for making decisions.

3.4 Waste Acceptance Criteria

The following sections discuss the waste acceptance criteria that will be used for verification of the DST waste feed. If the waste acceptance criteria information is provided by the DST system unit for the staged waste feed, then the WTP will not repeat analyses for the provided information. Waste feed received into the WTP that meets the waste acceptance criteria will be treated by the WTP.

3.4.1 Total Organic Carbon [C-2a(1), C-2a(2)]

The waste feed will be analyzed to determine the TOC. TOC has been chosen for analysis of the waste feed to ensure that the WTP is not required to comply with Subpart BB found in WAC 173-303-691. Proportionate liquid and solid aliquots of the split sample will be taken for this analysis.

The analytical method is SW-846 Method 9060 (EPA 1997a), or EPA Method 415.2 (EPA 1997b), using persulfate oxidation. The sample aliquot volume requirements for this analysis are expected to be less than 1 milliliter for liquid and 0.1 gram or less for solids. This method typically measures TOC to levels of about 1 part per million. The acceptance level for this verification process is 10 percent TOC. In order to preserve the liquid sample in accordance with Method 9060 (EPA 1997a), the liquid sample will be diluted from 1 part per hundred to 1 part per thousand in water, with enough Sulfuric Acid added to maintain the pH at less than 2 pH units. The dilution will be performed because of the high alkalinity and the need to acidify for preservation. Even with the dilution, Method 9060 (EPA 1997a) will meet the 1 percent detection limit, as given in Table B1-3. The solids will be analyzed separately for TOC, and will not be acidified or diluted.

3.4.2 Polychlorinated Biphenyls [C-2a(1), C-2a(2)]

Portions of the Hanford tank waste may contain PCBs at concentrations below 50 parts per million. These are regulated under the Toxic Substances Control Act (TSCA 1976), and codified in 40 CFR 761.61 as PCB remediation waste (Fitzsimmons and others, 2000). The waste feed verification sample aliquots will be analyzed to ensure that the waste feed contains less than 50 parts per million PCBs. This acceptance criteria of 50 parts per million PCBs may change as a result of the risk-based approval of PCBs in the Hanford tank waste that is being prepared jointly by DOE, Ecology, and EPA.

The sample will be separated into solid and liquid phases and analyzed for PCBs by SW-846 Method 8082 (EPA 1997a). Modification of the basic extraction procedure given in this method is expected to be needed to decrease the sample size and allow the extraction to be performed in a shielded glovebox. It is anticipated that a sample size of 0.5 to 1 gram would be required for solids, and 10 to 20 milliliters for liquids. If any single liquid sample contains more than 5 percent solids after centrifuging, the liquid and solid will be analyzed separately. Refer to Table B1-3 for the acceptance criteria.

3.4.3 Waste Feed pH [C-2a(1), C-2a(2)]

The measurement of pH will ensure that a batch of waste feed is compatible with the WTP materials of construction and treatment processes. SW-846 Method 9040 (EPA 1997a) will be used to measure pH. The estimated sample size is 5 milliliters. The decision criteria is greater than pH 7, as presented in Table B1-3.

3.4.4 Waste Feed Compatibility [C-2a(1), C-2a(2)]

The waste feed will be evaluated for compatibility with the residual aqueous waste in the WTP feed receipt tanks, before being accepted into the WTP. These evaluations will focus on the potential for a waste stream to react in an uncontrolled fashion with another waste (40 CFR 264, Appendix V, "Examples of Potentially Incompatible Wastes"). Although problems associated with co-mingling aqueous waste feeds are not expected, this evaluation will ensure the compatibility of two or more aqueous waste feeds from different DST system unit tanks.

Waste feed compatibility will be evaluated using the American Society for Testing and Materials Method (ASTM) D5058-90, *Standard Test Methods for Compatibility of Screening Analysis of Waste* (ASTM 2001). This evaluation provides three test methods to determine compatibility. Test method A, using a reduced sample volume, will be applied to the proposed DST system unit waste feed and the WTP feed receipt tank residual waste. This method prescribes the mixing of aliquots of the two waste streams and an evaluation of any temperature change of the mixture. The method also calls for a visual examination

to determine whether viscosity has increased. These evaluations will be performed to test for potential incompatibilities that could adversely affect the management of the waste in the WTP.

The recommended sample volume for this test method is 150 to 300 milliliters. The sample size will be decreased to 10 milliliters from each waste feed source, for a total of 20 milliliters of the combined waste feeds for waste minimization, and will comply with the as low as reasonably achievable (ALARA) philosophy.

3.5 Analytical Laboratory

The following sections discuss the WTP's onsite analytical laboratory and the quality assurance and quality control that will be implemented for analytical activities and for sampling performed by the WTP. Also discussed is the selection of other analytical laboratories.

3.5.1 Waste Treatment Plant Analytical Laboratory

The WTP will establish and operate an onsite analytical laboratory. A laboratory quality assurance (QA) program meeting the requirements of SW-846, Chapter 1, Section 4.4 (EPA 1997a) will be prepared before initiation of laboratory operations.

3.5.2 Establishing Quality Assurance and Quality Control Procedures [C-2a(2)(b)]

The following sections discuss the quality assurance (QA) and quality control (QC) for the analytical laboratory and for sampling operations.

3.5.2.1 Laboratory QA and QC

The WTP laboratory will conduct its operation in a way that ensures that reliable information is provided on request. The policies and procedures described in the QAPjP will be implemented to ensure reliable data.

Laboratory equipment and instrumentation will meet the requirements and specifications of the test methods and other procedures described in the QAPjP.

The QAPjP will describe or refer to laboratory activities that may affect data quality. Any deviation from an established procedure during a data collection activity will be documented. QC procedures will be available for the indicated activities as described in the QAPjP.

The QAPjP describes how the following elements of the QC program will be implemented:

- Sample control
- Analyses
- Measures of precision, accuracy, and representativeness
- Deviation
- Corrective action
- Data reduction and validation
- Reporting
- Generation, control, and disposal of records

The QA organization will conduct reviews consisting of internal and external assessments to assure that QA/QC procedures are in use and that laboratory staff conform to these procedures. QA reviews will be conducted as deemed appropriate and necessary. Non-conformances will be documented.

3.5.2.2 Waste Treatment Plant Sampling QA and QC

Sampling procedures, equipment, and sample preservation and handling requirements are discussed in the QAPjP. Policies and procedures commensurate with the complexity and importance of data will be developed and implemented.

Equipment, instrumentation, and supplies at the sampling site will be identified in written procedures that will be developed to accomplish the activities planned. The procedures will typically include the following information:

- Sampling equipment
- Sample management
- Reagent and standard preparation
- Decontamination equipment
- Sample collection
- Field measurements
- Equipment calibration and maintenance

3.5.3 Selecting Other Analytical Laboratories

The WTP may contract with other Hanford Site laboratories to provide analytical services, as necessary, based on a review of the ability of each laboratory to provide acceptable data for the types of waste handled by the WTP. The review will include an onsite surveillance of the laboratory facilities, and a review of its documentation. Evaluation of candidate laboratories will be based on the following criteria:

- Licenses or permits issued by the applicable government authority, allowing the laboratory to handle waste samples that contain chemical and radiological components.
- Laboratory accreditation.
- Analytical capacity, including number and type of analytical instruments, sample preparation facilities, and sufficient uncommitted capacity, or a commitment to procure sufficient capacity to handle the sample load.
- Adequate number of qualified technical staff.
- Demonstrated history of performing acceptable analyses.
- Adequate sample tracking system (refer to Section 7.2, *Sample Tracking*).
- A demonstrated QA program that meets the requirements of SW-846, Chapter 1, Section 4.4 (EPA 1997a).

3.6 Waste Feed Designation

Waste numbers described in the *Double-Shell Tank System Unit Permit, Operating Group 12, Addendum B, Waste Analysis Plan* are applicable to the waste feed. These dangerous waste numbers are listed in Table B1-2.

The waste feed will carry the numbers for ignitable (D001) and reactive (D003) waste. However, based on past process knowledge, which includes the age, temperature, history, and chemical composition of the waste feed stored in the DST system unit, it is not expected to exhibit the characteristics of ignitability or reactivity found in WAC 173-303-090. After the waste feed has been received into the WTP, this process knowledge will be used to remove the dangerous waste number for ignitability and reactivity.

Precautions taken to prevent accidental ignition or reaction of ignitable or reactive waste will be in accordance with WAC 173-303-395(1)(a) through (d), and will be documented in the WTP operating

record in accordance with WAC 173-303-395(1)(c), as discussed in the QAPjP. Tank inspection is addressed in Appendix 6A.

3.6.1 Ignitable Waste

Four properties of a waste found in WAC 173-303-090(5)(a) are used to determine whether a waste exhibits the characteristic of ignitability. These four properties are listed in Table B1-4, and discussed below.

WAC 173-303-090(5)(a)(i) states, in part: "It is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume, and has a flash point less than 60 °C (140 °F)." The *Tank Waste Remediation System Final Safety Analysis Report* (DOE-RL 1999), identifies 241-C-103 as the only tank, at this time, that contains a separate organic solvent phase. The flash point of the separate organic solvent phase on Tank 241-C-103 was determined to be 118 ºC (Pool and Bean, 1994). This flash point is well above the regulatory threshold of 60 ºC for determining the characteristic of ignitability and represents a worst case flash point for the liquid portion of the waste feed. Since the liquid portion of the waste feed is aqueous and contains a maximum of 10 percent total organic carbon, the flash point test will not be performed on the aqueous waste feed.

The WAC 173-303-090(5)(a)(ii) property of ignitability pertains to material that is not a liquid. Portions of the tank waste are in a solid (crust and salt cake) and semi-solid (sludge) form. Process knowledge indicates that this property of ignitability does not apply to the tank waste. Throughout the history of the tank farms (Blankenship, 1990), there has been no evidence of the solid or semi-solid portions of the tank waste "causing fire through friction, absorption of moisture or spontaneous chemical changes, and when ignited, burns so vigorously and persistently that it creates a hazard" (WAC 173-303-090(5)(a)(ii)).

WAC 173-303-090(5)(a)(iii) pertains to compressed gas. This definition does not apply since the tank farm waste is not a compressed gas.

WAC 173-303-090(5)(a)(iv) states: "It is an oxidizer, if it is defined as such in 49 CFR 173.127 and 173.128". According to 49 CFR 173.127 an oxidizer is defined as "a material that may, generally by yielding oxygen, cause or enhance the combustion of other materials." Nitrate and nitrite salts are present in the waste feed (Blankenship, 1990) and can yield oxygen. However, the *Organic Solvent Topical Report* (HNF-4240) determined that the nitrate and nitrite in the DST waste will not cause or enhance the combustion of other materials. Thus, the DST waste does not meet the definition of an oxidizer. The *Organic Solvent Topical Report* (HNF-4240) was independently reviewed and accepted by the Chemical Reactions Subpanel of the Tanks Advisory Panel, the Defense Nuclear Facilities Safety Board staff, and the Oregon Office of Energy (DOE-ORP 2000).

49 CFR 173.128 defines organic peroxides and is not applicable to the waste feed.

The dangerous waste number D001 for ignitability will be removed from the waste feed after it is received into the WTP, based upon the previous discussions of process knowledge.

3.6.2 Reactive Waste

WAC 173-303-090(7)(a) lists eight properties of a waste that would cause it to be designated as a reactive waste. The eight properties are listed in Table B1-5 and are discussed in the following paragraphs.

WAC 173-303-090(7)(a)(i) describes a waste that is unstable and will undergo violent change. The Hanford tank waste has not exhibited a violent change during the history of the tank farms. Differential thermal analysis or differential scanning calorimeter analysis has been performed on the tank waste. These tests have shown that the waste does not react under thermal stress (Blankenship, 1990).

WAC 173-303-090(7)(a)(ii), (iii), and (iv) involve waste that, when mixed with water, produces hazardous reactions, or generates toxic gases, vapors, or fumes. Since the tank waste is already a water solution, it does not meet the definitions that: (ii) "It reacts violently with water" (iii) "It forms explosive

mixtures with water," or (iv) "When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment."

Hydrogen, Ammonia, oxides of Nitrogen, and Methane are generated in the Hanford waste tanks. These gases are generated primarily from the radiolytic decomposition of the waste and are not a result of mixing with water (Johnson, 1996). Nevertheless, flammable gases produced by the radiolytic decomposition of the waste, and to a lesser degree, thermolytic decomposition, will be managed at the WTP through ventilation of the vessels that contain the waste feed.

WAC 173-303-090(7)(a)(v) concerns the generation of toxic gases, vapors, or fumes when a Cyanide- or Sulfide-bearing waste is exposed to pH conditions between 2 and 12.5, in a quantity sufficient to present a danger to human health or the environment. Hydrogen Cyanide and Hydrogen Sulfide are the gases that would be generated from Cyanide- or Sulfide-bearing waste when exposed to acidic conditions. In 1985, the EPA published guidance for determining regulated thresholds for these gases as 250 milligrams per kilogram of waste for Hydrogen Cyanide and 500 milligrams per kilogram of waste for Hydrogen Sulfide. Although these numerical thresholds were rescinded by the EPA (EPA 1998), they are still useful as benchmarks for determining the characteristic of reactivity and are still accepted by Ecology.

Thirteen tanks have been investigated by the Pacific Northwest National Laboratory under CH2M Hill Hanford Group, Inc., Project Number 41503, for their potential to generate these gases at pH between 2 and 12.5. Included in these thirteen tanks are the tanks scheduled for vitrification during the first ten years of WTP operation. This report researched the analytical data for the concentrations of Cyanide and Sulfide in the supernatant and solids in the tanks, using the best basis inventory on the Tank Waste Information Network System database current to November 2000 (LMHC 1999). Analytical data for Cyanide was available, but no data was available for Sulfide since there is no history of Sulfide addition to the tank farms. Consequently, the author used total Sulfur and Sulfate concentration values for the evaluation. Standard chemistry principles were used to calculate the potential generation of Hydrogen Cyanide and Hydrogen Sulfide in acidic conditions. This investigation determined that Hydrogen Cyanide and Hydrogen Sulfide would not be generated at the respective benchmark levels of 250 and 500 milligrams per kilogram of waste for these tanks. Thus the waste feed contained in tanks scheduled for the first ten years of WTP operation is not considered to be Sulfide- or Cyanide-bearing waste.

WAC 173-303-090(7)(a)(vi), (vii), and (viii) is concerned with waste that will detonate or explode. Process knowledge and history indicate that the tank waste does not detonate or explode. As mentioned previously, differential thermal analysis or differential scanning calorimeter analysis has been performed on the tank waste, showing that it does not react under thermal stress (Blankenship, 1990). Finally, the tank farm waste is not regulated as an explosive in 49 CFR 173.50.

The WTP will remove the dangerous waste number D003 for reactivity from the waste feed based upon the above process knowledge.

4.0 WASTE CHARACTERIZATION [C-1, C-2]

Prior to the transfer of DST waste feed, the WTP will characterize the waste feed in conformance with the RDQO Optimization (24590-WTP-RPT-MGT-04-001). After the the set of analytes are determined and methods are developed and approved by Ecology, the waste feed will be analyzed and the results used to characterize the waste. The data quality objective process is an ongoing activity and may periodically affect the set of analytes and analytical methods.

4.1 Sampling Methods and Sampling Frequency [C-2c, C-2d]

The samples collected for characterization of the DST waste feed staged for transfer to the WTP will be collected as described in Section 9.2 of the RDQO Optimization (24590-WTP-RPT-MGT-04-001). One sample will be collected from the DST waste feed tank for characterization of the waste stored in that tank.

4.2 Sample Preservation, Storage, and Holding Times

Sample preservation, storage, and holding times for the samples collect to support characterization of the DST waste feed are discussed in Section 9.7 of the RDQO Optimization (24590-WTP-RPT-MGT-04-001).

4.3 Selection of Analytes [C-2a(1)]

The analytes for characterization of the DST waste feed have been determined as a result of the RDQO Optimization (24590-WTP-RPT-MGT-04-001) process and will be re-evaluated as a result of the environmental risk assessment, currently under development. These activities are scheduled to be completed prior to the commencement of cold operations, and will be used to establish a set of analytes appropriate to perform characterization of the DST waste feed.

4.4 Selection of Analytical Methods [C-2a(2)(a)]

Identification of analytical methods that will be used to obtain the necessary data for characterizing the DST waste feed is addressed in Section 9.8.3 of the RDQO Optimization (24590-WTP-RPT-MGT-04-001). Modified SW-846 (EPA 1997a) methods, except for sample size or as otherwise identified in the RDQO Optimization (24590-WTP-RPT-MGT-04-001), will not be used for characterization until they are authorized by Ecology.

4.5 Quality Assurance and Quality Control [C-2a(2)(b)]

Quality assurance and quality control for DST waste feed characterization are addressed in Sections 9.6 and 9.8.5 of the RDQO Optimization (24590-WTP-RPT-MGT-04-001) report.

5.0 WASTE STREAMS

In addition to the vitrified glass product, the pretreatment processes and the LAW and HLW vitrification processes will generate a variety of solid, liquid, and gaseous waste streams. Some of these waste streams include waste derived from the incoming feed from the DST system unit. Other wastes include spent materials used in processing the waste feed, such as rinsate and scrubber solutions that come into contact with the waste feed or its derivatives, and contaminated equipment. General facility operations and maintenance activities will also generate dangerous waste.

Waste streams regulated under WAC 173-303 (because of dangerous waste concerns) include the ILAW and IHLW, as well as miscellaneous secondary solid and liquid waste streams. Air emissions subject to regulation, commonly referred to as Subparts AA, BB, and CC, are discussed in Section 2.3.4. Other regulated air emissions are addressed under the permit applications to be developed under the Clean Air Act of 1990 (CAA 1990) and the Washington Clean Air Act of 1967 (WCAA 1967), and are not included in the following discussions.

Section 5.1 describes the land disposal restriction (LDR) evaluation for the immobilized waste streams. Section 5.2 describes the secondary waste streams generated by the WTP, including characterization of secondary waste, the associated sampling and analysis activities, and the ultimate treatment, storage, or disposal of regulated waste.

5.1 Land Disposal Restrictions Evaluation for Immobilized Waste

This section describes the approach for addressing the LDR program requirements applicable to the land disposal of ILAW and IHLW.

5.1.1 Land Disposal Restrictions Treatment Standards

Land disposal restrictions are codified in WAC 173-303-140, which incorporates 40 CFR Part 268 by reference. 40 CFR 268.40 identifies the treatment standards for the land disposal of a dangerous waste. It states:

> "(a) A waste identified in the table "Treatment Standards for Hazardous Wastes" may be land disposed only if it meets the requirements found in the table. For each waste, the table identifies one of three types of treatment standard requirements:
>
> > (1) All hazardous constituents in the waste or in the treatment residue must be at or below the values found in the table for that waste ("total waste standards"); or
> >
> > (2) The hazardous constituents in the extract of the waste or in the extract of the treatment residue must be at or below the values found in the table ("waste extract standards"); or
> >
> > (3) The waste must be treated using the technology specified in the table ("technology standard"), which are described in detail in § 268.42, Table 1 – Technology Codes and Description of Technology-Based Standards."

The "total waste standards" and "waste extract standards" require repeated sampling and analysis of the waste to demonstrate that the dangerous constituents in the waste are at or below the values found in the table. These standards are appropriate for a limited dangerous waste stream, but are not a good choice for a mixed waste stream of extended duration because of repeated human exposure during sampling and analysis.

Table 1 – Technology Codes and Description of Technology-Based Standards (40 CFR 268.42) includes the technology standard HLVIT. At the request of DOE, the HLVIT treatment technology was promulgated by the EPA to treat the tank wastes at the Savannah River Site. According to the *Treatment Standards for Hazardous Wastes* table (40 CFR 268.40), HLVIT is the technology for the treatment of the following dangerous waste numbers from radioactive high-level wastes generated during the reprocessing of fuel rods:

D002	Corrosivity (pH)
D004	Arsenic
D005	Barium
D006	Cadmium
D007	Chromium (total)
D008	Lead
D009	Mercury
D010	Selenium
D011	Silver

5.1.1 Treatment Standard for the Hanford Tank Waste

Similar to the treatment of the Savannah River Site tank waste, the treatment of the Hanford tank waste will require many years of WTP operation. Rather than repeated sampling and analysis of the waste to demonstrate LDR using the total waste standard or the waste extract standard, it would be appropriate to treat the Hanford tank waste to a specific treatment standard, such as the HLVIT treatment standard described above for the Savannah River Site tank waste. Consequently, the WTP will submit a land disposal restriction treatability variance petition to the EPA and Ecology to establish a new treatment standard that will be specific to the Hanford tank waste. The new treatment standard would specify vitrification as the land disposal treatment standard for Hanford double-shell and single-shell tank waste for the characteristic and listed waste numbers applicable to the Hanford tank waste.

As required by 40 CFR 268.44, *Variance from a treatment standard*, the petition will be submitted in accordance with the procedures specified in 40 CFR 260.20. The negotiated petition would be published in the Federal Register for public comment. After successful resolution of public comments, the EPA would promulgate a final rule establishing the treatment standard. The Hanford tank waste would then meet LDR through treatment by the promulgated treatment standard.

5.2 Secondary Waste Streams

The WTP's primary mission is to vitrify the Hanford tank waste. This process will also generate a variety of secondary waste streams that must be properly managed. The management of secondary waste streams that will be regulated as dangerous waste is discussed in this section.

Secondary waste streams that will be transferred back to the DST system unit will be designated with waste numbers based upon process knowledge. Waste transferred to the DST system unit will meet the DST waste acceptance criteria.

Secondary waste streams are divided into solid waste streams (discussed in Section 5.2.1) and liquid waste streams (discussed in Section 5.2.2). Dangerous waste streams generated within the WTP will meet the waste acceptance criteria or protocols established by the receiving TSD facilities' permits and operating authority. This document does not outline the details of sampling and analyzing each waste stream because each TSD receiving waste may update its waste acceptance criteria and thus alter the required waste analyses.

The following general information related to waste classification applies to solid and liquid secondary waste streams:

- Normally, waste streams will be designated using process knowledge. Acceptable process knowledge includes:
  - Historical analytical data.
  - Mass balance from a controlled process with a specified output for a specified input.
  - Material safety data sheets.
  - Analytical data on the waste from a similar process.
  - For mixed waste, process knowledge could include information from surrogate material.
- The listed waste numbers F001 through F005 will follow the secondary waste if the secondary waste is derived from the waste feed. F039 waste was never placed in the DST system unit, and will not be applied to secondary waste. If the DST system unit receives F039 waste in the future, then F039 will be applied to secondary waste that contacts the DST waste feed.
- Secondary wastes that are not derived from the waste feed, such as laboratory and maintenance waste, will be characterized and designated with the appropriate EPA hazardous waste numbers and Washington State dangerous waste numbers, and managed accordingly.
- If analyses are required for determining waste numbers for a secondary waste, laboratory procedures will be prepared using applicable SW-846 (EPA 1997a) methods. Analytical procedures will be revised, as appropriate, if SW-846 (EPA 1997a) methods are revised.
- Documentation of the process knowledge or analytical data used to designate the waste numbers will be maintained in the WTP operating record. Documentation is discussed in Section 6 of this report, and waste tracking is presented in Section 7.
- Characteristic of ignitability (D001) and reactivity (D003) waste numbers can be removed after testing or the application of process knowledge, as appropriate.

5.2.1 Solid Waste Streams

Solid waste streams that are designated as dangerous or mixed waste will be transferred to Hanford Site TSDs in accordance with the current *Hanford Site Solid Waste Acceptance Criteria* (HSSWAC) (HNF 2001). The WTP will meet the unit specific waste acceptance criteria for the receiving Hanford Site or other appropriate TSD. Solid wastes that are stored at the WTP will meet the acceptance criteria of the specific WTP storage area.

5.2.1.1 Solid Waste Designated as Mixed Waste

Solid waste streams that will come into contact with the waste feed during any stage of the treatment processes will be designated as mixed waste by process knowledge. These secondary waste streams are listed in Table B1-6. EPA hazardous waste numbers and Washington State dangerous waste numbers will be assigned to these mixed waste streams, based on the characterization of the waste feed. Each waste stream discussed below will meet the waste acceptance criteria of the receiving facility. A discussion of each of these mixed waste streams is provided.

Out-of-Service Melters

It is anticipated that melters will require replacement at some point, due to the harsh conditions of the vitrification process. When the end of a melter's operational life is reached, residual molten glass will be removed as immobilized product, as much as is practical. The melter will be allowed to cool and then will be disconnected.

The locally shielded melter (LSM) will be a disposal container or overpack, defined as a Resource Conservation and Recovery Act (RCRA 1976) miscellaneous unit, containing the LAW melter. The LSM, including residual glass, will be the final disposal container. After disconnection, the openings will be closed to provide complete containment. The LAW LSM will be transported to a permitted Hanford TSD. Refer to Chapter 4.0 for a more complete description of the LSM.

A HLW melter that is removed from service and that meets the HSSWAC will be placed into an overpack that will serve as its disposal container. The HLW disposal container is not a LSM. The overpacked HLW melter will be transported to a permitted Hanford Site TSD for disposal.

An out-of-service HLW melter may not meet the HSSWAC, depending on its radionuclide content. If this should occur, the overpacked HLW melter will be stored at the WTP or another permitted facility until facility closure, at which time it will be dismantled, packaged, and transported to a permitted Hanford Site TSD for disposal.

The details for the disposal of the LAW LSM and overpacked HLW melters are currently under development.

HLW Glass Residue

The disposal path for HLW glass residue that may be removed from an out-of-service HLW melter will be determined case-by-case. Final disposal will be based on the radionuclide content and dangerous characteristics of the glass residue.

Melter Components

Melters will be fitted with various ancillary equipment (such as bubbler assemblies, heating elements, and thermocouples) that may require periodic replacement. The ancillary equipment will be removed, designated by process knowledge as mixed waste, and packaged and transferred to an appropriate TSD.

Off-gas Treatment System Components

HEMEs, HEPA filters, and silver mordenite canisters will be components of the off-gas treatment system incorporated to remove contaminants from the off-gas streams prior to discharge. These components will periodically be replaced to maintain treatment efficiency. They will be designated by process knowledge, packaged, and transferred to an appropriate TSD.

Spent Carbon and Catalyst from Off-gas Treatment

Spent carbon and catalyst from off-gas treatment will periodically be replaced to maintain treatment efficiency. These materials will be designated by process knowledge and managed as mixed waste. They will be removed from their respective equipment, packaged, and transferred to an appropriate TSD.

Spent Ion Exchange Resins

Ion exchange resins used for cesium removal will periodically be replaced to maintain treatment efficiency. These resins will be designated by process knowledge and managed as mixed waste. They will be eluted, removed from their respective columns, packaged, and transferred to an appropriate TSD.

Spent Ultrafilters

Ultrafilters may be periodically replaced to maintain treatment efficiency. They will be designated as mixed waste by process knowledge, packaged, and transferred to an appropriate TSD.

Out-of-Service Equipment

Ancillary equipment, such as pumps, valves, piping, motors, and electrical equipment that is no longer fit for use will be removed from service and designated as out-of-service equipment. Out-of-service equipment that contacted the waste feed or secondary waste liquid streams will be designated by process knowledge, packaged and transferred to an appropriate TSD.

Entrained Solids

Entrained solids will be generated by pretreating the LAW feed using ultrafiltration. The separated solids will be washed and again concentrated using ultrafiltration. The entrained solids will be incorporated into the HLW feed.

5.2.1.2 Variable Waste Streams

The waste streams listed in Table B1-7 can be dangerous waste or mixed waste, depending on the source of the waste and whether it had contact with the waste feed. EPA hazardous waste numbers and Washington State dangerous waste numbers will be assigned to these waste streams, based on the designation of the waste by process knowledge. In addition to the waste streams listed in Table B1-7, raw process materials and chemicals will be brought onto the WTP site. Some of these substances may subsequently become waste and will require characterization for proper waste management. The material safety data sheet (MSDS) provides the information necessary to properly characterize and designate a substance when it becomes a waste. Vendors will be required to provide MSDS for substances that will be brought onto the WTP site, and a MSDS file will be maintained by the WTP. Examples of these types of substances are process and laboratory chemicals, lubricants such as oils and greases, and maintenance products, such as paints, solvents, and adhesives.

Subcontractors to the WTP will be required to have an MSDS for the substances that they bring onto the WTP site. Subcontractors will also be required to remove the residuals of any substance that they bring onto the WTP site, including wastes generated such as wipes, paintbrushes, and personal protective equipment. Subcontractors may make arrangements with another waste management organization to manage the generated wastes.

Laboratory Waste

Liquid laboratory waste collected in the hot cell drain and lab area sink drain collection vessels will be transferred to the pretreatment facility for recycle. Non-wastewater laboratory waste derived from the waste feed will be designated as mixed waste by process knowledge, packaged, and transferred to an appropriate TSD. Other non-wastewater laboratory wastes, such as off-specification laboratory chemicals, will be designated by process knowledge and managed accordingly. These wastes will be packaged and treated as necessary and disposed of at an appropriate TSD.

Personal Protective Equipment

Personnel performing certain tasks such as facility maintenance, treatment process operations, and waste packaging activities, may wear personal protective equipment. Used personal protective equipment may be returned to the vendor for cleaning and refurbishment. Used personal protective equipment that cannot be recycled to the vendor and has had contact with waste feed will be designated as mixed waste by process knowledge, packaged, and transferred to an appropriate TSD. Personal protective equipment waste that is not radioactive but is designated as dangerous waste by process knowledge will be packaged as necessary and disposed of at an appropriate TSD.

Maintenance Waste

Maintenance wastes such as paints, lubricants, cleaning solvents, adhesives, and off-specification chemicals will be generated at the WTP. Maintenance wastes derived from the waste feed will be designated as mixed waste by process knowledge, packaged, and transferred to an appropriate TSD. Those not derived from the waste feed and designated as dangerous waste by process knowledge will be packaged as necessary and disposed of at an appropriate TSD.

5.2.2 Liquid Waste Streams [C-2c]

The dangerous liquid waste streams generated at the WTP will be managed in accordance with the *Hanford Site Liquid Waste Acceptance Criteria* (HSLWAC) (WMFS 1998). The LERF or the ETF, or both, will receive hazardous aqueous waste generated at WTP. The waste will meet the acceptance criteria as outlined in the HSLWAC. The LERF and ETF allow process knowledge to be used in lieu of some analyses in instances where process knowledge is adequate, and a LERF or ETF representative will work with a WTP representative to identify the waste acceptance criteria and analyses appropriate for liquid waste characterization.

The liquid waste streams listed in Table B1-8 will be collected in an effluent collection tank. Should sampling be required, the sample will be drawn from a location identified in Figure B1-1 as S3. Samples will be taken from the effluent collection tank by a computer-controlled auto-sampling system. Auto-sampling of waste streams is described in Section 7.2.1 of the American Society for Testing and Materials (ASTM) Designation D6232-98, *Standard Guide for Selection of Sampling Equipment for Waste and Contaminated Media Data Collection Activities* (ASTM 1998). The effluent collection tank will be stirred during sample collection to provide representative samples.

Disposable sampling equipment will eliminate the need for equipment decontamination after use. If the use of disposable equipment is not practical, the sampling equipment will be decontaminated before and following each sample event.

A discussion of each aqueous waste stream is presented below.

Aqueous Waste from Processes

Table B1-8 lists the aqueous waste streams that will be generated by the WTP from processing the DST waste feed. The analytical laboratory will also generate aqueous waste. These waste streams will contain both radioactive and dangerous waste components and will be similar to the process condensate stream described in the *Hanford Facility Dangerous Waste Permit Application, 242-A Evaporator* (DOE-RL 2005). These aqueous waste streams will be piped to the effluent collection tank prior to transfer to the LERF/ETF by underground pipeline for treatment.

Plant Wastewater

Wastewater will be generated primarily from decontamination and wash-down activities in the WTP. The wastewater will be designated as mixed waste by process knowledge, since it will contain dilute waste feed constituents. Wastewater will also be piped to the effluent collection tank prior to transfer to the LERF/ETF by underground pipeline for treatment.

6.0 WASTE TRANSFER DOCUMENTATION SYSTEM [C-3]

The WTP is part of the Hanford Site facility because it will operate under the same EPA identification number as the other Hanford Site facilities. The WTP will prepare transportation documentation for the transfer of dangerous or mixed waste to a Hanford TSD according to the requirements of Condition II.N of the Hanford Facility Dangerous Waste Permit (Ecology 1994). Condition II.N.2.d exempts waste that will be transported by rail or pipeline unless required by unit-specific conditions. This exemption will apply to waste feed that is transferred to and from the WTP by underground pipeline, and to effluent transferred to the LERF/ETF by underground pipeline.

Waste transfer documentation and supporting process knowledge will be considered QA records and managed in accordance with the requirements for document control, as outlined in the QAPjP. This documentation will specify the identity of the receiver and confirm that the receiver accepted the waste. WTP staff and the waste receiver's acceptance personnel will date and sign the waste transfer papers. Electronic waste transfer documentation may be used, as appropriate.

Solid and liquid waste transfers and LDR notifications are discussed in the following sections.

6.1 Solid Waste Transfer

The WTP, as a waste generator, will provide documentation with each shipment of regulated solid waste to a Hanford Site TSD in accordance with the current HSSWAC (HNF 2001). Regulated solid waste transferred from the WTP to a Hanford Site TSD will meet the unit-specific waste acceptance criteria for the receiving TSD. Regulated waste shipped to an offsite TSD will be accompanied by a manifest, according to WAC 173-303-180.

6.2 Liquid Waste Transfer

Aqueous waste transfers from the WTP to the 200 Area LERF/ETF will comply with the current HSLWAC (WMFS 1998). A waste profile sheet will accompany aqueous waste transfers.

6.3 Land Disposal Restrictions Notification and Certification

WTP will provide LDR notification and certification of WTP shipped waste that contain LDR constituents above the treatment standards listed in 40 CFR 268.40. The information will be included with transfer documents to the receiving TSD facility for solid waste and liquid waste transfers.

7.0 TRACKING SYSTEM [C-4]

The plant information network (PIN) system is designed to collect and maintain information. The PIN enables WTP operational and support activities. In addition, it provides data on the glass product, secondary wastes, and monitoring activities. The PIN consists of software applications designed to meet specific requirements and functions. An overview of the network software systems is provided in Figure B1-2.

The PIN will consist of the following:

- Computerized Maintenance Management System (CMMS).
- Plant Data Warehouse and Reporting System (PDWRS).
- Laboratory Information Management System (LIJ).
- Waste tracking and inventory system (to be developed).

The PIN will interface with the integrated control network (ICN). The ICN will consist of the process control system, mechanical handling control system, and the auto-sampling control system.

These systems will be discussed in the following sections as they relate to waste tracking.

7.1 Inventory and Batch Tracking

The waste tracking and inventory system serves as the main repository for the relevant information pertinent to a given waste batch. Data is collected for each sequence or step throughout the processing history of a given batch of waste, from receipt of raw feed to disposition of the finished products, including secondary waste. At the end of a batch cycle, the data applicable to that particular batch will be catalogued to facilitate historical recording and reporting.

The waste tracking and inventory system will also record the inventory of glass product containers, including the data generated for each container of vitrified waste, and including the final QA checks. Each glass product container will bear a unique identification number to facilitate tracking.

7.2 Sample Tracking

Sampling activities will be started, monitored, and controlled through the plant ICN, with key sequence durations and operations logged. These requests will be time and date stamped, as will the actual sampling operation and the associated sample handling and laboratory activities.

The LIMS will be an integral feature of the PIN. Workstations will be located within the laboratory and the plant control rooms. The required quality control checks to assure correct sample preparation and selection of analyses will be recorded in the LIMS.

Sample containers received in the laboratory preparation area will be identified by their identification (ID) label. The ID label correlates the sample container with the sample source and, therefore, identifies the required preparation and analysis techniques. The ID will be registered at the locations where manual intervention is required, such as manual samplers. The results of calibration checks on equipment and analyzers will be recorded.

Analytical results will be compiled by the LIMS and held, pending checking and approval by laboratory staff, before being formally recorded within the waste tracking and inventory system. Process control sample results will be communicated to appropriate plant personnel.

Samples transferred to an analytical laboratory external to the WTP will be tracked in the LIMS. The LIMS will be capable of accurately tracking samples through the laboratory, and accurately recording analytical results and quality control data. Section 3.5.3 discusses the evaluation of external analytical laboratories.

7.3 Secondary Waste Stream Tracking

Secondary waste streams will be tracked within the waste tracking and inventory system in a manner similar to that of primary waste streams. Secondary waste streams will be managed by using assigned, unique ID numbers. Corresponding histories and data collection triggers will gather process and status information during the processing of secondary waste in order to satisfy tracking of waste disposal records. Shipments of overpacks will be labeled and tracked as part of the inventory control function of the waste tracking and inventory system.

Maintenance, decommissioning, or disposal activities may generate consumables, including such items as equipment, hardware, personal protective equipment, and materials used in the normal operation of the facility. Consumables that are designated as dangerous waste will be tracked by the waste tracking and inventory system, with appropriate fields denoting the hazardous classification of the disposed parts and materials, and cross-linked to disposal records. Waste being accumulated in satellite accumulation areas under the provisions of WAC 173-303-200 will also be tracked.

8.0 RECORDKEEPING

Records generated for environmental compliance will be legible, identifiable, and retrievable, and will be protected against damage, deterioration, or loss. Requirements and responsibilities for record transmission, distribution, retention, maintenance, and disposal will be established and documented. The requirements contained in (a), (b), and (c) of WAC 173-303-380 "Facility Recordkeeping" are addressed in this WAP and will be managed through the waste tracking system record keeping policies. Additional requirements listed under WAC 173-303-380 are addressed in the QAPjP. Records generated to support activities described in the WAP will be considered QA records. These may be in electronic or hardcopy format, and will be managed according to the requirements outlined in the QAPjP.

The following documents that support this WAP are considered QA records:

- Sample information provided by the DST system unit, including constituents of concern from sampling activities, laboratory analysis results, waste certifications, shipping and transfer papers.
- Verification analytical data.
- Documentation used for any discrepancy resolution and non-conformance action.
- Confirmation volume measurement data, including any discrepancy resolution.
- Documentation used for LDR evaluation.
- Sampling and analytical data developed for meeting the waste acceptance criteria of receiving facilities.
- Calibration data from analytical equipment.
- Shipment and waste transfer documentation, including waste profile sheets, and LDR information forms.

9.0 REFERENCES

9.1 Project Documents

River Protection Project – Waste Treatment and Immobilization Plant Dangerous Waste Permit Application, as amended.

River Protection Project – Waste Treatment Plant Quality Assurance Project Plan for the Waste Analysis Plan, Rev. 0.

24590-WTP-RPT-MGT-04-001, Rev. 0, *Regulatory Data Quality Objectives Optimization Report*

RPT-W375LV-EN00002, as amended. *Approach to Immobilized Hanford Tank Waste Land Disposal Restrictions Compliance*.

9.2 Codes and Standards

10 CFR 72.3. *Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste*, Code of Federal Regulations, as amended.

40 CFR 260. *General*, Code of Federal Regulations, as amended.

40 CFR 261. *Identification and Listing*, Code of Federal Regulations, as amended.

40 CFR 264. *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities*, Code of Federal Regulations, as amended.

40 CFR 268. *Land Disposal Restrictions*, Code of Federal Regulations, as amended.

40 CFR 761.61. *PCB Remediation Waste*, Code of Federal Regulations, as amended.

49 CFR 172.101. *Hazardous Materials Table*, Code of Federal Regulations, as amended.

49 CFR 173. *Shippers – General Requirements for Shipments and Packages*, Code of Federal Regulations, as amended.

ASTM. 1990. *Preparation of Radioactive Mixed Waste Samples for Measurement of RCRA Organic Compounds*, Tomkins BA and Caton JE, Waste Testing and Quality Assurance, Second Volume, ASTM STP 1062, Friedman D, Editor. American Society for Testing and Materials, Philadelphia, Pennsylvania.

ASTM. 1998. *Standard Guide for Selection of Sampling Equiment for Waste and Contaminated Media Data Collection Activities*, Designation D6232-98, June 1998. American Society for Testing and Materials, West Conshohocken, Pennsylvania.

ASTM. 2001. *Standard Test Methods for Compatibility of Screening Analysis of Waste*, Method D5058-90. American Society for Testing and Materials, West Conshohocken, Pennsylvania.

CAA. 1990. *Clean Air Act of 1990*, 42 USC, Section 7401. US Congress, Washington D.C.

EPA. 1997a. *Test Methods for Evaluating Solid Waste, Physical Chemical Methods*, SW-846, Third Edition, (as amended by Updates I, II, IIA, IIB, and III). US Environmental Protection Agency, Washington, D.C.

EPA. 1997b. *Methods and Guidance for Analysis of Water*, CD-ROM EPA 821-C-97-001, as amended. US Environmental Protection Agency, Office of Science and Technology, Washington, D.C.

RCRA. 1976. *Resource Conservation and Recovery Act of 1976*, 42 USC 6901. US Congress, Washington D.C.

TSCA. 1976. *Toxic Substances Control Act of 1976*, 15 USC 2601. US Congress, Washington D.C.

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

WCAA. 1967. *Washington Clean Air Act of 1967*, Revised Code of Washington, as amended.

9.3 Other Documents

Bernero RM. 1993. Letter to Lytle J, Deputy Assistant Secretary for Waste Operations, Office of Waste Management, Environmental Restoration and Waste Management, US Department of Energy, Washington D.C., from Nuclear Regulatory Commission, Washington D.C., 2 March 1993. US Department of Energy, Washington D.C.

Blankenship TD. 1990. Internal Memo from TD Blankenship to SM Price, *Double-Shell Tank Waste Designation*, 82331-90-313. August 1990. Westinghouse Hanford Company, Richland, Washington.

DOE-RL. 2009. *Double-Shell Tank System Dangerous Waste Permit Application*, DOE/RL-90-39, as amended. October 1996. US Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL. 2005. *Hanford Facility Dangerous Waste Permit Application, 242-A Evaporator*, DOE/RL-90-42, as amended. July 2005. US Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL. 1998. *Hanford Facility Dangerous Waste Permit Application, General Information Portion*, DOE/RL-91-28, as amended. May 1998. US Department of Energy, Richland Operations, Richland, Washington.

DOE-RL. 1999. *Tank Waste Remediation System Final Safety Analysis Report*, HNF-SD-WM-SAR-067, as amended. US Department of Energy, Richland, Washington.

DOE-RL 2000. Memorandum from Richard T. French, Manager, Office of River Protection, US Department of Energy, to Carolyn L Huntoon, Assistant Secretary for Environmental Management, US Department of Energy, Washington, DC, *Closure of the Organic Solvent Safety Issue and Removal of the Organic Solvent Tanks from the Watchlist*, 00-SHD-066. July 14, 2000.

Ecology. 1994. *Dangerous Waste Portion of the Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste at the Hanford Facility*, WA7890008967. Washington State Department of Ecology, Olympia, Washington.

Ecology, EPA, and DOE. 1996. *Hanford Federal Facility Agreement and Consent Order*, (Tri-Party Agreement), 2 vols., as amended. Washington State Department of Ecology, Olympia, Washington, US Environmental Protection Agency, Washington D.C., and US Department of Energy, Washington D.C.

EPA. 1998. Memorandum from D. Busssard and B. Johnson to D. Love, *Withdrawal of Cyanide and Sulfide Reactivity Guidance*, April 21, 1998. US Environmental Protection Agency, Washington, D.C.

Fitzsimmons T, Boston H, Findley C, and Klein K. 2000. *Framework Agreement for Management of Polychlorinated Biphenyls (PCBs) in Hanford Tank Waste*, August 31, 2000. Washington State Department of Ecology, Olympia, Washington, US Environmental Protection Agency, Region 10, Washington D.C., US Department of Energy, Office of River Protection, Richland Washington, US Department of Energy, Richland Operations, Richland, Washington.

HNF. 2001. *Hanford Site Solid Waste Acceptance Criteria*, HNF-EP-0063, as amended. April 2001. Fluor Daniel Hanford, Inc., Richland, Washington.

HNF-4240. *Organic Solvent Topical Report*, HNF-4240, Revision 1. June 2000. CH2M Hill Hanford Group, Inc., Richland, Washington.

Johnson GD. 1996. *Flammable Gas Project Topical Report*, HNF-SF-1193, Revision 1. Pacific Northwest National Laboratory, Richland, Washington.

LMHC. 1999. *Tank Waste Information Network System (TWINS)*, http:twins.pnl.gov:8001/data/data.asp, for November, 2000, Lockheed Martin Hanford Corporation, Richland, Washington.

Mong GM, Campbell JA, Orr RD, Clauss SA , Wahl KL and Hoopes FV. 1997. *Activity Reduction of Radioactive Mixed Wastes for Subsequent Carboxylate Determinations*, Journal of Radioanalytical and Nuclear Chemistry, Vol. 219, No. 1. Akademia Kiado, Hungary.

NRC, EPA. 1997. *Joint NRC/EPA Guidance on Testing Requirements for Mixed Radioactive and Hazardous Waste*, November 1997. US Nuclear Regulatory Commission, Washington D.C, and US Environmental Protection Agency, Washington D.C.

Paperiello CJ. 1997. Letter to Kinzer J, Office of Tank Waste Remediation System, US Department of Energy, Richland Operations Office, Richland, Washington, from Nuclear Regulatory Commission, Washington D.C, June 9, 1997. US Department of Energy, Richland, Washington.

Patello GK, Almeida TL, Campbell JA, Farmer OT, Hoppe EW, Soderquist CZ, Swoboda RG, Urie MW and Wagner JJ. 2001. *Regulatory DQO Test Plan for Determining Method Detection Limits, Estimated Quantitation Limits, and Quality Assurance Criteria for Specified Analytes.* PNNL 13429, Pacific Northwest National Laboratory, Richland, Washington.

PNL.1993. *Methods of Chemical Analysis for Organic Waste Constituents in Radioactive Materials: A Literature Review*, Clauss SA and Bean RM, PNL-8266. Pacific Northwest Laboratory, Richland, Washington.

PNNL. 1990. *Statistical Analysis of Shard and Container Glass Correlation Test*, Pulsipher BJ, PNL-10655. Pacific Northwest National Laboratory, Richland, Washington.

Pool KH and Bean RM. 1994. *Waste Tank Safety Project: Analysis of Liquid Samples from Hanford Waste Tank 241-C-103*, PNL-9403. Pacific Northwest Laboratory, Richland, Washington.

WMFS. 1998. *Hanford Site Liquid Waste Acceptance Criteria*, HNF-3172, as amended. September 1998. Waste Management Federal Services of Hanford, Inc., Richland, Washington.

Table B1-1 Summary of the Waste Feed Acceptance Process [C-3a]

Section Reference	Action
3.2.1	The DST system unit submits a waste profile.
3.2.2	The DST system unit submits a split sample aliquot of the waste feed to WTP for waste verification analyses, if requested. The verification analysis process is discussed in Section 3.3.
3.2.3	Qualified WTP personnel perform a pre-shipment review by examining the waste profile and the verification analytical results to ensure compatibility and acceptability of the waste feed. If the review finds that the waste feed is acceptable, the WTP notifies the DST system unit that the waste feed can be transferred. If the review finds that the waste feed is not acceptable, non-conformance actions are initiated.
3.2.4	Non-conformance actions include a second review of the data and information and may include a second analysis of the verification split sample aliquot. If the waste feed continues to be outside of the waste acceptance criteria, the waste will be refused for transfer.
3.2.5	Acceptable waste feed is transferred from the DST system unit to the WTP.
3.2.6	After waste feed is received into the WTP, the DST system unit and the WTP perform confirmation volume measurements to ensure that the waste feed transferred is the waste feed that was accepted for transfer.

Table B1-2 Summary of Dangerous Waste Numbers for WTP

Characteristic Waste Numbers				Listed Waste Numbers		
D001	D002	D003	D004	F001	F002	F003
D005	D006	D007	D008	F004	F005	F039 [a]
D009	D010	D011	D018			
D019	D022	D028	D029			
D030	D033	D034	D035			
D036	D038	D039	D040			
D041	D043	WT01[b]	WT02[b]			
WP01[b]	WP02[b]					

[a] Multi-source leachate (F039) is included as a waste derived from non-specific source wastes F001 through F005.
[b] Washington State criteria

Table B1-3 Waste Feed Analysis, Waste Acceptance Criteria, and Non-Conformance Actions [C-2a(2)]

Parameter	Analytical Method[a]	Estimated Sample Volume[b]	Required Detection Limit[d]	Acceptance Criteria	Non-Conformance Actions
Total organic carbon using persulfate oxidation method	SW-846, Method 9060 or EPA Method 415.2[c]	1 mL liquid or 0.1 g solid	1 % by weight	TOC < 10 % by weight	Reject waste feed
PCBs	SW-846, Method 8082	10 to 20 mL liquid or 0.5 g solid	5 ppm[e]	PCBs < 50 ppm[e]	Reject waste feed
pH	pH Meter, SW-846, Method 9040	5 mL	1 pH unit	Acceptable pH range >7	Corrective actions to correct pH
Compatibility	ASTM[d] Method D5058-90	10 mL of each waste stream	Temperature Change = 1 °C	Acceptable temperature change < ± 20 °C No viscosity change adversely affecting waste processing	Corrective actions to eliminate incompatible conditions

[a] SW-846 Method (EPA 1997a) unless specified otherwise.
[b] Sample volume needed for each analysis.
[c] EPA Method 415.2 (EPA 1997b).
[d] American Society for Testing and Materials (ASTM 2001).
[e] Parts per million = milligrams per liter or milligrams per kilogram (approximate).

Table B1-4 Properties for the Determination of Ignitable Waste

Regulatory Citation	Ignitable (D001) Waste Property
WAC 173-303-090 (5)(a)(i)	It is a liquid, other than an aqueous solution containing less than 24 % alcohol by volume, and has a flash point less than 60 °C (140 °F), as determined by a Pensky-Martin Closed Cup Tester, using the test method specified in ASTM Standard D-93-79 or D-93-80, or a Setaflash Closed Cup Tester, using the test method in ASTM Standard D-3278-78.
WAC 173-303-090 (5)(a)(ii)	It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture, or spontaneous chemical changes, and when ignited, it burns so vigorously and persistently that it creates a hazard.
WAC 173-303-090 (5)(a)(iii)	It is an ignitable compressed gas that is defined in 49 CFR 173.115 and is determined to be flammable by the test methods described in that regulation.
WAC 173-303-090 (5)(a)(iv)	It is an oxidizer, if it is defined as such in 49 CFR 173.127 and 173.128.

Table B1-5 Properties for the Determination of Reactive Waste

Regulatory Citation	Reactive (D003) Waste Property
WAC 173-303-090 (7)(a)(i)	It is normally unstable and readily undergoes violent change without detonating.
WAC 173-303-090 (7)(a)(ii)	It reacts violently to water.
WAC 173-303-090 (7)(a)(iii)	It forms potentially explosive mixtures with water.
WAC 173-303-090 (7)(a)(iv)	When mixed with water, it generates toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or the environment.
WAC 173-303-090 (7)(a)(v)	It is a cyanide- or sulfide-bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or the environment.
WAC 173-303-090 (7)(a)(vi)	It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.
WAC 173-303-090 (7)(a)(vii)	It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.
WAC 173-303-090 (7)(a)(viii)	It is a forbidden explosive as defined in 49 CFR 173.54, or a Class 1 explosive, Division 1.1, Division 1.2, Division 1.3, and Division 1.5, as defined in 49 CFR 173.50.

Table B1-6 Secondary Solid Mixed Waste Streams

Waste Stream	Characterization	Disposal
Out-of-service melters	Designated by process knowledge	[a]
HLW glass residue		Determined case-by-case
Melter components		These wastes will be packaged and transferred to the appropriate Hanford TSD.
Off-gas treatment system components: High-efficiency mist eliminators HEPA filters Silver mordenite canisters		
Spent carbon and catalyst from off-gas treatment		
Spent ion exchange resins		
Spent ultrafilters		
Out-of-service equipment		
Entrained solids		[b]

a Disposal of out-of-service melters is currently under development.

b Entrained solids will be added to the HLW feed for vitrification.

Table B1-7 Variable Solid Waste Streams

Waste Stream	Characterization	Disposal
Non-wastewater laboratory waste	Each generation event of these wastes will be individually designated by process knowledge and will comply with the receiving TSD waste acceptance criteria	The wastes will be packaged and transferred for disposal to an appropriate TSD
Personal protective equipment		
Maintenance waste		

Table B1-8 Liquid Mixed Waste Streams

Waste Stream	Characterization and Disposal	Sampling Point	Sampling Frequency
Waste feed evaporator condensate	The waste streams will collect in a mixer tank, be designated as mixed waste by process knowledge and analysis, as necessary, and will be transferred to the LERF or ETF.	The streams collected in a mixer tank are grab sampled by autosampler.	Sampling will be: • before initial discharge • at major process change • at request for re-sampling by the ETF
LAW melter feed evaporator condensate			
Pretreatment, LAW, and HLW off-gas condensate			
LAW and HLW melter off-gas scrubber blowdown			
Cesium process condensate			
Cesium ion exchange rinse water			
Laboratory wastewater			
Plant wastewater containing waste feed			

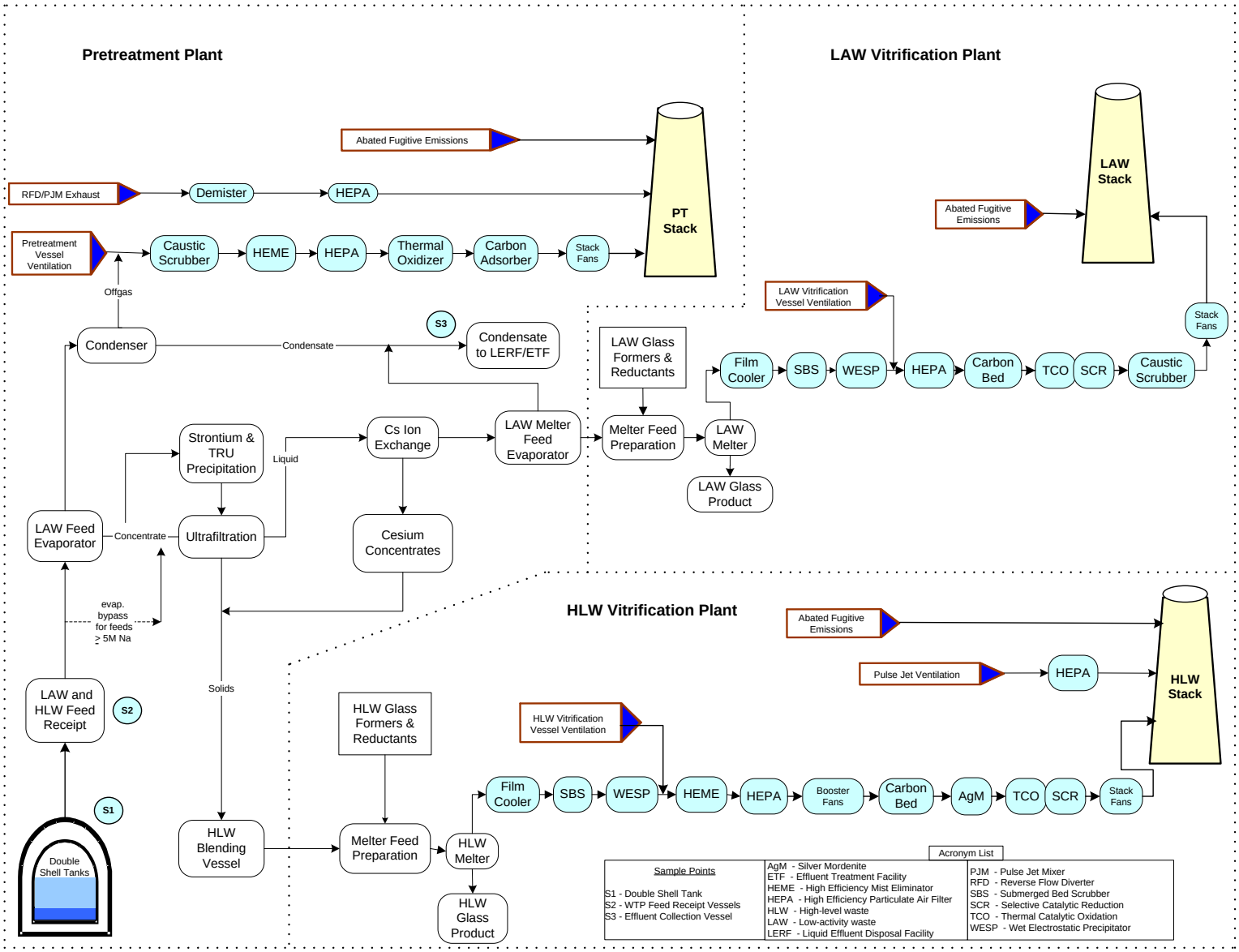


Figure B1-1 Simplified Flow Diagram and Sampling Locations

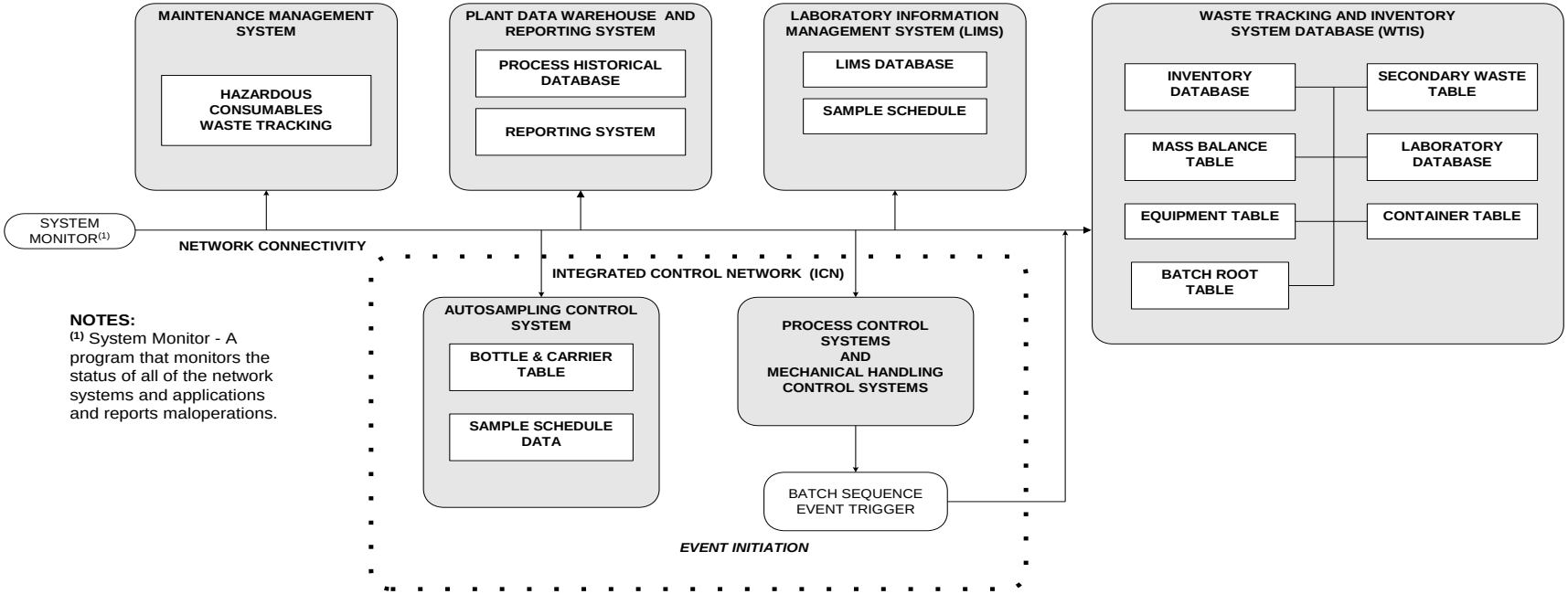


Figure B1-2 Plant Information Network Data Relationships

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 3B
QUALITY ASSURANCE PROJECT PLAN FOR THE WASTE ANALYSIS PLAN

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
03/2007	

This page intentionally left blank.

APPENDIX 3B
QUALITY ASSURANCE PROJECT PLAN FOR WASTE ANALYSIS PLAN

This page intentionally left blank.

APPENDIX 3B
QUALITY ASSURANCE PROJECT PLAN FOR WASTE ANALYSIS PLAN

TABLE OF CONTENTS

1.0 INTRODUCTION 7
2.0 PROJECT DESCRIPTION 7
3.0 CONSTITUENTS OF CONCERN 7
3.1 Waste Acceptance Criteria 7
3.2 Characterization of the Waste Feed 8
4.0 PROJECT MANAGEMENT 8
4.1 Project Organization and Responsibility 8
4.2 Special Training Requirements 8
4.3 Documentation and Records 9
4.3.1 Document and Record Procedures 9
4.3.2 Document and Records Storage 9
4.4 Standard Operating Procedures 10
5.0 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA 10
5.1 Data Quality Objectives 10
5.1.1 Data Quality Objectives for the WTP 10
5.1.2 RDQO Optimization for Hanford Tank Waste Characterization 10
5.2 Data Quality Indicators 10
5.2.1 Analytical Measurement Accuracy 10
5.2.2 Analytical Precision 11
5.2.3 Representativeness 12
5.3 Detection Limits and Estimated Quantitation Limits 12
5.4 Reporting Requirements 12
6.0 DATA ACQUISITION AND MEASUREMENT 13
6.1 Sampling Procedures and Management 13
6.1.1 Sampling Procedures and Design 13
6.1.2 Selected Sampling Equipment 13
6.1.3 Sample Handling and Shipping 13
6.1.4 Sampling Quality Assurance and Quality Control Procedures 15
6.2 Instrument and Equipment Calibration, Testing, Inspection and Maintenance 15

6.2.1 Instrument Calibration Frequency 15
6.2.2 Instrument and Equipment Testing, Inspection and Preventive Maintenance Requirements 15
6.3 Sample Preparation Methods, Analytical Methods, and Analytical Performance Requirements 15
6.4 Laboratory Information Management 16
6.5 Laboratory Quality Control 16
7.0 PERFORMANCE ASSESSMENTS, CORRECTIVE ACTIONS, AND EVALUATIONS 16
7.1 Routine Laboratory Assessment and Corrective Actions 16
7.2 Data Reduction and Validation 16
7.3 Reports to Management 16
8.0 DATA REPORT PACKAGES 16
9.0 VERIFICATION AND VALIDATION OF ANALYTICAL DATA 17
9.1 Data Verification 17
9.2 Data Validation 17
10.0 DATA QUALITY ASSESSMENT 17
11.0 REFERENCES 18
11.1 Project Documents 18
11.2 Codes and Standards 18

TABLES

Table B2-1 Data Quality Objective 7-Step Process [a] 19
Table B2-2 Proposed Sampling Methods 20
Table B2-3 Sample Preservatives, Containers, and Holding Times for Tank Waste Acceptance Samples 22
Table B2-4 Field Sampling Quality Control 23
Table B2-5 Analytical Method Requirements for Tank Waste Acceptance Samples 24
Table B2-6 Laboratory Quality Control 25

FIGURES

Figure B2-1 Simplified Flow Diagram and Sample Locations 26
Figure B2-2 WTP Sampling and Analysis Program Organization 27

ACRONYMS

ASTM	American Society for Testing and Materials
BNI	Bechtel National, Inc.
DOE	United States Department of Energy
DST	double-shell tank
EPA	United States Environmental Protection Agency
EQL	estimated quantitation limit
HLW	high-level waste
LAW	low-activity waste
LDR	Land Disposal Restrictions
LIMS	laboratory information management system
MDL	method detection limit
PCB	Polychlorinated Biphenyl
QA	quality assurance
QAPjP	Quality Assurance Project Plan
QC	quality control
WTP	River Protection Project – Waste Treatment and Immobilization Plant
WAC	Washington Administrative Code
WAP	Waste Analysis Plan

This page intentionally left blank.

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPjP) was prepared to support sampling and analysis to be implemented by the River Protection Project – Waste Treatment and Immobilization Plant (WTP), particularly in support of the verification and characterization of the waste feed and the characterization of secondary waste streams.

This QAPjP will ensure that the quality and quantity of data resulting from these sampling and analysis activities can support the decision-making process for the management of WTP wastes. This document was prepared using guidance provided in the following references:

- *EPA Guidance for Quality Assurance Project Plans* (EPA 1998).
- *Test Methods for Evaluating Solid Waste-Physical/Chemical Methods* (EPA 1997).
- *Quality Assurance Manual* (QA Manual).

Quality assurance (QA) and quality control (QC) ensure that an activity or project meets a required quality standard. QA is associated with record-keeping, tracking, audits, and assessments, and involves determining the desired level of quality and setting limits in advance. QC is associated with the controls that are implemented while an activity is being performed. This QAPjP will comply with the applicable requirements of the QA Manual and will become effective at the commencement of laboratory operations.

Controlled copies of this QAPjP will be kept at the WTP facility. The Project Document Control Manager, or equivalent title, will be responsible for ensuring that controlled copies of the QAPjP are kept current when revisions to this QAPjP are made.

2.0 PROJECT DESCRIPTION

The United States Department of Energy (DOE) has contracted Bechtel National, Inc. (BNI) to design, construct, and commission the WTP. DOE will select an alternate contractor to operate the WTP. The WTP will store and treat mixed waste currently stored in the Hanford tank system unit. The waste feed will be divided into two streams for processing and disposal purposes: high-level waste (HLW) stream, which is composed of the higher radionuclide and solids content of the waste feed, and low-activity waste (LAW) stream, which has a lower radionuclide and solids content. The LAW stream is generally the supernatant portion of the tank waste. The treatment processes are being designed to pretreat the waste feed to separate the waste feed into the HLW and LAW streams, immobilize the waste streams in a glass matrix through vitrification, and treat the off-gas to a level that protects human health and the environment.

BNI and the operations contractor will conduct sampling and analysis to characterize incoming waste feed and to assess the effectiveness of the treatment processes at the WTP. Secondary waste will also be sampled and analyzed if process knowledge is insufficient to properly designate the secondary waste. Figure B2-1 presents a simplified flow diagram showing the locations where samples will be collected for analytical testing to support regulatory decisions.

3.0 CONSTITUENTS OF CONCERN

The *River Protection Project – Waste Treatment Plant Waste Analysis Plan* (WAP) (Appendix 3A) identifies the sampling locations and associated constituents of concern for verification of the waste feed and for characterization of the waste feed.

3.1 Waste Acceptance Criteria

Verification analysis determines whether the waste feed can be accepted into the WTP for processing. The verification waste acceptance criteria are:

- Total organic carbon.
- Polychlorinated biphenyls (PCBs).

- pH.
- Compatibility.

The waste acceptance criteria for waste feed verification is described in the *Regulatory Data Quality Objectives Optimization Report (RDQO Optimization)* (24590-WTP-RPT-MGT-04-001) and will be re-evaluated as a result of the environmental risk assessment, currently under development. The environmental risk assessment is scheduled for completion prior to the commencement of cold operation of the WTP. The RDQO Optimization process is subject to periodic evaluation and may affect the list of analytes.

3.2 Characterization of the Waste Feed

The Regulatory DQO (Wiemers and others, 1998) process will determine the constituents of concern and analytical methods appropriate for the characterization of the waste feed. The Regulatory DQO (Wiemers and others, 1998) process is progressing according to the *Regulatory DQO Test Plan for Determining Method Detection Limits, Estimated Quantitation Limits, and Quality Assurance Criteria for Specified Analytes* (Patello and others, 2001) and is projected to be completed prior to commissioning of the WTP. The DQO process is an ongoing activity and may periodically change the constituents of concern and the selection of analytical methods.

4.0 PROJECT MANAGEMENT

This section of the QAPjP addresses the following requirements:

- Project organization and responsibility.
- Special training requirements.
- Documentation and records.
- Standard operating procedures.

4.1 Project Organization and Responsibility

An example of the WTP management structure supporting sampling and analysis activities is depicted in Figure B2-2. These organizational structures and functions may change over the life of the facility.

The WTP QA Manager (or designee) reports directly to the WTP Project Manager. The WTP QA Manager will provide independent QA oversight to ensure that onsite and subcontracted sampling and analytical laboratory activities are performed in accordance with this QAPjP.

The facility managers (or designees) for pretreatment, balance of facility, HLW vitrification, and LAW vitrification, supported by the Analytical Laboratory Manager, will coordinate the execution of sampling and analysis activities and ensure compliance with this QAPjP.

The shift managers (or designees) for pretreatment, balance of facility, HLW vitrification, and LAW vitrification will be responsible for the activities associated with sampling.

The WTP Analytical Laboratory Manager (or designee) will ensure that analysis is conducted in accordance with this QAPjP. This manager will oversee the WTP onsite laboratory, will be responsible for the coordination and technical oversight of any subcontracted laboratories, and will conduct periodic assessments to verify that onsite laboratory activities are being performed in accordance with this QAPjP.

Subcontracted analytical laboratory managers will be responsible for ensuring that this QAPjP is implemented in their respective laboratories.

4.2 Special Training Requirements

Individuals involved in sampling, analysis, or data review will be trained and qualified to safely implement the activities addressed in the WAP and this QAPjP. Training will conform to the training

requirements specified in the *Washington Administrative Code*, *Personnel Training* (WAC 173-303-330), the QA Manual, and the *River Protection Project – Waste Treatment Plant Dangerous Waste Training Plan* (Chapter 8.0).

Only individuals familiar with and trained in the requirements for waste acceptance criteria will approve waste shipments into the WTP. Evaluations will be performed by process engineers or chemists who are qualified to evaluate the waste for compatibility and acceptability for processing.

Training records will be maintained in accordance with Section 4.3 of this document.

4.3 Documentation and Records

This section presents the requirements associated with the development, management, and distribution of data and documents.

4.3.1 Document and Record Procedures

Documents and records developed as part of the waste analysis program will be generated, reviewed, approved, distributed, used, controlled, and revised in accordance with approved procedures. These procedures will comply with applicable requirements of the QA Manual.

Organizations that generate or use data in an electronic format are responsible for complying with applicable software quality requirements specified in the QA Manual to ensure that data input (and changes to data input) is complete and accurate, and that security and integrity of the data is maintained.

4.3.2 Document and Records Storage

Documents and records will be stored and maintained according to approved procedures consistent with applicable requirements of the QA Manual. These documents and records will include, but will not be limited to, the following:

- Training (see Section 4.2).
- Data report packages.
  - Chain-of-custody forms.
  - Sampling methods.
  - Sampling conditions.
  - Sample descriptions.
  - Sample management records.
  - Analytical methods.
  - Data summary reports.
  - QA and QC reports.
- Assessment reports (including non-conformance and deficiency reports).
- Instrument inspection, maintenance, and calibration logs.
- Records and results of waste analysis, specifically:
  - Waste profiles.
  - Waste verification.
  - Waste confirmation.
  - LDR evaluation.
  - Waste acceptance.
  - Waste non-conformance.

- Corrective actions.
- DST waste feed characterization.

4.4 Standard Operating Procedures

Standard operating procedures for waste sampling and analysis will be developed after the system design has been completed and before waste is received for processing. Standard operating procedures will be developed, implemented, and controlled in accordance with applicable requirements of the QA Manual.

5.0 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

5.1 Data Quality Objectives

The data quality objectives for the WTP and for the characterization of the Hanford tank waste are addressed in the following subsections.

5.1.1 Data Quality Objectives for the WTP

A DQO process [such as the seven-step procedure provided in *Guidance for the Data Quality Objectives Process* (EPA 1994)] may be implemented to support the decision-making process, particularly when complex decisions need to be made using analytical data. Using the DQO process ensures that the data collected are of adequate quality and quantity to support the decision-making process. The seven steps of this process are identified in Table B2-1, along with a summary of the key activities that are performed under each step.

5.1.2 RDQO Optimization for Hanford Tank Waste Characterization

Characterization of the Hanford waste feed will be performed in conformance with the RDQO Optimization (24590-WTP-RPT-MGT-04-001) process. This process establishes sample preparation and analytical methods suitable for determining the concentration of selected constituents of concern at method detection limits sufficient for regulatory requirements. The RDQO Optimization process is an ongoing activity and may affect the set of analytes and analytical methods.

5.2 Data Quality Indicators

This section discusses the following data quality indicators:

- Analytical measurement accuracy.
- Analytical precision.
- Representativeness.

5.2.1 Analytical Measurement Accuracy

Accuracy can be estimated by calculating the percentage recovery of laboratory matrix spike samples using the following equation, described in *Preparation Aids for the Development of Category II Quality Assurance Project Plans* (EPA 1991):

$$\%R = \left(\frac{s - u}{C_{sa}}\right)100$$

Where

%R = percentage recovery
s = measured concentration in spiked laboratory aliquot
u = measured concentration in un-spiked laboratory aliquot
C_{sa} = actual concentration of spike added

Accuracy can also be estimated by calculating percentage recovery for the use of standard reference materials or surrogates using the following equation, as outlined in *Preparation Aids for the Development of Category II Quality Assurance Project Plans* (EPA 1991):

$$\%R = \left(\frac{C_m}{C_{srm}}\right)100$$

Where

C_m = measured concentration of standard reference material or surrogate
C_{srm} = actual concentration of standard reference material or surrogate

Table B2-5 lists the parameters for which accuracy will be estimated.

5.2.2 Analytical Precision

Precision can be estimated by analyzing matrix spikes and matrix spike duplicates. The relative percentage difference between the analytical results for the matrix spike samples and the matrix spike duplicate samples will be calculated as outlined in *Preparation Aids for the Development of Category II Quality Assurance Project Plans* (EPA 1991):

$$RPD = \frac{|S_{ms} - S_{msd}|}{\left(\frac{S_{ms} + S_{msd}}{2}\right)} \times 100$$

Where

RPD = relative percentage difference
S_{ms} = matrix spike sample
S_{msd} = matrix spike duplicate sample

Precision can also be estimated by analyzing duplicate samples. The relative percentage difference between the analyte levels measured in these samples will be calculated using the following equation, provided in *Preparation Aids for the Development of Category II Quality Assurance Project Plans* (EPA 1991):

$$RPD = \frac{(C_1 - C_2)}{\left(\frac{C_1 + C_2}{2}\right)} \times 100$$

Where

RPD = relative percentage difference
C_1 = larger of the two observed values
C_2 = smaller of the two observed values

Table B2-5 lists the parameters for which precision will be estimated.

5.2.3 Representativeness

Representativeness is a qualitative QA objective that determines the degree to which a sample or group of samples is indicative of the subject being studied. It takes into account the size and volume of the sample, as well as the times and locations of sampling. The number of samples collected for the characterization of waste feed and secondary waste streams will be evaluated during the development of standard operating procedures to ensure that sampling is representative of the total waste being sampled.

Liquid samples taken within the WTP will be obtained from agitated vessels or piping systems to ensure that the sample taken represents the vessel contents.

5.3 Detection Limits and Estimated Quantitation Limits

Method detection limits (MDLs) and the estimated quantitation limits (EQLs) supporting waste characterization analysis have been established in the RQDO Optimization (24590-WTP-RPT-MGT-04-001) report. For other analyses supporting environmental decision-making, the laboratory will establish the MDLs and EQLs in conformance with SW-846 (EPA 1997) or other guidance.

The MDL is defined as the minimum concentration of a substance that can be measured and reported with 99 % confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

EQLs are defined as the lowest concentration that can reliably be achieved within specified limits of precision and accuracy during routine laboratory operating conditions. The EQL is generally 5 to 10 times the MDL. For many analytes, the EQL analyte concentration is selected as the lowest non-zero standard in the calibration curve. Sample EQLs are highly matrix-dependent.

The MDLs and EQLs will be determined as defined by Chapter 1 of SW-846 (EPA 1997). The MDLs will include sample preparation methods, and will be determined by spiking uncontaminated water and solid (typically sand) with known concentrations.

The EQL is affected by:

- Sample matrix.
- Sample volume or mass used.
- Final concentrate volume or final digestate volume from sample preparation.
- Amount introduced into the instrument for quantitation.
- Use of dry or wet weight for reporting solids.

Each EPA method in SW-846 (EPA 1997) lists target EQLs in water, soil, or both matrices. Water EQLs are lower than those in soil or waste. For various waste types, the methods list EQL multipliers relative to water or soil. The SW-846 methods stress that the EQL will differ by matrix and should be evaluated by matrix.

Certain samples may be reduced in sample size or diluted for waste minimization and to comply with the as low as reasonably achievable (ALARA) philosophy. The SW-846 (EPA 1997a) “method hotline” indicates that sample size is not a method modification unless detection limits are not sufficient for making decisions.

Section 6.3 and Table B2-5 present the project-specific analytical performance requirements.

5.4 Reporting Requirements

Data generated from laboratory analyses will be reported to BNI or the operations contractor in an organized format that contains the supporting information required in the data report package for the appropriate level of data verification or validation. Refer to Section 8.0 for a discussion of the data report package and to Section 9.0 for a discussion of data verification and validation.

The reported data will identify the concentration units (such as milligrams per liter) and appropriate laboratory qualifiers. Data reported as non-detected will be referenced against a stated MDL or instrument detection limit value. Values between the MDL and the EQL will be qualified and documented. If selected reporting limits are used instead of EQLs or detection limits, the reporting limits will be consistent with the specific data reporting requirements presented throughout the WAP.

6.0 DATA ACQUISITION AND MEASUREMENT

The following section addresses the QA requirements for data acquisition and measurement.

6.1 Sampling Procedures and Management

Subsections 6.1.1 through 6.1.4 provide direction on the types of sampling procedures to be implemented and the types of equipment that may be used to support the sampling, as well as guidance on how to manage and document field activities.

6.1.1 Sampling Procedures and Design

The sampling procedures to be implemented for analyzing waste feed from the DST system unit to support characterization of the waste feed and the characterization of secondary waste streams are described in the following sections. Proposed sampling methods are shown in Table B2-2. For samples taken at the WTP, standard operating procedures for sample collection will be developed after the system design is complete and before waste is received for processing.

6.1.2 Selected Sampling Equipment

Equipment selected to support waste sampling activities will meet the requirements of the specific SW-846 method (EPA 1997) or other applicable performance based analytical methods. If modifications of the procedure are needed, they will be requested in accordance with WAC 173-303-110.

When feasible, disposable equipment will be used to collect samples to obviate the need to decontaminate equipment after use. The process for decontamination of sampling equipment, when necessary, is presented in Section 6.1.3.3.

6.1.3 Sample Handling and Shipping

Personnel involved in sampling will be required to have read and understood the operating procedures for sampling before implementing sampling activities. The sample preservation, containers, and holding times for each of the types of analyses to be performed are specified in Table B2-3.

Storage conditions will be evaluated to ensure that the samples remain representative. Samples will normally be transported to the analytical laboratory pneumatically or manually.

A unique identification number generated by the laboratory information management system (LIMS) will be marked on sample containers before collecting the sample. This number will be recorded on the chain-of-custody form. The sample labeling and chain-of-custody documentation will be checked to ensure the traceability of each of the samples.

6.1.3.1 Chain-of-Custody

The ability to demonstrate that samples were obtained from the locations specified in the applicable WAP and that they reached the laboratory without alteration are key considerations for data resulting from laboratory analysis. Evidence of collection, shipment, reception at the laboratory, and laboratory custody until disposal will be documented using a chain-of-custody form. The chain-of-custody form will, as a minimum, supply the following information:

- Sample identification number.
- Sample volume.

- Number of sample bottles/type.
- Method of sampling.
- Sampling date and time.
- Sampling location.
- Name of the contact person.
- Shipping date.
- Analyses to be performed.
- Preservation method.
- Sample characteristics, if any.

A sample will be considered to be in custody when it is under any of the following conditions:

- In a person's possession.
- In view, after having been in a person's physical possession.
- Locked so that it cannot be tampered with, after having been in a person's physical custody.
- Sealed with tamper-proof seal.
- In a secured area, restricted to authorized personnel only.

Chain-of-custody forms will be included in the final data report package. Electronic chain-of-custody forms and electronic signatures may be used.

The chain-of-custody practices and procedures for the WTP will address the following general requirements for custody records:

- Sample management planning and procedures will identify responsibilities, including interfaces between organizations for documenting possession of a sample from collection and identification through handling, preservation, shipment, transfer, analysis, storage, and final disposition.
- Sample traceability will ensure that it can be tracked from its collection through final disposition.
- Sample identification will be documented and checked before the sample is released.
- If individual samples have specific custody requirements, as required by documents such as the WAP, test plans, study plans or job packages, these requirements will be implemented.
- For samples with limited use or storage life, methods will be established that preclude using an out-of-date sample.

Implementing documents will identify those representative samples that need to be archived.

6.1.3.2 Sample Preservation, Containers and Holding Time

Table B2-3 lists the sample container, preservation method, and holding time requirements for different types of analyses.

6.1.3.3 Maintaining and Decontaminating Field Equipment

Field equipment used to support waste monitoring and sampling activities will be maintained in accordance with manufacturer guidelines, and will be decontaminated prior to use. Disposable sampling equipment will be used whenever possible due to the high concentrations of radionuclides in the waste materials to be sampled.

Equipment decontamination will be performed according to approved procedures and consistent with guidance provided in the following references or by the manufacturer:

- *Test Methods for Evaluating Solid Waste - Physical/Chemical Methods*, SW-846 (EPA 1997).

- *A Compendium of Superfund Field Operations Methods* (EPA 1987).

6.1.4 Sampling Quality Assurance and Quality Control Procedures

The WTP sampling procedures for characterization of waste feed and secondary waste streams shall be developed in accordance with the requirements of this QAPjP. QA audits and surveillances of sampling activities will be conducted by the WTP QA Manager (or designee) to verify the implementation of QAPjP requirements. Management assessments will also be performed by the WTP Analytical Laboratory Manager (or designee) to ensure that the waste sampling program is adequate and effective.

Revisions to established sampling procedures will be reviewed to determine their possible impacts on data quality and approved by authorized personnel prior to issuance and implementation. Field records and documentation, including field measurements, will be handled and preserved in a manner consistent with Section 4.3 of this QAPjP.

Quality assurance surveillances and audits, management assessments, corrective actions, and root cause analyses will be implemented as described in Section 7.1 of this QAPjP.

Sampling quality control (QC) procedures may involve the collection of blanks and duplicate samples. The purpose and frequency of collection for each of these samples are presented in Table B2-4, together with sampling QC objectives.

6.2 Instrument and Equipment Calibration, Testing, Inspection and Maintenance

The following sections address instrument calibration, testing, inspection, and maintenance requirements for waste anaylsis.

6.2.1 Instrument Calibration Frequency

Laboratory personnel will be responsible to ensure that instruments are calibrated in accordance with approved procedures. Instrument calibration will comply with applicable QA/QC requirements of the applicable analytical method. Instrument calibration records will be managed in accordance with Section 4.3 of the QAPjP.

6.2.2 Instrument and Equipment Testing, Inspection and Preventive Maintenance Requirements

The Laboratory Manager (or designee) will ensure that laboratory instruments are routinely tested and inspected to confirm that they are in proper working order. Preventive maintenance schedules recommended by the equipment manufacturer will be implemented and documented.

6.3 Sample Preparation Methods, Analytical Methods, and Analytical Performance Requirements

The sample preparation methods, analytical methods and performance requirements (such as EQL, precision, and accuracy) for analyses are summarized in Table B2-5, and are consistent with the requirements specified in SW-846 (EPA 1997) or as negotiated in conformance with the regulatory data quality objectives identified in the RDQO Optimization (24590-WTP-RPT-MGT-04-004, Rev 0). Any applicable analytical method provided in WAC 173-303-110 may be used for analysis. If an analytical method used for regulatory purposes other than the methods provided in WAC 173-303-110 are proposed, approval of the method will be requested from Ecology according to WAC 173-303-910(2). The proposed analytical method will not be used for regulatory purposes until Ecology authorizes the method. If modifications to a procedure are needed, they will be requested in accordance with WAC 173-303-110(4). The SW-846 (EPA 1997a) “method hotline” indicates that sample size is not a method modification unless detection limits are not sufficient for making decisions.

6.4 Laboratory Information Management

The laboratory information management system (LIMS) is part of the plant information network (PIN) system. Sample and QC data will be stored in the LIMS database. At a minimum, this database will hold the sample number, sample collection date, analysis date, analytical methods employed, analytical results, and validation qualifiers. In the event of a LIMS system failure, this information will be recorded in paper form and entered into LIMS once the system is operating. For a more complete description of these software systems, refer to Section 7 of the WAP.

6.5 Laboratory Quality Control

Laboratory QC procedures will involve the analysis of duplicates, method blanks, and matrix spike samples. The purpose and frequency for each of these samples is presented in Table B2-6.

7.0 PERFORMANCE ASSESSMENTS, CORRECTIVE ACTIONS, AND EVALUATIONS

The following subsections address assessment and oversight requirements.

7.1 Routine Laboratory Assessment and Corrective Actions

The WTP Technical Manager (or designee) will conduct periodic assessments to verify that laboratory procedures meet the requirements of this QAPjP. QA surveillances and audits will be conducted by the WTP QA Manager (or designee) to ensure that laboratory activities comply with applicable QA requirements. Management assessments will also be performed by the WTP Analytical Laboratory Manager (or designee) to ensure that the laboratory program is adequate and effective.

Management assessments, QA surveillances and audits, corrective action, and root cause analyses will be conducted according to approved procedures.

7.2 Data Reduction and Validation

Data reduction and validation procedures will be developed for data generated for environmental compliance according to the requirements of the current version of SW-846 (EPA 1997) or other applicable guidance, prior to the operation of the analytical laboratory. Validation and verification of analytical data is discussed in Section 9.0.

7.3 Reports to Management

Conditions identified as having an adverse effect on quality, the significance of such conditions, and corrective actions will be documented, reported to the appropriate level of management, and resolved according to approved procedures.

The assessment reports may include the following items, as appropriate:

- Deviations from the requirements specified in this QAPjP.
- Limitations or constraints on the applicability of the resulting analytical data.
- Results of QA surveillances and audits of the waste analysis program.
- Management assessments of data quality in terms of MDLs, precision, accuracy, and representativeness. The quantitative performance indicators for precision and accuracy are given in Table B2-5.

8.0 DATA REPORT PACKAGES

The data reports received from the laboratory will serve as documentation of an analytical project. The primary data reporting will be by electronic systems. The following are examples of the information contained in data reports documenting environmental support activities:

- Sample identifications.

- Holding times, including:
  - Sampling date.
  - Date the laboratory received the sample.
  - Extraction or preparation date.
  - Analysis date.
  - Re-extraction or re-analysis dates.
- Analytical parameters.
- QA, including:
  - Descriptions of procedures and methods used to generate the results.
  - Deviations from procedures.
  - Analytical anomalies for raw data results, spikes, surrogates, and method blanks.
  - Analytical qualifiers.
  - Calibration and instrument tuning.
  - Corrective actions implemented.
- Raw analytical data, as appropriate.
- Chain-of-custody, as appropriate.

9.0 VERIFICATION AND VALIDATION OF ANALYTICAL DATA

The data verification and validation processes will ensure that the data resulting from the selected analytical method are consistent with the requirements specified in this QAPjP. Persons performing data verification or validation will be trained according to Section 4.2.

9.1 Data Verification

The primary data reporting will be by electronic data systems. Data verification will be performed on laboratory data packages that support environmental compliance to ensure that their content is complete and in order. A page by page review of the data package will be performed to ensure that:

- The data package contains the required technical information.
- Deficiencies are identified and documented.
- Identified deficiencies are corrected by the laboratory and the appropriate revisions are made.
- Deficient pages are replaced with the laboratory corrections.
- Data package revisions are tracked.
- A copy of the completed verification report is placed in the data file.

9.2 Data Validation

Data validation ensures that the data resulting from analytical measurements meet the quality requirements specified in this QAPjP. Data validation will be performed on data packages that support environmental compliance.

A validation plan will be developed and implemented prior to the operation of the laboratory, according to guidance found in SW-846, Chapter 4 (EPA 1997), or other appropriate guidance.

10.0 DATA QUALITY ASSESSMENT

Data obtained will be evaluated to determine whether they are of the appropriate type, quality, and quantity to support their intended use. Such data quality assessment will be performed, in accordance with *Guidance for Data Quality Assessment* (EPA 1996), on data packages used to ensure environmental compliance.

11.0 REFERENCES

11.1 Project Documents

24590-WTP-PL-ENV-01-002, *River Protection Project – Waste Treatment Plant Dangerous Waste Training Plan.*

24590-WTP-QAM-QA-01-001, *Quality Assurance Manual.*

24590-WTP-RPT-ENV-01-003, *River Protection Project – Waste Treatment Plant Waste Analysis Plan.*

24590-WTP-RPT-MGT-04-001, Rev. 0, *Regulatory Data Quality Objectives Optimization Report*

11.2 Codes and Standards

ASTM. 2001. *Standard Test Methods for Compatibility of Screening Analysis of Waste*, Method D5058-90. American Society for Testing and Materials, West Conshohocken, Pennsylvania.

EPA. 1987. *A Compendium of Superfund Field Operations Methods*, EPA/540/P-87/001b. US Environmental Protection Agency, Washington, D.C.

EPA. 1991. *Preparation Aids for the Development of Category II Quality Assurance Project Plans*, EPA/600/8-91/004. US Environmental Protection Agency, Washington, D.C.

EPA. 1994. *Guidance for the Data Quality Objectives Process*, EPA QA/G-4, September 1994. US Environmental Protection Agency, Washington, D.C.

EPA. 1996. *Guidance for Data Quality Assessment*, EPA QA/G-9. US Environmental Protection Agency, Washington, D.C.

EPA. 1997. *Test Methods for Evaluating Solid Waste, Physical Chemical Methods*, SW-846, Third Edition as amended. US Environmental Protection Agency, Washington, D.C.

EPA. 1998. *EPA Guidance for Quality Assurance Project Plans*, EPA QA/G-5, February 1998. US Environmental Protection Agency, Washington, D.C.

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

Table B2-1 Data Quality Objective 7-Step Process [a]

	Key Activities
Step 1: State the problem	• Identify the constituents of concern • Develop a conceptual site model • Formulate a concise problem statement
Step 2: Identify the decisions	• Identify the principle study questions that the study will attempt to resolve • Identify the alternative actions that may result once each of the principal study questions has been resolved • Integrate the principal study questions and alternative actions to form decision statements
Step 3: Identify required inputs	• Identify the information needed to resolve each decision statement • Define the source and level of quality for the information needed • Determine whether data of adequate quality already exist
Step 4: Define study boundaries	• Define the population of interest and the geographic area or volume to which each decision statement applies • Divide the population into statistically-based strata with relatively homogeneous characteristics • Define the temporal boundaries of the problem • Define the time frame to which each decision applies • Determine when to collect the data
Step 5: Develop a decision rule	• Define the statistical parameters (such as mean, upper confidence limit) • Determine the final action • Develop "if… then…" statements that incorporate the parameter of interest, scale of decision-making, action level, and actions that would result from the decision
Step 6: Specify tolerable limits on decision errors	• Define the expected concentration range for the analyte of interest • Identify the decision error • Define the null hypothesis • Select a statistical vs. non-statistical sampling design • For statistical designs, define the boundaries of the gray region and set tolerable limits for decision error
Step 7: Optimize the design	<u>Non-statistical design</u> • Summarize applicable screening method alternatives • Summarize applicable sampling method alternatives • Develop an integrated screening or sampling design <u>Statistical design</u> • Identify statistical sampling design alternatives (such as simple random, stratified random) and select the preferred option • Select the statistical hypothesis test for testing the null hypothesis • Evaluate various design options by varying the decision error criteria and width of the gray region • Select the preferred sampling design
[a] *Guidance for the Data Quality Objectives Process* (EPA 1994)	

Table B2-2 Proposed Sampling Methods

Waste Category	Waste Type	Sample Purpose	Type of Sample
DST system unit waste feed	Staged tank waste	Waste verification[a]	Representative split sample from the Department of Energy
	As received waste	Waste acceptance[b]	Grab
Solid	**Mixed Waste Streams**		
	ILAW/IHLW product verification	ILAW/IHLW characterization	Grab
	Entrained solids	Secondary waste characterization	Grab
	Spent ion exchange resin	Secondary waste characterization	Grab
	Off-gas treatment system equipment and components	Secondary waste characterization	Grab or smear
	Spent carbon and catalyst from off-gas treatment	Secondary waste characterization	Grab
	Out-of-service equipment	Secondary waste characterization	Grab or smear
	Dangerous or Mixed Waste Streams		
	Laboratory waste	Secondary waste characterization	Grab
	Maintenance waste	Secondary waste characterization	Grab
	Used personal protective equipment	Secondary waste characterization	Grab
Liquid	**Mixed Waste Streams**		
	Waste feed evaporator condensate[c]	Secondary waste characterization	Grab
	LAW melter feed evaporator condensate[c]	Secondary waste characterization	Grab
	LAW and HLW off-gas condensate[c]	Secondary waste characterization	Grab
	LAW and HLW melter off-gas scrubber blowdown[c]	Secondary waste characterization	Grab
	Cesium process condensate[c]	Secondary waste characterization	Grab
	Cesium ion exchange rinse water[c]	Secondary waste characterization	Grab
	Plant wastewater containing DST waste[c]	Secondary waste characterization	Grab

Waste Category	Waste Type	Sample Purpose	Type of Sample
	Dangerous or Mixed Waste Streams		
	Maintenance waste	Secondary waste characterization	Grab
	Off-specification chemicals	Secondary waste characterization	Grab

[a] Subject to requirements of the RDQO Optimization (24590-WTP-RPT-MGT-04-001).

[b] Refer to table B2-2.

[c] These aqueous waste streams are collected in the effluent mixing tank prior to sampling.

Table B2-3 Sample Preservatives, Containers, and Holding Times for Tank Waste Acceptance Samples

Analysis	Container	Minimum Sample Size[a]	Preservative[b]	Holding Time
Liquid Samples				
Total organic carbon	Plastic	1 mL	H_2SO_4 to pH<2	28 days
PCB[c] compounds	Plastic	10 mL	None	14 days (extraction) 40 days (analysis)
pH	Plastic	5 mL	None	Analyze as soon as possible
Compatibility	Plastic	10 mL	None	None
Solid Samples				
Total organic carbon	Plastic	0.1 g	None	28 days
PCB[c] compounds	Plastic	0.5 g	None	14 day (extraction) 40 days (analysis)

Notes:
[a] Minimum sample size may change based on ALARA ("as low as reasonably achievable") philosophy
[b] Methodologies may be modified per requirements of the RDQO Optimization (24590-WTP-RPT-MGT-04-001).
[c] PCB = Polychlorinated biphenyls

Table B2-4 Field Sampling Quality Control

Sample Type	Frequency	Purpose
Water blank	The frequency will be determined and documented in operating procedures before sampling operations are begun.	This will be a water sample that receives the same analysis steps as the sample for the specified procedure. The blank will confirm that the water is not contaminated.
Equipment blank		A sample of analyte-free water used to rinse the sampling equipment. It is used to document of adequate decontamination of sampling equipment[a]. Analysis will be for tests performed for the specified procedure.
Duplicate		This QC sample is a second aliquot of the collected sample and is used to determine method precision.
[a] Decontamination will be performed if disposable equipment cannot be used.		

Table B2-5 Analytical Method Requirements for Tank Waste Acceptance Samples

CAS[a] Number	Constituent of Concern	Target EQL[b]	SW-846 Method (EPA 1997)		Precision[c]	Accuracy
			Solid	Liquid		
None	Total organic carbon (TOC)	10 mg/L	9060	9060	80-120 %	80-120 %
1336-36-3	Polychlorinated biphenyls (PCBs)	3.3 mg/L	3550B/8082	3510C/8082	70-130 %	80-120 %
None	pH	2 to 12.5 pH units	9040B/ EPA 150.1	9040B/ EPA 150.1	± 0.1 pH unit [d]	± 0.1 pH unit [e]
None	Compatibility	± 1 °C	NA [f]	ASTM [g] D 5058-90	NA [f]	90-110 %

Notes:
[a] Chemical Abstracts Service
[b] estimated quantitation limit
[c] Methodologies may be modified per requirements of the RDQO Optimization (24590-WTP-RPT-MGT-04-001).
[d] results of replicate measurements
[e] comparison to calibration solution
[f] not applicable
[g] American Society for Testing and Materials (ASTM 2001)

1

Table B2-6 Laboratory Quality Control

Sample Type	Frequency	Purpose
Duplicate	The frequency will be determined and documented in operating procedures before analytical operations are begun.	This QC sample is a second aliquot of the collected sample and is used to determine method precision.
Method blank		An analyte-free matrix to which reagents are added in the same volumes or proportions as those used in sample processing. It is used to document contamination resulting from the analytical process. This method blank will be carried through the complete sample preparation and analytical procedure.
Matrix spike or matrix spike duplicate		This QC sample is spiked with known quantities of analytes. The QC spike ensures that the analysis is testing for the specified analyte.

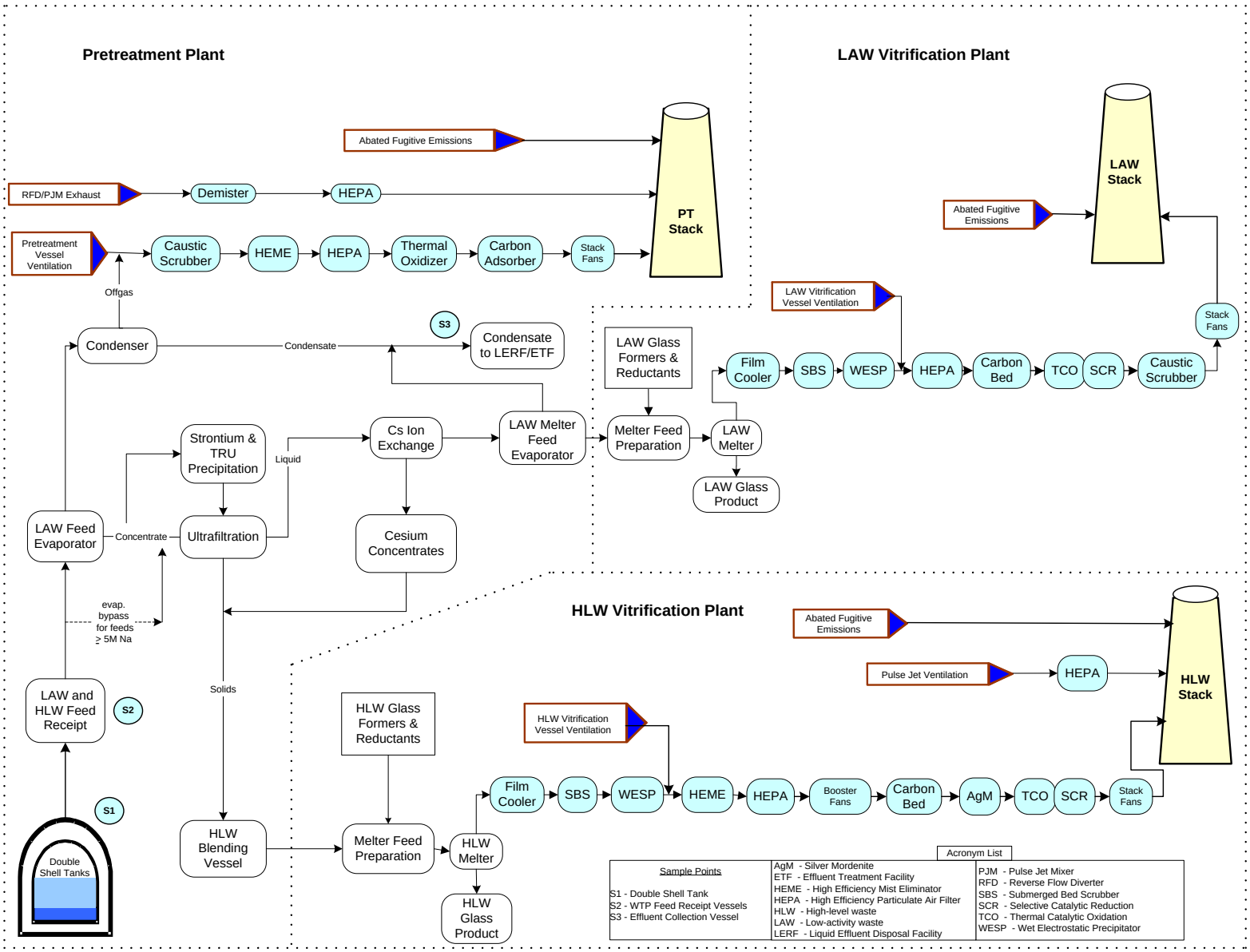


Figure B2-1 Simplified Flow Diagram and Sample Locations

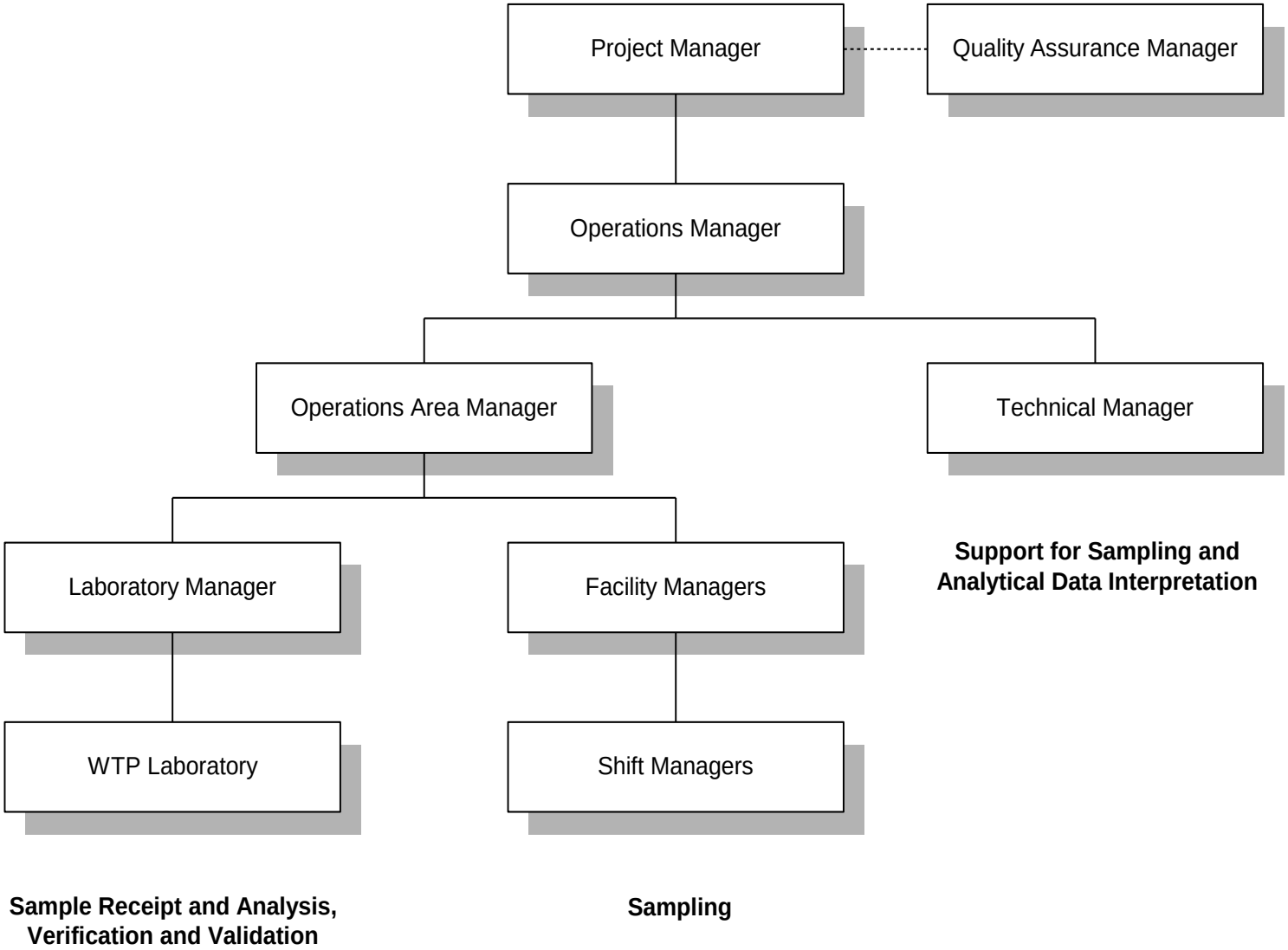


Figure B2-2 WTP Sampling and Analysis Program Organization

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
CHAPTER 4.0
PROCESS INFORMATION

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
12/15/2016	8C.2016.Q3
06/20/2016	8C.2016.4F

This page intentionally left blank.

CHAPTER 4.0
PROCESS INFORMATION

This page intentionally left blank.

CHAPTER 4.0
PROCESS INFORMATION

TABLE OF CONTENTS

4.0 PROCESS INFORMATION 5
4.1 Process Description 5
4.1.1 Process Overview 5
4.2 Tank Systems 7
4.2.1 Design, Installation, and Assessment of Tank Systems 8
4.2.1.1 Design Requirements 8
4.2.1.2 Physical Information for Tanks 9
4.2.2 Ancillary Equipment Requirements 9
4.2.2.1 Transfer or Pressure Control Devices 9
4.2.2.2 Bulges 11
4.2.2.3 Description of WTP Piping System 11
4.2.2.4 Description of Foundations 13
4.2.3 Integrity Assessments 13
4.2.4 Additional Requirements for Existing Tanks 14
4.2.5 Additional Requirements for New Tanks 14
4.2.5.1 Additional Requirements for New On-Ground or Underground Tanks 14
4.2.6 Secondary Containment and Release Detection for Tank Systems 14
4.2.6.1 Secondary Containment System Requirements 15
4.2.6.2 Management of Release or Spill to Sump and Secondary Containment Drain Systems 19
4.2.6.3 Additional Requirements for Secondary Containment 19
4.2.7 Variances from Secondary Containment Requirements 20
4.2.8 Tank Management Practices 20
4.2.9 Labels or Signs 21
4.2.10 Air Emissions 21
4.2.10.1 Tank System Emissions 21
4.2.10.2 Process Vents 21
4.2.10.3 Equipment Leaks 21
4.2.10.4 Tanks and Containers 21
4.2.11 Management of Ignitable, Reactive and Incompatible Waste in Tanks 21

4.3 LAW and HLW Miscellaneous Treatment Sub-Systems [WAC 173-303-680 and WAC 173-303-806(4)(i)] 22
4.3.1 Melter Capacity and Production 22
4.3.2 Description of Melter Units [WAC 173-303-806(4)(i)(i)] 22
4.3.3 Automatic Waste Feed Cut-Off System 24
4.3.4 Offgas Treatment System 25
4.3.5 Miscellaneous Unit Emissions Performance 25
4.3.6 Physical and Chemical Characteristics of Waste [WAC 173-303-680(2)(a)(i)] 26
4.3.7 Treatment Effectiveness Report [WAC 173-303-806(4)(i)(iv)] 26
4.3.8 Environmental Performance Standards for Melter Systems [WAC 173-303-680(2)] 26
4.3.8.1 Protection of Groundwater, Subsurface Environment, Surface Water, Wetlands and Soil Surface [WAC 173-303-680(2)(a) and (b)] 26
4.3.8.2 Protection of the Atmosphere [WAC 173-303-680(2)(c)] 27
4.3.9 Approach to Risk Assessment [WAC 173-303-680(2)(c)(i) through (vii)] 27
4.4 Other Waste Management Units 28
4.4.1 Waste Piles 28
4.4.2 Surface Impoundments 28
4.4.3 Incinerators 28
4.4.4 Landfills 28
4.4.5 Land Treatment 28
4.4.6 Air Emissions Control 28
4.4.7 Waste Minimization 28
4.4.8 Groundwater Monitoring for Land-Based Units 29
4.4.9 Functional Design Requirements 29

4.0 PROCESS INFORMATION

4.1 Process Description

Mixed waste is managed by the Hanford Tank Waste Treatment and Immobilization Plant (WTP) using tanks, containment buildings, container storage areas, and miscellaneous unit systems. The floors and lower portions of the black cells and hot cell walls are lined with stainless steel for secondary containment. Black cells and hot cells will be equipped with an instrumented sump or sumps for leak detection. Liquids are removed from the black cell sumps by steam ejectors.

The pretreatment facility uses tank systems, miscellaneous unit systems (defined in Operating Unit Group 10, Section III.10.G of this Permit), and containment buildings to prepare waste feed from the Hanford Site double-shell tank (DST) system for vitrification. The low-activity waste (LAW) vitrification facility uses miscellaneous treatment unit sub-systems and equipment (defined in Operating Unit Group 10, Section III.10.H and III.10.I of this Permit), tank systems, and containment buildings to vitrify LAW feed. The high-level waste (HLW) vitrification facility uses miscellaneous treatment unit sub-systems and equipment (defined in Operating Unit Group 10, Section III.10.J and III.10.K of this Permit), tank systems, containment buildings, and container storage areas to vitrify HLW feed. A tank system and a container storage area are used at the analytical laboratory (Lab). Container storage is used in the balance of facilities (BOF) for waste management activities. These waste management activities are discussed in the following sections and in Appendix 4D for the pretreatment facility, Appendix 4E for the LAW vitrification facility, Appendix 4F for the HLW vitrification facility, Appendix 4H for the Lab and Appendix 4I for the BOF. Appendix 4G is reserved for the direct-feed low-activity waste (DFLAW) effluent management facility (EMF) and will be completed and submitted at a later date.

4.1.1 Process Overview

The WTP will store and treat waste feed from the Hanford Site DST system in the pretreatment facility. The pretreatment facility will separate the waste into two feed streams for the LAW and HLW melters. Feed from the DST system is expected to be of four major waste feed types, or waste feed envelopes. These waste feed envelopes are described as follows:

- Envelope A. This waste feed envelope will contain cesium at concentrations high enough to warrant removal of these radionuclides during pretreatment, to ensure that the immobilized low-activity waste (ILAW) glass will meet applicable requirements.
- Envelope B. This waste feed envelope will contain higher concentrations of cesium than envelope A. Cesium must be removed to comply with the ILAW specifications. This envelope may also contain concentrations of chlorine, chromium, fluorine, phosphates, and sulfates that are higher than those found in envelope A, which may limit the waste incorporation rate into the glass.
- Envelope C. This waste feed envelope will contain organic compounds containing complexed strontium and transuranics (TRU) that will require removal in a processing step unique to this waste envelope. As with envelopes A and B, cesium will also require removal in the pretreatment process to ensure that ILAW glass meets applicable requirements.
- Envelope D. HLW feed will be in the form of a slurry containing approximately 10 to 200 grams of unwashed solids per liter. The liquid fraction of the slurry will be separated from the solids and classified as envelope A, B, or C waste. The solid fraction will be envelope D waste.

The WTP treatment processes are designed to immobilize the waste constituents in a glass matrix by vitrification and to treat the offgas from the processes to a level that protects human health and the environment.

Two similarly designed vitrification systems will be used in the WTP. One system will immobilize the pretreated LAW feed and the second will immobilize the pretreated HLW feed. The dangerous waste

constituents in the melter feed will be destroyed, removed, or immobilized in a glass matrix through the vitrification process.

The ILAW and immobilized high-level waste (IHLW) produced by the WTP will be in the form of glass packaged in stainless steel containers for ILAW and stainless steel canisters for IHLW and placed in permitted treatment, storage, and/or disposal (TSD) facilities.

Secondary waste streams (e.g., dangerous and mixed solid waste, nonradioactive and nondangerous liquid effluents, mixed waste and dangerous liquid effluents) will be characterized and recycled into the treatment process, transported to permitted TSD facilities located on the Hanford Site, or transported off-site, as appropriate. Nonradioactive dangerous waste will also be generated by laboratory and maintenance activities. This waste will be managed at the WTP until it can be transferred to an off-site TSD unit.

There are four primary components of the WTP: pretreatment, LAW vitrification, HLW vitrification, and the analytical laboratory. In addition, each of these waste treatment processes is supported by systems and utilities known as the balance of facilities. The following discussion presents an overview of these waste treatment processes and balance of facilities systems at the WTP. Figure 4A-1 in Appendix 4A presents a simplified process flow diagram of the WTP treatment processes.

Pretreatment

The waste feed will be stored and subsequently treated in the pretreatment facility prior to vitrification. The processes in the pretreatment facility will condition the waste feed and remove cesium, strontium, TRU compounds, and entrained solids. The waste feed will also be processed through ultrafiltration to separate the solids.

There will be three types of waste management units in the pretreatment facility, as follows:

- Tank systems
- Containment buildings
- Miscellaneous unit systems

The structure of the pretreatment facility is supported by a reinforced concrete foundation. The superstructure will be made of structural steelwork with a metal roof. Typically, the process cells within the pretreatment facility will be constructed of reinforced concrete. Secondary containment is provided as required for tank systems and miscellaneous unit systems managing dangerous or mixed waste. Secondary containment consists of either stainless steel liner or protective coating. Table 4D-3 in Appendix 4D provides information on secondary containment. Figure 4A-2 and 4A-02A in Appendix 4A present simplified process flow diagrams of the pretreatment processes.

LAW Vitrification

The LAW vitrification facility will house the vitrification systems for production of the ILAW. Three types of waste management units will be located in the LAW vitrification facility, as follows:

- Tank systems
- Containment buildings
- Miscellaneous treatment unit sub-systems and equipment

The LAW vitrification facility will be constructed of reinforced concrete and structural steelwork. The below-grade portion of the building structure is made of reinforced concrete, and the superstructure will be made of reinforced concrete and structural steelwork with a metal roof. The facility structure will be supported by a reinforced concrete mat foundation.

Secondary containment is provided as required for tank systems and miscellaneous unit sub-systems and equipment managing dangerous or mixed waste. Secondary containment consists of either stainless steel liner or protective coating. Table 4E-3 in Appendix 4E provides information on secondary containment**.** Figure 4A-3 in Appendix 4A presents a simplified process flow diagram of the LAW vitrification treatment processes.

HLW Vitrification

The HLW vitrification facility will house the vitrification systems for producing IHLW. Four types of waste management units will be located in the HLW vitrification facility, as follows:

- Container storage areas
- Tank systems
- Containment buildings
- Miscellaneous treatment sub-systems and equipment

The HLW vitrification facility will be constructed of reinforced concrete and structural steelwork. The lower elevations of the building structure are reinforced concrete construction, and the upper elevations made of structural steelwork with a metal roof. The facility structure will be supported by a reinforced concrete mat foundation. Secondary containment is provided as required for tank systems and miscellaneous unit sub-systems and equipment managing dangerous or mixed waste. Secondary containment consists of either stainless steel liner or protective coating. Table 4F-3 in Appendix 4F provides information on secondary containment. Figure 4A-4 in Appendix 4A presents a simplified process flow diagram of the HLW vitrification treatment processes.

Analytical Laboratory

The analytical laboratory will house the hot cells, laboratories, and systems for analyzing process samples and managing regulatory compliance samples. Two types of waste management units will be located in the analytical laboratory, as follows:

- Container storage areas
- Tank systems

The analytical laboratory will be constructed of reinforced concrete, structural steelwork, and a metal roof. The below-grade portions of the building structure will be constructed of reinforced concrete. The analytical laboratory structure will be supported by a reinforced concrete mat foundation. Secondary containment is provided as required for tank systems managing dangerous or mixed waste. Secondary containment consists of either stainless steel liner or protective coating. Table 4H-2 in Appendix 4H provides information on secondary containment.

Balance of Facilities

The balance of facilities includes support systems and utilities required for the waste treatment processes within the pretreatment, LAW vitrification, HLW vitrification, and the analytical laboratory. The balance of facilities support systems and utilities include, but are not limited to, heating and cooling, process steam, process water, chilled water, primary and secondary power supplies, and compressed air. The balance of facilities also includes the glass former reagent system (GFR) that supplies glass former reagents to the LAW and HLW vitrification facilities. Regulated waste management units within the balance of facilities include the HLW failed melter storage facility and the nonradioactive dangerous waste storage area.

4.2 Tank Systems

This section contains descriptive information for each tank system used for managing mixed waste. The term “tank systems” refers to mixed waste storage or treatment tanks, including primary containment

sumps, and their associated ancillary equipment and containment systems. Figures and permit drawings depicting design features of tank systems are found in DWP Operating Unit Group 10.

The following text uses the terms "vessel" and "tank". The term "vessel" is an engineering term and denotes more robust construction than a typical mixed waste storage or treatment tank. The term "vessel" is included due to the use of the term in the American Society of Mechanical Engineers (ASME) codes and specifications, which will be followed for most tank construction at the WTP.

4.2.1 Design, Installation, and Assessment of Tank Systems

This section describes the attributes of tank systems that will contain mixed waste. Tanks and ancillary equipment containing only additives or reagents, such as glass-forming chemicals, precipitation reagents, or unused resin, are not regulated under Resource Conservation and Recovery Act (RCRA) or the Washington State Dangerous Waste Program, and are therefore not included.

Tank systems that will contain mixed waste are designed to comply with worst-case scenarios, such as extreme pH, temperature, and pressure conditions. The WTP will be entirely new construction, and there will be no "existing tanks" in the plant.

Tank systems, with the exception of the two outside tanks at the pretreatment facility, will be located indoors and within process cells, process rooms, or caves with controlled access.

4.2.1.1 Design Requirements

Tanks

Most of the tanks that come in contact with the waste will be operated under atmospheric pressure conditions at the WTP. The mixed waste tanks will be designed, at a minimum, to *Boiler and Pressure Vessel Code* (ASME 2000), the American Petroleum Institute (API) codes, or other appropriate design codes. Tank integrity will be reinforced by additional requirements of the tank group and seismic category assignment to each tank.

The vessels will be designed for seismic loading in accordance with the *Uniform Building Code* (UBC) standard for Zone 2B (UBC 1997).

The codes and standards that will be followed for design, construction, and inspection for the tanks are identified below, as applicable:

ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ASNT	American Society of Non-Destructive Testing
ASTM	American Society for Testing and Materials
EPA	US Environmental Protection Agency
NBBPVI	The National Board of Boilers and Pressure Vessel Inspectors
OSHA	Occupational Safety and Health Administration
PFI	Pipe Fabrication Institute
UBC	Uniform Building Code
WRC	Welding Research Council

Permit documents describing tank design requirements are located in DWP Operating Unit Group 10, Appendix 7.7:

- Specification for Pressure Vessel Design and Fabrication, 24590-WTP-3PS-MV00-T0001
- Seismic Qualification Criteria for Pressure Vessels, 24590-WTP-3PS-MV00-T0002

- Specification for Pressure Vessel Fatigue Analysis, 24590-WTP-3PS-MV00-T0003

Piping and Pipe Support Design

The design code of the WTP piping and pipe supports is ASME B31.3 Code (ASME 1996), as well as the United States Department of Energy (DOE) seismic requirements. In compliance with DOE seismic requirements (DOE 1996), response spectrum method or UBC (UBC 1997) static method is used for the seismic analysis of the piping systems.

Additional information for piping and pipe support design is included in the following documents, which are included in DWP Operating Unit Group 10 Appendices as indicated:

- *Material for Ancillary Equipment*, 24590-WTP-PER-M-02-002 (Appendix 7.9)
- *Piping Material Class Description*, 24590-WTP-PER-PL-02-001 (Appendix 4)
- *Ancillary Equipment Pipe Support Design*, 24590-WTP-PER-PS-02-001 (Appendix 7.5)

4.2.1.2 Physical Information for Tanks

Tables in Appendices 4D, 4E, 4F and 4H list current tank design information (capacity, materials of construction, and dimensions). The tank systems are grouped by plant and process system.

Tank operation is generally automated. However, operator intervention can be used when human decisions or approval are required for initiation and termination of a process operation. Descriptions of tank system operation for major WTP process systems are identified in Appendices 4D, 4E, 4F and 4H.

4.2.2 Ancillary Equipment Requirements

Information concerning ancillary equipment is provided in the following subsections.

4.2.2.1 Transfer or Pressure Control Devices

Several fluid transfer devices will be used in the WTP. These devices include mechanical pumps, reverse flow diverters, and steam ejectors. Breakpots and seal pots, although not fluid transfer devices, are an important component of vessel operations. These components are discussed in the following sections.

Mechanical Pumps

Mechanical pumps will be used for operations that require high-flow pumps (such as through the evaporator circuits) or high-pressure head pumps (such as for pumping a waste stream through ultrafiltration circuits). Mechanical pumps will be located in process cells, process rooms, or caves. In general, mechanical pumps will be repaired in place, or removed to a maintenance area. However, remotely maintained pumps will be used in areas where maintenance activities would result in a significant radiation dose to the operators.

For normal process operating sequences, mechanical pumps and associated valves will be controlled by the process control system. In systems where off-normal conditions would require pump shutdown, the design will include an alarm mechanism that will also trip the transfer device. The pump system is designed to allow for the drainage of liquid from the pump, and for the introduction of flush liquids at the end of transfers to reduce residual contamination.

Reverse Flow Diverters

Reverse flow diverters will provide for the maintenance-free pulsed or metered transfer of liquids or slurries throughout the treatment process. A reverse flow diverter does not need to be fully submerged in order to remove the contents of a vessel, and it maintains a small and predictable volume of tank contents following its use. Operation of the reverse flow diverter is cyclical, following timed phases: suction phase, drive phase, and blowdown. The following paragraphs describe a typical reverse flow diverter system arrangement.

Suction phase: In the suction phase, the secondary automatic valve A is open, admitting air to the suction jet pump. Valve B is shut and liquid is drawn from the supply tank through the reverse flow diverter and into the charge vessel. The suction ejector is designed so that it cannot produce a vacuum capable of lifting liquid higher than a certain valve known as the "suction lift". After a short time, the liquid reaches this "suction lift" height and stops, then valve A is shut.

Drive phase: When valve A is shut, valve B is opened, admitting air to the drive nozzle. Air passes through the nozzle and pressurizes the charge vessel. Liquid is forced across the reverse flow diverter and into the delivery pipe. The delivery pipe is quickly filled with liquid that flows into the delivery vessel.

Blowdown phase: When the charge vessel is nearly empty, valve B is shut; no air is supplied to either jet pump. The compressed air in the charge vessel passes back through the paired jet pumps, down the vent pipe, and into vessel vent system.

Shortly after blowdown begins, the pressure in the charge vessel falls below the delivery head, and the flow of liquid into the delivery vessel is halted.

The liquid in the delivery vessel then falls back down the pipe, across the reverse flow diverter, and into the charge vessel. After a short time, the pressure in the charge vessel falls to zero (gauge). The cycle is now complete.

Steam Ejectors

Steam ejectors are used to transfer process liquids, or to reduce the operating pressure of a system by gas removal. They empty liquid from vessels by means of suction lift, using a simple control system.

An automated control valve supplies high-pressure steam to the steam ejector. This steam accelerates through a nozzle, creating a differential pressure along a submerged suction leg within the vessel. The pressure than forces the liquid up the suction pipe. This effect is known as *striking*. The steam then conveys the liquid to the destination vessel, normally via a breakpot. Control is established using liquid level instrumentation in the vessel being emptied, and using a temperature indicator, such as a thermocouple, within the breakpot.

Seal Pots

A seal pot is a type of hydraulic seal. A hydraulic seal is used primarily to maintain a separation between vessel vent or offgas systems for feed and receipt vessels. This separation is necessary to prevent migration of airborne contamination between the vessels. Without the seal, airflow could occur due to the different pressures in the vent systems. The seal is a slug of liquid in the interconnecting pipe work that remains after each liquid transfer is completed, blocking airflow between vessels.

The seal can be provided by constructing a simple "U" shape in the piping. Different piping arrangements are used for different purposes. A seal pot is a small vessel with one (inlet or outlet) pipe submerged in the liquid slug in the lower part of the pot, while the other pipe terminates in the top of the pot, above the static liquid level. The pot may be provided with a level indicator or alarm, if necessary, to ensure adequate liquid level. Periodic liquid additions may be needed to maintain the seal, especially if the pipeline is infrequently used.

Breakpots

The main function of the breakpot is to reduce the amount of mixed waste material entrained into the vessel ventilation system. Breakpots are provided on transfer lines that use steam ejectors for moving liquids by pressure flow. These types of transfers create the potential for air entrainment of mixed waste contamination. Breakpots function to convert steam from pressure flow to liquid gravity flow, thereby reducing both the effluent loading on the downstream vessel ventilation treatment system and the mixed waste contamination levels in the vessel vent ductwork. Breakpots also serve a secondary purpose by providing a siphon break for other transfer systems where siphoning could occur.

Breakpots are typically placed at a high point in the discharge line from the steam ejector. Liquid will be pumped into the breakpot through an inlet nozzle in its wall. The incoming liquid will be directed towards a baffle. Within the baffle, noncondensed steam and gases will disengage. The breakpot will be self-draining; the liquid will drain through the breakpot discharge pipe to the destination vessel.

Above the inlet nozzle(s) will be a packed bed where disentrainment of the gas stream will occur. The exiting gas from the packed section will pass into the vessel ventilation system. The packed bed can be washed periodically using a wash ring permanently installed above the packed bed.

4.2.2.2 Bulges

Bulges are intended to allow hands-on maintenance of equipment after process fluids are flushed from the bulge piping and components. Bulges provide shielding to personnel during process operation and allow vulnerable or failure prone components to be located outside the process environment. The cell wall provides shielding between the cell and the bulge interior. The bulge includes shielding and contamination control as needed, depending on the process fluid within the bulge piping.

A typical bulge consists of a metal frame attached to the outside wall of a process cell; the frame is used to support the piping and components as well as the shielding plates (usually steel), which are bolted to the frame. Bulges provide secondary containment for DWP ancillary equipment inside the bulge.

The ancillary equipment located inside the bulges will be provided with leak detection or the bulge is provided with a drain line that flows to a sump equipped with leak detection. Leak detection can be provided internal to the bulge or in the sump associated with bulge drain line.

There are two classifications of bulges used at the WTP. One is a “process” bulge; the other is a “service” bulge. The process bulge contains valves, pumps, piping, etc. The service bulge contains valves used to transfer reagents, steam, etc., to the in-cell process equipment. The design of the two bulges is similar.

Bulges are equipped with several wash systems, facilitating washing both internal and external piping, components, and bulge confinement surfaces. Decontamination of the equipment internals and associated piping is achieved by externally connecting a flushing system located on the outside of the bulge. Wash fluids could be water or more aggressive media such as nitric acid, provided compatibility with the bulge materials is ensured.

Additional information on process bulges may be found in *Process Bulge Design and Fabrication* (24590-WTP-3PS-MX00-TP001), located in DWP Operating Unit Group 10, Appendix 7.7 and Appendix 4A, Figure 4A-127.

4.2.2.3 Description of WTP Piping System

Detailed information on piping is included in *Piping Material Class Description* (24590-WTP-PER-PL-02-001), located in DWP Operating Unit Group 10, Appendix 4.

<u>Interplant Piping Transfer Lines</u>

Waste feed from the DST system will be transported to the WTP via the waste transfer lines.

The waste feed transfer lines will be double-walled pipe. The inner pipe will be constructed of stainless steel, while the outer pipe will be constructed of carbon steel. The carbon steel outer pipe will be coated with a corrosion-resistant material. In addition, the coated outer pipe for the waste transfer lines from the DST to the pretreatment facility will be surrounded by insulation and a seamless high-density polyethylene outer shell. This extra layer of protective material will isolate the waste transfer lines from soil. The waste transfer lines between the pretreatment facility and the other WTP process plants will not have this extra barrier from the soil, but will be cathodically protected as described later in this section.

A leak detection system will be provided for the entire length of the waste transfer line. Pumping will be terminated, and reception of waste feed from the DST system unit will stop, when a leak is identified by the leak detection system.

The inner pipe will be supported by guides, saddles, support keys, or anchors within the outer pipe. The inner pipe will transport waste and maintain the pressure boundary, while the outer pipe will provide secondary containment for the inner pipe. The piping system will be buried under a minimum depth of soil for radiation shielding. The minimum depth of soil will be finalized at the detail design phase and will not be less than the 2 feet (ft) freeze depth. A heat trace system is not required for pipes buried below freeze depth.

The piping system will have a continuous slope down toward the pretreatment facility. Released liquids resulting from leaks to the outer pipe can be removed as required by WAC 173-303-640(4)(b). The piping system will be designed to allow water flushing to occur in both directions.

Liquid Effluent Transfer Lines

Liquid effluent generated at the WTP will be routed to the pretreatment facility for recycling through the WTP or disposal to the Liquid Effluent Retention Facility (LERF) and Effluent Treatment Facility (ETF).

An effluent line will be routed from the pretreatment facility to the LERF and ETF. This line is a buried pipe, constructed of materials that are compatible with the waste, under a minimum 2 ft of soil serving as freeze protection. The pipes will have a continuous downwards slope towards the LERF and ETF, and will be designed to maintain structural integrity. A leak detection system will be provided for the LERF/ETF waste transfer lines.

Intraplant Piping

Within plants, the pipelines associated with the tank system will be single-walled. Secondary containment will be provided for piping within the plants by double-walled pipe or partially lined process cells, process rooms, or caves. If needed, other containment methods such as a bulge or concrete ducts with liners will be provided at appropriate locations. The bulge or concrete ducts will be provided with a low point which will drain to process cells, process rooms, or caves. The leak detection equipment located within the process cells, process rooms, and caves will warn of a piping leak through alarms.

Piping between plants and the two outdoor tanks at the pretreatment facility will be double-walled below grade and below the freeze line, similar to the waste transfer line.

Cathodic Protection

An impressed current cathodic protection system will be used for eliminating or mitigating corrosion on underground piping. The cathodic protection system will maintain a negative polarized potential between the protected pipe and a saturated copper/copper sulfate reference electrode.

The impressed current cathodic protection system uses direct current provided by a rectifier that is powered from the plant's normal 480 Vac power system. The direct current from the rectifier is connected across the buried anode wire and the protected pipe. The current flows from the anode wire, which is positive, through the electrolyte, to the protected pipe, which is negative, and back to the rectifier completing the electrical circuit.

An annual survey, recommended by NACE International (formerly the National Association of Corrosion Engineers), will be performed on the overall system. Test stations will be provided to permit potential measurements. Additional information on inspections is provided in Operating Unit Group 10, Chapter 6.0.

The following waste transfer lines are provided with cathodic protection at the WTP. The waste transfer lines are double encased and constructed of materials that are compatible with the waste:

- Mixed waste transfer lines between the Pretreatment Facility and the HLW Vitrification Facility
- Mixed waste transfer lines between the Pretreatment Facility and the LAW Vitrification Facility
- Mixed waste transfer line between the Analytical Laboratory and the Pretreatment Facility

Corrosion Protection

The following waste transfer and effluent transfer lines are isolated from soil moisture with an external waterproof barrier to provide corrosion protection:

- DOE waste feed pipelines from the Tank Farm interface point to the PTF
- Radioactive/dangerous waste effluent transfer lines from the PTF to the ETF/LERF interface point

The incoming DOE waste feed pipelines that interface with the WTP pipelines are intentionally not cathodically protected. Consistent with the existing Tank Farm waste transfer design, transfer lines from the WTP interface point, the Waste Feed Receipt Process (FRP) transfer lines and the LERF/ETF effluent coaxial transfer lines are furnished with additional corrosion protection by the addition of an external waterproof barrier. This barrier isolates the lines from moisture in the surrounding soils and provides corrosion protection in lieu of cathodic protection.

The barrier consists of a 2 inch layer of sprayed or injected closed-cell polyurethane foam with an external jacket of extruded high density polyethylene (HDPE) jacket with a minimum thickness of 150 mils. This barrier is located over the fusion bonded epoxy coated carbon steel outer encasement pipe which provides secondary containment for the inner stainless steel process line.

The incoming waste transfer lines are also bonded at the crossing of the plant service air piping between the PTF and the HLW Vitrification Facility on the opposite end (which is perpendicular protected piping). The waste feed lines, therefore, may receive some amount of protective cathodic protection current in the area where they are bonded. This area is defined as the "zone of influence." Bonding is provided to minimize stray electrical currents that may occur in the zone of influence and thereby eliminate the possible corrosion process. The waste feed lines are also provided with the test stations at both ends to allow potential tests that will indicate if corrosion is a concern.

4.2.2.4 Description of Foundations

Tank systems containing mixed waste will be located indoors in process cells or caves, which will be integral parts of the pretreatment facility, analytical laboratory, the LAW vitrification facility, and the HLW vitrification facility with the exception of two outdoor tanks. Therefore, the design requirements of the tank systems will be met by the structural integrity of the plants. WTP compliance with UBC seismic design requirements, found in DWP Operating Unit Group 10, Supplement 1, provides the seismic design requirements for the WTP. The outdoor tanks will be located outside of the pretreatment facility on a protectively-coated concrete pad and concrete berm. The concrete pad for these tanks will be sufficient to support the tanks.

Additional information on the design criteria, load definitions, load combinations, and methodology for the structural design and analysis may be found in *Secondary Containment Design* (24590-WTP-PER-CSA-02-001), located in DWP Operating Unit Group 10, Appendix 7.5.

4.2.3 Integrity Assessments

A written assessment of the adequacy of the design of tank systems and miscellaneous treatment systems will be prepared on a system-by-system basis. Separate reports are prepared for tanks, tank system ancillary equipment, and associated secondary containment systems. Each assessment will be reviewed and certified by an independent, qualified, registered professional engineer to attest that the tank and miscellaneous treatment systems are adequately designed for managing dangerous waste. Each

assessment will include an evaluation of the foundation, structural support, seams, connections, pressure controls, compatibility of the waste with the materials of construction, and corrosion controls for each mixed waste management system, as appropriate. Assessment reports are located in DWP Operating Unit Group 10, Appendix 8.11 for the pretreatment facility, Appendix 9.11 for the LAW vitrification facility, Appendix 10.11 for the HLW vitrification facility, and Appendix 11.11 for the Lab.

4.2.4 Additional Requirements for Existing Tanks

Tanks and vessels to be permitted in the WTP will be newly constructed; pre-existing tanks will not be used. Therefore, the requirements of this section do not apply.

4.2.5 Additional Requirements for New Tanks

Installation of tank systems will be performed in a manner designed to prevent damage to the tank system. The WTP uses an independent, qualified installation inspector, or an independent qualified registered professional engineer to perform tank system installation inspections. Inspection activities will include testing tanks for tightness, verifying protection of ancillary equipment against physical damage and stress, and evaluating evidence of corrosion. The inspections will document weld breaks, punctures, coating scrapes, cracks, corrosion, and other structural defects. Installation inspections will conform to permit requirements and consensus-recognized standards. Inspection findings and corrective actions, as appropriate, will be documented in post-inspection reports.

Additional information describing the installation of tank systems and associated inspections are provided in *Installation of Tank Systems and Miscellaneous Unit Systems*, 24590-WTP-PER-CON-02-001.

4.2.5.1 Additional Requirements for New On-Ground or Underground Tanks

The majority of the tanks and vessels to be constructed in the WTP will be located within the pretreatment facility, the analytical laboratory, the LAW vitrification plant, and the HLW vitrification facility. Therefore, the requirements of this section do not apply to the indoor tanks.

The two outdoor Process Condensate Tanks located at the pretreatment facility (RLD-TK-00006A/B) will be located within a bermed and lined secondary containment system and will not be in direct contact with soil. The design of the outdoor tanks' concrete pad will address backfill, soil saturation, seismic forces, and freeze thaw effects. A portion of the ancillary piping for the unit will be in contact with the soil, and the effects of corrosion on the piping will be addressed in the final design.

4.2.6 Secondary Containment and Release Detection for Tank Systems

This section provides information about the secondary containment for tank systems that will contain mixed waste in the WTP. Descriptions of equipment and procedures used for detecting and managing releases or spills from tank systems are also provided.

A number of documents are provided in appendices to DWP Operating Unit Group 10 that provide detailed information regarding the design of the secondary containment system. These documents include the following:

- *Secondary Containment Design*, 24590-WTP-PER-CSA-02-001, located in Appendix 7.5
- Material Selection for Building Secondary Containment/Leak Detection, 24590-WTP-PER-M-02-001, located in Appendix 7.9
- *Leak Detection in Secondary Containment Systems*, 24590-WTP-PER-J-02-002, located in Appendix 7.5
- *Flooding Volume for PT Facility*, 24590-PTF-PER-M-02-005, located in Appendix 8.8
- *Flooding Volume for 28 Ft Level in PT Facility*, 24590-PTF-PER-M-03-001, located in Appendix 8.8

- Flooding Volume for 56 Ft Level in PT Facility, 24590-PTF-PER-M-04-001, located in Appendix 8.8
- Flooding Volume for 77 Ft Level in PT Facility, 24590-PTF-PER-M-04-0003, located in Appendix 8.8
- Flooding Volume for Room P-0150 in the PT Facility, 24590-PTF-PER-M-04-0008, located in Appendix 8.8.
- Flooding Volume for Room P-0119 in the PT Facility, 24590-PTF-PER-M-04-0005, located in Appendix 8.8.
- Flooding Volume for Room P-0123A in the PT Facility, 24590-PTF-PER-M-04-0007, located in Appendix 8.8.
- Dangerous Waste Permit (DWP) Liner Heights in the LAW Facility, 24590-LAW-PER-M-02-002, located in Appendix 9.8
- *Flooding Volume for the HLW Facility*, 24590-HLW-PER-M-02-003, located in Appendix 10.8
- Dangerous Waste Permit Liner Heights in the LAB Facility, 24590-LAB-PER-M-02-001, located in Appendix 11.8
- Leak Detection Capability in the Pretreatment Facility, 24590-PTF-PER-M-04-0010, located in Appendix 8.18
- Waste Removal Capability for the Pretreatment Facility, 24590-PTF-PER-M-04-0011, located in Appendix 8.18
- Leak Detection Capability in the Low Activity Waste Facility, 24590-LAW-PER-M-05-002, located in Appendix 9.18
- *Waste Removal Capability for LAW Vitrification*, 24590-LAW-PER-M-05-001, located in Appendix 9.18
- *Leak Detection Capability in the HLW Facility*, 24590-HLW-PER-M-04-002, located in Appendix 10.18
- *HLW Facility Waste Removal Capability*, 24590-HLW-PER-M-04-0001, located in Appendix 10.18
- Lab Minimum Leak Rate Detection Capabilities for Leak Detection Boxes, Cell Sumps, and Pit Sumps, 24590-LAB-PER-M-04-0001, located in Appendix 11.8
- LAB Waste Removal Capability for the Effluent Vessels Cells, 24590-LAB-PER-M-04-0002, located in Appendix 11.18

4.2.6.1 Secondary Containment System Requirements

Most of the tank systems containing mixed waste will be located within the plants, although two tanks will be located outside the pretreatment facility. Tank systems containing mixed waste that are located within the plants will be arranged within process cells, process rooms, caves, or other areas provided with secondary containment liners or coatings. The outside tanks will be located on a coated, bermed, concrete pad within concrete berms that will provide secondary containment.

The secondary containment systems will be designed, installed, and operated to prevent migration of waste or accumulated liquid to soil, groundwater, or surface water. The piping associated with the tank systems will be located in the process cells, process rooms, caves, berms, or bulges. Secondary containment for piping systems will be incorporated into the design.

Tank systems and wet miscellaneous treatment systems will be provided with secondary containment that can contain 100% of the volume from the largest tank within the containment area. In the pretreatment facility, the 15 black cells and the hot cell at the 0’ (foot) elevation are interconnected through hydraulic

connections (open penetrations that interconnect adjacent cells) such that the combined secondary containment volume is available, if necessary, to contain a 100% leak from the largest tank. A leak to the hot cell floor, if large enough, will drain to the overflow vessels in the pit at -45' (foot) elevation and ultimately to the -45' (foot) pit secondary containment if the volume of the overflow vessel(s) is exceeded. Secondary containment areas lined with stainless steel will have a gradient (minimum 1%) designed to channel fluids to a sump. In some cases, there may be more than a single sump. For example, the hot cell in the pretreatment facility has three instrumented sumps for leak detection. Fire suppression water is included as appropriate in determining the height of the secondary containment. Table 4D-3 in Appendix 4D, Table 4E-3 in Appendix 4E, Table 4F-3 in Appendix 4F, Table 4H-2 in Appendix 4H summarize the calculated minimum liner height at the four process plants. The flooding volume documents identified above present the secondary containment height for each plant.

A concrete berm with protective coating will be used for the pretreatment facility outdoor tanks. This secondary containment area will be capable of holding 100% of the volume from the largest tank within the berm, plus the precipitation from a 25-year, 24-hour rainfall event, as required under WAC 173-303-640(4)(e)(i)(B).

The WTP uses selected industry standards to ensure secondary containment systems have sufficient strength, thickness, and compatibility with waste. The design includes an engineered structural base to protect against failure resulting both from excess force applied during catastrophic events or settlement, and from the stress of daily operation.

In the event of a spill or release, the secondary containment design will prevent released mixed waste from reaching the environment, and will safely contain the waste until it can be transferred to an appropriate collection tank.

The following subsections provide detailed descriptions of typical secondary containment systems that will be used at the WTP.

Process Cells

Process cells will be located within process plants. Process cells will typically be constructed of concrete walls to protect plant operators and the environment from radiological exposure and to prevent migration of waste or accumulated liquid to soil, groundwater, or surface water. Operator access to the process cells will not be allowed during normal operations.

Black Cells

A black cell is a type of process cell that may contain vessels, evaporators, and piping systems that are used to support process waste stream storage and blending functions. No active equipment (i.e., equipment with moving parts) components are located in the black cell. The design for the vessels and piping is all welded construction. Some instrumentation (e.g., thermocouples, radiation detectors) are remotely replaceable by insertion into sealed pipe wells. The black cell vessels and design do not possess design features for remote replacement. The black cell concept is used in areas where the risk of vessel or piping failure due to corrosion or erosion is low. The WTP pretreatment facility contains fifteen black cells and the HLW Vitrification facility contains three black cells.

Hot Cell

Alternatively, a hot cell is a type of process cell that contains active equipment and will periodically need to be remotely accessed for equipment maintenance or replacement.

All process cells will be provided with secondary containment as required. The floor will be sloped to a collection sump to allow for collection and removal of accumulated liquid within the sump.

Process Rooms

Process rooms will be located in the LAW vitrification facility and will be very similar to process caves. Access to process rooms will not be allowed during normal operations. However, access will be allowed for certain areas within WTP for nonroutine operations such as equipment replacement or maintenance. Process rooms will be provided with secondary containment as required. Systems within process rooms that manage mixed waste will have secondary containment (for example, the locally shielded melter and piping).

Caves

Caves will be located within process plants. Caves will typically be constructed with concrete walls thick enough to protect personnel from exposure to mixed waste. Caves will house mechanical handling equipment designed for remote operation and maintenance. They will generally have viewing windows and closed circuit television to allow observation of the cave operations and for overseeing remote maintenance. The cave floors and portions of the walls will be provided with secondary containment as required. The floor of the cave will be sloped to a collection sump to allow for collection and removal of accumulated liquid within the sump.

Berms

Concrete berms will be used at the LAW Vitrification Facility for the Caustic Collection Tank (LVP-TK-00001) and the two outdoor Process Condensate Tanks (RLD-TK-00006A/B) at the pretreatment facility. The berms will be of sufficient structural strength and height to contain the 100% of the volume of the largest tank plus, for the outdoor Process Condensate Tanks, the amount of precipitation that results from the 24-hour, 25-year storm event. A protective coating will be applied to the concrete pad and a portion of the berms to prevent contaminant penetration into the concrete. The containment system will be designed to allow for the discharge of storm water after visual or other testing.

Drip Pan

The ancillary equipment/piping may be provided with a drip pan, sloped, or otherwise designed to perform the secondary containment functions, including leak detection. One such drip pan is located in the HLW vitrification facility Drum Transfer Tunnel (H-B015). Design details of the HLW drip pan are provided in the *Secondary Containment Design*, 24590-WTP-PER-CSA-02-001, located in Operating Unit Group 10 Appendix 7.5.

LAW Melter Feed Line Encasement Assembly

The feed lines that transfer wastes from the LAW melter feed process (LFP) system to the melters are housed in the LAW Melter Feed Line Encasement Assemblies (LMP-LDB-00001/00002). The encasement assemblies are a sloped bellows encasement that contains the feed line where they travel between the process cells and the melter gallery. The encasement assemblies are equipped with leak detection cables that run under the feed lines and into the bellows. The assemblies are equipped with drain lines to flow to sumps in the LAW process cells.

ASX Samplers

The autosampling (ASX) samplers in the PTF, HLW, and LAW facilities contain both upper and lower secondary containment liners and leak detection systems. The upper containment area is designed to collect a potential leak from the incoming sample feed and return lines where they connect to the ISOLOK sampling device. If a leak occurs in the upper containment area, the leak flows to the sloped liner which diverts the leak to the annular space of the coaxial sample return lines. Leaks flow down the secondary containment pipe and discharge to secondary containment with leak detection, typically a sump with a radar level detector. The ASX sample feed and sample return lines, and the routing of potential leaks in the annular space of the return lines are shown on the associated process system piping and instrumentation diagrams (P&IDs) provided in Operating Unit Group 10, Appendix 8.2, 9.2, and 10.2.

The sloped stainless steel liner in the lower containment area is designed to divert liquids to a sloped collection trough. The trough contains a removable weir that allows liquids to collect and activate the thermal level detection switch and alarms to indicate that a leak has occurred. Effluent from a leak flows to the same drain line that manages ISOLOK flush solutions. The ISOLOK flush lines terminate below the top of the trough drain to ensure that the leak detection system is not activated when flushing the ISOLOK. The ASX lower containment area drain lines are shown on the associated process system P&IDs provided in Operating Unit Group 10, Appendix 8.2, 9.2, and 10.2.

Sump and Leak Detection Boxes and Secondary Containment Drain Systems

Sumps, leak detection boxes, and secondary containment drain systems for the three process plants and the analytical laboratory are listed in Table 4D-4 in Appendix 4D, Table 4E-4 in Appendix 4E, Table 4F-4 in Appendix 4F, Table 4H-3 in Appendix 4H and described in the following sections. Systems will monitor and collect liquids managed in the system. Sumps, leak detection boxes, and secondary containment drains will be provided with a stainless steel liner or equivalent to act as the secondary containment. The sumps and leak detection boxes within the process areas will provide a low point for each secondary containment. The sumps and leak detection boxes will serve the following functions:

- Low point containment.
- Removal of material by means of sump emptying ejectors or pumps.
- Sampling of sump contents by means of sump sampling ejectors.

The following sections describe the type of sump used at the WTP and the secondary containment drains.

Sumps and Leak Detection Boxes

Sumps and leak detection boxes are part of the secondary containment system provided for tank systems and wet miscellaneous treatment systems. Sumps and leak detection boxes are located at a low point in the secondary containment systems, and are equipped with leak detection instrumentation and corresponding alarm. Mechanical or fluidic pumps are used to remove liquid that may accumulate in a sump or leak detection box.

A typical sump design is shown in *Secondary Containment Design*, 24590-WTP-PER-CSA-02-001, located in Operating Unit Group 10 Appendix 7.5. Design details of each sump and leak detection box, such as the sump size, capacity, level detection instrumentation and pumps or ejectors are included in Table 4D-4 in Appendix 4D, Table 4E-4 in Appendix 4E, Table 4F-4 in Appendix 4F, Table 4H-3 in Appendix 4H and shown on the P&IDs for the Radioactive Liquid Waste Disposal (RLD) and/or Plant Wash and Disposal (PWD) systems, located in Operating Unit Group 10 Appendices 8.2, 9.2, 10.2, and 11.2.

Four sumps located in the HLW vitrification facility Melter Cave 1 and 2 (HSH-SUMP-00003/7/8/9) will be equipped with stainless steel sump baskets. Sump baskets will capture and retain small objects which may be inadvertently dropped into the sump, and prevent them from entering the piping. The baskets will be provided with a lifting bail for the crane to remove from the sump and handles for the power manipulator to empty into a waste bucket. A typical sump basket design is shown in *Secondary Containment Design*, 24590-WTP-PER-CSA-02-001, Figure 10, located in Operating Unit Group 10 Appendix 7.5. Sump baskets are also identified on the P&IDs for the HLW RLD system, located in Operating Unit Group 10 Appendix 10.2.

Secondary Containment Drains

Many of the bulges, the autosamplers, and some process areas will have secondary containment drains. This type of liquid collection system will be located in a low spot in the cell formed by the sloping floor. Liquid detection instrumentation will be provided for the secondary containment drains. Liquid collected

will gravity-drain to a collection vessel with a tank level indicator. The liquid managed could be waste released from a tank system, including ancillary equipment, or water used to wash the exterior of tanks or the walls of the containment area. Design details of each secondary containment drain/drain line are included in Table 4D-4 in Appendix 4D, Table 4E-4 in Appendix 4E, Table 4F-4 in Appendix 4F, Table 4H-3 in Appendix 4H and shown on the P&IDs for the RLD and/or PWD systems, located in Operating Unit Group 10 Appendices 8.2, 9.2, 10.2, and 11.2.

Design Requirements

The process cells, process rooms, or caves with mixed waste vessel or tank systems will be partially lined with stainless steel or special protective coating, which will cover the floor and extend up the sides of the process cell or cave to a height that can contain 100 percent of the volume from the largest tank within the process cell or cave. Table 4D-3 in Appendix 4D, Table 4E-3 in Appendix 4E, Table 4F-3 in Appendix 4F, Table 4H-2 in Appendix 4H present the calculated minimum secondary containment liner height at the four process plants.

A concrete berm with protective coating will be used for the pretreatment facility outdoor tanks. This secondary containment area will be capable of holding 100% of the volume from the largest tank within the berm, plus the precipitation from a 25-year, 24-hour rainfall event, as required under WAC 173-303-640(4)(e)(i)(B).

The WTP uses consensus-recognized standards to ensure that the process cells, process rooms, caves, or berms provide secondary containment with sufficient strength, thickness, and compatibility with waste. The design includes an engineered structural base to protect the cells, caves, berms and tank systems against failure resulting both from excess force applied during catastrophic events or settlement, and from the stress of daily operation. In the event of a spill or release, the structural and foundation design for tank and process cells, process rooms, caves and berms will prevent released mixed waste from reaching the environment, and will safely contain the waste until it can be transferred to an appropriate collection tank.

4.2.6.2 Management of Release or Spill to Sump and Secondary Containment Drain Systems

The WTP uses dry sumps and leak detection boxes as part of the secondary containment and leak detection systems. Sumps and leak detection boxes are instrumented to inform the operator to investigate the cause of the liquid detected in the sump or leak detection box. Secondary containment systems are sloped to direct flow of leaks or spills to the sump or leak detection box. To remove liquid from the sumps or leak detection boxes in a timely fashion, sumps and leak detection boxes will be equipped with mechanical or fluidic pumps.

A detection alarm indicating that there is liquid in the sump or leak detection box will be investigated to determine if the alarm is valid. If the alarm is valid, the incident will be corrected. Mixed waste released from the primary system and collected in a sump or leak detection box will be removed within 24 hours, or in as timely a manner as possible. If the released material cannot be removed within 24 hours, the Department of Ecology will be notified.

4.2.6.3 Additional Requirements for Secondary Containment

The WTP dangerous waste storage tanks have vault-type secondary containments that have either of the following configurations that the Department of Ecology has approved as equivalent to a coating/water stop system:

- An impermeable interior coating that is compatible with the stored waste and a polymeric filler material at interior corners and construction joints that performs a function equivalent to a water stop.
- A welded stainless steel liner attached to walls and floors.

Ancillary equipment such as piping is addressed within Section 4.2. Other types of ancillary equipment such as pumps, seal pots, and reverse flow diverters are provided with secondary containment. Inspection of ancillary equipment is addressed in Operating Unit Group 10, Chapter 6.0.

4.2.7 Variances from Secondary Containment Requirements

No variances from secondary containment requirements are sought for the WTP tank systems. Tank systems will be provided with secondary containment as identified in the flooding volume documents described in the previous sections.

4.2.8 Tank Management Practices

The following provides the basic philosophy for the WTP vessel overflow systems. Three types of barriers exist to prevent overfill of process equipment: preventive controls, detectors, and regulators. Preventive controls promote controlled filling within normal process ranges. Detectors recognize if a vessel is being overfilled and alert an operator. Lastly, if preventive controls and detectors fail to stop overfill from occurring, regulators trip a control sequence that stops inflow and/or initiates outflow. The principal design concept to control vessel overflow is to prevent an overflow from occurring. The engineering design will minimize the likelihood of tank, ancillary equipment, and containment system overflows, and over-pressurization, ruptures, leaks, corrosion, and other failures.

In general, overflows will be prevented by inventory control in conjunction with level monitoring. The fluid levels in a vessel will be maintained within low- and high-level ranges. Appropriate alarm settings will be used to note deviations from the designed settings. Automatic trip action will be designed to shut down feed to the vessel when the high-level settings are exceeded. These automatic trip actions will be provided for vessels with the potential for high operational and environmental impact in case of an accident or release.

Most of the WTP tank systems will be designed to incorporate minimal or zero maintenance requirements and will be based on a design life of approximately 40 years. The design emphasis of zero maintenance will minimize the likelihood of spills and overflows in the tank systems. In the event that the process controls fail to prohibit vessel overfilling, engineered overflows will be provided to prevent liquid from entering the vessel ventilation systems. Vessels that are nominally operating at atmospheric pressure will have a suitable gravity or engineered overflow system, unless an overflow can be shown not to be possible. Vessels or systems that normally operate at above atmospheric pressures will not be provided with overflows.

The following principles apply when designing an engineered overflow system:

- The overflow system for vessels must be instantaneously and continuously available for use.
- Overflowed process streams must be returned to the waste treatment process.
- Overflow systems must meet the requirements of WAC 173-303, *Dangerous Waste Regulations*, Section 640, Tank Systems. In meeting these requirements, overflowing direct to the cell floor will only be considered as the last overflow in a cascaded system. Where an overflow is from a vessel to the cell, the overflow system will maintain segregation of the cell and vessel ventilation systems. The compatibility of the overflowing liquid and the recipient vessel will be considered.
- A vessel overflow line is sized to handle the maximum inflow to the vessel without the liquid level in the overflowing tank reaching an unacceptably high level. No valves or other restrictions are permitted in the overflow line. This line is also designed to prevent the buildup of material that could cause blockages.
- The overflow receiver is sufficiently sized to contain the overflow.
- Inspections will be performed on the various tank and overflow systems, using the example schedules described in DWP Operating Unit Group 10, Chapter 6.0.

4.2.9 Labels or Signs

Tanks managing mixed or dangerous waste will be labeled according to the requirements of DWP permit conditions DWP III.10.E.5.e, for routinely non-accessible tanks, and DWP III.10.E.5.f, for tanks not addressed in DWP III.10.E.5.e. The labels will inform employees and emergency personnel of the types of waste present, warn of the identified risks, and provide other pertinent information.

4.2.10 Air Emissions

This section describes air emissions from vessel ventilation systems and reverse flow diverter exhausts. Organic emissions from vents associated with evaporator or distillation units are also discussed.

4.2.10.1 Tank System Emissions

Most of the tanks will be connected to a vessel ventilation system to collect vapors. Vessel vents will be located on major tanks, breakpots, and other small vessels. Exhaust from reverse flow diverters and pulse jet mixers will also be collected.

4.2.10.2 Process Vents

The air emission regulations, specified under WAC 173-303-690 and 40 CFR 264 Subpart AA, apply to process vents associated with distillation, fractionation, thin-film evaporation, and air or steam stripping operations that manage mixed waste with total organic carbon concentrations of at least 10 parts per million by weight. The WTP does not use these regulated processes; therefore, this regulation does not apply to the WTP.

4.2.10.3 Equipment Leaks

Regulations provided in WAC 173-303-691 and 40 CFR 264 Subpart BB contain the "Air Emission Standards for Equipment Leaks". These air emission standards do not apply to the WTP because waste feed entering the WTP contains less than 10% total organic carbon by weight and is excluded under 40 CFR 264.1050(b).

4.2.10.4 Tanks and Containers

The regulations specified under WAC 173-303-692 and 40 CFR 264 Subpart CC do not apply to the WTP mixed waste tank systems and containers. These tanks and containers qualify as waste management units that are "used solely for the management of radioactive dangerous waste in accordance with applicable regulations under the authority of the Atomic Energy Act and the Nuclear Waste Policy Act" and are excluded under 40 CFR 264.1080(b)(6). Containers bearing nonradioactive, dangerous waste, such as maintenance and laboratory waste, that is not excluded under 40 CFR 264.1080 (b)(2) or 40 CFR 264.1080(b)(8), will comply with the tank and container standards specified under 40 CFR 264 Subpart CC.

4.2.11 Management of Ignitable, Reactive and Incompatible Waste in Tanks

Mixed waste from the DST system unit will initially be designated as both ignitable (D001) and reactive (D003). The D001 and D003 waste numbers will be as described in the waste analysis plan in DWP Operating Unit Group 10, Appendix 3A. The vessels will be located in a manner that meets the National Fire Protection Association (NFPA) buffer zone requirements for vessels, as contained in Tables 2-1 through 2-6 of the *NFPA-30 Flammable and Combustible Liquids Code* (NFPA 1981). The vessels will be designed to store the waste in such a way that it will be protected from materials or conditions that could cause the contents to ignite or react. Vessel contents will be constantly mixed and will be actively vented to process stacks, which will be equipped with vapor collection and treatment systems that will manage emissions. Further information on waste numbers is contained in DWP Operating Unit Group 10, Appendix 3A.

Ignitable or reactive waste may be generated from laboratory or maintenance activities. This waste will be accumulated and managed in compliance with regulatory requirements, in approved containers. Potentially incompatible waste generated from laboratory or maintenance activities will not be stored in the tank systems.

A potential for incompatibility may exist, for example when nitric acid is used to elute waste components from ion-exchange column resins that were previously regenerated with sodium hydroxide. To minimize a reaction, water flushes will be performed between batches.

Process reagents that could react with waste in the tank systems will be stored in areas that are separated by physical barriers from process tanks. Potentially incompatible wastes generated from laboratory or maintenance activities will not be stored in proximity to each other in the tank systems.

4.3 LAW and HLW Miscellaneous Treatment Sub-Systems [WAC 173-303-680 and WAC 173-303-806(4)(i)]

The LAW vitrification system and HLW vitrification system consist of the vitrification melters, offgas treatment equipment, and associated equipment. The melters immobilize mixed waste in a glass matrix. The LAW vitrification system and the HLW vitrification system contain two melters each. The following sections provide additional information on the vitrification systems.

Other miscellaneous treatment sub-systems, and their associated process control features, are described in Section 4.2.

4.3.1 Melter Capacity and Production

For the melters, throughput is defined on the basis of quantity of glass waste produced. In turn, the quantity of glass waste produced depends on the degree to which the feed can be incorporated into the glass matrix. The maximum design throughput of the LAW Melter systems will be approximately 15 metric tons per day of glass waste for each melter and approximately 30 metric tons per day. The production rate of the HLW Melters is approximately 3 metric tons per day for each melter and approximately 6 metric tons per day throughput.

4.3.2 Description of Melter Units [WAC 173-303-806(4)(i)(i)]

The LAW Melter systems are located in the melter galleries and the HLW Melters are housed within the melter caves as depicted in the general arrangement plan and section permit drawings, which are found in DWP Operating Unit Group 10, Appendix 9.4 for the LAW vitrification facility and Appendix 10.4 for the HLW vitrification facility. The following subsections provide detailed descriptions of the melter units.

Low-Activity Waste Melter Units

Figure 4A-48 in Appendix 4A provides a sketch of an LAW Melter. Each LAW Melter (LMP-MLTR-00001/2) is a rectangular shell, lined with refractory material. An additional outer steel casing with access panels will be provided to enclose the LAW Melter. This outer steel casing is designed to provide local shielding and containment. Each LAW Melter has a nominal design capacity of approximately 15 metric tons of glass waste per day. Each will have a molten glass surface area of approximately 108 square feet (ft^2). Each of the two LAW melters has external dimensions of approximately 26 × 21 × 16 ft high, and weighs approximately 270 metric tons empty and 290 metric tons with glass. The operating temperature of the melter is between 950°C and 1250°C.

The locally shielded LAW Melter (LMP-MLTR-00001/2) will be operated and maintained in a personnel access area. The melter will be maintained at a lower pressure than the surrounding room to prevent escape of contaminants. Consumable melter parts will be replaced through access panels. The melters will be transported in and out of the gallery on a rail system. A transporter will move the melters to and from the LAW vitrification facility.

The melter refractory package is designed to serve as a mechanical, thermal, and electrical barrier between the molten glass residing in the melter and the melter shell. The refractory package is housed in a steel shell and provides containment for the molten glass. Active cooling on the outside of the refractory package is provided by water jackets. The water jackets will be in the intermediate loop of a two-loop system that will transfer heat from the LAW Melter through heat exchangers to cooling towers. The intermediate loop containing the water jacket will be a closed system that isolates the water circulating through the water jacket from the water in the cooling water loop circulating to the cooling tower. Mixed waste material leaking into the intermediate loop cooling water will be prevented from becoming an inadvertent discharge via the cooling tower. The refractory package will provide adequate containment if there is a temporary loss of cooling. Penetrations in the melter system are sealed using appropriate gaskets and flanges. This system is designed for plenum temperatures of up to 1,100°C. The LAW melter lid is composed of steel and refractory material layers.

Each LAW Melter (LMP-MLTR-00001/2) will use two independent discharge chambers. An air lift pumps molten glass from the bottom of the melter pool, through a riser, into a discharge chamber, and pours it into an ILAW container. The ILAW is then allowed to cool, forming a highly durable borosilicate glass waste form within the container.

Spent LAW Melters will initially be managed within the LAW melter gallery containment building unit. Spent LAW Melters will be removed from the melter gallery and transported using a transport and rail system. If necessary, the melter exterior surfaces will be decontaminated prior to transfer to a Hanford Site TSD unit.

High-Level Waste Melter Units

Figure 4A-54 in Appendix 4A provides a sketch of an HLW Melter. In addition, the HLW melter mechanical assembly drawings (24590-HLW-MF-HMP-00001/2/3) are located in Operating Unit Group 10, Appendix 10.2. Each HLW Melter (HMP-MLTR-00001/2) is a rectangular shell, lined with refractory material. They have four compartments: a glass tank, two discharge chambers, and a plenum just above the glass tank. The tanks are lined with refractory material designed to withstand corrosion by molten glass.

The HLW Melter systems consist of two melters. Each HLW Melter (HMP-MLTR-00001/2) is designed for glass production rates up to 3 metric tons per day (MTG/d). The normal operating temperature of the melter is between 950°C and 1250°C. The HLW Melters have a molten glass surface area of approximately 40 ft^2. The HLW Melters have external dimensions of approximately 11 ft high × 14 ft deep × 14 ft wide. The glass contained in a full HLW Melter has a volume of approximately 145 ft^3 and weighs approximately 9.1 metric tons. An entire melter, including the supporting structure and transport mechanism, weighs approximately 90 metric tons empty and approximately 99 metric tons full.

The HLW Melters (HMP-MLTR-00001/2) have been designed to be remotely operated and maintained. Remote maintenance will be performed by a power manipulator, overhead crane, and auxiliary hoist, or by through-wall master-slave manipulators. The melter will be positioned within the HLW vitrification facility for ease of access and viewing of both discharge chambers during operations, and for viewing access to the melter lid to facilitate removal and replacement of subcomponents, if needed. A rail and bogie transport system will facilitate remote removal and replacement of the entire melter structure.

The HLW Melters (HMP-MLTR-00001/2) will use a refractory package similar to the LAW melter to contain the molten glass. The refractory package is designed to serve as a mechanical, thermal, and electrical barrier between the molten glass inside the melter and the melter shell.

The HLW Melters will also use an outer shell, which, with the refractory package, will contain the molten glass and melter offgas. Active cooling on the exterior of the melter will be provided by a water jacket, which will be in a two-loop system that will transfer heat from the HLW Melter through heat exchangers to cooling towers. The loop containing the water jacket will be a closed system that isolates the water

circulating through the water jacket from the water in the cooling water loop circulating to the cooling tower. Mixed waste material leaking into the intermediate loop cooling water will be prevented from becoming an inadvertent discharge through the cooling tower. The refractory package will provide adequate containment should there be a loss of cooling. The HLW Melter lid will be constructed of a steel outer shell and insulated from the melter plenum by refractory material.

The HLW Melter will use two independent discharge chambers. Discharge will be achieved by transferring the molten glass from the bottom of the melter pool, through a riser, from which it will be poured into a stainless steel IHLW canister. Glass waste transfer will be accomplished through air lifting. The IHLW will then be allowed to cool, forming a highly durable borosilicate glass waste form.

Spent HLW Melters will be removed from the melter cave and placed in an overpack. The spent melter will be treated as newly generated waste, and will initially be managed within the HLW melter containment buildings. If necessary, the overpack will be decontaminated using a dry process. Failed HLW Melters will be stored in the failed melter storage building.

4.3.3 Automatic Waste Feed Cut-Off System

The LAW and HLW Melters will be equipped with the ability to cut off waste feed. Automatic waste feed cut-off systems terminate feed to the Melter if a specified operating condition is exceeded. This design approach is consistent with the WAC 173-303-680 regulatory requirements.

The LAW (LMP-MLTR-00001/2) and HLW (HMP-MLTR-00001/2) Melters are fed via air displacement slurry pumps that utilize pressurized air as the motive force. These pumps supply feed to the melters in slugs that act to keep lines from plugging. The feed is injected into the melters through the feed nozzles on top of the Melter creating a “cold cap”, where waste feed undergoes several physical and chemical changes. The glass product in the melter is then “air lifted” through the discharge chamber and into the glass container. Melter offgas is generated from the vitrification of LAW and HLW of which the rate of generation is dynamic and not steady state. The offgas is then carried away and treated via a dedicated offgas system.

The melter systems are designed to minimize the need for automatic waste feed cut-off functions. Control of melter level and plenum pressure, process alarming, and optimized operating procedures will be in place to reduce the occurrences of interlocking. Given the processing speeds and the relatively slow rates of change in the operating states of the melter, operators should have adequate time to react to upset conditions. An example of the slow rate of change can be seen in the volume of feed per air displacement slurry pump feed cycle when increasing melter level. Each pump cycle adds approximately 1 gallon of slurry into the melter. At 1 gallon of volume, the liquid level rises no greater than 0.01 inch inside the melter. This provides ample time for operator response.

Previous operating experience with similar melter systems has shown the following operating conditions warrant automatic waste feed cut off:

- Maximum melter chamber pressure
- Minimum off-gas temperature at the thermo catalytic oxidizer bed inlet
- Maximum carbon bed adsorber bed temperature
- Maximum stack gas flow rate
- Maximum stack gas carbon monoxide

These interlocks have been sufficient to allow continued melter operations without inadvertent feed cut off signals, yet provide a sufficient safety margin.

4.3.4 Offgas Treatment System

The offgas treatment system will remove steam, aerosols, entrained particulates, decomposition products, and volatile contaminants that are generated from the vitrification processes and the vessel ventilation systems. The typical constituents contained in the melter offgas stream are as follows:

- Nitrogen oxides from decomposition of metal nitrates in the melter feed.
- Chloride, fluoride, and sulfur as oxides, acid gases, and salts.
- Entrained feed material and glass.

A detailed description of the current offgas treatment trains for the LAW (LMP-MLTR-00001/2) and HLW (HMP-MLTR-00001/2) Melters is provided in Appendix 4E and Appendix 4F, respectively.

4.3.5 Miscellaneous Unit Emissions Performance

The WTP melter systems are thermal treatment units classified as miscellaneous units in Washington Administrative Code (WAC 173-303-680). The dangerous waste regulations require that permits for miscellaneous units include such terms, conditions, and provisions that are necessary to protect human health and the environment and are appropriate for the miscellaneous unit being permitted. The Department of Ecology has determined that regulations that are most appropriate to apply to the melters and offgas systems (melter systems) are found in the tank requirements (WAC 173-303-640) and applicable sections of the incinerator requirements (WAC 173-303-670) and 40 CFR Section 63.1203. As applied to the melter systems, the tank regulations primarily provide requirements for structural integrity, material compatibility, secondary containments, etc.

The incinerator regulations primarily provide operational requirements for parameters such as temperature, pressure, feed rate, demonstration testing, and performance standards, etc. The Department of Ecology determined and incorporated into the final WTP Dangerous Waste Permit issued in September 2002 the standards specified in 40 CFR Section 63.1203 in the following table apply to the WTP melter system miscellaneous units.

Miscellaneous Unit Emissions Performance Standards	
Pollutant	**Ecology-directed requirement**
PODC	99.99% DRE
Dioxins and Furans	0.20 ng TEQ/dscm
Mercury	45 μg/dscm
Lead and Cadmium	120 μg/dscm, combined emissions
Arsenic, Beryllium, Chromium	97 μg/dscm, combined emissions
Carbon Monoxide and Hydrocarbons	Carbon monoxide not in excess of 100 ppmv over an hourly rolling average, dry basis, and hydrocarbons not in excess of 10 ppmv over an hourly rolling average, dry basis, and reported as propane, at any time during the DRE test runs or their equivalent, or hydrocarbons not in excess of 10 ppmv, over an hourly rolling average, dry basis, and reported as propane
Hydrochloric Acid and Chlorine Gas	21 ppmv, combined emissions, expressed as hydrochloric acid equivalents, dry basis
Particulate Matter	34 mg/dscm

Miscellaneous Unit Emissions Performance Standards	
Pollutant	**Ecology-directed requirement**
• PODC is Principle Organic Dangerous Constituent • TEQ is dioxin/furan toxicity equivalence defined in 40 CFR 63.1201(a) • dscm is dry standard cubic meter • ppmv is parts per million by volume • Rolling average is the average of all 1- minute averages over the averaging period [40 CFR 63.1201(a)]	

DOE intends that the melter systems be designed and constructed so that they operate in compliance with the appropriate and applicable standards. Environmental performance demonstrations during cold commissioning of the HLW and LAW vitrification facilities will be used to verify compliance with the DRE and other applicable air emission standards. The final WTP Dangerous Waste Permit issued in September 2002 also requires periodic demonstration testing will be performed after the WTP has begun processing radioactive wastes (Ecology, 2001).

4.3.6 Physical and Chemical Characteristics of Waste [WAC 173-303-680(2)(a)(i)]

A description of the waste characteristics of the LAW and HLW feeds is presented in DWP Operating Unit Group 10, Chapter 3.0 (see Appendix 3A). The immobilized waste generated by the vitrification processes will be in the form of glass that maintains its chemical and physical integrity during long-term storage. The waste analysis plan (Appendix 3A) describes the types and frequency of analysis that will be performed on the glass waste.

4.3.7 Treatment Effectiveness Report [WAC 173-303-806(4)(i)(iv)]

A treatment effectiveness report evaluating the performance of the miscellaneous treatment sub-systems, and their effectiveness in treating the LAW and HLW, will be located in DWP Operating Unit Group 10, Appendix 9 for LAW and Appendix 10 for HLW. The report will use the results of the environmental performance demonstration and the risk assessment activities to document treatment effectiveness of miscellaneous treatment sub-systems.

4.3.8 Environmental Performance Standards for Melter Systems [WAC 173-303-680(2)]

An environmental performance demonstration will be conducted to demonstrate the efficiency of the LAW and HLW Melter systems and their respective air pollution control systems. Emissions from the LAW and HLW systems will be sampled and analyzed during an environmental demonstration performed during cold commissioning. The data developed during the environmental performance demonstration will support the screening-level risk assessment, which will support the development of environmental performance standards for the LAW and HLW Melter systems.

The operational activities of the WTP include methods intended to ensure proper performance of equipment and processes. These methods include sampling of materials, use of direct process controls, development of equipment life specifications and ongoing maintenance.

4.3.8.1 Protection of Groundwater, Subsurface Environment, Surface Water, Wetlands and Soil Surface [WAC 173-303-680(2)(a) and (b)]

The LAW Melters will be located in the LAW melter gallery (L-0112) within the LAW vitrification facility. The HLW Melters will be located in the HLW melter caves (H-0117, H-0106) within the HLW vitrification facility. Both plants are designed to comply with standards that ensure protection of the surface and subsurface environments. The vitrification plants will be completely enclosed and are designed to have sufficient structural strength and corrosion protection to prevent collapse or other

structural failure. In addition, the melter systems, melter feed systems, and related piping will be provided with secondary containment, to minimize the potential for release. The LAW melter gallery (L-0112) and the HLW melter caves (H-0117, H-0106) will be permitted as containment buildings and are described in Appendix 4E and Appendix 4F, respectively.

Floors within the vitrification plants will be protected in a manner consistent with the intended usage of the space. The floor and portions of the walls of HLW Melter cave will be partially lined with stainless steel. Nonradioactive materials usage areas requiring heavy equipment will have concrete floors with hardener and sealer finishes.

The *Hanford Facility Dangerous Waste Permit Application General Information Portion*, Section 5.4 (DOE-RL 1998), provides climatological data, topography, hydrogeological and geological characteristics, groundwater flow quantity and direction, groundwater quality data, and surface water quantity and quality data for the area around the WTP.

4.3.8.2 Protection of the Atmosphere [WAC 173-303-680(2)(c)]

A risk assessment will be performed to evaluate the impacts of the WTP emissions on human and ecological receptors. Actual offgas emissions will be measured during an environmental performance demonstration that will be performed as part of the WTP commissioning activities. The data will be used during a screening-level risk assessment that will be performed to determine ecological and human health risk. The emissions data and the results of the screening level risk assessment will be used to establish operating conditions for the melters that do not endanger human health and the environment.

4.3.9 Approach to Risk Assessment [WAC 173-303-680(2)(c)(i) through (vii)]

A screening level risk assessment is being conducted to evaluate any possible human health and ecological risk posed by the thermal treatment of mixed wastes. The risk assessment will provide information about the potential terrestrial, aquatic, and food pathways for exposure of human and ecological receptors to dangerous waste constituents. This risk assessment will present the quantitative methods, detailed assumptions, and numerical parameters that will be used to estimate the nature, extent, and magnitude of potential risks from operation of the WTP. The primary regulatory guidance followed for this risk assessment is found in the *Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities* (EPA 1998a) and the *Screening-Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities* (EPA 1999a)

Treated air emissions through the stack will be the only planned direct releases into the environment from the WTP. Other waste streams will be transferred to a permitted facility and will not be released directly into the environment. Thus, the overall risk assessment process will focus primarily on air emissions.

Major components of the human health and ecological risk assessment process for evaluating airborne emissions will be as follows:

- Risk assessment work plan
- Pre-demonstration test risk assessment
- Final risk assessment

The overall approach for the risk assessment will be to identify potential risks associated with various receptors, their locations, exposure pathways, and activity patterns in two broad exposure scenarios, as follows:

- Plausible exposure scenario
- Worst-case exposure scenario

The plausible exposure scenarios will be based on where potential receptors currently exist or may reasonably be expected to exist within the foreseeable future. The worst-case assumptions will be based

on locations of maximum concentration even though it is not expected that such receptors will ever actually exist at these locations. Both scenarios will reflect current uses of the surrounding land and habitat and reasonable assumptions about future uses of the land and habitat.

During the environmental performance demonstration, emission samples will be collected and analyzed, and the data will be used to evaluate risk to the human population and ecological (such as wildlife) receptors. Operating conditions will be established for the WTP, which limit risks to human health and the environment to acceptable levels.

4.4 Other Waste Management Units

Sections 4.4.1 through 4.4.5 discuss the applicability of the requirements for waste management units that have not been discussed up to this point in the permit. Sections 4.4.6 through 4.4.9 describe the applicability of air emission controls, waste minimization, groundwater monitoring, and functional design requirements to the WTP. References to other sections of the permit are provided as appropriate.

4.4.1 Waste Piles

The operation of the WTP does not involve the placement of dangerous waste in waste piles. Therefore, the requirements of WAC 173-303-660, "Waste Piles", do not apply to the WTP.

4.4.2 Surface Impoundments

The operation of the WTP does not involve the placement of dangerous waste in surface impoundments. Therefore, the requirements of WAC 173-303-650, "Surface Impoundments", do not apply to the WTP.

4.4.3 Incinerators

The WTP does not include a dangerous waste incinerator. Therefore, the requirements of WAC 173-303-670, "Incinerators", do not apply to the WTP.

4.4.4 Landfills

The operation of the WTP does not involve the placement of dangerous waste in landfills. Therefore, the requirements of WAC 173-303-665, "Landfills", do not apply to the WTP.

4.4.5 Land Treatment

The operation of the WTP does not involve the land treatment of dangerous waste. Therefore, the requirements of WAC 173-303-655, "Land Treatment", do not apply to the WTP.

4.4.6 Air Emissions Control

Information regarding air emissions control is provided in the following sections:

- Pretreatment facility vessel vent process and exhaust system (PVP/PVV) - Appendix 4D, Section 4D.4.2
- LAW vitrification offgas treatment system description - Appendix 4E, Section 4E.4.2
- HLW vitrification offgas treatment system description - Appendix 4F, Section 4F.4.2
- Process vents (40 CFR 264 Subpart AA) - Section 4.2.10.2
- Equipment leaks (40 CFR 264 Subpart BB) - Section 4.2.10.3
- Tanks and containers (40 CFR 264 Subpart CC) - Section 4.2.10.4

4.4.7 Waste Minimization

Waste minimization information is presented in Operating Unit Group 10 of the permit.

4.4.8 Groundwater Monitoring for Land-Based Units

The groundwater monitoring requirements found in WAC 173-303-645, "Releases from regulated units", do not apply to the WTP, since it is not operated as a regulated dangerous waste surface impoundment, landfill, land treatment area or waste pile, as defined in WAC 173-303-040. Therefore, groundwater monitoring is not required.

4.4.9 Functional Design Requirements

The WTP will be designed to comply with applicable design codes and specifications. The documents referenced in this chapter, appendices and contained in DWP Operating Unit Group 10 identify the codes and standards to which the WTP system, structures, and components are being constructed.

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 4A
FIGURES AND DRAWINGS

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
08/2012	

This page intentionally left blank.

APPENDIX 4A
FIGURES AND DRAWINGS

This page intentionally left blank.

APPENDIX 4A
ENGINEERING FIGURES

The figures listed below are included in this appendix, and are to be used in conjunction with the text in the Dangerous Waste Permit (DWP) Chapter 4.

Title	Figure Number
Simplified Plant Flow Figures	
WTP Simplified Flow Diagram	4A-1
Primary Pretreatment Process Systems	4A-2
Primary Pretreatment Process Systems (Continued)	4A-2A
Primary LAW Vitrification Systems	4A-3
Primary HLW Vitrification Systems	4A-4
Process Flow Figures	
Cesium Resin Addition Process System (CRP)	4A-11
LAW Melter Process System (LMP)	4A-21
LAW Container Finishing Handling System (LFH)	4A-24
HLW Melter Process System (HMP)	4A-27
Typical System Figures	
Typical Tank System – Cesium Ion Exchange Column	4A-38
Typical System – LAW Melter Process System (LMP)	4A-48
Typical Tank System – HLW Melter Feed Process System (HFP)	4A-53
Typical Tank System – Containment Building (Sheet 1)	4A-59
Typical System - Containment Building Typical Design Features Crosswalk (Sheet 2)	4A-59
Simplified General Arrangement Figures	
Simplified General Arrangement Pretreatment – Plan at El. 98’	4A-65
Miscellaneous Figures	
Schematic of an Example IHLW Container and Label	4A-118
Schematic of an Example ILAW Container and Label	4A-119
Typical Arrangement of a Reverse Flow Diverter	4A-120
Basic Reverse Flow Diverter Design	4A-121
Typical Arrangement of a Steam Ejector System	4A-122
Typical Seal Pot Arrangement	4A-123
Typical Breakpot Arrangement	4A-124
Typical Bulge Configuration	4A-127
Typical Primary Containment Sump Conceptual Design	4A-128

This page intentionally left blank.

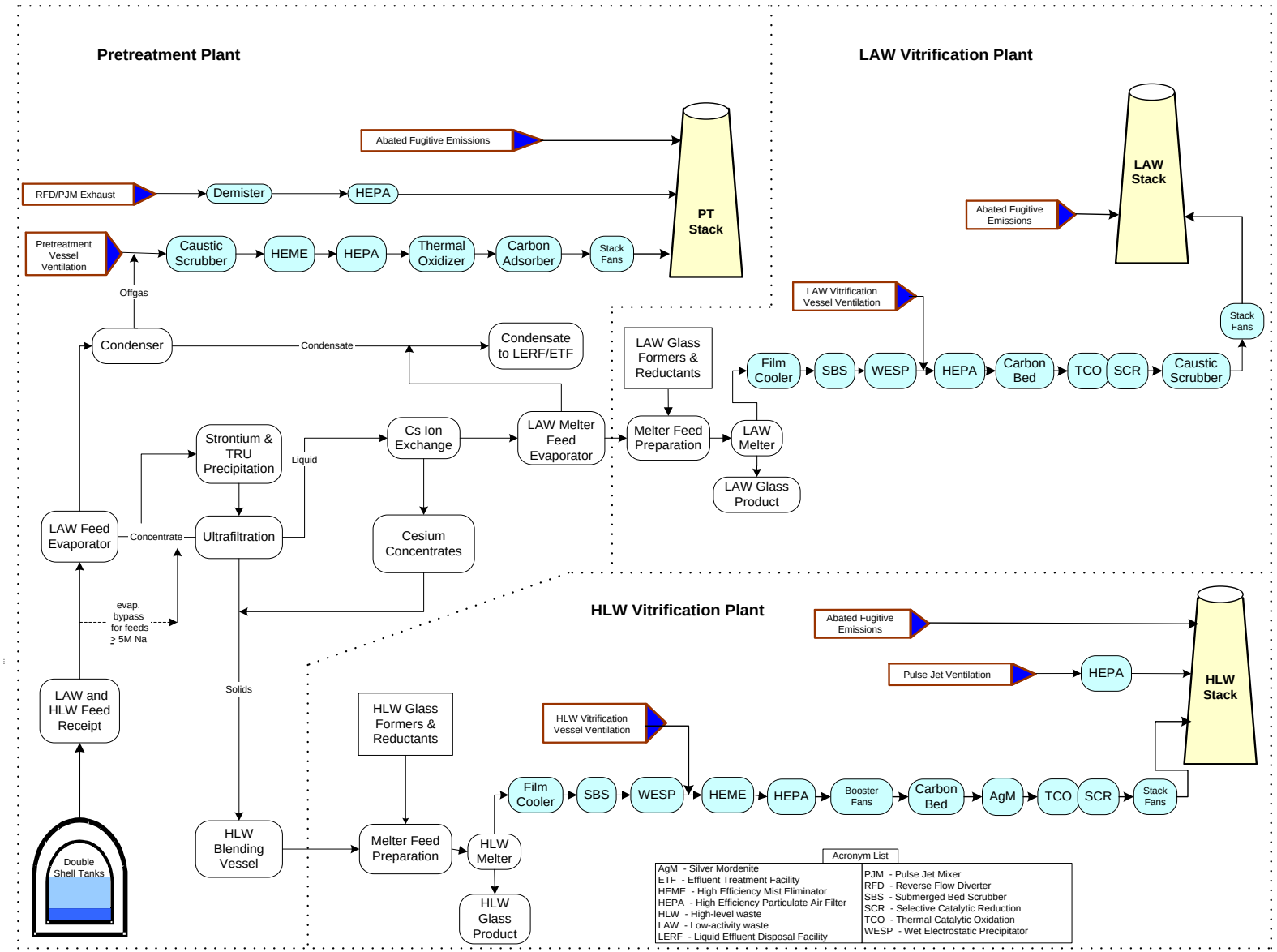


Figure 4A-1 WTP Simplified Flow Diagram

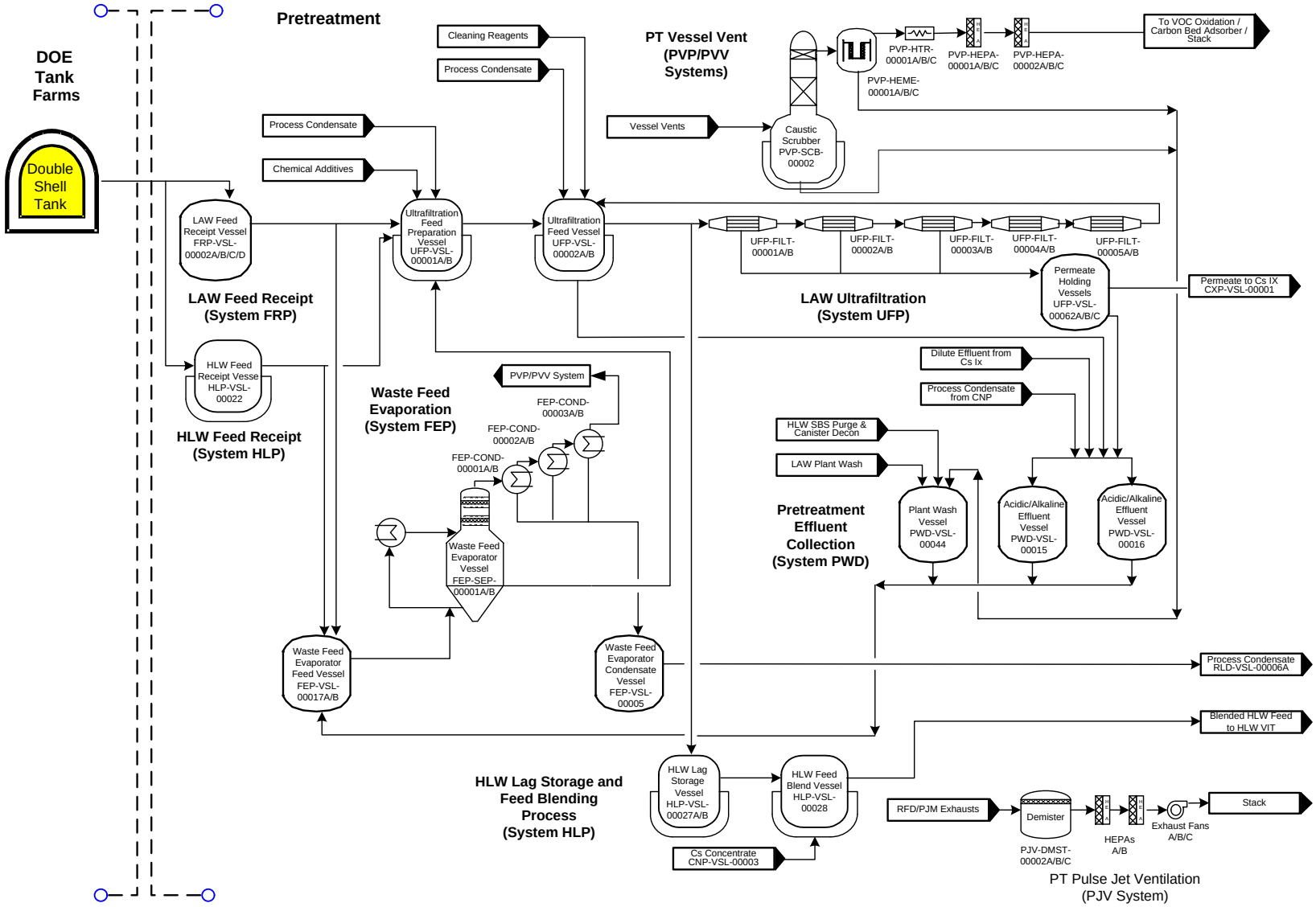


Figure 4A-2 Primary Pretreatment Process Systems

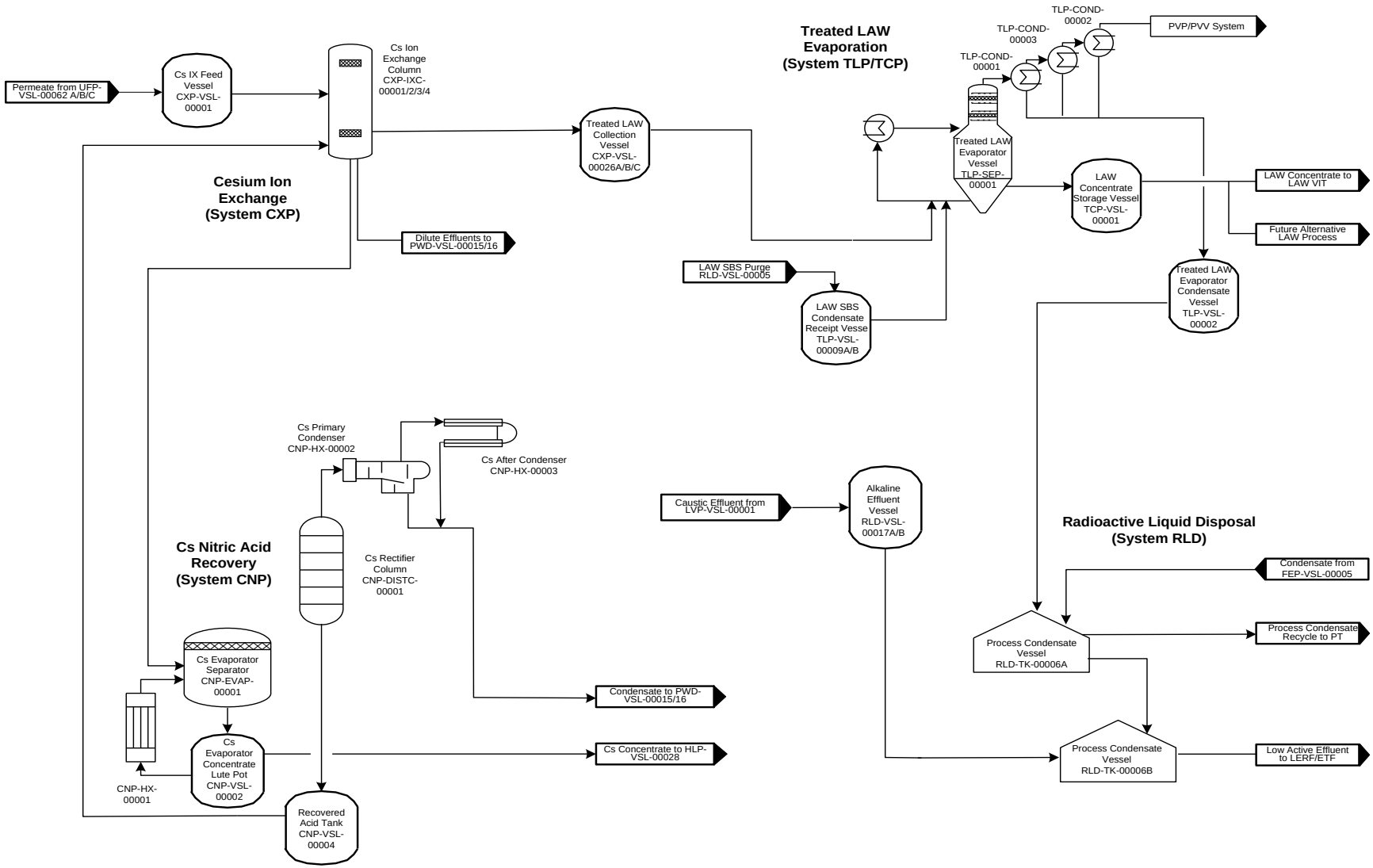
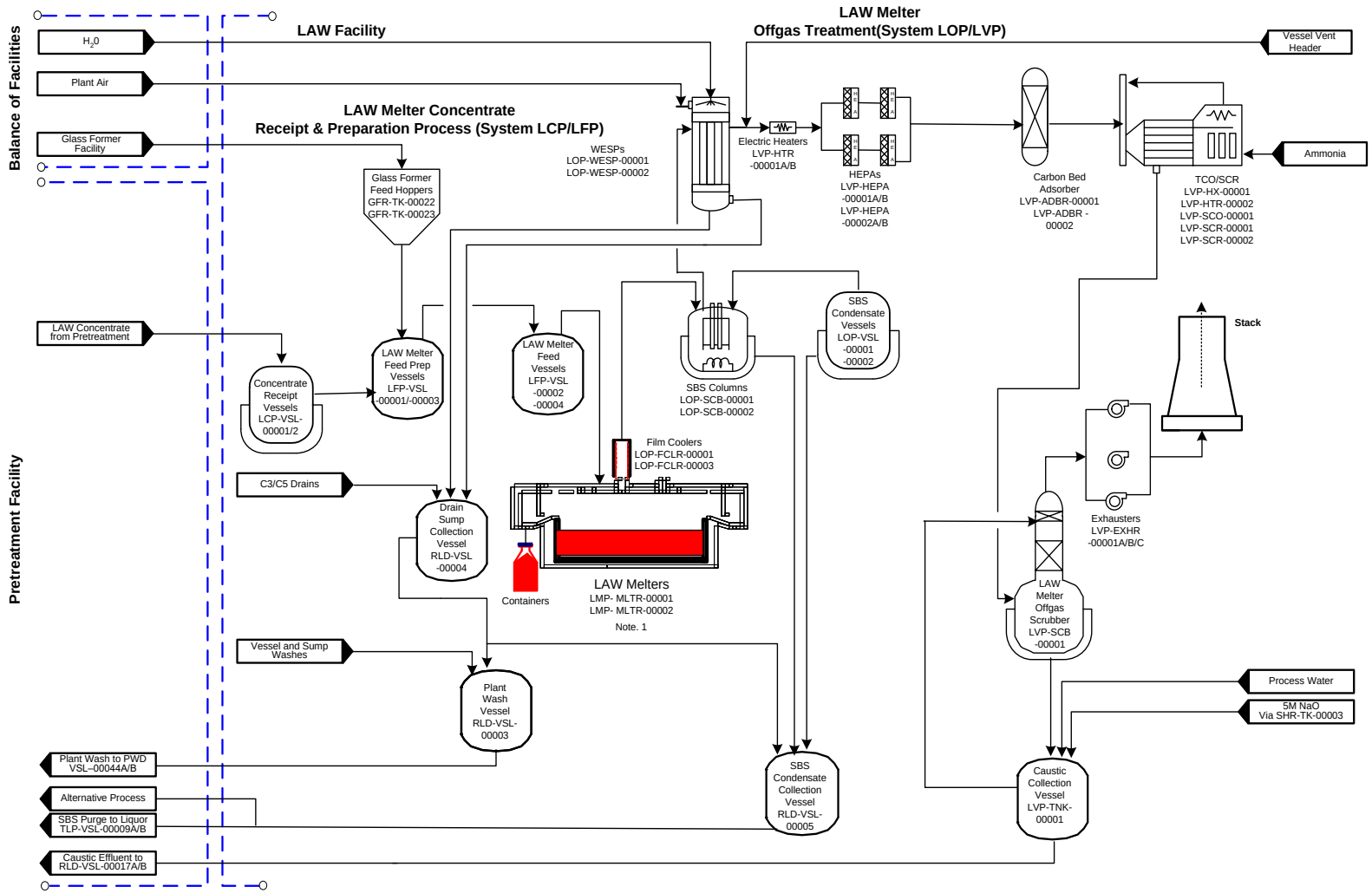


Figure 4A-2A Primary Pretreatment Process Systems (Continued)



Notes

1. For this diagram one melter system is shown but assumes a total of two LAW melter systems of identical capacity.

Figure 4A-3 Primary LAW Vitrification Systems

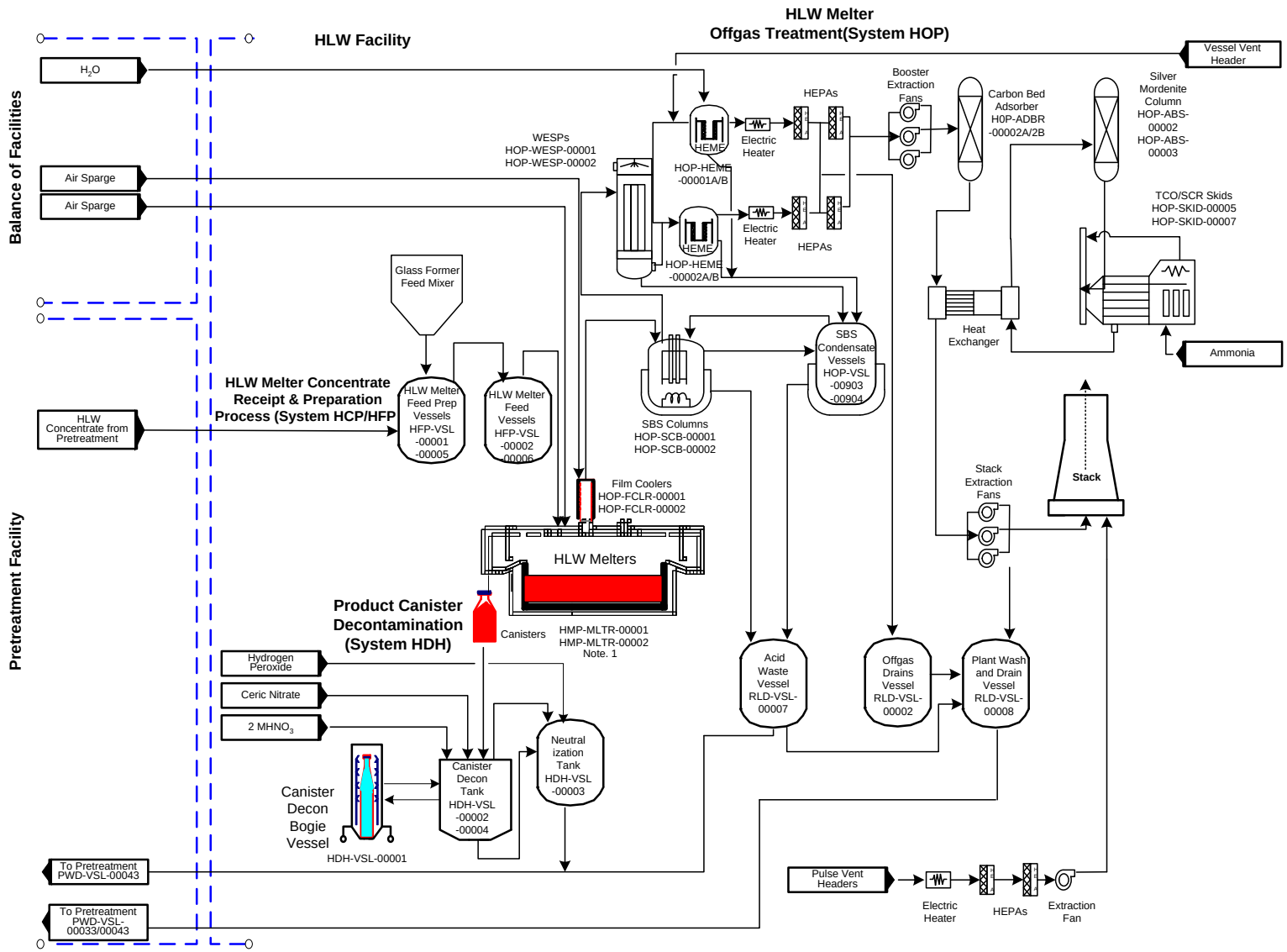


Figure 4A-4 Primary HLW Vitrification Systems

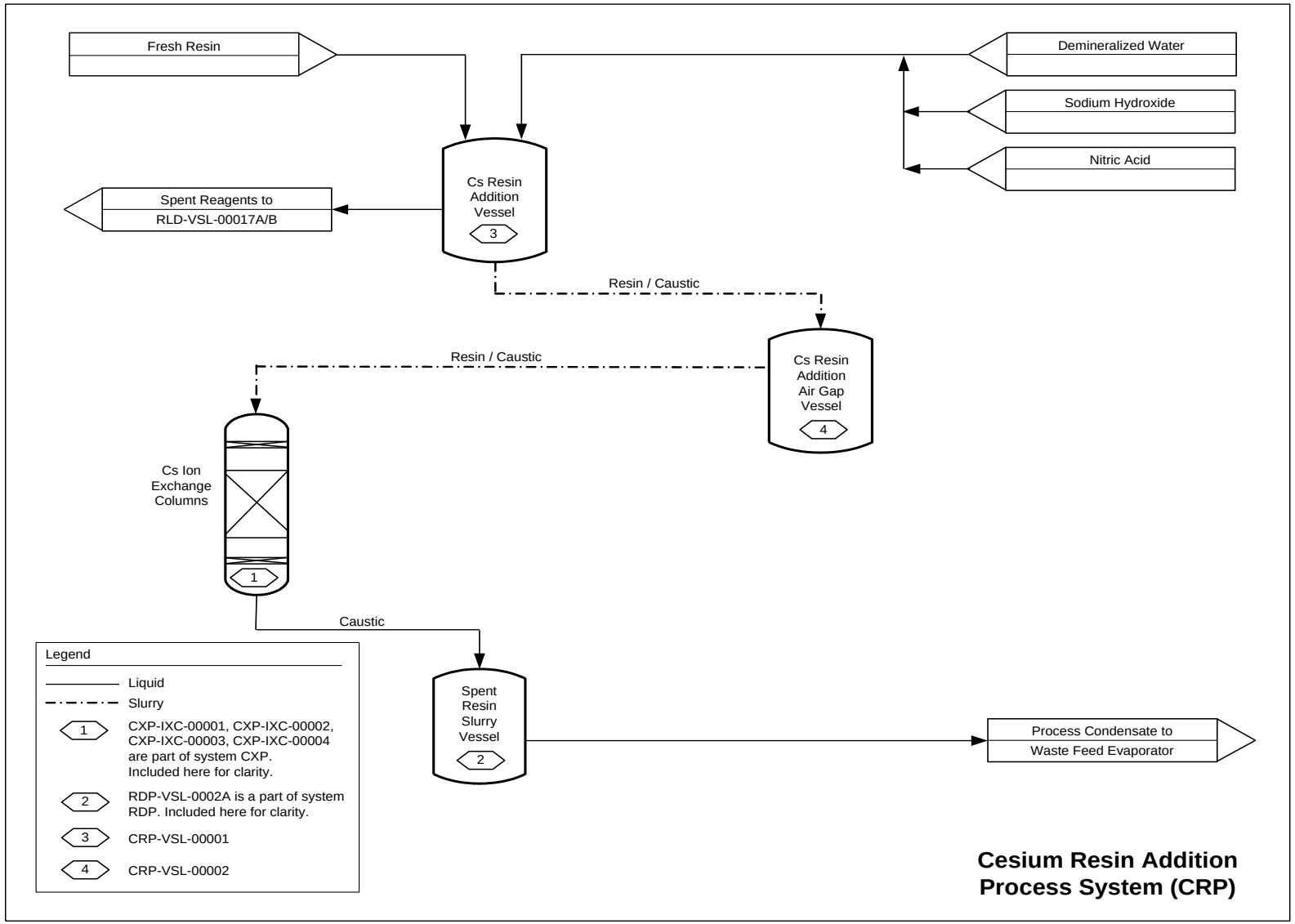


Figure 4A-11 Cesium Resin Addition Process System (CRP)

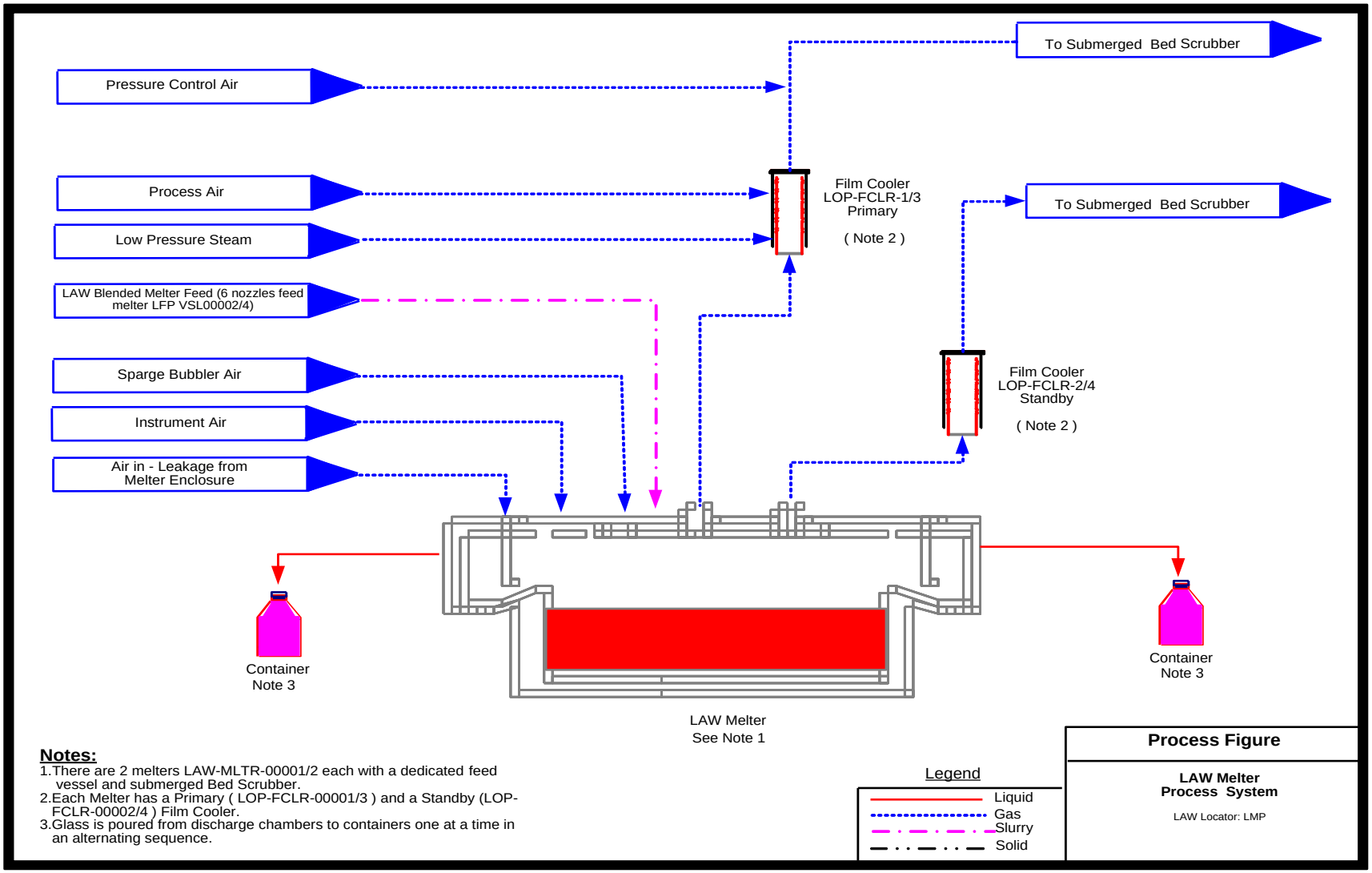


Figure 4A-21 LAW Melter Process System (LMP)

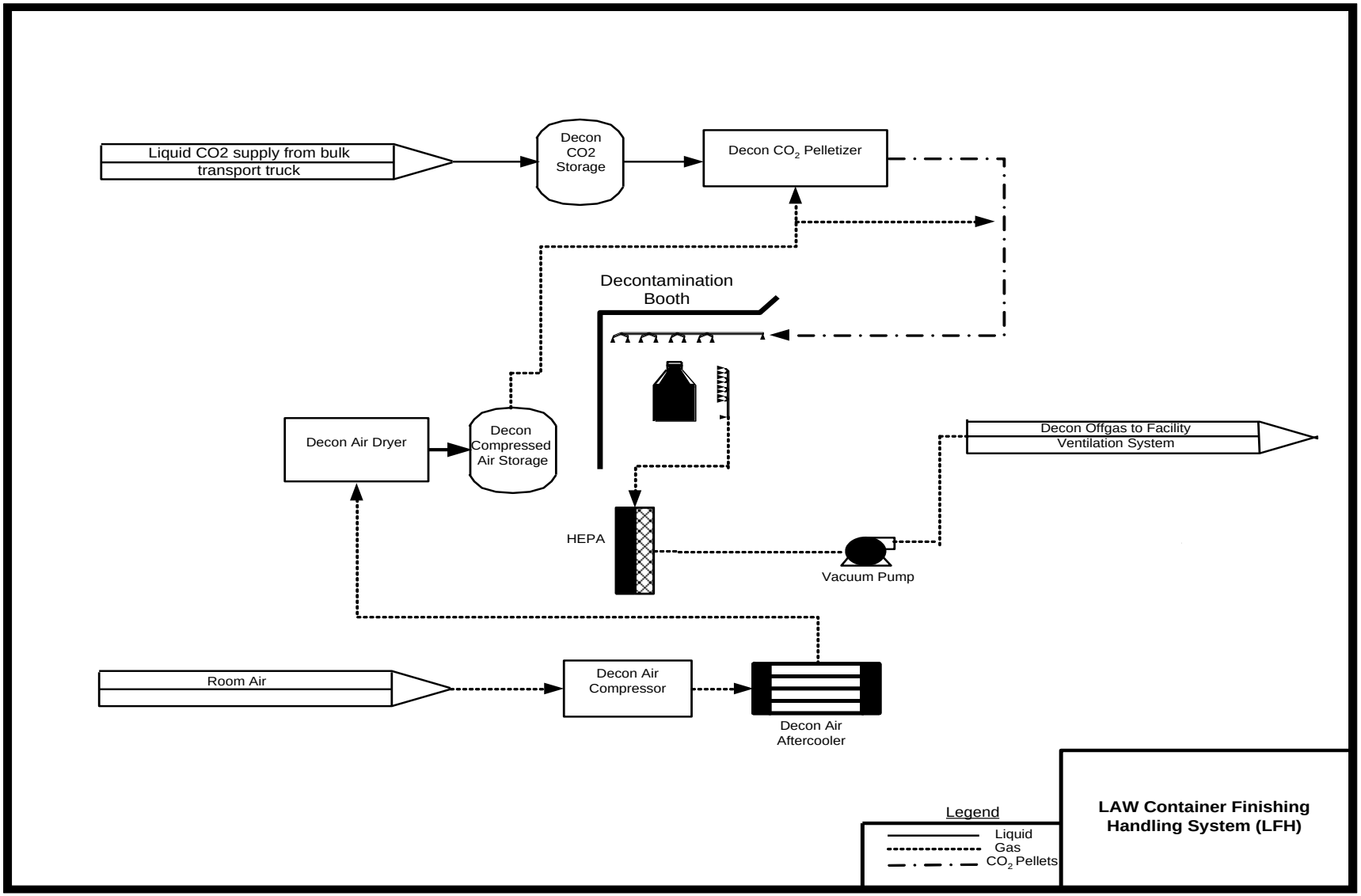


Figure 4A-24 LAW Container Finishing Handling System (LFH)

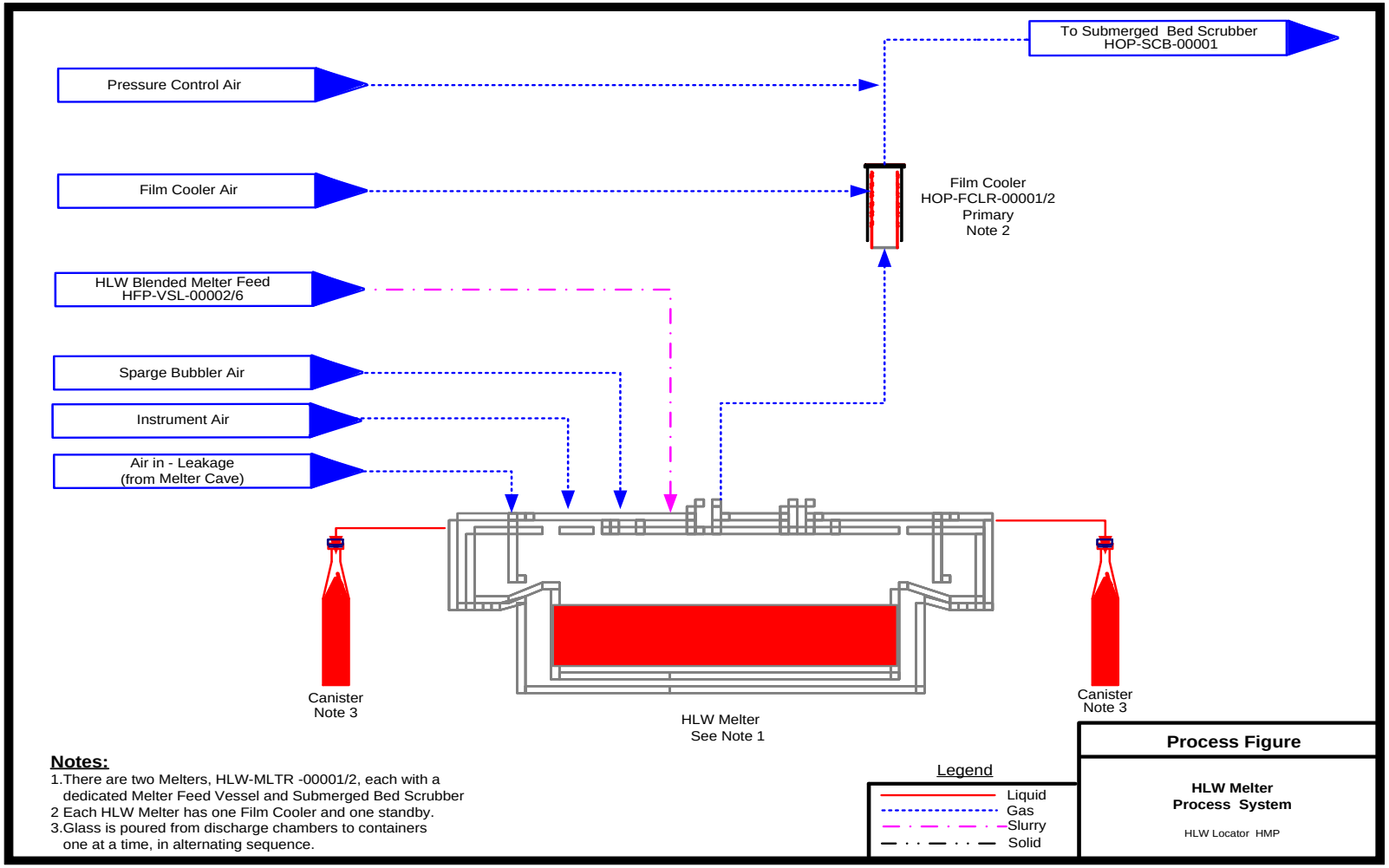


Figure 4A-27 HLW Melter Process System (HMP)

This page intentionally left blank.

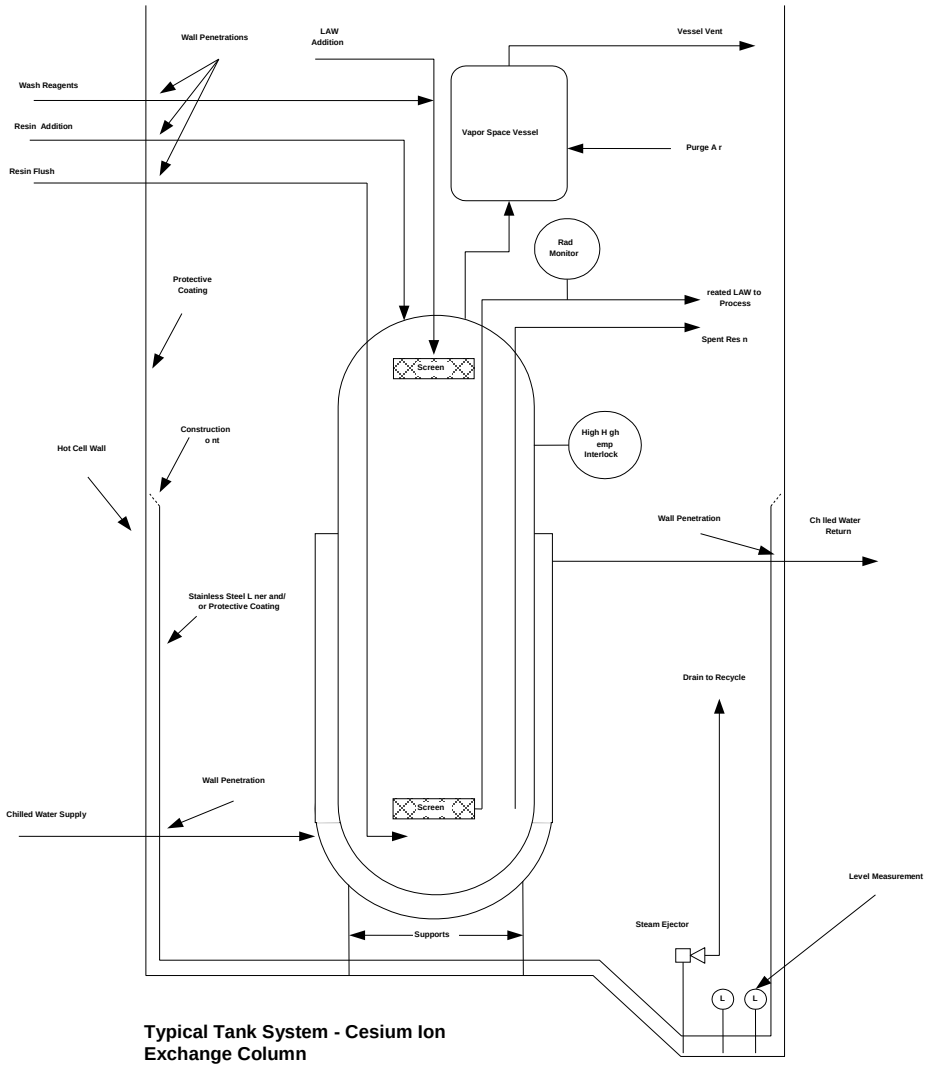


Figure 4A-38 Typical Tank System – Cesium Ion Exchange Column

This page intentionally left blank.

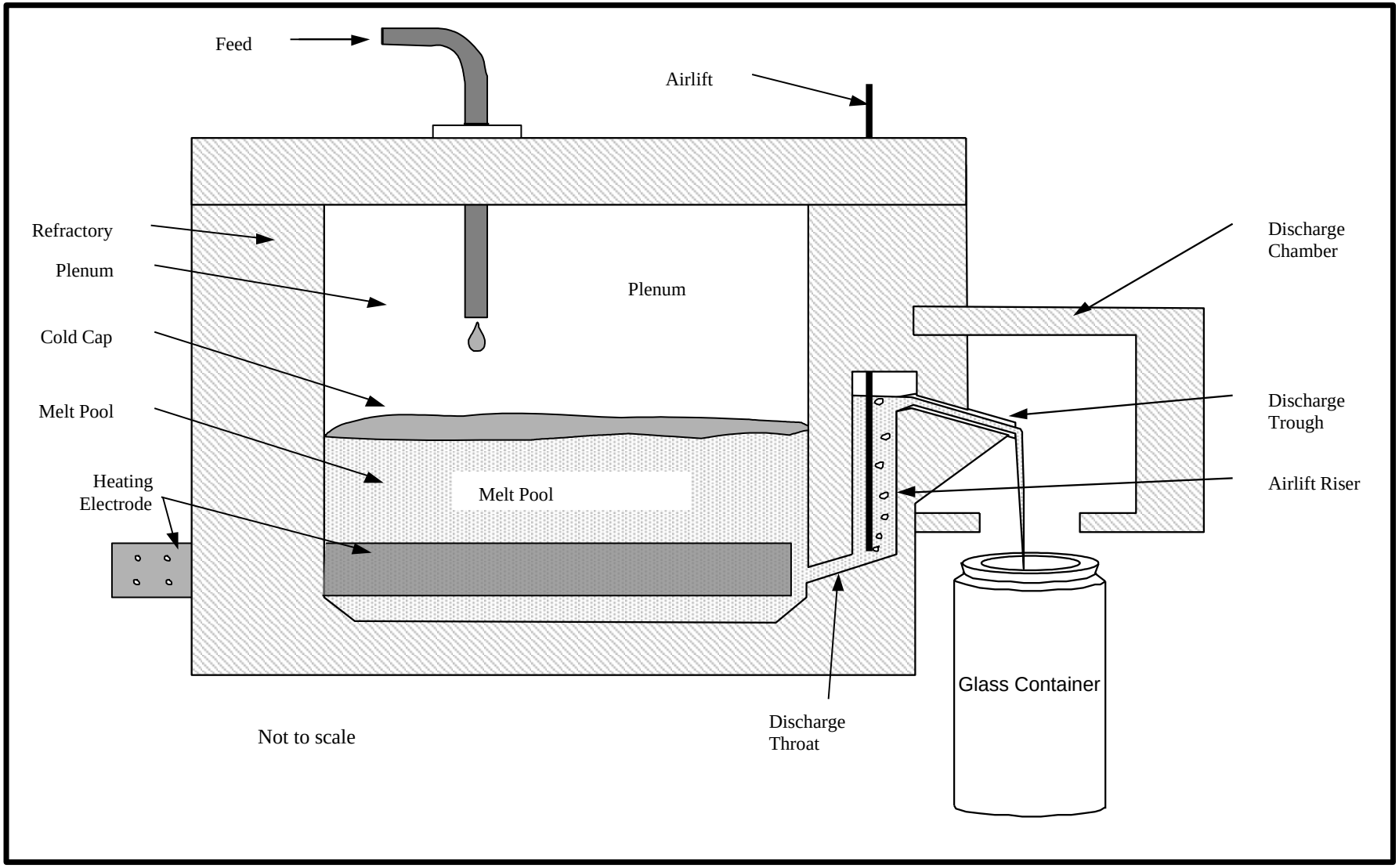


Figure 4A-48 Typical System - LAW Melter Process System (LMP)

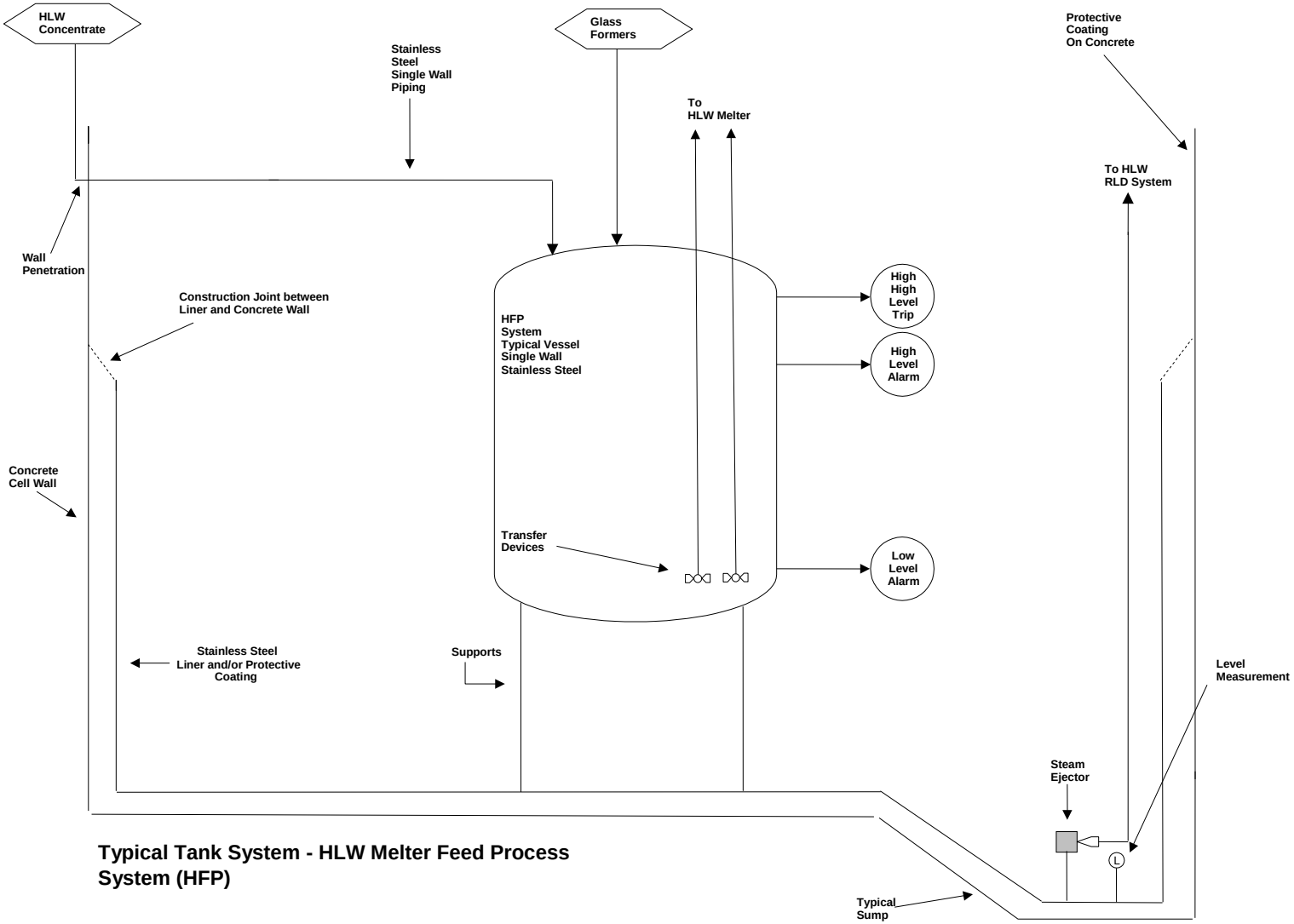
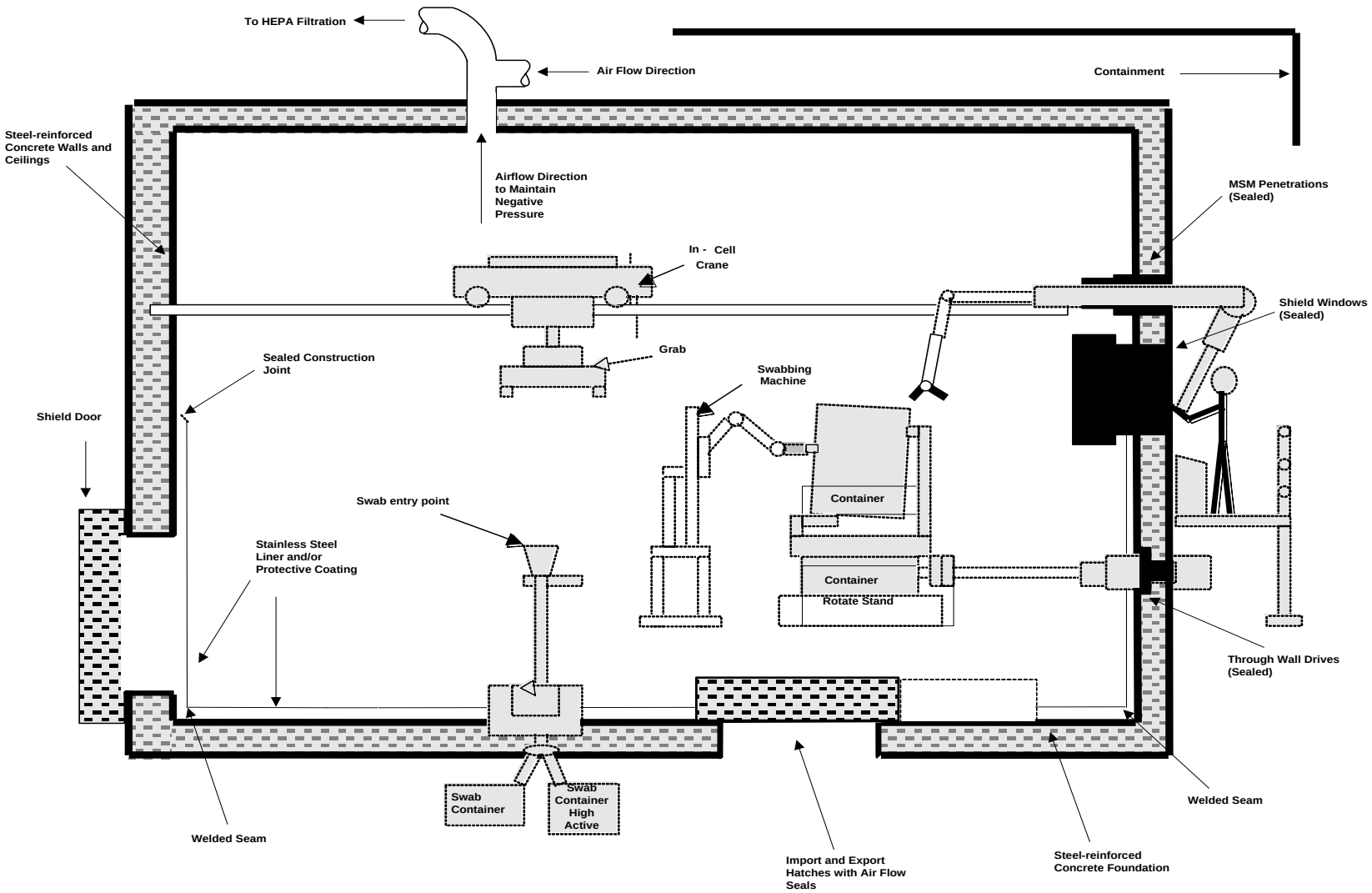


Figure 4A-53 Typical Tank System – HLW Melter Feed Process System (HFP)



Typical System - Containment Building

Figure 4A-59 Typical System - Containment Building (Sheet 1)

This page intentionally left blank.

Figure 4A-59 Typical System - Containment Building Typical Design Features Crosswalk (Sheet 2)

Containment Building	Negative Cell Air Pressure	Air Flow to HEPA Filters	SS Liner With Welded Seams	Import / Export Hatch - (Controlled Air Gap)	Shield Windows - (Sealed)	Steel Reinforced Concrete Floor/Foundation	Steel Reinforced Concrete Walls & Ceilings	Through Wall MSMs - (Sealed)	In - Cell Bridge Crane / Monorail	Horiz./Vertical Shield Doors - (Controlled Air Gap)	Miscellaneous In-cell Room Equipment
Pretreatment Plant											
Pretreatment Hot Cell Containment Building (P-0123)	X	X	X	X	X	X	X	X	X	X	X
Pretreatment Maintenance Containment Building											
PM0124 Hot Cell Crane Maintenance Mezzanine	X				X	X	X		X		X
P-0121A Spent Resin Dewatering	X	X		X	X	X	X				X
P-0122A Waste Packaging Area	X	X		X	X	X	X				X
P-0123A Remote Decontamination Maintenance Cave	X	X	X	X	X	X	X		X		X
P-0124 C3 Workshop	X	X		X	X	X	X		X		X
P-012C1 C3 Workshop	X	X		X	X	X	X		X		X
P-0125 Cask Lidding Airlock	X	X		X	X	X	X			X	X
P-0125A Cask Lidding Room	X	X		X	X	X	X		X		X
P-0128A MSM Repair Area	X	X		X	X	X	X				X
P-0128 Temporary Storage Room	X				X	X	X				X
Pretreatment Spent Filter Drum Handling Area Containment Building (P-0223)	X	X				X	X			X	X
Pretreatment Filter Cave Room-Containment Building (P-0335)	X	X	X			X	X			X	X
Pretreatment PJV Secondary HEPA Filter Room Containment Building (P-0431A)	X	X				X	X				

Containment Building	Negative Cell Air Pressure	Air Flow to HEPA Filters	SS Liner With Welded Seams	Import / Export Hatch - (Controlled Air Gap)	Shield Windows - (Sealed)	Steel Reinforced Concrete Floor/Foundation	Steel Reinforced Concrete Walls & Ceilings	Through Wall MSMs - (Sealed)	In - Cell Bridge Crane / Monorail	Horiz./Vertical Shield Doors - (Controlled Air Gap)	Miscellaneous In-cell Room Equipment
LAW Vitrification Plant											
LAW LSM Gallery Containment Building (L-0112)	X	X				X	X			X	X
ILAW Container Finishing Containment Building											
L-0109B Swabbing Cell North Line	X	X		X	X	X	X	X	X	X	X
L-0109C Decontamination Area North Line	X	X		X	X	X	X	X	X	X	X
L-0109D Inert Fill / Welding Area North Line	X	X		X	X	X	X	X	X	X	X
L-0115B Swabbing Cell South Line	X	X		X	X	X	X	X	X	X	X
L-0115C Decontamination Area South Line	X	X		X	X	X	X	X	X	X	X
L-0115D Inert Fill / Welding Area South Line	X	X		X	X	X	X	X	X	X	X
L-0109E Container Monitoring/Export Area - North Line	X	X		X	X	X	X	X	X	X	X
L-0115E Container Monitoring/Export Area - South Line	X	X		X	X	X	X	X	X	X	X
LAW Vit Plant C3 Workshop Containment Building (L-226A)	X	X				X	X		X		X
LAW Consumable Import/Export Containment Building (L-0119B)	X	X				X	X		X		X
LAW Pour Cave Containment Building											
L-B015A Pour Cave (Melter 1)	X	X		X	X	X	X	X	X	X	X
L-B013C Pour Cave (Melter 1)	X	X		X	X	X	X	X	X	X	X
L-B013B Pour Cave (Melter 2)	X	X		X	X	X	X	X	X	X	X
L-B011C Pour Cave (Melter 2)	X	X		X	X	X	X	X	X	X	X
L-B011B (Spare)	X	X		X	X	X	X	X	X	X	X
L-B009B (Spare)	X	X		X	X	X	X	X	X	X	X
ILAW Container Buffer Storage Containment Building											
L-B025C											
L-B025D											

Containment Building	Negative Cell Air Pressure	Air Flow to HEPA Filters	SS Liner With Welded Seams	Import / Export Hatch - (Controlled Air Gap)	Shield Windows - (Sealed)	Steel Reinforced Concrete Floor/Foundation	Steel Reinforced Concrete Walls & Ceilings	Through Wall MSMs - (Sealed)	In - Cell Bridge Crane / Monorail	Horiz./Vertical Shield Doors - (Controlled Air Gap)	Miscellaneous In-cell Room Equipment
HLW Vitrification Plant											
HLW Melter Cave 1 Containment Building:	X	X	X	X	X	X	X	X	X	X	X
H-0117 Melter Cave 1	X	X	X	X	X	X	X	X	X	X	X
H-0116B Melter Cave 1 - C2/C3 Airlock	X	X				X	X			X	
H-0310A Melter Cave 1 Equipment Decon Pit	X	X	X	X	X	X	X	X	X	X	
HLW Melter Cave2 Containment Building:	X	X	X	X	X	X	X	X	X	X	X
H-0106 Melter Cave 2	X	X	X	X	X	X	X	X	X	X	X
H-0105B Melter Cave 2 - C2/C3/ Airlock	X	X				X	X		X	X	
1 H-0304A Melter Cave 2 Equipment Decontamination Area	X	X	X	X	X	X	X	X	X	X	
IHLW Canister Handling Cave Containment Building (H-0136)	X	X	X	X	X	X	X	X	X	X	X
IHLW Canister Swab and Monitoring Cave Containment Building (H-0133)	X	X		X	X	X	X	X	X	X	
C3 Workshop Containment Building:	X	X				X	X				X
C3 Workshop (H-0311A)	X	X				X	X				X
C3 MSM Maintenance Workshop (H-0311B)	X	X				X	X				
HLW Filter Cave Containment Building (H-0104)	X	X		X	X	X	X	X	X	X	X
HLW Waste Handling Area Containment Building:	X	X				X	X				
H-0410B E&I Room	X	X				X	X				
H-0411 Waste Handling Room	X	X				X	X				
HLW Pour Tunnel 1 Containment Building (H-B032)	X	X	X	X		X	X		X		
HLW Pour Tunnel 2 Containment Building (H-B005A)	X	X	X	X		X	X		X		
HLW Drum Swabbing and Monitoring Area Containment Building:	X	X				X	X		X		
H-0126A Crane Maintenance Room	X	X				X	X				
H-0126B Swabbing and Monitoring Room	X	X				X	X				
H-B028 Cask Import/Export Room	X	X				X	X		X		

This page intentionally left blank.

Figure 4A-65 Simplified General Arrangement Pretreatment - Plan at El. 98

Some information, on this page, may appear to be illegible; however, the information necessary for assuring adequate design is legible

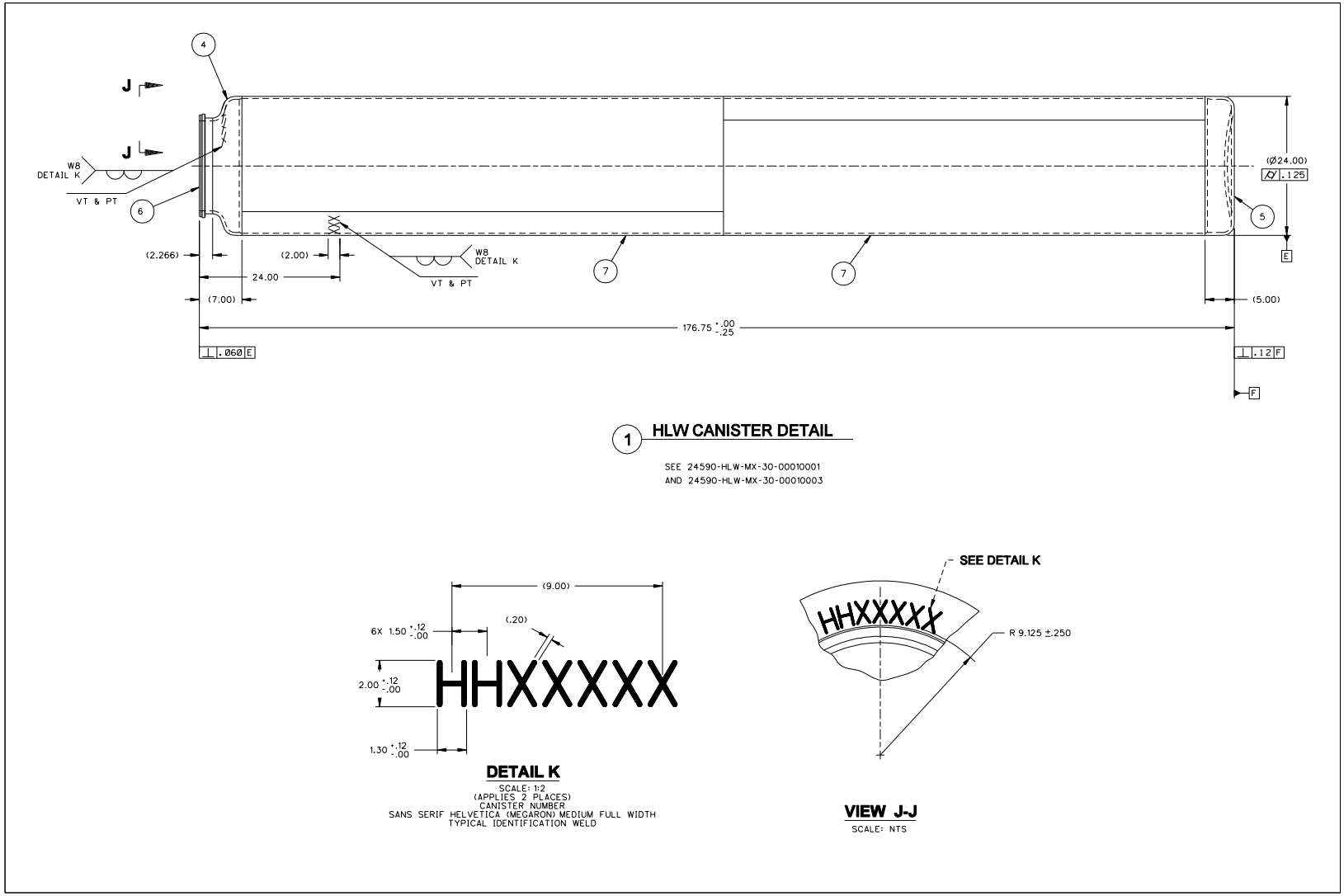


Figure 4A-118 Schematic of an Example IHLW Container and Label

Some information, on this page, may appear to be illegible; however, the information necessary for assuring adequate design is legible

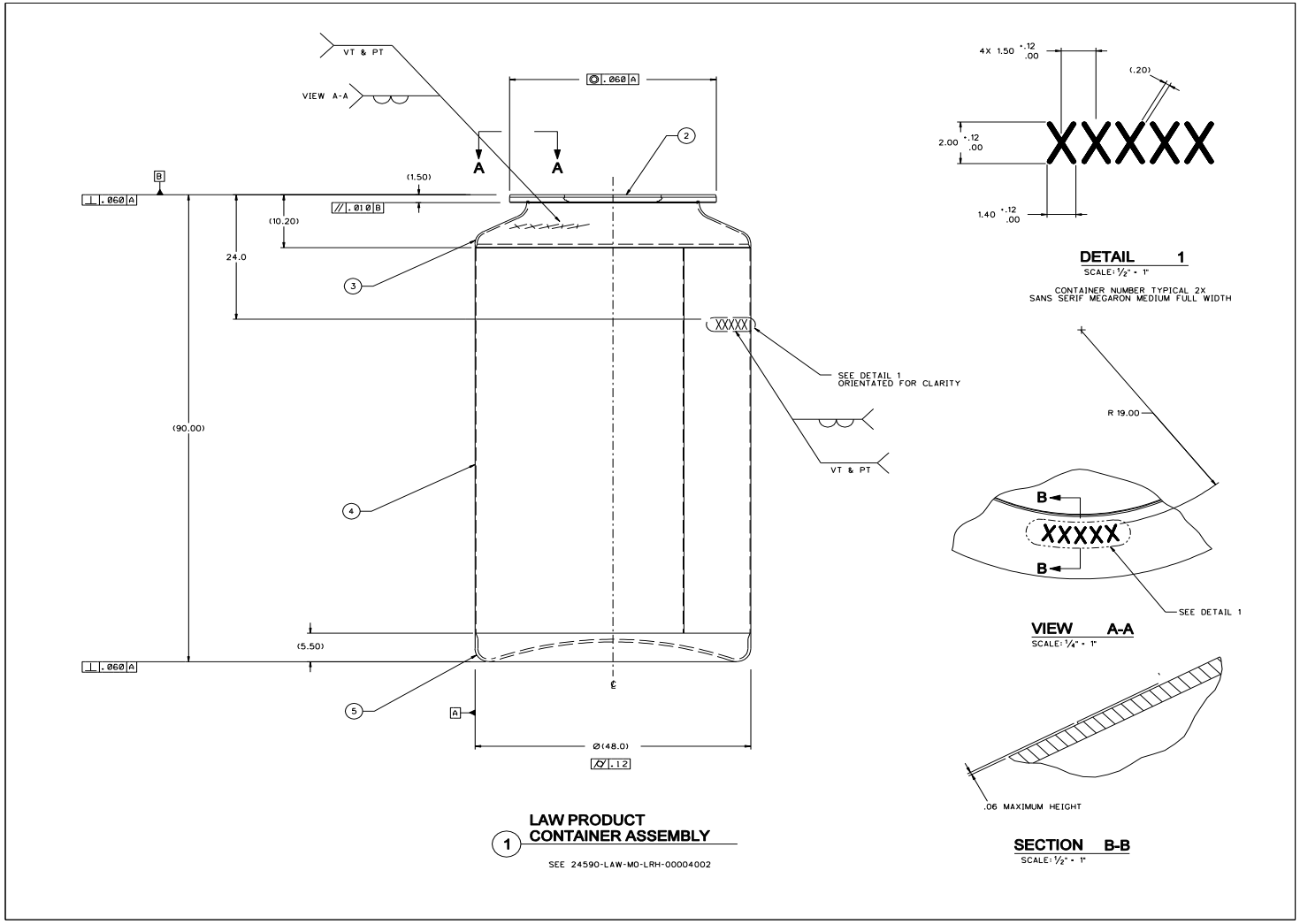


Figure 4A-119 Schematic of an Example ILAW Container and Label

Some information, on this page, may appear to be illegible; however, the information necessary for assuring adequate design is legible

This page intentionally left blank.

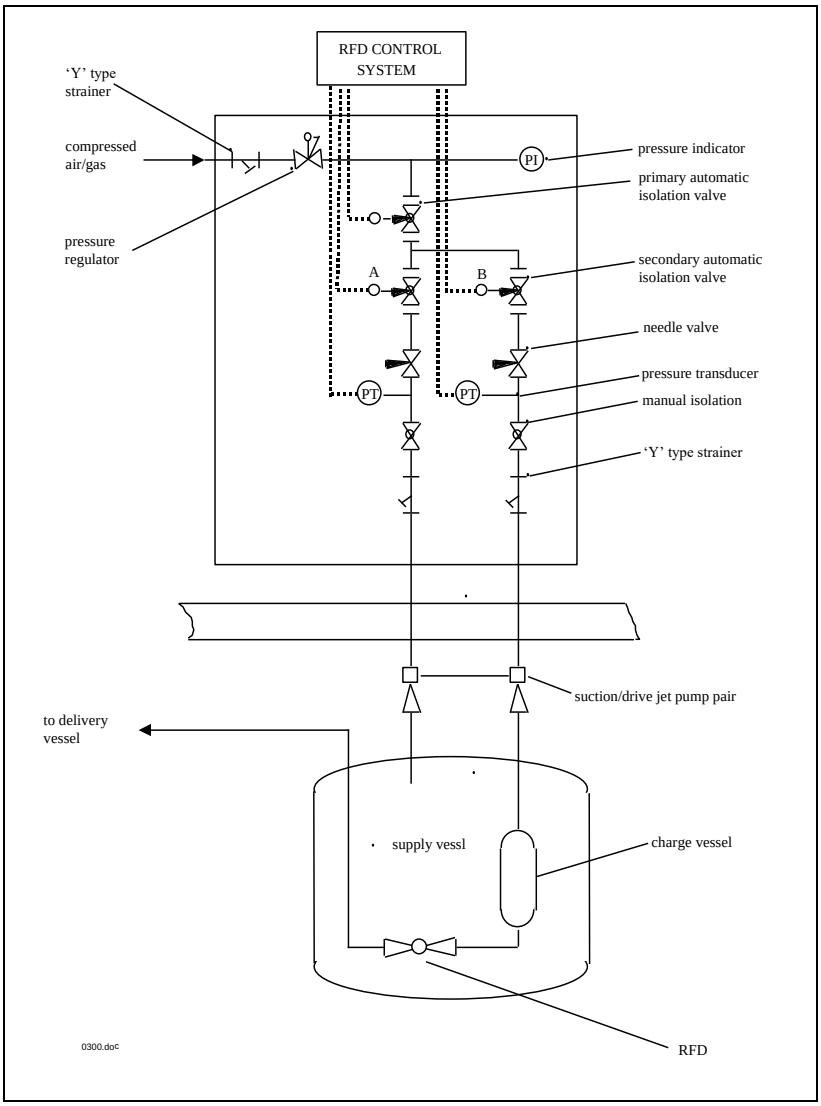


Figure 4A-120 Typical Arrangement of a Reverse Flow Diverter

Some information, on this page, may appear to be illegible; however, the information necessary for assuring adequate design is legible

This page intentionally left blank.

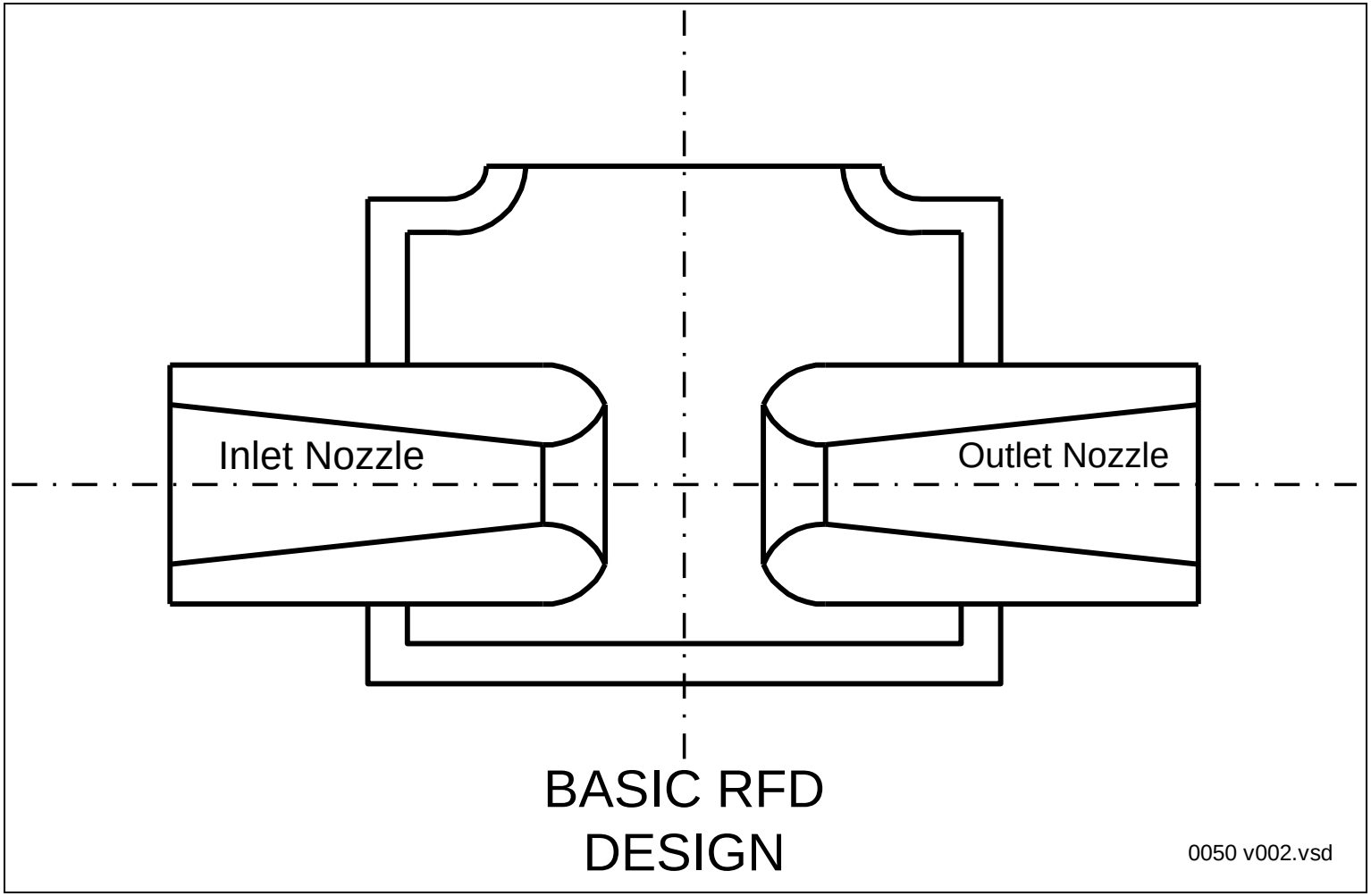


Figure 4A-121 Basic Reverse Flow Diverter Design

This page intentionally left blank.

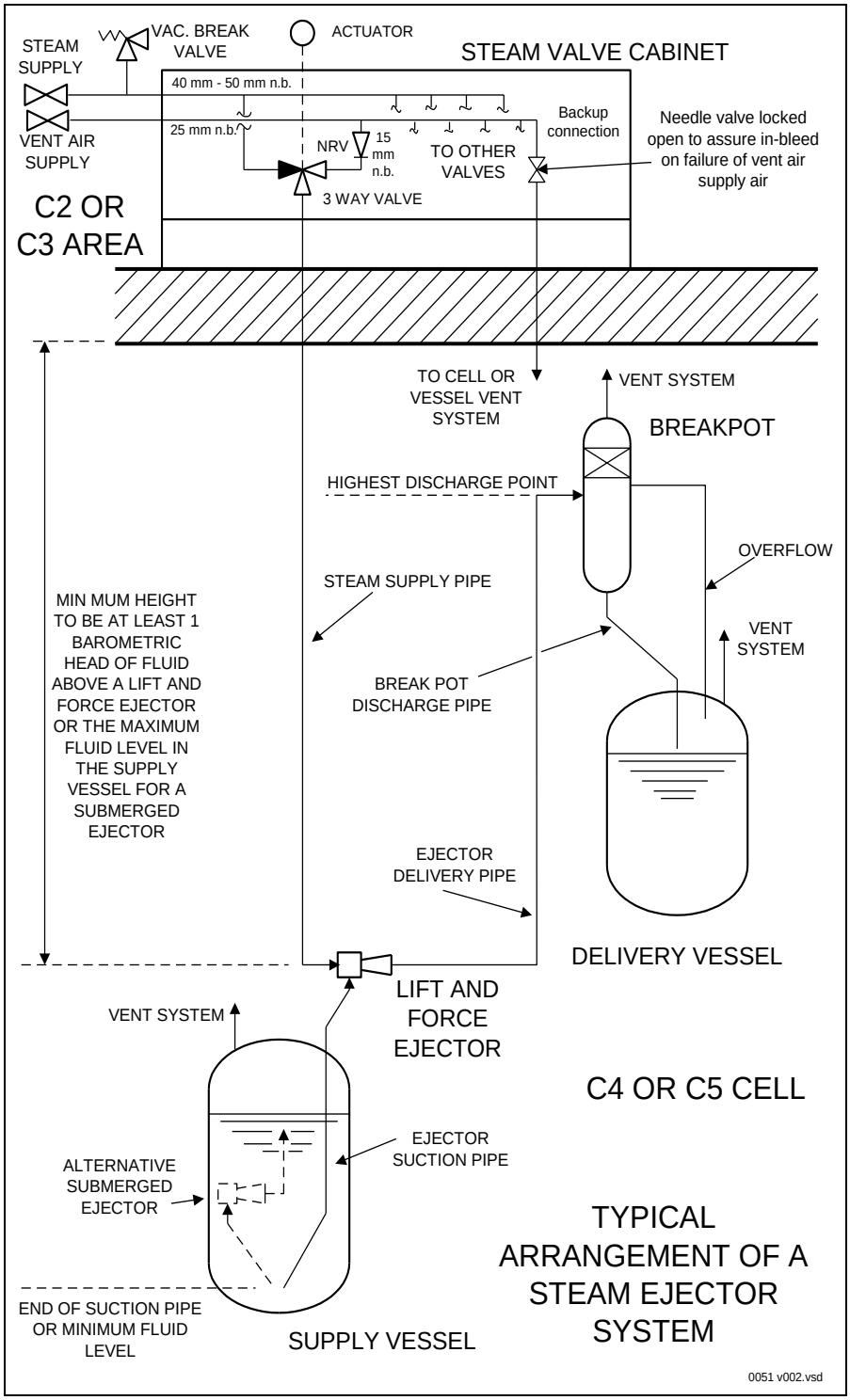


Figure 4A-122 Typical Arrangement of a Steam Ejector System

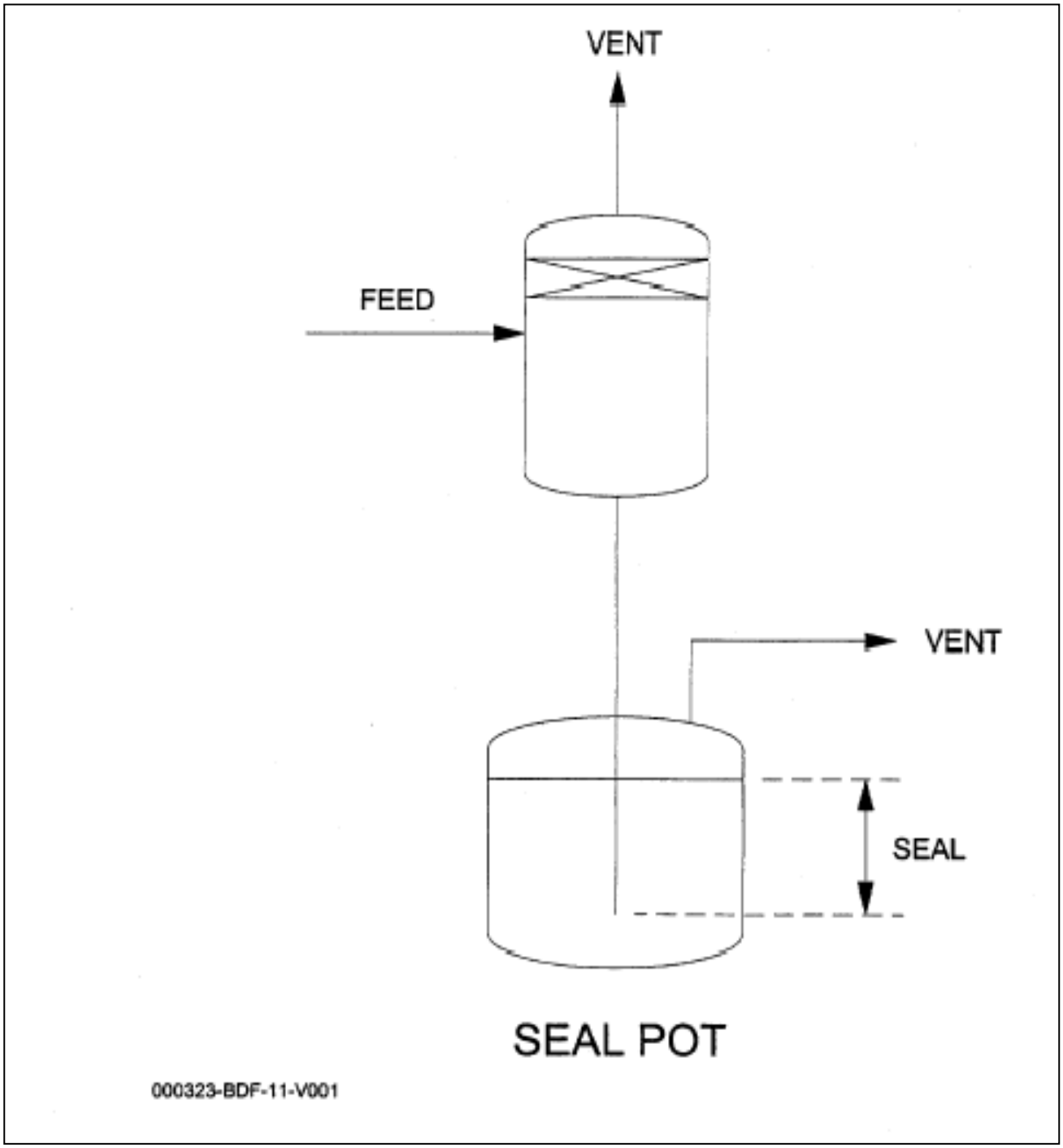


Figure 4A-123 Typical Seal Pot Arrangement

0052 v002 ppt

Figure 4A-124 Typical Breakpot Arrangement

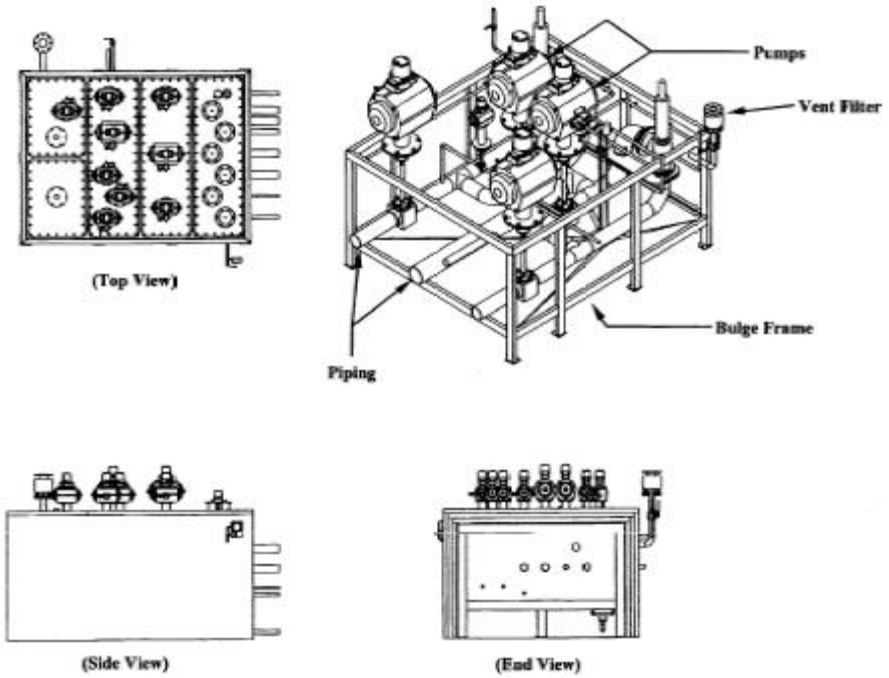


Figure 4A-127 Typical Bulge Configuration

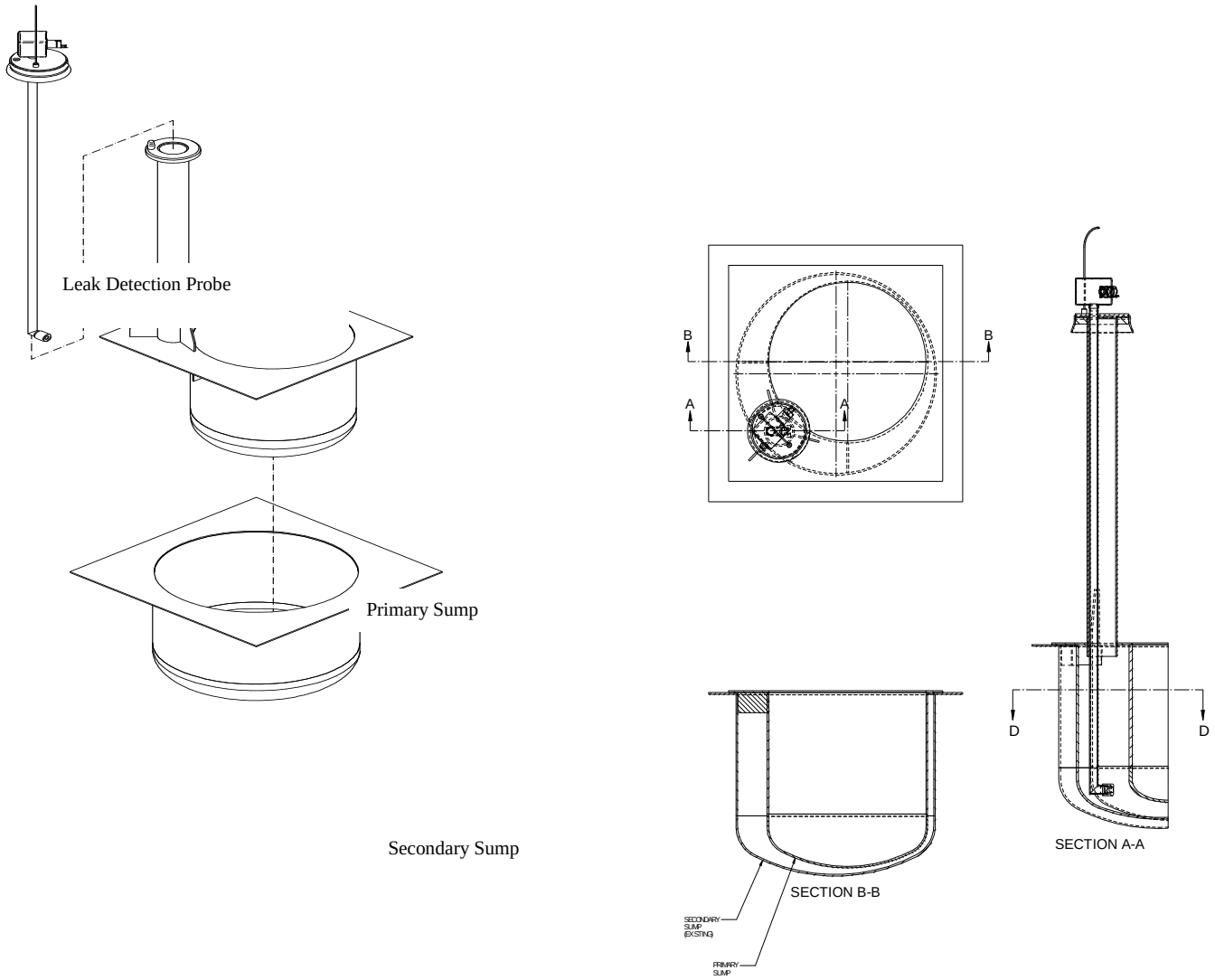


FIgure 4A-128 Typical Primary Containment Sump Conceptual Design

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 4D
PRETREATMENT FACILITY (PTF)

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
12/15/2016	8C.2016.Q3

This page intentionally left blank.

APPENDIX 4D
PRETREATMENT FACILITY (PTF)

This page intentionally left blank.

APPENDIX 4D
PRETREATMENT FACILITY (PTF)

TABLE OF CONTENTS

4D Pretreatment Facility (PTF) 5
4D.1 Containers 6
4D.1.1 Description of Containers 7
4D.1.2 Container Management Practices 8
4D.1.3 Container Labeling 8
4D.1.4 Containment Requirements for Storing Waste 9
4D.1.5 Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes in Containers 11
4D.2 Tank Systems 11
4D.2.1 Waste Feed Receipt Process (FRP) System 11
4D.2.2 Waste Feed Evaporation Process (FEP) System 12
4D.2.3 Ultrafiltration Process (UFP) System 14
4D.2.4 HLW Lag Storage and Feed Blending Process (HLP) System 16
4D.2.5 Cesium Ion Exchange Process (CXP) System 17
4D.2.6 Cesium Nitric Acid Recovery Process (CNP) System 18
4D.2.7 Cesium Resin Addition Process (CRP) System 20
4D.2.8 Reserved 21
4D.2.9 Reserved 21
4D.2.10 Reserved 21
4D.2.11 Treated LAW Evaporation Process (TLP) System 21
4D.2.12 Treated LAW Concentrate Storage Process (TCP) System 24
4D.2.13 Spent Resin Collection and Dewatering Process (RDP) System 25
4D.2.14 Pretreatment Maintenance 26
4D.2.15 Plant Wash and Disposal (PWD) System 28
4D.2.16 Radioactive Liquid Waste Disposal (RLD) System 29
4D.2.17 Sodium Hydroxide Reagent (SHR) System 30
4D.3 Containment Buildings 30
4D.3.1 Pretreatment Hot Cell Containment Building (P-0123) 31
4D.3.2 Pretreatment Maintenance Containment Building (PM0124, P-0121A, P-0122A, P-0123A, P-0124, P-0124A, P-0125, P-0125A, P-0128, P-0128A) 35

4D.3.3 Pretreatment Spent Filter Drum Handling Area Containment Building (P-0223) 39
4D.3.4 Pretreatment Filter Cave Containment Building (P-0335) 41
4D.3.5 Pretreatment PJV Secondary HEPA Filter Room Containment Building (P-0431A) 42
4D.4 Air Emission Control 44
4D.4.1 Pretreatment Facility Ventilation 44
4D.4.2 Vessel Vent Process and Exhaust (PVP/PVV) System 45
4D.4.3 Pulse Jet Ventilation (PJV) System 49

TABLES

Table 4D-1 Pretreatment Facility Tank Systems 53
Table 4D-2 Pretreatment Facility Miscellaneous Units (Systems and Sub-Systems) 59
Table 4D-3 Pretreatment Facility Secondary Containment Rooms/Areas 64
Table 4D-4 Pretreatment Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines 67
Table 4D-5 Pretreatment Facility Containment Buildings Summary 77

4D PRETREATMENT FACILITY (PTF)

The PTF is designed to receive mixed waste from the double shell tank (DST) system and separate and prepare the low-activity waste (LAW) and high-level waste (HLW) feed streams for vitrification. The main functions performed at the pretreatment facility are as follows:

- Receive waste feeds from the Hanford Site DST system.
- Separate cesium, strontium, and TRU radionuclides from the waste feeds.
- Segregate solids into the HLW feed stream.
- Concentrate the separated radionuclides for incorporation into the HLW feed stream.
- Adjust the concentration of the waste for vitrification.
- Collect and monitor liquid effluents.
- Blend waste fractions to optimize treatment steps.

The purpose of this appendix is to describe the major systems associated with the pretreatment facility. Descriptions of process systems, ventilation systems, and mechanical support systems associated with the pretreatment facility are provided in Sections 4D.2 through 4D.4. Table 4D-1 lists current tank design information (capacity, materials of construction, and dimensions). Table 4D-2 lists the current miscellaneous unit design information. The tanks and miscellaneous units are grouped by process systems in these tables.

Tanks or miscellaneous units that manage liquid mixed or dangerous waste are provided with secondary containments. Table 4D-3 summarizes the secondary containment rooms/areas and calculated minimum liner heights. Sumps, leak detection boxes, and secondary containment drain systems are listed in Table 4D-4.

The following figures found in Appendix 4A and drawings, found in the *Hanford Facility Dangerous Waste Permit* (DWP), Operating Unit Group 10, Appendix 8, provide additional detail for the pretreatment facility:

- Simplified process flow diagrams for the Waste Treatment Plant (WTP).
- Process flow figures for pretreatment process information.
- Typical system figures depicting main features for each regulated system.
- General arrangement figures and drawings showing locations of regulated equipment.
- Waste management area figures showing facility locations to be permitted.

Vessels in black cells are designed for a 40-year life, and are of welded stainless steel construction. The black cells in the pretreatment facility are located adjacent to the hot cell. Hydraulic connections connect the black cells to each other and connect selected black cells to the hot cell. These hydraulic connections are used to cascade fluid flow between cells in the event that the black cell secondary containment hold-up volume is exceeded by the contents of a single leaking vessel in the black cell. As the liquid cascades from cell to cell it will reach the hot cell. The floors and lower portions of the black cells and hot cell walls are partially lined with stainless steel for secondary containment. This secondary containment will have a gradient designed to channel liquid to a low-point sump within each black cell and three sumps in the hot cell. Black cells and hot cells will be equipped with an instrumented sump or sumps for detecting loss of vessel or piping integrity. Liquids are removed from the black cell sumps by steam ejectors.

The radiation monitor and valves with potential exposure to elevated radiation are contained within a shielded bulge attached to the outside wall of the black cell. The bulge provides secondary containment for ancillary equipment and is equipped with decontamination sprays, liquid level instrumentation for leak detection, and a drain to the Ultimate Overflow Vessel (PWD-VSL-00033).

Liquid level in the vessels will be monitored and maintained within low and high operating limits. Regulated WTP plant tank systems processes and leak detection systems instruments and parameters will be provided in DWP Table III.10.E.E. Regulated miscellaneous treatment systems process and leak detection systems instruments and parameters will be provided in DWP Table III.10.G.C.

At times, internal decontamination of vessels may be required. The primary permanent process vessels are fitted with wash rings for decontamination by flushing. Wash systems will be able to introduce water, caustic solution, or acid. The stainless steel lined floor provides secondary containment.

Instrumentation, alarms, controls, and interlocks will be provided for the tank systems and miscellaneous treatment systems to indicate or prevent the following conditions, as appropriate:

- Overfilling: Plant items are protected against overfilling by liquid level indication, high level instrumentation interlocks to shut off feed sources, and process control system control functions backed up by hard wired trips as required.
- Loss of containment: Plant items are protected against containment loss by liquid level indication, and by process control system control and alarm functions as required, including shut off of feed sources. Tanks or miscellaneous units (MUs) that manage liquid mixed or dangerous waste is provided with secondary containment, and some tanks and MUs utilize daily visual inspection for leak detection. Tank and MU ancillary equipment is provided with secondary containment or visually inspected for leaks on a daily basis in accordance with WAC-173-303-640(4)(f). Sumps associated with the management of liquid mixed or dangerous waste are provided with liquid level instrumentation and an ejector or pump to empty the sump as needed.
- Inadvertent transfers of fluids: System sequential operations are properly interlocked to prevent inadvertent transfers at the wrong time or to the wrong location.
- Loss of mixing function: Tank systems are instrumented (air pressure/flow indication) to prevent hydrogen accumulation and solids settling. A forced air in-bleed is provided to dilute hydrogen generated through radiolysis.
- Loss of process function: System vessels using reverse flow diverters incorporated dual reverse flow diverter system redundancy into the design to prevent loss of process function and to maintain appropriate liquid levels in vessels if one of the reverse flow diverters should fail.
- Overheating: Temperature regulation with chilled water is provided for those plant items where heat may be generated due to radiolysis. Chilled water lines will be monitored for contamination.
- Overpressurization: Relief is provided by use of rupture disks.
- Vacuum in vessels: Relief is provided through the Pretreatment Vessel Vent Process (PVP) system during transfer of waste out of vessels.
- Loss of air flow: The plant ventilation system creates a pressure gradient which causes air to flow through engineered routes from an area of lower contamination potential to an area of higher contamination potential.

In addition to level control, temperature and pressure may be monitored for tank systems and miscellaneous treatment systems in some cases. Additional information may be found in the system logic descriptions located in DWP Operating Unit Group 10, Appendix 8.13.

4D.1 Containers

This section identifies the containers and container management practices that will be followed at the PTF. The term “container” is used as defined in Washington Administrative Code (WAC) 173-303-040. Note that in this appendix and throughout the permit, terms other than containers may be used, such as canisters, boxes, bins, flasks, casks, and overpacks.

The following sections address waste management containers:

- Description of Containers - Section 4D.1.1
- Container Management Practices - Section 4D.1.2
- Container Labeling - Section 4D.1.3
- Containment Requirements for Storing Waste - Section 4D.1.4
- Prevention of Ignitable, Reactive, and Incompatible Wastes in Containers - Section 4D.1.5

4D.1.1 Description of Containers

These types of waste will be managed in containers:

- Miscellaneous mixed waste (secondary waste)
- Miscellaneous nonradioactive dangerous waste (secondary waste)

The waste form dictates the type of containers used for waste management. The following paragraphs describe these types of containerized waste that are managed at the PTF.

Miscellaneous Mixed Waste

Generally, miscellaneous mixed wastes are secondary wastes that may include, but are not limited to, the following items:

- Spent or failed equipment
- Spent, dewatered ion exchange resins in the pretreatment facility
- Offgas HEPA filters

Spent equipment and offgas filters will typically be managed in commercially-available containers such as steel drums or steel boxes, of varying size. The containers for miscellaneous mixed waste will comply with transportation requirements, with receiving treatment, storage, and disposal (TSD) facility waste acceptance criteria, and will be compatible with the miscellaneous mixed waste. These containers may or may not include a liner. Final container selection, container and waste compatibility, and the need for liners, will be based on the physical, chemical, and radiological properties of the waste being managed.

Spent ion exchange resins will be dewatered and managed in high integrity containers (HICs). This waste will be generated and managed in the PTF, until it is transferred to a suitable TSD unit for further management.

Each miscellaneous mixed waste container will have associated documentation that describes the contents, such as waste type, physical and chemical characterization, and radiological characterization. This information will be retained within the plant information network.

Most miscellaneous secondary mixed wastes will be spent equipment and consumables such as pumps, air lances, HEPA filters, etc., and are not expected to contain liquids. If wastes are generated that contain liquids, these wastes may be treated to remove or absorb liquids, to comply with the receiving TSD facility waste acceptance criteria.

Miscellaneous Nonradioactive Dangerous Waste

Each nonradioactive dangerous waste container will have associated documentation that describes the contents, such as waste type and physical and chemical characterization. Typically, commercially available containers will be used. The types of containers used for packaging nonradioactive dangerous waste will comply with the receiving TSD facility waste acceptance criteria and transportation requirements. However, final container selection, container and waste compatibility, and the need for liners will be based on the physical and chemical properties of the waste being managed.

4D.1.2 Container Management Practices

The following paragraphs describe how each of the containers used at the PTF are managed.

4D.1.2.1 Miscellaneous Nonradioactive Dangerous Waste Containers

Miscellaneous dangerous waste containers will typically be managed in non-permitted waste management units (satellite accumulation areas and less-than-90-day storage areas) located throughout the PTF. Containers will be kept closed unless waste is being added, removed, or sampled. They will routinely be moved by forklift or drum cart, and will be managed in a manner that prevents ruptures and leaks.

4D.1.2.2 Waste Tracking

The plant information network interfaces with the integrated control network and is designed to collect and maintain plant information. The plant information network is currently planned to the following systems (all systems used at the plants/facilities and balance of facilities [BOF] are provided for information only):

- Plant data warehouse and reporting system
- Laboratory information management system
- Waste tracking and inventory system

Inventory and Batch Tracking

The waste tracking and inventory system will interface with the information system data historian to provide reporting information such as tank volumes, waste characteristics, and facility inventories of process waste. The waste tracking system will also be used to query operations parameters at any time information is needed, as specified by operations, to manage the process system.

Secondary Waste Stream Tracking

Containerized secondary waste streams and equipment will be tracked and managed through commercially available database management software. Containers will be mapped in each plant and updated during the inspection process using a commercially available drawing software application.

Laboratory Information Management System

The laboratory information management system (LIMS) will be an integral feature of the plant information network. The LIMS will serve as an essential tool for providing data management of regulatory and processing samples. The chosen LIMS will be a commercial off-the-shelf software package designed for performing laboratory information management tasks as described in ASTM E1578-93, *Standard Guide for Laboratory Information Management Systems (LIMS)*.

The LIMS will track the flow of samples through the laboratory. Samples received in the laboratory will be identified with a unique identification label. The identification label provides details of the sample process stream. Baseline analyses are defined by the requesting plant. Additional analyses, as required, will be input into LIMS by laboratory analysts. Data will be input into LIMS manually or by data transfer using LIMS/instrument interface. Analyses will be performed using approved and validated analytical procedures.

Analytical results will be compiled by the LIMS and held pending checking and approval by appropriate staff. Approved results will be reported to the requesting plant.

4D.1.3 Container Labeling

Miscellaneous Mixed Waste Containers

The miscellaneous mixed waste containers will be labeled with the accumulation or generation start date, as appropriate, the major risk(s) associated with the waste, and the words “hazardous waste” or

"dangerous waste." A waste tracking and inventory system will be implemented. Labels and markings will be positioned so that required information is visible. The label will meet the WAC 173-303-630(3) requirements, and the dangerous waste number will be clearly identified.

A waste tracking and inventory system will be implemented. Labels and markings will be positioned so that required information is visible, and the dangerous waste number will be clearly identified.

Miscellaneous Dangerous Waste Containers

The miscellaneous dangerous waste drums will be labeled with the accumulation or generation start date, as appropriate, the major risk(s) associated with the waste, and the words "hazardous waste" or "dangerous waste". A waste tracking and inventory system will be implemented. Labels and markings will be positioned so that required information is visible. The label will meet the WAC 173-303-630(3) requirements, and the dangerous waste number will be clearly identified.

4D.1.4 Containment Requirements for Storing Waste

Secondary containment requirements for the waste are discussed below.

4D.1.4.1 Secondary Containment System Design

Secondary containment is required for areas in which containers hold free liquids. It is also required for areas managing wastes exhibiting the characteristics of ignitability or reactivity as defined in WAC 173-303-090(5) and (7).

Miscellaneous Mixed Waste

Miscellaneous mixed waste storage areas may contain waste requiring secondary containment. If wastes containing liquids or wastes exhibiting the characteristics of ignitability or reactivity are generated, portable secondary containment that meets the requirements of WAC 173-303-630(7) will be provided.

Miscellaneous Dangerous Waste

Miscellaneous dangerous waste storage areas may contain waste requiring secondary containment. If wastes containing liquids or wastes exhibiting the characteristics of ignitability or reactivity are generated, portable secondary containment that meets the requirements of WAC 173-303-630(7) will be provided.

4D.1.4.2 System Design (Reserved)

Containers with liquids will be provided with portable secondary containment meeting the requirements of WAC 173-303-630(7).

4D.1.4.3 Structural Integrity of the Base

The storage areas will be constructed to support storage and transportation of containers within the container storage areas and will be designed with the following:

- Containment system capable of collecting and holding spills and leaks.
- Base will be free of cracks and gaps and sufficiently impervious to contain leaks.
- Positive drainage control.
- Sufficient containment volume.
- Sloped to drain or remove liquid, as necessary.

4D.1.4.4 Containment System Capacity

Miscellaneous Mixed Waste

Each container holding liquid dangerous waste will be placed into portable secondary containment that meets the requirements of WAC 173-303-630(7). The waste container will function as the primary containment while the portable containment device will function as the secondary containment.

Each portable secondary containment will have the capacity to contain 10% of the volume of all containers within the containment area, or the volume of the largest container, whichever is greater.

Miscellaneous Dangerous Waste

Each container holding liquid nonradioactive dangerous waste will be placed into portable secondary containment. The waste container will function as the primary containment while the portable sump will function as the secondary containment.

Each portable secondary containment will have the capacity to contain 10% of the volume of all containers within the containment area, or the volume of the largest container, whichever is greater. Typically, the waste containers will be steel drums.

4D.1.4.5 Control of Run-On

Miscellaneous Mixed Waste

Run-on will not reach the interior of the miscellaneous mixed waste storage areas, because they will be located within buildings, which will have roof gutters to remove precipitation.

Miscellaneous Dangerous Waste

Run-on will not reach the interior of the miscellaneous dangerous waste storage areas, because waste will be managed in buildings with walls and roof to remove precipitation.

4D.1.4.6 Removal of Liquids from Containment System

Miscellaneous Mixed Waste

Portable secondary containment sumps will be provided for individual containers that contain liquids. Hand pumps or similar devices will be used to remove liquid released to the portable secondary containments.

Miscellaneous Dangerous Waste

Portable secondary containment sumps will be provided for individual containers that contain liquids. Hand pumps or similar devices will be used to remove liquid released to the portable secondary containments.

4D.1.4.7 Demonstration that Containment is not Required because Containers do not Contain Free Liquids, Wastes that Exhibit Ignitability or Reactivity, or Wastes Designated F020-023, F026 or F027

Miscellaneous Mixed Waste

Secondary containment will be provided for individual containers that manage liquids. Wastes with the F020-F023, F026, and F027 numbers are not identified for the DST system. Therefore, these waste numbers will not be present at the PTF.

Miscellaneous Dangerous Waste

Wastes with the F020-F023, F026, and F027 numbers are not identified for the DST system. Therefore, these waste numbers will not be present at the PTF.

4D.1.5 Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes in Containers

Ignitable, Reactive, or Incompatible Miscellaneous Mixed Waste and Miscellaneous Dangerous Waste

Potentially incompatible wastes are not expected to be managed in the miscellaneous mixed waste storage areas. If such wastes are managed in one of these areas, the containers of incompatible waste or chemicals will not be stored in close proximity to each other. Acids and bases will be stored on separate portable secondary containment sumps; oxidizers will be stored in areas separate from combustible materials; and corrosive chemicals will be stored on a separate secondary containment sump. These separate storage areas within the unit will be clearly marked with signs indicating the appropriate waste to be stored in each area. Potentially incompatible waste will be stored at least one aisle width apart.

4D.2 Tank Systems

4D.2.1 Waste Feed Receipt Process (FRP) System

Process flow diagram of the Waste Feed Receipt Process system (FRP) is provided in DWP Operating Unit Group 10, Appendix 8.1. The primary function of the FRP is to receive batch transfers of waste feed from the DST system, and to store the waste pending processing through pretreatment.

The main components of the FRP system are:

- Waste transfer lines.
- Waste Feed Receipt Vessels (FRP-VSL-00002A/B/C/D).
- Vessel inlet and outlet valve headers.
- Pumps, piping, and instrumentation for waste transfers.
- Waste sampling equipment.

Waste feed will normally be transferred from the DST system in batches up to 1 million gallons into three of the four Waste Feed Receipt Vessels. The fourth vessel containing waste feed from the preceding transfer is used to sustain production while the current batch transfer is being mixed and sampled to verify waste characteristics.

The Waste Feed Receipt Vessels (FRP-VSL-00002A/B/C/D) can also receive concentrate from the Waste Feed Evaporation Process (FEP) System and off-specification treated LAW from the treated LAW Concentrate Storage Process (TCP) System. The waste feed stored in the Waste Feed Receipt Vessels is batch-transferred forward for processing to either the FEP system or to the Ultrafiltration Process (UFP) System. The FRP system also has the capability to return stored waste to the DST system.

Waste feed is received from the DST system through the inner pipe of any one of three co-axial transfer lines. The inlet valve header routes the waste to the Waste Feed Receipt Vessels. The inlet and outlet valve headers and pumps are used in combination to facilitate the transfer of waste from one Waste Feed Receipt Vessel to another, forward transfer of waste to the pretreatment process, or the return of waste to the DST system using the transfer lines.

FRP system design features include:

- Capability to pressure-test both the inner and outer transfer lines for integrity.
- Transfer line leak detection system for integrity indication during transfer.
- Transfer line flushing and draining capability.
- Instrumentation for monitoring vessel liquid level.
- Vessel vent to the PVP System.

- Forced air purge and passive air purge of the vessel vapor space for mitigation of hydrogen gas buildup.
- Internal pulse jet mixers (PJMs) for solids suspension and slurry mixing.
- Remote sampling capability off the discharge of the transfer pump via autosampler ASX-SMPLR-00025.

4D.2.2 Waste Feed Evaporation Process (FEP) System

Process flow diagrams of the Waste Feed Evaporation Process (FEP) System are provided in DWP Operating Unit Group 10, Appendix 8.1. The primary process function of the FEP tanks and miscellaneous unit system is to concentrate waste streams from:

- The FRP System.
- The HLW Lag Storage and Feed Blending Process (HLP) System.
- The Plant Wash and Disposal Process (PWD) System.
- The Spent Resin Collection and Dewatering Process (RDP) System.

The main components of the FEP tank and miscellaneous unit system are as follows:

Tank systems

- Waste Feed Evaporator Feed Vessels (FEP-VSL-00017A/B).
- Waste Feed Evaporator Condensate Vessel (FEP-VSL-00005).
- Vessel outlet valve headers.
- Pumps, piping, and instrumentation for waste transfers.

Miscellaneous Unit systems

- Waste Feed Evaporator Separator Vessels (FEP-SEP-00001A/B).
- Waste Feed Evaporator Primary Condensers (FEP-COND-00001A/B).
- Waste Feed Evaporator Intercondensers (FEP-COND-00002A/B).
- Waste Feed Evaporator Aftercondensers (FEP-COND-00003A/B).
- Waste Feed Evaporator Reboilers (FEP-RBLR-00001A/B).
- Pumps.

The Waste Feed Evaporator Separator Vessels (FEP-SEP-00001A/B) will deliver concentrate to the Ultrafiltration Process (UFP) System. Overhead vapors and noncondensables from the Waste Feed Evaporator Separator Vessels (FEP-SEP-00001A/B) are routed to the Waste Feed Evaporator Primary Condensers (FEP-COND-00001A/B). Process condensate from the Waste Feed Evaporator Primary Condensers and steam condensate from the vacuum system are collected in the Waste Feed Evaporator Condensate Vessel (FEP-VSL-00005) and discharged to the Radioactive Liquid Waste Disposal Process (RLD) System. The noncondensables from the vacuum system are discharged to the PVP system.

During off-normal conditions, excess dilute recycles to the FEP Waste Feed Evaporator Feed Vessels (FEP-VSL-00017A/B), or excess concentrate from the FEP Waste Feed Evaporator Separator Vessels can be routed to the FRP system for interim storage. Fluids generated from solids washing in the UFP system that are collected in the HLP system and are too dilute for feed to HLW vitrification can also be concentrated in the FEP system.

The FEP system includes two Waste Feed Evaporator Feed Vessels (FEP-VSL-00017A/B) for managing feed makeup from multiple sources. One Waste Feed Evaporator Feed Vessel will be in a makeup mode while the alternate vessel is feeding the evaporator trains.

The design features of the FEP evaporator feed system include:

- Internal pulse jet mixers for solids suspension.
- Instrumentation for monitoring vessel liquid level.
- Vessel vent to the PVP system.
- Forced air purge and passive air purge of the vessel vapor space for mitigation of hydrogen gas buildup.
- Pump and line flushing capability.
- Transfer flow rate indication and transfer volume totalizer.
- Remote sampling capability off the discharge of the transfer pumps via autosampler ASX-SMPLR-00025.
- Vessel spray rings for vessel decontamination.

The FEP waste feed evaporator trains can be operated independently or at the same time depending on the evaporation needs. The Waste Feed Evaporator Separator Vessels (FEP-SEP-00001A/B) are forced-circulation units operating under vacuum to reduce the operating temperature. Recirculation pumps maintain a high flow rate from the Waste Feed Evaporator Separator Vessels (FEP-SEP-00001A/B) to the Waste Feed Evaporator Reboilers (FEP-RBLR-00001A/B). Pumps maintain a high flow rate around the evaporation system. The pumps transfer the waste through the Waste Feed Evaporator Reboilers and back into the Waste Feed Evaporator Separator Vessels (FEP-SEP-00001A/B). The recirculating waste stream is prevented from boiling in the reboiler tubes by maintaining sufficient hydrostatic head (submergence) to increase the boiling point above the temperature of the liquor in the Reboiler tubes.

As the liquid travels out of the Reboilers (FEP-RBLR-00001A/B), the hydrostatic head diminishes and flash evaporation occurs as the flow enters the Waste Feed Evaporator Separator Vessels (FEP-SEP-00001A/B). The liquid continues to flash and the vapor and liquid streams are separated (liquid-vapor disengagement). The liquid stream circulates in this loop and becomes more concentrated, while the vapor stream passes through a demisting section to the evaporator condensers.

A portion of the concentrate is also pumped from the bottom of the Waste Feed Evaporator Separator Vessels (FEP-SEP-00001A/B) at the controlled liquid density and is discharged to Ultrafiltration Feed Preparation Vessels (UFP-VSL-00001A/B) in the UFP system, or is recycled to the FRP system.

The vapor stream exiting the Waste Feed Evaporator Separator Vessels (FEP-SEP-00001A/B) is condensed in a three-stage condenser system consisting of Waste Feed Evaporator Primary Condensers (FEP-COND-00001A/B), Waste Feed Evaporator Intercondensers (FEP-COND-00002A/B), and Waste Feed Evaporator Aftercondensers (FEP-COND-00003A/B). The noncondensables exiting the After-Condenser are routed to the PVP system for treatment.

Design features of the evaporator trains include:

- Operating pressure indication and control.
- Differential pressure indication across the Waste Feed Evaporator Separator Vessels (FEP-SEP-00001A/B) demister section.
- Water sprays to the Waste Feed Evaporator Separator Vessels (FEP-SEP-00001A/B) demister section.
- Process condensate radiation monitoring and recycle capability.
- Low-pressure steam supply for heating the Waste Feed Evaporator Reboilers (FEP-RBLR-00001A/B).

- Waste Feed Evaporator Reboilers (FEP-RBLR-00001A/B) tube leak detection and diversion capability.
- Waste Feed Evaporator Reboilers (FEP-RBLR-00001A/B) steam condensate collection.
- Instrumentation for monitoring and control of vessel liquid level.
- Forced air purge of the vessel vapor space for mitigation of hydrogen gas buildup (passive venting of purge air via the downstream vessels connected to the vent header).
- Capability to drain, flush, and chemically clean the system.

The condensed vapor from the FEP condensers is collected in the Waste Feed Evaporator Condensate Vessel (FEP-VSL-00005). One condensate vessel is used to collect condensate from both evaporator trains. A small fraction of the total condensate is recycled to the Waste Feed Evaporator Separator Vessels (FEP-SEP-00001A/B) demister water sprays. The balance of the condensate is transferred to the RLD system. Off-specification condensate is recycled to the Waste Feed Evaporator Feed Vessels (FEP-VSL-00017A/B).

Design features include:

- Instrumentation for monitoring and control of vessel liquid level.
- Vessel vent to the PVP system.
- Outlet valve header.
- Remote sampling capability off the discharge of the transfer pumps.
- Dip legs in the vessel that maintain a liquid seal (pressure boundary) between the vessel and the condensers.
- Makeup recycle water as required for startup.

4D.2.3 Ultrafiltration Process (UFP) System

Process flow diagrams of the Ultrafiltration Process (UFP) System are provided in DWP Operating Unit Group 10, Appendix 8.1.

The UFP tank system separates the waste feed from the HLW Lag Storage and Blending Process and the Waste Feed Receipt Process Systems and/or the Waste Feed Evaporation Process System into a high solids stream, referred to as the HLW feed stream, and a relatively solids-free stream, referred to as the LAW feed stream. In the UFP system, the separated solids may undergo additional treatment (washing and/or leaching operations) to reduce the quantity of IHLW produced. In addition, the LAW feed stream may require Sr/TRU precipitation (Envelope C only). This operation will be performed in the UFP system prior to solids separation.

The main components of the UFP tank system are:

- Ultrafiltration Feed Preparation Vessels (UFP-VSL-00001A/B).
- Ultrafiltration Feed Vessels (UFP-VSL-00002A/B).
- Two ultrafilter trains, each containing five individual ultrafilters (UFP-FILT-00001A/2A/3A/4A/5A and -00001B/2B/3B/4B/5B).
- Associated ultrafilter backpulsing equipment.
- Ultrafilter Permeate Collection Vessels (UFP-VSL-00062A/B/C).
- Pumps, piping, and instrumentation for waste transfers and control of unit operations.
- Heat exchangers (UFP-HX-00041A/B and -00001A/B) for cooling waste slurry.

Ultrafiltration is a filtration process in which the waste stream is processed axially through the Ultrafilters (UFP-FILT-00001A/2A/3A/4A/5A and -00001B/2B/3B/4B/5B), which are long bundles of permeable

tubes. Solids-free liquids pass radially through the permeable ultrafilter tubes surface while the concentration of the solids in the recirculating stream continuously increases within the associated feed vessel. The resulting solids slurry may need treatment such as caustic leaching, oxidative leaching, and/or water washing to reduce the quantity of IHLW produced.

Waste is received from the HLP, FRP, and/or the FEP systems into the Ultrafiltration Feed Preparation Vessels (UFP-VSL-00001A/B) of the UFP system. The waste may be sampled here to determine the ultrafiltration parameters. The waste may undergo caustic leaching here for some envelope A/D feeds. Heat and agitation are applied for caustic leaching. For envelope C feeds, the capability exists for the addition of chemicals to the Ultrafiltration Feed Preparation Vessels (UFP-VSL-00001A/B) to precipitate strontium and TRU elements contained in the incoming waste stream prior to solids concentration by ultrafiltration. Heat (if required) and agitation can be applied to ensure that the precipitation process is completed.

The Ultrafiltration Feed Preparation Vessels (UFP-VSL-00001A/B) feed the Ultrafiltration Feed Vessels (UFP-VSL-00002A/B), which feed the ultrafilters themselves. During the initial solids concentration, the solids-free stream generated by ultrafiltration is designated as the LAW feed stream, which is then routed to one of the three Ultrafilter Permeate Collection Vessels (UFP-VSL-00062A/B/C). Here, the permeate is sampled for solids breakthrough (turbidity) and criticality (plutonium) prior to further processing, which includes cesium removal and additional evaporation prior to LAW vitrification.

The resulting concentrated slurry may then be caustic leached and/or oxidative leached to remove glass-limiting compounds, and washed in the Ultrafiltration Feed Vessels (UFP-VSL-00002A/B) with process water to remove interstitial liquid and soluble salts, while being further processed through the Ultrafilters (UFP-FILT-00001A/2A/3A/4A/5A and -00001B/2B/3B/4B/5B). The final concentrated HLW feed stream is transferred to the HLW Lag Storage Vessels currently planned to be HLP-VSL-00027B and HLP-VSL-00028 and then on to the HLW vitrification process. Permeate from solids washing is also collected in one of the Ultrafilter Permeate Collection Vessels (UFP-VSL-00062A/B/C), but a substantial fraction of this stream is normally routed to the facility wash and disposal process system (PWD) for recycle.

During waste processing, the permeability of the Ultrafilters (UFP-FILT-00001A/2A/3A/4A/5A and 00001B/2B/3B/4B/5B) is reduced over time. Re-establishing the ultrafilters' permeability can be accomplished using one of three different methods: 1) backpulsing one filter at any time with filter permeate or 2) backpulsing one filter at any time with nitric acid or caustic or 3) cleaning an entire filter train utilizing nitric acid or caustic. Backpulsing with permeate may be utilized while the filter train is in normal operation, but cleaning with nitric acid or caustic requires the filters to be out of operation. Filter performance will be monitored to determine when cleaning is required.

The primary design features of the UFP system are:

- Pulse jet mixers in the Ultrafiltration Feed Preparation Vessels, the Ultrafiltration Feed Vessels, and in the Ultrafilter Permeate Collection Vessels, and mixing air spargers in the Ultrafiltration Feed Vessels.
- Cooling jackets on the Ultrafiltration Feed Preparation Vessels and on the Ultrafiltration Feed Vessels and external heat exchangers in recirculation loops associated with these vessels for cooling their contents.
- Passive vessel overflow routes for the Ultrafiltration Feed Preparation Vessels, the Ultrafiltration Feed Vessels, and in the Ultrafilter Permeate Collection Vessels to the Ultimate Overflow Vessel (PWD-VSL-00033).
- Steam spargers in the Ultrafiltration Feed Preparation Vessels and the Ultrafiltration Feed Vessels for heating waste slurry for certain treatment processes.
- UFP-PMP-00044A/B for emptying Ultrafiltration Feed Vessels.

- Sampling capabilities from recirculation loops associated with the Ultrafiltration Feed Preparation Vessels and Ultrafiltration Feed Vessels, and in the Ultrafilter Permeate Collection Vessels via autosamplers ASX-SMPLR-00019 and ASX-SMPLR-00020.
- Vessel wash rings for the Ultrafiltration Feed Preparation Vessels, the Ultrafiltration Feed Vessels, and in the Ultrafilter Permeate Collection Vessels Ventilation (both passive and forced) for the Ultrafiltration Feed Preparation Vessels, the Ultrafiltration Feed Vessels, and in the Ultrafilter Permeate Collection Vessels.

4D.2.4 HLW Lag Storage and Feed Blending Process (HLP) System

Process flow diagrams of the HLW Lag Storage and Feed Blending Process (HLP) System are provided in DWP Operating Unit Group 10, Appendix 8.1. The primary functions of the HLP system are to receive, blend, store, and transfer HLW feed. The HLP system receives for staging and blending the following waste streams: HLW feed from the Hanford Tank Farms, the HLW pretreated slurry from the UFP system, cesium concentrate from the CNP system, and transfers from the FEP.

The main components of the HLP tank system are:

- HLW Feed Receipt Vessel (HLP-VSL-00022).
- HLW Lag Storage Vessels (HLP-VSL-00027A/B).
- HLW Feed Blend Vessel (HLP-VSL-00028).
- Pumps, breakpots, piping, and instrumentation for waste transfers.

All feeds within the HLP system contain solids; as a result, mixing with PJMs is required in all HLP vessels. In addition to PJMs, the HLW Lag Storage Vessels (HLP-VSL-00027A/B) and the HLW Feed Blend Vessel (HLP-VSL-00028) will be provided with air sparging capabilities.

HLW Feed Receipt Vessel (HLP-VSL-00022)

HLW feed is received into the HLW Feed Receipt Vessel (HLP-VSL-00022).

The waste received in this vessel is sampled (via ASX-SMPLR-00020) and transferred to either the UFP vessels (UFP-VSL-00001A/B), the Waste Feed Evaporation Process (FEP) vessels (FEP-VSL-00017A/B) or the Waste Feed Receipt Process (FRP) System.

HLW Lag Storage Vessels (HLP-VSL-00027A/B)

Treated high solids waste (HLW feed stream) received from the UFP system is stored, segregated, and blended in the HLW Lag Storage Vessels (HLP-VSL-00027A/B). As needed, the waste stored in these vessels is sampled (via ASX-SMPLR-00020) to determine blending and to comply with vitrification parameters of IHLW.

The HLW feed stream is routed from the HLW Lag Storage Vessels (HLP-VSL-00027A/B) to the HLW Feed Blend Vessel (HLP-VSL-00028). For operational flexibility, there is an option to blend the HLW feed in the HLW Lag Storage Vessel HLP-VSL-00027B prior to transfer to the HLW vitrification facility. The HLW feed blending will occur primarily in the HLW Feed Blend Vessel HLP-VSL-00028).

The HLW treated solids may be blended with contents of:

- Strontium/TRU precipitate slurry from HLW Lag Storage Vessels (HLP-VSL-00027A/B).
- Un-neutralized cesium concentrate from the Cesium Evaporator Separator Vessel. (CNP-EVAP-00001) via the Cesium Evaporator Concentrate Lute Pot (CNP-VSL-00002).
- Neutralized cesium concentrate from the Eluate Contingency Storage Vessel (CNP-VSL-00003).

The amount of each of these waste streams will be coordinated. Sodium Hydroxide will be added as needed. The blended HLW feed stream is then transferred to the HLW vitrification facility for final

treatment and immobilization. Before the blended HLW feed is transferred to the HLW vitrification facility, it is sampled (via autosampler ASX-SMPLR-00020). The HLP system includes an option to return the blended HLW feed stream to the Hanford Tank Farms.

The primary design features of the HLP vessels are:

- Internal PJMs for solids suspension.
- External cooling jackets.
- Passive vessel overflow routes to the Ultimate Overflow Vessel (PWD-VSL-00033).
- Sampling capabilities via autosampler ASX-SMPLR-00020.
- Vessel wash rings.
- Vessel ventilation (both passive and forced) through the PVP/PVV systems.
- PJM ventilation through the Pulse Jet Ventilation System (PJV) system.

4D.2.5 Cesium Ion Exchange Process (CXP) System

Process flow diagrams of the Cesium Ion Exchange Process (CXP) System are provided in DWP Operating Unit Group 10, Appendix 8.1. The primary function of the CXP system is to remove cesium-137 from the LAW feed stream. This is accomplished using a series of ion exchange columns containing a resin that preferentially extracts cesium-137. After caustic displacement of LAW feed in the ion exchange columns and a water rinse, elution of the cesium-loaded resin is accomplished using dilute nitric acid supplied by the Cesium Nitric Acid Recovery Process (CNP) System. The cesium-loaded nitric acid is then routed to the CNP system with the cesium ultimately processed in the HLW melter.

The main components of the CXP system are:

- Cesium Ion Exchange Feed Vessel (CXP-VSL-00004).
- Cesium Ion Exchange Columns (CXP-IXC-00001/2/3/4).
- Cesium Ion Exchange Treated LAW Collection Vessels (CXP-VSL-00026A/B/C).
- Pumps, heat exchanger, filter, piping, and instrumentation for waste transfers.

The Cesium Ion Exchange Feed Vessel (CXP-VSL-00004) receives LAW feed from the UFP system and allows for continuous operation of the ion exchange system. The CXP system contains four Cesium Ion Exchange Columns (CXP-IXC-00001/2/3/4). At any given time, three of the columns are used in series to remove cesium-137 from the LAW feed stream. The three columns are termed lead, lag, and polishing columns, depending on their position in the train. The fourth column is eluted and regenerated, and is then placed in a standby mode until the lead column reaches the desired cesium loading. At this point, the lead column is rotated out for elution and regeneration, the lag column becomes the lead, the polishing column becomes the lag, and the standby column is rotated into the polishing position.

The concentration of cesium-137 in the feed stream is monitored by sampling in the Ultrafilter Permeate Collection Vessels (UFP-VSL-00062A/B/C) prior to transfer to the lead Cesium Ion Exchange Column and by radiation monitors on the line between each Cesium Ion Exchange Column (CXP-IXC-00001/2/3/4). When cesium-137 is detected above an established set point following an ion exchange column, the lead column is taken out of the loading cycle, eluted, and the resin bed regenerated while the other columns are placed into the loading cycle.
Elution is part of a resin bed regeneration cycle that typically includes the following steps:

- Displacement of residual LAW feed stream in the column by displacement with dilute caustic solution to prevent the potential of precipitating aluminum hydroxide from the LAW feed stream at low pH values. This caustic rinse is provided from the Cesium Ion Exchange Reagent Vessel (CXP-VSL-00005).

- Displacement of residual dilute caustic solution from the column with demineralized water to prevent an acid-base reaction during elution.
- Elution of cesium-137 ions with dilute nitric acid from the CNP system.
- Displacement of residual acid from the column with demineralized water to prevent an acid-base reaction with the caustic solution.
- Regeneration of the resin bed with caustic solution from the Cesium Resin Addition Process (CRP) System.
- Displacement of residual caustic solution with treated LAW feed solution to prevent churning of the resin bed upon introduction of untreated LAW feed. This treated LAW feed is provided directly from the Cesium Ion Exchange Column functioning as the polishing column.

After a number of loading and regeneration cycles, the resin performance is expected to decrease to a set point, which is termed "spent". The number of cycles depends on LAW feed constituents, operating temperatures, properties of the resin, radiation exposure, and LAW feed throughput rates. The spent resin is slurried with recycled Ion Exchange resin flush solution and flushed out of the column into the Spent Resin Collection and Dewatering Process (RDP) System for resin disposal. A slurry of fresh resin is prepared in the Cesium Resin Addition Process (CRP) System and then added to the column as an ion exchange column bed replacement.

An elution system is provided by three vessels; one containing nitric acid, another containing demineralized water, and a third vessel containing sodium hydroxide. Each vessel has a volume sufficient to fully elute one fully loaded column, and one partially loaded column. The vessels are located at an elevation sufficiently high above the Cesium Ion Exchange Columns (CXP-IXC-00001/2/3/4) to provide enough hydrostatic head to induce flow through the Cesium Ion Exchange Columns (CXP-IXC-00001/2/3/4) and associated piping to the destination vessel.

Following cesium ion exchange, the treated LAW feed is transferred to the Cesium Ion Exchange Treated LAW Collection Vessels (CXP-VSL-00026A/B/C) where the LAW feed is sampled then transferred for further treatment in the Treated LAW Evaporation Process (TLP) System and the Treated LAW Concentrate Storage Process (TCP) System.

The primary design features of the CXP system are:

- Instrumentation for monitoring and control of vessel liquid level.
- Pulse jet mixers in the Cs Ion Exchange Feed Vessel (CXP-VSL-00004) and the Cesium Ion Exchange Treated LAW Collection Vessels (CXP-VSL-00026A/B).
- Passive vessel overflow routes from the Cs Ion Exchange Feed Vessel (CXP-VSL-00004), the Cs Ion Exchange Reagent Vessel (CXP-VSL-00005) and the Cesium Ion Exchange Treated LAW Collection Vessels (CXP-VSL-00026A/B).
- Remote sampling capabilities on the discharge of transfer pumps via autosampler ASX-SMPLR-00017.
- Connection of the vessel vapor space to the Pretreatment Vessel Vent Process (PVP) System.

4D.2.6 Cesium Nitric Acid Recovery Process (CNP) System

Process flow diagram of the Cesium Nitric Acid Recovery Process (CNP) System is provided in DWP Operating Unit Group 10, Appendix 8.1. The Cesium Nitric Acid Recovery Process System (CNP) supports the Cesium Ion Exchange Process System (CXP). Cesium is removed from LAW feed via resin in Cesium Ion Exchange Columns and is concentrated prior to transfer to the High Level Waste Lag Storage and Feed Blending Process System (HLP) for incorporation into the HLW melter feeds. The Cesium Nitric Acid Recovery System also provides recovered nitric acid for reuse in the CXP system as eluant.

The CNP system is composed of tanks and miscellaneous unit systems with the following equipment.

Tank Systems

- Eluate Contingency Storage Vessel (CNP-VSL-00003).
- Cesium Evaporator Recovered Nitric Acid Vessel (CNP-VSL-00004).
- Cesium Evaporator Eluant Lute Pot (CNP-VSL-00001).
- Pumps, piping, and instrumentation for waste transfers.

Miscellaneous Unit Systems

- Cesium Evaporator Separator Vessel (CNP-EVAP-00001).
- Cesium Evaporator Concentrate Reboiler (CNP-HX-00001).
- Cesium Evaporator Nitric Acid Rectifier Column (CNP-DISTC-00001).
- Cesium Evaporator Primary Condenser (CNP-HX-00002).
- Cesium Evaporator Inter-Condenser (CNP-HX-00003).
- Cesium Evaporator After-Condenser (CNP-HX-00004).
- Pumps, piping, and instrumentation for waste transfers.

The CNP system receives the cesium rich eluate from the CXP system, concentrates the dissolved salts in the eluate, and transfers the concentrate to the HLP system. The CNP system also recovers dilute nitric acid from the evaporator overheads stream, at the correct acid concentration, for reuse as eluant in the CXP system.

The CNP system consists of the vacuum evaporator/separator vessel, a reboiler, a concentrate recirculation pump, an acid rectifier column, 3 condensers, 2 vacuum steam ejectors, a lute pot, 2 breakpots, a recovered acid receiver vessel and an eluate contingency storage vessel. Utility systems include steam supply, including a desuperheater, steam condensate, and a closed loop cooling water supply and return system. The necessary sample points and instrumentation and controls for completing system functions in a safe and efficient manner are included in the system.

During the process of regenerating the cesium ion exchange resin beds, eluate composed of cesium-bearing nitric acid will be fed to the Cesium Evaporator Separator Vessel (CNP-EVAP-00001) operating under reduced pressure. A closed-loop circulation stream is fed from the evaporator to the steam-heated Cesium Evaporator Concentrate Reboiler (CNP-HX-00001) and back to the Cesium Evaporator Separator Vessel (CNP-EVAP-00001).

Vapor from the Cesium Evaporator Separator Vessel (CNP-EVAP-00001), composed primarily of water and nitric acid, is sent to the Cesium Evaporator Nitric Acid Rectifier Column (CNP-DISTC-00001) where the nitric acid is recovered for reuse as eluant. Recovered nitric acid is collected in the Cesium Evaporator Recovered Nitric Acid Vessel (CNP-VSL-00004) for reuse in the elution of cesium ion exchange column resin beds. Condensed water vapor is recovered from the Cesium Evaporator Primary Condenser (CNP-HX-00002), Cesium Evaporator Inter-Condenser (CNP-HX-00003), and Cesium Evaporator After-Condenser (CNP-HX-00004), and sent to the PWD system. These condensers are water-cooled shell-and-tube heat exchangers. Uncondensed vapors exiting from the after-condenser are routed to the PVP system for further treatment.

The cesium concentrated in the evaporator is routed to the HLW Feed Blend Vessel (HLP-VSL-00028) for blending and incorporation into the HLW melter feed streams. This cesium concentrate may also be stored in the Eluate Contingency Storage Vessel (CNP-VSL-00003), which is equipped with a cooling jacket for heat removal.

The Cesium Evaporator Separator Vessel (CNP-EVAP-00001) is fed through a break pot and the Cesium Evaporator Eluant Lute Pot (CNP-VSL-00001) in order to create a hydraulic seal to maintain a vacuum in the Cesium Evaporator Separator Vessel (CNP-EVAP-00001).

The recovered nitric acid is periodically sampled and, depending on the acid concentration of the recovered acid sample, some pH adjustment may be necessary. Fresh 2 molar nitric acid is available to the Cesium Evaporator Recovered Nitric Acid Vessel (CNP-VSL-00004) along with process condensate to adjust the recovered acid concentration as required.

The CNP system operates when a Cesium Ion Exchange Column (CXP-IXC-00001/2/3/4) is in the process of having its resin bed regenerated through an elution process. When elution of a cesium ion exchange column is not taking place, the nitric acid recovery system is maintained in a standby mode. The major vessels of the CNP system are equipped with internal wash rings for decontamination of the system.

The primary design features of the CNP system are:

- Instrumentation for monitoring and control of vessel liquid level.
- Pulse jet mixers in the Eluate Contingency Storage Vessel (CNP-VSL-00003) and the Cs Evaporator Recovered Nitric Acid Vessel (CNP-VSL-00004).
- Passive vessel overflow routes from the Eluate Contingency Storage Vessel, and the Cs Evaporator Recovered Nitric Acid Vessel.
- Connection of the vessel vapor space and condensers to the Pretreatment Vessel Vent Process (PVP) System.
- Remote sampling capabilities via autosampler ASX-SMPLR-00017.

4D.2.7 Cesium Resin Addition Process (CRP) System

Figure 4A-11 presents a simplified process flow diagram of the Cesium Resin Addition Process (CRP) System. The purpose of the CRP system is to provide a means to add fresh resin to the Cesium Ion Exchange Columns (CXP-IXC-00001/2/3/4), prevent backflow from R5/C5 areas into R3/C3 areas, and vent the ion exchange columns. The system provides for preparation of the fresh cesium resin by hydraulically removing fines from the bulk of the resin particles as well as chemically conditioning the fresh resin. After conditioning, the resin is transferred to the ion exchange columns as a slurry, by gravity flow.

The main components of the CRP system are:

- Cesium Resin Addition Vessel (CRP-VSL-00001).
- Cesium Resin Addition Bulge.
- Cesium resin addition recycle pump.
- Pumps, piping, and instrumentation for waste transfers.

Cesium is removed from the LAW feed using the ion exchange resin. Each batch of the resin has a limited useful operating life after which it must be removed from the ion exchange column and replaced with fresh resin.

Fresh resin is delivered per specification by the vendor. It is then transferred from bulk storage with the aid of handling equipment to the resin addition room. The resin is transferred from the shipping container to the Cesium Resin Addition Vessel (CRP-VSL-00001) with an eductor and demineralized water. After transfer, the cesium resin undergoes resin conditioning processes. The resin is then transferred via the CRP-BULGE-00001 to a Cesium Ion Exchange Column (CXP-IXC-00001/2/3/4) as a slurry by gravity flow.

The CRP system contains resin and reagent products. However, ancillary equipment, such as piping and valves, located in the Cesium Resin Addition Bulge (CRP-BULGE-00001) will contain resin flush liquor and can be used to recycle spent resin from the Spent Resin Collection and Dewatering Process (RDP) System back to CXP-IXC-00001/2/3/4. The Cesium Resin Addition Bulge (CRP-BULGE-00001) provides secondary containment for the ancillary equipment located inside the bulge.

The Cesium Resin Addition Bulge (CRP-BULGE-00001), located on the 56' elevation, contains piping and valves that connect the Cesium Resin Addition Vessel (CRP-VSL-00001) to the Cesium Ion Exchange Columns (CXP-IXC-00001/2/3/4). The function of the Cesium Resin Addition Bulge (CRP-BULGE-00001) is to contain the valves that prevent back-flow of contaminated gas, resin, or liquid, from entering the C3 area upstream of the bulge. In the unlikely event of back-flow into the Cesium Resin Addition (CRP-BULGE-00001), valves close and contain the contamination within the bulge. For hydrogen control, gas is vented to the Pretreatment Vessel Vent Process (PVP) System and other constituents gravity flow into the Plant Wash Vessel (PWD-VSL-00044) of the Plant Wash and Disposal Process (PWD) System.

The cesium resin must be conditioned before processing the LAW feed stream through the Cesium Ion Exchange Columns (CXP-IXC-00001/2/3/4). The purpose of conditioning is to fully expand the resin and convert the resin into the right ionic form for cesium removal.

The primary design features of the CRP system are:

- Instrumentation for monitoring and control of vessel liquid level.
- Passive vessel overflow routes from the Cesium Resin Addition Vessel (CRP-VSL-00001).
- Connection of the Vessel vapor space to the Pretreatment Vessel Vent Process (PVP) System.

4D.2.8 Reserved

4D.2.9 Reserved

4D.2.10 Reserved

4D.2.11 Treated LAW Evaporation Process (TLP) System

Process flow diagram of the Treated LAW Evaporation Process (TLP) System is provided in DWP Operating Unit Group 10, Appendix 8.1. The primary function of the TLP tank and miscellaneous unit system is to concentrate the pretreated feed to the LAW melters. The TLP system also collects the offgas condensate from LAW vitrification, neutralizes the stream, and evaporates the recycle stream with the treated LAW feed.

The main processes of the TLP tank and miscellaneous unit system are as follows:

- Receive waste from the treated LAW collection vessels.
- Receive and neutralize submerged bed scrubber purge and wet electrostatic precipitator (WESP) condensate from LAW vitrification.
- Evaporate a portion of the feed (reducing the volume and increasing the sodium concentration).
- Transfer the waste to the Treated LAW Concentrate Storage Process System (TCP).
- Condense the overhead vapors and transfer the condensate to the Radioactive Liquid Waste Disposal System (RLD).
- Vent non-condensable gases to the PVP for treatment.

The main components of the TLP tank and miscellaneous unit system are as follows:

Tank Systems

- LAW SBS Condensate Receipt Vessels (TLP-VSL-00009A/B).

- Treated LAW Evaporator Condensate Vessel (TLP-VSL-00002).
- Pumps, piping, and instrumentation for waste transfers.

Miscellaneous Unit Systems

- Treated LAW Evaporator Separator Vessel (TLP-SEP-00001).
- Pumps, piping, and instrumentation for waste transfers.
- Treated LAW Evaporator Reboiler (TLP-RBLR-00001).
- Concentrate pumps with outlet valve header.
- Treated LAW Primary Condenser (TLP-COND-00001).
- Treated LAW Inter-Condenser (TLP-COND-00002).
- Treated LAW After-Condenser (TLP-COND-00003).
- Pumps, piping, and instrumentation for waste transfers.

Subsequent to sampling and analysis, the treated LAW is pumped from one of three Cesium Ion Exchange Treated LAW Collection Vessels (CXP-VSL-00026A/B/C) to the evaporator system. The Treated LAW Evaporator Separator Vessel (TLP-SEP-00001) will deliver treated LAW concentrate to the Treated LAW Concentrate Storage Process (TCP) System.

The TLP system also evaporates recycle streams from the Treated LAW Concentrate Storage Process (TCP) System and the Radioactive Liquid Waste Disposal Process (RLD) System, and submerged bed scrubbers in the LAW Facility. Overhead vapors from the Treated LAW Evaporator Separator Vessel (TLP-SEP-00001) are routed to the Treated LAW Primary Condenser (TLP-COND-00001).

Process condensate from the Treated LAW Primary Condenser (TLP-COND-00001), Inter-Condenser (TLP-COND-00002), and After-Condenser (TLP-COND-0003) are collected in the Treated LAW Evaporator Condensate Vessel (TLP-VSL-00002) and discharged to the RLD system. The noncondensables from the condenser train are discharged to the Pretreatment Vessel Vent Process (PVP) System.

The TLP feed system includes two LAW SBS Condensate Receipt Vessels (TLP-VSL-00009A/B) for managing submerged bed scrubber recycles from LAW vitrification and pretreatment process recycles. One vessel will be in an accumulation mode while the alternate vessel is feeding the Treated LAW Evaporator Separator Vessel (TLP-SEP-00001).

The primary design features of the TLP feed components include:

- Internal pulse jet mixers that blend and maintain solids suspension in the waste.
- Instrumentation for monitoring of vessel liquid level.
- Vessel vent to the PVP system.
- Passive air purge of the vessel vapor space.
- Pump and line flushing capability.
- Transfer flow rate indication and transfer volume totalizer.
- Remote sampling capability off the discharge of the transfer pumps.
- Vessel spray rings for vessel decontamination.

The Treated LAW Evaporator Separator Vessel (TLP-SEP-00001) is a forced-circulation unit operating under vacuum to reduce the operating temperature. A recirculation pump maintains a high flow rate from the evaporator separator vessel to the Treated LAW Evaporator Reboiler (TLP-RBLR-00001). The pump transfers the waste through the Treated LAW Evaporator Reboiler (TLP-RBLR-00001) and back into the Treated LAW Evaporator Separator Vessel (TLP-SEP-00001). The recirculating waste stream is

prevented from boiling in the reboiler tubes by maintaining sufficient hydrostatic head (submergence) above the reboiler tubes.

As the liquid travels out of the Treated LAW Evaporator Reboiler (TLP-RBLR-00001), the hydrostatic head diminishes and flash evaporation occurs as the flow enters the Treated LAW Evaporator Separator Vessel (TLP-SEP-00001). The liquid continues to flash and the vapor and liquid streams are separated (liquid-vapor disengagement). The liquid stream circulates in this loop and becomes more concentrated, while the vapor stream passes through a demisting section to the evaporator condensers. A portion of the concentrate is also pumped from the bottom of the Treated LAW Evaporator Separator Vessel (TLP-SEP-00001) at the controlled liquid density and is discharged to the TCP system as feed to LAW vitrification.

The primary design features of the evaporator trains include:

- Operating pressure indication and control.
- Differential pressure indication across the Treated LAW Evaporator Separator Vessel (TLP-SEP-00001) demister section.
- Water sprays to the Treated LAW Evaporator Separator vessel (TLP-SEP-00001) demister section.
- Process condensate radiation monitoring and recycle capability.
- Low-pressure steam supply for heating the Treated LAW Evaporator Reboiler (TLP-RBLR-00001).
- Treated LAW Evaporator Reboiler (TLP-RBLR-00001) tube leak detection and diversion capability.
- Treated LAW Evaporator Reboiler (TLP-RBLR-00001) steam condensate collection.
- Instrumentation for monitoring and control of vessel liquid level.
- Passive venting via the downstream vessels connected to the vent header.
- Capability to drain, flush, and chemically clean the system.

The vapor stream exiting the Treated LAW Evaporator Separator Vessel (TLP-SEP-00001) is condensed in a three-stage condenser system consisting of a Primary Condenser (TLP-COND-00001), an Inter-Condenser (TLP-COND-00002), and an After-Condenser (TLP-COND-00003). The noncondensable offgas exiting downstream of the After-Condenser (TLP-COND-00003) are routed to the PVP system for treatment.

The primary design features for vapor stream management include:

- Instrumentation for monitoring and control of vessel liquid level.
- Vessel vent to the PVP system to prevent pressurization of a vessel.
- Remote sampling capability of the transfer pump discharge via autosampler ASX-SMPLR-00017.
- Dip legs in the vessel that maintain a liquid seal (pressure boundary) between the vessel and the condensers.
- Makeup recycle water as required for startup.

The condensed vapor from the condensers is collected in the Treated LAW Evaporator Condensate Vessel (TLP-VSL-00002). A small fraction of the total condensate is recycled to the Treated LAW Evaporator Separator Vessel (TLP-SEP-00001) demister water sprays. The balance of the condensate is transferred to the RLD system.

Condensate from the primary condenser is monitored for radioactivity. In the event of radioactivity breakthrough being detected, a Treated LAW Evaporator Separator (TLP) System shutdown is initiated

and the contents of the Treated LAW Evaporator Condensate Vessel (TLP-VSL-00002) are transferred to a LAW SBS Condensate Receipt Vessels (TLP-VSL-00009A/B).

4D.2.12 Treated LAW Concentrate Storage Process (TCP) System

Process flow diagram of the Treated LAW Concentrate Storage Process (TCP) System is provided in DWP Operating Unit Group 10, Appendix 8.1. The primary function of the TCP system is to receive treated LAW concentrate from the Treated LAW Evaporation Process (TLP) System and store the material for subsequent batch transfer to the LAW vitrification facility.

The main components of the TCP tank system are:

- Treated LAW Concentrate Storage Vessel (TCP-VSL-00001).
- Pumps for transferring treated LAW concentrate.
- Three waste transfer lines to LAW vitrification.
- Vessel inlet and outlet valve headers.
- Pumps, piping, and instrumentation for waste transfers.

Dilute treated LAW direct from the Cesium Ion Exchange Process (CXP) System can also be received and stored in the TCP system (evaporator by-pass option). The Treated LAW Concentrate Storage Vessel (TCP-VSL-00001) provides lag storage to sustain ILAW glass production if the pretreatment processing is interrupted.

Out-of-specification treated LAW concentrate can be recycled to the waste feed receipt process system (FRP) for rework through pretreatment, or recycled to the TLP system for blending and additional evaporation.

Under strict administrative control (sampling and jumper installation), the Treated LAW Concentrate Storage Vessel (TCP-VSL-00001) can also receive treated LAW entrained solids directly from the Ultrafiltration Feed Vessels (UFP-VSL-00002A/B) if the solids meet treated LAW feed specification.

During commissioning, treated LAW concentrate may be stored in a dedicated FRP vessel for additional lag storage capacity. Transfers from and to the TCP and FRP systems will also be under strict administrative control (sampling and jumper installation).

Treated LAW concentrate is batch-transferred from the tank to LAW vitrification through the inner pipe of any one of three co-axial transfer lines (two connected, one unconnected spare). The inlet and outlet valve headers and pumps are used in combination to facilitate circulation and sampling, forward transfer to LAW vitrification, and recycle to the TLP system or FRP system.

The primary design features of the TCP system include:

- Capability to pressure test both the inner and outer transfer lines for integrity.
- Transfer line leak detection system for integrity indication during transfer.
- Transfer line flushing and draining capability.
- Instrumentation for monitoring vessel liquid level.
- Vessel vent to the PVP system.
- Direct steam injection to maintain the concentrate temperature above the saturation temperature to prevent precipitation.
- Internal pulse jet mixers (PJMs) for solids suspension and slurry mixing.
- Remote sampling capability off the discharge of the transfer pump via autosampler ASX-SMPLR-00017.
- Vessel spray rings for vessel decontamination.

- Administrative controls and radiation monitoring to ensure that treated LAW transferred into and from the vessel meets waste specification for LAW vitrification.

The TCP system pumps and valve headers exposed to low radiation potential are located in a C3/R3 area for ease of maintenance.

4D.2.13 Spent Resin Collection and Dewatering Process (RDP) System

Process flow diagram of the Spent Resin Collection and Dewatering Process (RDP) System is included in DWP Operating Unit Group 10, Appendix 8.1. The primary function of the RDP system to support the CXP system by providing equipment necessary for periodic removal of spent ion exchange resin. The RDP system has four main functions:

- Provide resin flush liquor to fluidize and transport the resin from the CXP columns to the RDP vessels.
- Temporarily store spent resin to allow sampling of spent resin.
- Transfer spent resin to the dewatering high integrity disposal container.
- Dewater spent resin to the required water content for transportation and disposal.

The primary components of the RDP system include:

- Spent Resin Slurry Vessels (RDP-VSL-00002A/B/C).
- Dewatering skid, containing the Spent Resin Dewatering Moisture Separation Vessel (RDP-VSL-00004), shielded dewatering cask with high integrity container (HIC) inside, filters, blower, and pump.
- Pumps, piping, and instrumentation for waste transfers.

Spent resin is first eluted and then hydraulically discharged under pressure from the ion exchange column by fluidizing the bed of resin with transport liquid. The spent resin removal process is initiated by flushing an eluted Cesium and Ion Exchange Column (CXP-IXC-00001/2/3/4) and hydraulically discharging the contents into a Spent Resin Slurry Vessel (RDP-VSL-00002A/B/C). In these vessels, the resin slurry will be circulated, monitored for cesium content, and delivered to a sampling system (ASX-SMPLR-00015) to determine whether the resin is in compliance with the receiving TSD unit's waste acceptance criteria. Spent resins that meet the receiving TSD unit's waste acceptance criteria will be dewatered, containerized, and transferred to a TSD unit.

Spent Resin Slurry Vessels (RDP-VSL-00002A/B/C)

Spent resin is removed from each Cesium Ion Exchange Column (CXP-IXC-00001/2/3/4) independently as a batch operation. Spent resin slurry from the ion exchange columns is collected in the three Spent Resin Slurry Vessels (RDP-VSL-00002A/B/C), which are interchangeable and will be capable of storing transport liquid and resin slurry. Once in the Spent Resin Slurry Vessel (RDP-VSL-00002A/B/C), the resin slurry will be mixed by pulse jet mixers and monitored for radiation (gamma) content in a circulation loop to determine if elution has sufficiently removed radionuclides from the resin for disposal.

Spent resin that does not meet the predetermined treatment limits will be routed back through CRP-BULGE-00001 to the Cesium Ion Exchange Columns (CXP-IXC-00001/2/3/4) for additional elution. After completing the additional elution, the resin is transferred back to a Spent Resin Slurry Vessels (RDP-VSL-00002A/B/C) where it is processed again.

Spent Resin Dewatering Moisture Separation Vessel (RDP-VSL-00004)

Following assurance that the spent resin is in compliance with the receiving TSD unit's acceptance criteria, the resin is pumped to the disposable spent resin dewatering HIC located inside the transportable shielding cask.

There are three steps to resin dewatering. First, a gross dewatering removes excess water as the slurry is pumped to the shielded cask/HIC. Next, a dewatering pump is used to remove standing water above the resin bed. Finally, in order to remove the final few inches of water from the HIC, dry air is circulated from the dewatering blower into the dewatering HIC. The dry air becomes humidified and is then pumped into the dewatering moisture separator vessel (RDP-VSL-00004). Inside the moisture separator vessel are coils that remove the water from the air. The condensation collects inside the moisture separator vessel (RDP-VSL-00004) while the dry air is then circulated back into the dewatering HIC. When the water content in the resin is reduced to an acceptable level, the dewatering operation is complete.

The primary design features of the RDP system are:

- Instrumentation for monitoring and control of vessel liquid level.
- Pulse jet mixers in the Spent Resin Slurry Vessels (RDP-VSL-00002A/B/C).
- Passive vessel overflow routes from the Spent Resin Slurry Vessels (RDP-VSL-00002A/B/C).
- Remote sampling capabilities on the discharge transfer pumps.
- Connection of the vessel vapor spaces to the Pretreatment Vessel Vent Process (PVP) System.

4D.2.14 Pretreatment Maintenance

The pretreatment facility will include maintenance facilities that will enable remote and hands-on maintenance of process equipment, and will consist of the following systems:

- Pretreatment in-cell handling system (PIH).
- Pretreatment filter cave handling system (PFH).
- Radioactive solid waste handling system (RWH).

The individual systems and their primary functions are described below:

Pretreatment In-Cell Handling (PIH) System

The purpose of this system is to decontaminate and perform maintenance on equipment in the hot cell and/or dispose of hot cell equipment. The PIH system will perform the following functions:

- Decontaminate equipment using carbon dioxide pellets or an acid and steam mixture sprays to decontaminate equipment surfaces.
- Decontaminate equipment internals in the Decontamination Soak Tank (PIH-TK-00001).
- Collecting liquids in catch pans.
- Holding components while doing work using fixtures.
- Disassembling, repairing, and reassembling process equipment remotely.

Typical process equipment that the system will handle are pumps, valves, jumpers, small vessels, and other ancillary equipment and/or tools. Maintenance equipment requiring periodic servicing by this system will include cranes, manipulators, and decontamination and disassembly tools.

Equipment in this system will include:

- Overhead cranes
- Manipulators (powered and manual)
- Shield and airlock doors
- Size reduction equipment (cutters, shears, etc.)
- Crane deployed equipment, such as impact wrenches and spreader bars
- Fixtures

- Decontamination equipment (carbon dioxide, wash down, Decontamination Soak Tank [PIH-TK-00001])
- Manipulator-operated assembly/disassembly tools used in repair
- Turntables
- Pumps, piping, and instrumentation for waste transfers

Pretreatment Filter Cave Handling (PFH) System

The purpose of this system is to provide a method for performing maintenance on ventilation equipment in the filter cave. The equipment in this system will provide the following functions:

- Lifting, holding, transporting, installing/uncoupling primarily filters, some process equipment, and failed in-cell cranes and powered manipulators.
- Providing fixtures for holding components while doing work.
- Operation of some manual valves.
- Decontamination and monitoring of contaminated equipment.

Typical ventilation equipment the PFH system will handle are High Efficiency Particulate Air Filter (HEPA) and High-Efficiency Mist Eliminators (HEMEs), and duct isolation valves, inside the cell. Maintenance equipment requiring periodic servicing by this system will include cranes, manipulators, and decontamination and disassembly tools.

Equipment in this system will include:

- Overhead cranes
- Manipulators (powered and manual)
- Shield and airlock doors
- Crane deployed equipment, such as impact wrenches and spreader bars
- Decontamination equipment (carbon dioxide, wash down)
- Manipulator-deployed assembly/disassembly tools used in repair

Radioactive Solid Waste Handling (RWH) System

The purpose of this system is to provide a means to dispose of mixed waste contaminated equipment. This system interfaces with system PIH, system PFH, and the spent resin dewatering system. The main functions system RWH provides are:

- Lifting, holding, and transporting disposal containers.
- Packaging disposal containers and preparing the containers for shipping.
- Cleaning and remote monitoring of disposal containers.
- Temporary shielding and confinement barriers.

Typical process and ventilation equipment the system will handle are failed process equipment, such as pumps and valves, filters, jumpers, and maintenance equipment.

Equipment in this system will include:

- Overhead cranes.
- Manipulators (manual).
- Carts for transporting waste containers.
- Associated support equipment, like impact wrenches and spreader bars.
- Decontamination systems, such as carbon dioxide.

- Remote radioactive monitoring.
- Temporary shielding and confinement barriers used for packaging.
- Disposal containers.

The primary design features of the PIH, PFH, and RWH systems are:

- RESERVED

4D.2.15 Plant Wash and Disposal (PWD) System

Process flow diagrams of the Plant Wash and Disposal (PWD) System are provided in DWP Operating Unit Group 10, Appendix 8.1. The primary function of the PWD tank system is to receive, store, and transfer effluent. It will collect plant wash, drains, and acidic or alkaline effluent from the pretreatment facility.

The primary components of the PWD tank system include:

- Plant Wash Vessel (PWD-VSL-00044).
- Acidic/ Alkaline Effluent Vessels (PWD-VSL-00015/ 16).
- HLW Effluent Transfer Vessel (PWD-VSL-00043).
- C3 Floor Drain Collection Vessel (PWD-VSL-00046).
- Ultimate Overflow Vessel (PWD-VSL-00033).
- Pumps, piping, and instrumentation for waste transfers.

Plant Wash Vessel (PWD-VSL-00044)

During operations, plant wash and drain effluents will be collected and mixed in with other effluents in the Plant Wash Vessel prior to transfer. The solution will be analyzed for pH and excess acidic effluent will be neutralized. Effluents will be recycled to the FEP system.

Pulse jet mixers are used to provide a uniform mixture during neutralization within the Plant Wash Vessel. Excess acidic effluent is neutralized with sodium hydroxide supplied from a reagent header. Wash rings are used for vessel washing. Vessel-emptying ejectors may be used for transfers to the Acidic/Alkaline Effluent Vessel (PWD-VSL-00016).

A reverse flow diverter supplies a representative sample of the contents of the Plant Wash Vessel (PWD-VSL-00044) for analysis. If the pH is confirmed to be above a predetermined value, reverse flow diverter(s) transfer the effluent from the Plant Wash Vessel (PWD-VSL-00044) to the Waste Feed Evaporator Feed Vessels (FEP-VSL-00017A/B). Normally, the contents of the Plant Wash Vessel (PWD-VSL-00044) is blended with the contents of the Acidic/Alkaline Effluent Vessels (PWD-VSL-00015/16) in the Waste Feed Evaporator Feed Vessels to maintain a consistent evaporator feed.

Acidic/Alkaline Effluent Vessels (PWD-VSL-00015/16)

The Acidic/Alkaline Effluent Vessels (PWD-VSL-00015/16) primarily receive alkaline cleaning effluent from the Ultrafiltration Process (UFP) System, caustic rinse from the Cesium Ion Exchange Process (CXP) System, and process condensate from the Cesium Nitric Acid Recovery Process (CNP) System. The effluents are sampled to confirm that the pH is above a predetermined value, and reverse flow diverters transfer the high-activity effluents to the Waste Feed Evaporator Feed Vessels (FEP-VSL-00017A/B) for reprocessing.

HLW Effluent Transfer Vessel (PWD-VSL-00043)

The HLW Effluent Transfer Vessel (PWD-VSL-00043) receives HLW acidic wastes from HLW vitrification line drains from HLW vitrification/pretreatment facility transfer lines, and laboratory drains.

The vessel may also receive flush wastes from the HLW facility. These effluents are transferred to the Plant Wash Vessel (PWD-VSL-00044) to recycle the effluents back into the process system.

C3 Floor Drain Collection Vessel (PWD-VSL-00046)

The C3 Floor Drain Collection Vessel (PWD-VSL-00046) receives effluents from miscellaneous floor drains in the C3 areas, and liquids from the sump in the local pit. Sampling capability has been provided but will not normally be used. This effluent will be transferred to the Alkaline Effluent Vessels (RLD-VSL-00017A/B). The C3 Floor Drain Collection Vessel (PWD-VSL-00046) is vented locally through a high-efficiency particulate air filtration system.

Ultimate Overflow Vessel (PWD-VSL-00033)

The Ultimate Overflow Vessel receives overflows from vessels in the pretreatment facility. Additionally, this vessel receives line drains and flushes. The vessel operating level is maintained below a predetermined level to allow the vessel to hold 30 minutes of overflow at the highest transfer rate within the facility.

The primary design features of the PWD system are:

- Instrumentation for monitoring and control of vessel liquid level.
- Pulse jet mixers in the Ultimate Overflow Vessel (PWD-VSL-00033), the HLW Effluent Transfer Vessel (PWD-VSL-00043), the Acidic/Alkaline Effluent Vessels (PWD-VSL-00015/16), and the Plant Wash Vessel (PWD-VSL-00044).
- Passive vessel overflow routes from the Acidic/Alkaline Effluent Transfer Vessels, and the Plant Wash Vessel.
- Remote sampling capabilities on the discharge of transfer pumps via autosamplers ASX-SMPLR-00019 and ASX-SMPLR-00025.
- Connection of the vessel vapor spaces to the Pretreatment Vessel Vent Process (PVP) System.

4D.2.16 Radioactive Liquid Waste Disposal (RLD) System

Process flow diagrams of the Radioactive Liquid Waste Disposal (RLD) System are provided in DWP Operating Unit Group 10, Appendix 8.1. The primary function of the RLD tank system is to receive, store, and transfer contaminated liquid effluents. The RLD system will receive low-activity mixed waste effluents.

The primary components of the RLD tank system include:

- Process Condensate Tanks (RLD-TK-00006A/B).
- Alkaline Effluent Vessels (RLD-VSL-00017A/B).
- Pumps, piping, and instrumentation for waste transfers.

These RLD vessels primarily receive effluent from the caustic scrubber purges from the LAW vitrification facility and from the C3 Floor Drain Collection Vessel in PTF (PWD-VSL-00046).

When these vessels reach a predetermined level, they are sampled, and if the sample meets the LERF/ETF waste acceptance criteria, it will be transferred to the Process Condensate Tanks (RLD-TK-00006A/B). If the effluent does not meet LERF/ETF waste acceptance criteria, it will be returned to the Treated LAW Evaporation Process (TLP) System for reprocessing.

Process Condensate Tanks (RLD-TK-00006A/B)

Process condensates are the effluent condensed vapors removed from the waste streams by the PTF evaporators. Waste Feed Evaporator Feed Process (FEP) effluents and Treated LAW Evaporation Process (TLP) condensates are normally received directly into the Process Condensate Tanks

(RLD-TK-00006A). The effluents from the Process Condensate Tank (RLD-TK-00006A) are recycled into the process or discharged to the Process Condensate Tank (RLD-TK-00006B).

The effluent in the Process Condensate Tanks will be sampled, to demonstrate compliance with the LERF/ETF waste acceptance criteria. It may also be sampled should a process upset occur. If analysis determines that the effluent is outside the waste acceptance criteria, it will be returned to the TLP for reprocessing.

The Alkaline Effluent Vessels (RLD-VSL-00017A/B) and Process Condensate Tanks (RLD-TK-00006A/B) are vented to the PVP system.

The primary design features of the RLD system are:

- Instrumentation for monitoring and control of vessel liquid level.
- Passive vessel overflow routes from the Alkaline Effluent Vessels (RLD-VSL-00017A/B).
- Remote sampling capabilities on the discharge of transfer pumps via autosampler ASX-SMPLR-00017.
- Connection of the vessel vapor spaces to the Pretreatment Vessel Vent Process (PVP) System.

4D.2.17 Sodium Hydroxide Reagent (SHR) System

The PTF sodium hydroxide reagent (SHR) system includes a vessel (SHR-VSL-00001), ancillary equipment, and instruments associated with its operation. Sodium hydroxide is stored in vessel SHR-VSL-00001for emergency elution of the cesium ion exchange (CXP) columns. The vessel SHR-VSL-00001 receives sodium hydroxide from the BOF sodium hydroxide reagent storage vessel after dilution to 0.1 M using ionized water. When the high temperature alarm is detected on the CXP columns, the sodium hydroxide is gravity transferred from the SHR-VSL-00001 to the cesium ion exchange system.

The SHR system does not manage dangerous waste and is provided here for completeness of the PTF process description.

4D.3 Containment Buildings

This section describes how these units are designed and operated, in accordance with the requirements of WAC 173-303-695, which incorporates 40 CFR 264 Subpart DD, “Containment Buildings”, by reference. Regulatory citations in this section list the applicable section of the CFR to make it easier for readers to find the requirement. A typical containment building is illustrated in Appendix 4A, Figure 4A-59.

There are twenty-one containment buildings at the WTP: five located within the pretreatment facility; six in the LAW vitrification facility; and ten in the HLW vitrification facility. The regulated units in the PTF are:

- Pretreatment hot cell containment building (P-0123)
- Pretreatment maintenance containment building (PM0124, P-0121A, P-0122A, P-0123A, P-0124, P-0124A, P-0125, P-0125A, P-0128, P-0128A)
- Pretreatment spent filter drum handling area containment building (P-0223)
- Pretreatment filter cave containment building (P-0335)
- Pretreatment PJV secondary HEPA filter room containment building (P-0431A)

Table 4D-5 summarizes the units within the PTF. The following figures and drawings found in DWP Operating Unit Group 10 provide further detail for the containment buildings:

- Figure 4A-59 depicting common features of containment buildings.
- General arrangement figures and drawings showing locations of containment buildings.

- Waste management area figures showing containment building locations to be permitted.

Control of fugitive emissions from containment buildings is described in *Fugitive Emissions Control Description* (24590-WTP-PER-HV-02-001) located in Operating Unit Group 10 Appendix 7.15.

The following sections address each of the containment buildings.

4D.3.1 Pretreatment Hot Cell Containment Building (P-0123)

The Pretreatment Hot Cell Containment Building is situated between Feed Receipt Cell (Room P-0108B) and Remote Decontamination Maintenance Cave (Room P-0123A), in the central portion of the PTF. The room contains process equipment, which may require remote maintenance over the life of the plant. Typical waste management activities performed in the containment building include waste storage, the removal and staging of remote-handled process equipment prior to decontamination, repair, and/or packaging of waste for disposal. Equipment located in the Hot Cell Containment Building can be moved, using an overhead crane and a power manipulator, into the Remote Decontamination Maintenance Cave for decontamination and size reduction for waste packaging, or decontamination for maintenance.

Due to the radiation and contamination levels, personnel are prohibited from entering and working in Room P-0123. All activities within the room will be remotely controlled. The hot cell provides secondary containment for tank systems located in the room, and for tank systems located in adjacent black cells. The hot cell floor provides primary containment for spills that occur during associated maintenance activities.

The Pretreatment Hot Cell Containment Building contains two tank systems, three primary containment sumps and three miscellaneous units.

<u>Cesium Ion Exchange Process System</u>

Cesium Exchange Columns CXP-IXC-00001/2/3/4 remove cesium from permeate produced by the ultrafiltration system and are regulated as dangerous waste tanks.

<u>Ultrafilter Process System</u>

Ultrafilters UFP-FILT-00001A-5A and UFP-FILT-00001B-5B concentrate the waste feed for the HLW vitrification process and are regulated as dangerous waste tanks.

<u>Primary Containment Sumps</u>

The hot cell floor slopes to three primary containment sumps; PWD System Sumps PWD-SUMP-00026, PWD-SUMP-00028, and PWD-SUMP-00029. Design, construction, and operating requirements applicable to primary containment sumps are detailed in DWP III.10.E. Each primary containment sump will have a steam ejector for transferring liquids to PWD System Vessel PWD-VSL-00044. The sumps will be covered with stainless steel grating and/or screen mesh to protect the ejectors from debris. Figure 4A-128 in Appendix 4A contains a conceptual design for a typical, primary containment sump.

<u>LAW Evaporator Reboiler Miscellaneous Unit</u>

Waste is pumped through LAW Evaporator Reboiler TLP-RBLR-00001 and concentrated by flash evaporation. The concentrated waste is transferred to the Treated LAW Evaporator Separator Vessel TLP-SEP-00001.

<u>Cesium Evaporator Concentrate Reboiler</u>

Dilute acidic solution from Cesium Evaporator Separator Vessel CNP-EVAP-00001 is recirculated through Reboiler CNP-HX-00001 and concentrated by flash evaporation.

Waste Evaporator Reboilers Miscellaneous Unit

Dilute waste is pumped through Waste Feed Evaporator Reboilers FEP-RBLR-00001A/B and concentrated by flash evaporation. The concentrated waste is transferred to the Waste Feed Evaporator Separator Vessels FEP-VSL-00017A/B.

Hot Cell Floor Miscellaneous Unit

The Hot Cell Containment Building floor provides primary containment for spills that occur during maintenance activities. Remotely removable sections of flexible pipe called "jumpers" are used to connect equipment located in the Hot Cell Containment Building. A jumper may consist of a process, electrical or pneumatic line with remote connector heads at either end. As a precursor for maintenance or equipment change-out, jumpers (flexible pipes) may be used to transfer waste from one process component to another. After waste transfer, the jumper remains in place, and approximately three jumper-volumes of water will be flushed through the jumper to the receiving component. After the flush has been completed, the jumper will be disconnected from the upstream component. When the jumpers are disconnected, flush water from the jumper will spill onto the floor and flow into the room sump(s). The amount of flush water, which may spill onto the floor, depends on the length of the jumper and the location of the components involved in the transfer.

Maintenance activities, using jumpers, are expected to average two per week. The anticipated spill per maintenance activity will be approximately 30 to 150 gallons. About once in three years, an equipment changeout is expected to result in a spill of approximately 200 to 300 gallons.

Spills from maintenance activities will be managed in the Hot Cell Floor Miscellaneous Unit. Spills will flow down the sloped floor into a primary containment sump, for transfer to a PWD system tank. The room floor is lined with stainless steel plate, which is fully grouted. Objects will not be placed directly on the floor liner. Objects will be staged on a platform to protect the stainless steel floor liner from damage.

Hot Cell Containment Building Dangerous Waste Management Units		
Equipment Number	**Description / System**	**Purpose**
Dangerous Waste Tank Systems		
CXP-IXC-00001/2/3/4	Cesium Ion Exchange Column / Cesium Ion Exchange Process	Remove cesium from permeate produced by the ultrafiltration system.
UFP-FILT-00001A-5A UFP-FILT-00001B-5B	Ultrafilter / Ultrafiltration Process	Concentrate the waste feed.
PWD-SUMP-00026	Primary Containment Sump / Plant Wash and Disposal System	Manage liquids.
PWD-SUMP-00028	Primary Containment Sump / Process Wash and Disposal System	Manage liquids.
PWD-SUMP-00029	Primary Containment Sump / Pretreatment In-Cell Handling System	Manage liquids.
Miscellaneous Units		
CNP-HX-00001	Evaporator Concentrate Reboiler / Cesium Nitric Acid Recovery	Concentrate dilute acid solution for reuse.

Hot Cell Containment Building Dangerous Waste Management Units		
Equipment Number	**Description / System**	**Purpose**
	Process System	
TLP-RBLR-00001	LAW Evaporator Reboiler / Treated LAW Evaporation Process	Concentrate pretreated LAW feed prior to transfer from PTF to LAW.
FEP-RBLR-00001A/B	Waste Feed Evaporator Reboilers / Waste Feed Evaporation Process	Concentrate the dilute recycled waste streams.
Not Applicable	Hot Cell Floor / NA	Manage liquid waste.

Process equipment, such as pumps, valves, and jumpers, are located in the hot cell. Typical waste management activities performed in the hot cell include the removal and staging of remote-handled process equipment prior to decontamination, repair, and/or packaging of waste for disposal. Equipment located in the Hot Cell Containment Building can be moved, using an overhead crane and a power manipulator, into the Remote Decontamination Maintenance Cave for decontamination and size reduction for waste packaging, or decontamination for maintenance.

Pretreatment Hot Cell Containment Building Design

The pretreatment hot cell containment building is designed as a completely enclosed area within the pretreatment facility.

It is designed to prevent the release of dangerous constituents and their exposure to the outside environment. The design and construction of the hot cell and the pretreatment facility exterior will prevent water from running into the facility. The approximate dimensions of the unit are summarized in Table 4D-5.

Pretreatment Hot Cell Containment Building Structure

The pretreatment hot cell containment building will be a concrete-walled structure fully enclosed within the pretreatment facility. Therefore, structural requirements for the containment building will be met by the design standards of the pretreatment facility. The roof of the pretreatment facility will consist of metal roofing, roof insulation, and vapor barrier. Rainwater run-off will be collected by roof drains and drainage systems with overflow roof drains. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the pretreatment facility meet or exceed the Uniform Building Code Seismic Design Requirements.

Pretreatment Hot Cell Containment Building Materials

The pretreatment hot cell containment building will be constructed of steel-reinforced concrete. The interior floor and portions of the lower walls will be lined with stainless steel plate. The balance of the walls will not have an impervious coating.

Use of Incompatible Materials in the Pretreatment Hot Cell Containment Building

A stainless steel liner will be provided on the floor and portions of the wall. Stainless steel will be compatible with the waste that will be generated and managed, in the room, such as failed pumps, ultrafilters, and valves. Activities in the unit may include, but are not be limited to, equipment changeout and maintenance.

Primary Barrier Integrity in the Pretreatment Hot Cell Containment Building

The pretreatment hot cell containment building is designed to withstand loads from the movement of personnel, wastes, and handling equipment. The seismic design criteria identified in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the Pretreatment Hot Cell Containment Building

Prior to initial receipt of dangerous and mixed waste startup of operations, a certification by a qualified registered professional engineer that the pretreatment hot cell containment building meets the design requirements of 40 CFR 264.1101(a), and (c) will be obtained.

Operation of the Pretreatment Hot Cell Containment Building

Operational and maintenance controls and practices will be established and followed to ensure containment of the waste within the pretreatment hot cell containment building as required by 40 CFR 264.1101(c)(1).

Maintenance of the Pretreatment Hot Cell Containment Building

The partial stainless steel lining will be constructed and maintained in a manner that will be free of significant cracks, gaps, corrosion, or other deterioration. The partial stainless steel liner will remain free of corrosion or other deterioration because it is compatible with materials that will be managed in the containment building. The failed equipment and other objects that will be managed in the containment building unit will be staged on a platform to protect the floor from damage.

Measures to Prevent Tracking Wastes from the Pretreatment Hot Cell Containment Building

The pretreatment hot cell containment building is designed to isolate failed equipment from the accessible environment and to prevent the spread of contaminated materials. Very little dust is expected to be generated in the unit. Personnel access to the unit, which is classified as a C5 contamination area, will be restricted. Waste leaving the unit may or may not be enclosed within containers. Equipment leaving the unit will be monitored for radioactive contamination and decontaminated if necessary, before being released for removal.

Procedures in the Event of Release or Potential for Release from the Pretreatment Hot Cell Containment Building

The design and operation of the unit makes it very unlikely that releases will occur. The design and operational measures will minimize the generation of dust and contain it within the unit. The ventilation system will also use negative air pressure to keep contamination from spreading to areas of lesser contamination. Offgas will be routed to the pretreatment facility C5 ventilation system.

Inspections will identify conditions that could lead to a release. Such conditions will be corrected on a schedule intended to preclude any releases that could be hazardous to public health or the environment. In the unlikely event that a release of dangerous wastes from the containment building is detected, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods that will be used to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste. These methods will be followed to repair conditions that could lead to a release.

Inspections of the Pretreatment Hot Cell Containment Building

An inspection program will be established to detect conditions that could lead to a release of wastes from the pretreatment hot cell containment building. The inspection and monitoring schedule and methods that will be used to detect releases from the unit are included in DWP Operating Unit Group 10, Chapter 6.0.

4D.3.2 Pretreatment Maintenance Containment Building (PM0124, P-0121A, P-0122A, P-0123A, P-0124, P-0124A, P-0125, P-0125A, P-0128, P-0128A)

The second area that meets the definition of a containment building is the pretreatment maintenance containment building, which comprises the majority of the east end of the building. Typical waste management activities performed in this containment building include waste storage, equipment maintenance, including decontamination, size reduction, and packaging of spent equipment. This unit consists of the interim storage, lag storage, manipulator decontamination and repair, resin handling, waste packaging, tool cribs, and cask lidding room. The unit will include hatches to import or export spent equipment. An overhead crane will facilitate movement of equipment and removal or placement of the spent equipment in the waste containers. The floor and lower wall of Room P-0123A provide secondary containment for Process In-Cell handling, Decontamination Soak Tank PIH-TK-00001 and primary containment for decontamination activities.

Pretreatment Maintenance Containment Building Design

The pretreatment maintenance containment building is designed as a completely enclosed area within the pretreatment facility. The unit is designed to prevent the release and exposure of dangerous constituents to the outside environment. The design and construction of the pretreatment facility exterior will prevent water from running into the facility. The roof of the pretreatment facility will consist of metal roofing, roof insulation, and a vapor barrier. Rainwater run-off will be collected by roof drains and drainage system with overflow roof drains. The approximate dimensions of the unit are summarized in Table 4D-5.

Pretreatment Maintenance Containment Building Structure

The pretreatment maintenance containment building will consist of several rooms within the concrete-walled, fully enclosed pretreatment facility.

Therefore, structural requirements for the containment building will be met by the design standards of the pretreatment facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the pretreatment facility meet or exceed the Uniform Building Code Seismic Design Requirements.

Pretreatment Maintenance Containment Building Materials

The pretreatment maintenance containment building will be constructed of steel-reinforced concrete. In Room P-0123A, the floor and portions of the walls provide primary containment for decontamination activities. The floor and portions of the walls will be lined with stainless steel plate. The walls above the stainless steel liner to the bottom of the runway beam support (approximately 27-foot elevation) for the In-Cell Bridge Crane PIH-CRN-00004 will be coated during construction. Since the room is classified as a C5 area and is located in an unmanned portion of the facility, the wall coating will not be maintained.

Use of Incompatible Materials in the Pretreatment Maintenance Containment Building

In Room P-0123A, the floor and portions of the walls provide primary containment for decontamination activities. The floor and portions of the walls will be lined with stainless steel plate. The walls above the stainless steel liner to approximately 27-foot elevation will be coated during construction. The stainless steel liner and wall coating will be compatible with the wastes that will be managed and the

decontamination solutions that will be used in the room. Activities in the Pretreatment Containment Building will be limited to decontamination, maintenance, size reduction, and waste packaging.

Primary Barrier Integrity in the Pretreatment Maintenance Containment Building

The pretreatment maintenance containment building is designed to withstand loads from the movement of personnel, wastes, and handling equipment. The seismic design criteria identified in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the Pretreatment Maintenance Containment Building

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the pretreatment maintenance containment building meets the design requirements of 40 CFR 264.1101(a), and (c) will be obtained.

Operation of the Pretreatment Maintenance Containment Building

Operational and maintenance controls and practices will be followed to ensure containment of the waste within the pretreatment maintenance containment building as required by 40 CFR 264.1101(c)(1).

Maintenance of the Pretreatment Maintenance Containment Building

The stainless steel lining and coatings in Room P-0123A that provides primary containment will be constructed and maintained in a manner that will be free of significant cracks, gaps, corrosion, or other deterioration. The stainless steel liner in Room P-0123A will remain free of corrosion or other deterioration because it will be compatible with materials that will be managed in the containment building. Since Room P-0123A is located in an unmanned portion of the facility, any wall coatings above the stainless steel liner will not be maintained. Only decontamination solutions that are compatible with the primary containment liner material will be used.

Measures to Prevent Tracking Wastes from the Pretreatment Maintenance Containment Building

The pretreatment maintenance containment building is designed to isolate failed equipment from the accessible environment and to prevent the spread of contaminated materials.

The containment building will be classified as a C3/C5 contamination area and, therefore, personnel access will be limited, and may be restricted. Wastes leaving the unit may be enclosed within containers. If necessary, these containers will be decontaminated in the unit prior to transportation to a permitted storage area. Equipment leaving the unit will be monitored for radioactive contamination and decontaminated, as necessary, before being released for removal from the containment building.

Procedures in the Event of a Release or Potential Release from the Pretreatment Maintenance Containment Building

The design and operation of the unit makes it very unlikely that releases will occur. The design and operational measures that will be used will minimize the generation of dust and contain it within the unit. The ventilation system will also use negative air pressure to keep contamination from spreading to areas of lesser contamination.

In the unlikely event that a release of dangerous wastes from the containment building is detected, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste. These methods will be followed to repair condition that could lead to a release.

Inspections of the Pretreatment Maintenance Containment Building

An inspection program will be established as required under WAC 173-303-695 to detect conditions that could lead to the release of wastes from the pretreatment maintenance containment building. Such conditions will be corrected on a schedule which prevents hazards to the public health and the environment. The inspection and monitoring schedule and methods that will be used to detect a release are included in DWP Operating Unit Group 10, Chapter 6.0.

4D.3.2.1 Remote Decontamination Maintenance Cave (Room P-0123A)

The Remote Decontamination Maintenance Cave (Room P-0123A) is situated between the hot cell (Room P-0123) and the hands-on, Crane Maintenance Area (Room P-0122A). Due to the radiation and contamination levels, personnel are prohibited from entering and working in Room P-0123A. All activities within the room will be remotely controlled. The entire floor and portions of the walls are lined with stainless steel. The stainless steel plate on the floor is 3/16 inch thick. On the west side of Room P-0123A, a stub wall, separates the Remote Decontamination Maintenance Cave from Room P-0123 hot cell. The stub wall is approximately 4 feet (ft) 8 inches (in) high on the north end of the room and approximately 10 ft high on the south end, adjacent to Spray Decontamination Turntable PIH-TTBL-00001. Typical waste management activities performed in the room includes waste storage, decontamination, sizing, and packaging. The Remote Decontamination Maintenance Cave contains four dangerous waste management units consisting of a tank system, two primary containment sumps, and a miscellaneous unit.

Primary Containment Sumps

Room P-0123A floor slopes to primary containment sump PWD-SUMP-00032 located near Spray Decontamination Turntable PIH-TTBL-00001 and to primary containment sump PWD-SUMP-00033 located near Remote Repair Turntable PIH-TTBL-00002. The stainless steel sumps will manage spent decontamination solution resulting from activities performed in the maintenance cave. Design, construction, and operating requirements applicable to primary containment sumps are detailed in DWP III.10.E. Each primary containment sump will have a steam ejector for transferring liquids to Plant Wash and Disposal System Vessel PWD-VSL-00044. The sumps will be covered with stainless steel grating and/or screen mesh to protect the ejectors from debris. Figure 4A-128 contains a typical, primary containment sump, conceptual design.

Decontamination Soak Tank PIH-TK-00001

For items that require a more robust decontamination process, the room is equipped with Decontamination Soak Tank PIH-TK-00001.

Using the overhead crane, items can be immersed in the soak tank before either being packaged or repaired. The decontamination solutions used in the soak tank will be non-combustible. Examples of decontamination solutions which may be used in the soak tank, are nitric acid and plant water with a surfactant. The room provides secondary containment for the Decontamination Soak Tank. Secondary containment consists of the room floor and the wall several inches above the floor. The secondary containment area is lined with fully grouted, stainless steel plate.

Spray Decontamination and Sizing System Miscellaneous Unit

The Spray Decontamination and Sizing System Miscellaneous Unit is comprised of the following equipment: Spray Decontamination Turntable PIH-TTBL-00001, Remote Repair Turntable PIH-TTBL-00002, Size Reduction Table PIH-BENCH-00003, other platforms located in the room, and various tools consisting of decontamination spray lances, cutting tools and a hydraulic shear. The floor provides primary containment for the unit. Objects will not be placed or staged directly on the floor. Equipment and bulk waste too large for the size reduction table will be placed on platforms or support frames. Equipment repair, waste storage, decontamination, and sizing activities may be performed at

each of these stations. Decontamination activities may consist of any combination of swabs and sprays. Decontamination sprays will be, but not limited to: high pressure steam in conjunction with nitric acid, CO2 pellets, and low pressure water or water and surfactant. Items are moved to and from room P-0123A via the in-cell bridge crane. Items can be moved to various locations within the room using the two overhead cranes.

Spray Decontamination Turntable PIH-TTBL-00001 will primarily be used to stage items for decontamination. The turntable is approximately 2.5 ft high by 5 ft wide, and will support up to 5 tons. Spent decontamination fluid and other liquids generated at the turntable will drain to primary containment sump PWD-SUMP-00032.

Remote Repair Turntable PIH-TTBL-00002 will primarily be used to stage items for remote disassembly and repair. Various holding fixtures and remote operated tools to support repair activities will be staged at the turntable. The turntable, approximately 2.5 ft high by 11 ft wide, will support up to 30 tons. Spent decontamination fluid and other liquid wastes generated at the turntable will drain to primary containment sump PWD-SUMP-00033.

Size Reduction Table PIH-BENCH-00003, is located in the central portion of the room. The table, approximately 25 ft long by 15 ft wide, will be used as a staging and work area for items too large for the turntables. The table will support 30 tons and will protect the floor from damage. Spent decontamination solutions and other liquid wastes generated at the table will drain to the primary containment sumps.

The floor and walls provide primary containment for decontamination activities. The walls above the stainless steel liner to 27-foot elevation, will be initially coated with an imperious coating, compatible with the decontamination solutions which will be used in the room. The room is a C5 area, located in an unmanned portion of the facility. The wall coatings above the stainless steel liner plate will not be maintained. Administrative controls will be in place to minimize the over spray of decontamination solution to the walls above the stainless steel liner. Procedurally, a pressurized liquid source will not be introduced until the lance is positioned for use and under the control of a manipulator grip. Positioning will be verified visually or via camera. If over spray of decontamination solution to the wall, above the stainless steel liner occurs, spray decontamination will be stopped until the cause of the over-spray has been identified and corrected. Possible corrective actions include but are not limited to: additional training for the equipment operator, replacing the spray lance, and revising the operating procedure.

Remote Decontamination Maintenance Cave Dangerous Waste Management Units		
Equipment Number	**Description / System**	**Purpose**
Dangerous Waste Tank Systems		
PWD-SUMP-00032	Primary Containment Sump / Plant Wash and Disposal System	Manage spent decontamination solution generated by room activities.
PWD-SUMP-00033	Primary Containment Sump / Plant Wash and Disposal System	Manage spent decontamination solution generated by room activities.
PIH-TK-00001	Decontamination Soak Tank / Plant Wash and Disposal System	Decontamination of items by soaking and spraying.
Spray Decontamination and Sizing System Miscellaneous Unit Equipment		
PIH-TTBL-00001	Spray Decontamination Turntable / Pretreatment In-	Primarily for the decontamination of items prior to repair or sizing. Items

	Cell Handling System	maybe sized for packaging.
PIH-TTBL-00002	Remote Repair Turntable / Pretreatment In-Cell Handling System	Primarily for repair of items. Items may undergo further decontamination or be sized for packaging.
PIH-BENCH-00003	Size Reduction Table / Pretreatment In-Cell Handling System	Primarily for the decontamination and size reduction of items too large to stage on a turntable.

4D.3.3 Pretreatment Spent Filter Drum Handling Area Containment Building (P-0223)

The pretreatment spent filter drum handling area containment building is the third containment building within the pretreatment facility, located in the southeast portion of the facility. Typical waste management activities performed in this containment building include, waste storage, decontamination, and equipment repair. A crane transports spent HEPA and HEME filters and then places them inside a disposal container. The disposal container is then transported via cart, through an air lock and shield doors and to a load-out area for storage pending final disposal. The containment building also houses a hands-on crane decontamination and repair area.

Pretreatment Spent Filter Drum Handling Area Containment Building Design

The pretreatment spent filter drum handling area containment building will be completely enclosed within the pretreatment facility, and will be designed to prevent the release and exposure of dangerous constituents to the outside environment. The design and construction of the pretreatment facility exterior will prevent water from running into the facility. The roof of the pretreatment facility will consist of metal roofing, roof insulation, and a vapor barrier. Run-off will be collected by roof drains and a drainage system with overflow drains. The interior floor and a portion of the walls will be covered with epoxy coating to protect the concrete and facilitate decontamination. The approximate dimensions of the containment building are summarized in Table 4D-5.

Pretreatment Spent Drum Handling Area Containment Building Structure

Because the pretreatment spent filter drum handling area containment building will be a concrete-walled structure fully enclosed within the pretreatment facility, its requirements will be met by the design standards of the pretreatment facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the pretreatment facility meet or exceed the Uniform Building Code Seismic Design Requirements.

Pretreatment Spent Drum Handling Area Containment Building Materials

The pretreatment spent filter drum handling area containment building will be constructed of steel-reinforced concrete. The containment building floor and partial walls be covered with epoxy coating to protect the concrete and facilitate decontamination.

Use of Incompatible Materials for the Pretreatment Spent Drum Handling Area Containment Building

A protective coating on the floor will be compatible with the wastes that will be managed in the unit, which will include spent HEPA and HEME filters. Activities in the unit will be limited to waste packaging.

Primary Barrier Integrity in the Pretreatment Spent Drum Handling Area Containment Building

The pretreatment spent filter drum handling area containment building will be designed to withstand loads from the movement of personnel, wastes, and handling equipment.

The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the Pretreatment Spent Drum Handling Area Containment Building

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the pretreatment spent filter drum handling area containment building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained. The requirements of 40 CFR 264.1101(b) do not apply to this design because any dangerous waste containing free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the Pretreatment Spent Drum Handling Area Containment Building

Operational and maintenance controls and practices will be established to ensure containment of the waste within the pretreatment spent filter drum handling area containment building, as required by 40 CFR 264.1101(c)(1).

Maintenance of the Pretreatment Spent Drum Handling Area Containment Building

The protectively-coated concrete floor and walls of the unit will be constructed and maintained in a manner that will be free of significant cracks, gaps, corrosion, or other deterioration. The epoxy coating will be compatible with materials that will be managed in the containment building, which will include spent HEPA and HEME filters. Only decontamination solutions that are compatible with the protective coating will be used.

Measures to Prevent Tracking Wastes from the Pretreatment Spent Drum Handling Area Containment Building

The pretreatment spent filter drum handling area containment building is designed to manage spent HEPA and HEME filters. Conducting these activities in a C5 contamination zone will prevent the spread of contaminated materials. Restricted personnel access and controlled movement of equipment into and out of the unit will decrease the possibility that waste will be tracked from the unit.

Personnel access to the pretreatment spent filter drum handling area containment building, which is classified as a C5 contamination area, will be restricted. Access to the unit will be allowed only under limited circumstances, thereby limiting the potential for contacting the waste and tracking it from the unit.

Procedures in the Event of Release or Potential for Release from the Pretreatment Spent Drum Handling Area Containment Building

Conditions that could lead to a release from the pretreatment spent filter drum handling area containment building will be corrected on a schedule intended to preclude any release that could be hazardous to public health or the environment. In the unlikely event of a release of dangerous wastes from the containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods that will be used to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste.

Inspections of the Pretreatment Spent Drum Handling Area Containment Building

An inspection program will be established to detect conditions that could lead to a release of wastes from the pretreatment spent filter drum handling area containment building. Such conditions will be corrected on a schedule which prevents hazards to the public health and environment. The inspection and monitoring schedule, and methods that will be used to detect releases from the unit, are included in DWP Operating Unit Group 10, Chapter 6.0.

4D.3.4 Pretreatment Filter Cave Containment Building (P-0335)

The Pretreatment Filter Cave Containment Building is the fourth containment building within the pretreatment facility, in the southeast portion of the facility.

Typical waste management activities performed in this containment building include waste storage, decontamination, and equipment repair. A crane transports the spent HEPA and HEME filters and places them inside a disposal container. The disposal container is then transported via cart through an air lock and shield doors to a load-out area for storage pending final disposal. The containment building also houses a dedicated crane maintenance area.

Pretreatment Filter Cave Containment Building Design

The Pretreatment Filter Cave Containment Building will be completely enclosed within the pretreatment facility, and will be designed to prevent the release and exposure of dangerous constituents to the outside environment. The design and construction of the pretreatment facility exterior will prevent water from running into the facility. The roof of the pretreatment facility will consist of metal roofing, roof insulation, and a vapor barrier. Run-off will be collected by roof drains and a drainage system with overflow drains. The approximate dimensions of the containment building are summarized in Table 4D-5.

Pretreatment Filter Cave Containment Building Structure

Because the Pretreatment Filter Cave Containment Building will be a concrete-walled structure fully enclosed within the pretreatment facility, its requirements will be met by the design standards of the pretreatment facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the pretreatment facility meet or exceed the Uniform Building Code Seismic Design Requirements.

Pretreatment Filter Cave Containment Building Unit Materials

The Pretreatment Filter Cave Containment Building will be constructed of steel-reinforced concrete. The floor, wall, and berm surrounding the PJV demisters and PVP HEMEs will be covered with a stainless steel liner.

Use of Incompatible Materials for the Pretreatment Filter Cave Containment Building

The liner will be compatible with the wastes that will be managed in the unit, which will include spent HEPA and HEME filters. Activities in the unit will be limited to waste packaging. Decontamination solutions will be compatible with the liner on the floor.

Primary Barrier Integrity in the Pretreatment Filter Cave Containment Building

The Pretreatment Filter Cave Containment Building will be designed to withstand loads from the movement of wastes and handling equipment. The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the Pretreatment Filter Cave Containment Building

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the Pretreatment Filter Cave Containment Building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained. The requirements of 40 CFR 264.1101(b) do not apply to this design because any dangerous waste containing free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operations of the Pretreatment Filter Cave Containment Building

Operational and maintenance controls and practices will be established to ensure containment of the waste within the Pretreatment Filter Cave Containment Building, as required by 40 CFR 264.1101(c)(1).

Maintenance of the Pretreatment Filter Cave Containment Building

The stainless steel liner surrounding the demisters and HEMEs will be constructed and maintained in a manner that will be free of significant cracks, gaps, corrosion, or other deterioration. The liner on the floor will be compatible with materials that will be managed in the containment building, which will include spent HEPA and HEME filters. Only decontamination solutions that are compatible with the liner on the floor will be used.

Measures to Prevent Tracking Wastes from the Pretreatment Filter Cave Containment Building

The Pretreatment Filter Cave Containment Building is designed to manage spent HEPA and HEME filters. Conducting these activities in a C5 contamination zone will prevent the spread of contaminated materials. Restricted personnel access and controlled movement of equipment into and out of the unit will decrease the possibility that waste will be tracked from the unit.

Procedures in the Event of Release or Potential for Release from the Pretreatment Filter Cave Containment Building

Conditions that could lead to a release from the Pretreatment Filter Cave Containment Building will be corrected on a schedule intended to preclude any release that could be hazardous to public health or the environment. In the unlikely event of a release of dangerous wastes from the containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods that will be used to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste.

Inspections of the Pretreatment Filter Cave Containment Building

An inspection program will be established to detect conditions that could lead to a release of waste from the Pretreatment Filter Cave Containment Building. Such conditions will be corrected on a schedule which prevents hazards to public health and the environment. The inspection and monitoring schedule and methods that will be used to detect releases from the unit are included in DWP Operating Unit Group 10, Chapter 6.0.

4D.3.5 Pretreatment PJV Secondary HEPA Filter Room Containment Building (P-0431A)

The pretreatment PJV secondary HEPA filter room containment building is the fifth containment building within the pretreatment facility, located in the center of the Pretreatment facility at El. 77 ft. Typical waste management activities performed in this containment building include packaging and storage of spent PJV system HEPA filters.

Pretreatment PJV Secondary HEPA Filter Room Containment Building Design

The pretreatment PJV secondary HEPA filter room containment building will be completely enclosed within the pretreatment facility, and will be designed to prevent the release and exposure of dangerous constituents to the outside environment. The design and construction of the pretreatment facility exterior will prevent water from running into the facility. The roof of the pretreatment facility will consist of metal roofing, roof insulation, and a vapor barrier. Run-off will be collected by roof drains and a drainage system with overflow drains. The interior floor and a portion of the walls will be covered with epoxy coating to protect the concrete from contamination. The approximate dimensions of the containment building are summarized in Table 4D-5.

Pretreatment PJV Secondary HEPA Filter Room Containment Building Structure

Because the pretreatment PJV secondary HEPA filter room containment building will be a concrete-walled structure fully enclosed within the pretreatment facility, its requirements will be met by the design standards of the pretreatment facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure.

DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the pretreatment facility meet or exceed the Uniform Building Code Seismic Design Requirements.

Pretreatment PJV Secondary HEPA Filter Room Containment Building Materials

The pretreatment PJV secondary HEPA filter room containment building will be constructed of steel-reinforced concrete. The containment building floor and partial walls be covered with epoxy coating to protect the concrete and facilitate decontamination.

Use of Incompatible Materials for the Pretreatment PJV Secondary HEPA Filter Room Containment Building

The epoxy coating will be compatible with the wastes that will be managed in the unit, which will include spent HEPA filters. Activities in the unit will be limited to waste packaging and storage. Decontamination reagents that could cause the epoxy coating to leak, corrode, or otherwise fail will not be used within the unit.

Primary Barrier Integrity in the Pretreatment PJV Secondary HEPA Filter Room Containment Building

The pretreatment PJV secondary HEPA filter room containment building will be designed to withstand loads from the movement of personnel, wastes, and handling equipment. The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the Pretreatment PJV Secondary HEPA Filter Room Containment Building

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the pretreatment PJV secondary HEPA filter room containment building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained.

The requirements of 40 CFR 264.1101(b) do not apply to this design because any dangerous waste containing free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the Pretreatment PJV Secondary HEPA Filter Room Containment Building

Operational and maintenance controls and practices will be established to ensure containment of the waste within the pretreatment spent filter drum handling area containment building, as required by 40 CFR 264.1101(c)(1).

Maintenance of the Pretreatment PJV Secondary HEPA Filter Room Containment Building

The epoxy-coated concrete floor and walls will be compatible with materials that will be managed in the containment building, which will include spent HEPA filters. No decontamination chemicals that are incompatible with the coated concrete will be used.

Measures to Prevent Tracking Wastes from the Pretreatment PJV Secondary HEPA Filter Room Containment Building

The pretreatment PJV secondary HEPA filter room containment building is designed to manage spent HEPA filters. Conducting these activities in a C3 contamination zone will prevent the spread of

contaminated materials. Limited personnel access and controlled movement of equipment into and out of the unit will decrease the possibility that waste will be tracked from the unit.

Procedures in the Event of Release or Potential for Release from the Pretreatment PJV Secondary HEPA Filter Room Containment Building

Conditions that could lead to a release from the pretreatment PJV secondary HEPA filter room containment building will be corrected on a schedule intended to preclude any release that could be hazardous to public health or the environment. In the unlikely event of a release of dangerous wastes from the containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods that will be used to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste.

Inspections of the Pretreatment PJV Secondary HEPA Filter Room Containment Building

An inspection program will be established to detect conditions that could lead to a release of wastes from the pretreatment PJV secondary HEPA filter room containment building. The inspection and monitoring schedule, and methods that will be used to detect releases from the unit, are included in DWP Operating Unit Group 10, Chapter 6.0.

4D.4 Air Emission Control

4D.4.1 Pretreatment Facility Ventilation

Pretreatment facility ventilation includes the following systems:

- C1 ventilation system (C1V)
- C2 ventilation system (C2V)
- C3 ventilation system (C3V)
- C5 ventilation system (C5V)

The primary consideration in the design of the ventilation systems is to confine airborne sources of contamination to protect human health and the environment from exposure to hazardous materials during normal and abnormal operating conditions. Physical barriers or structures supported by the ventilation systems will ensure air released to the environment and residual contamination is well below acceptable, safe levels for public exposure.

The pretreatment facility will be divided into four numbered zones, listed below, with the higher number indicating greater hazard potential that needs greater control or restriction. The ventilation system zoning is based on the classifications assigned to building areas for potential contamination. Zones classified as C5 are potentially the most contaminated, such as the pretreatment cells. Zones classified as C1 are uncontaminated areas.

The confinement provided by physical barriers is enhanced by the ventilation system, which creates a pressure gradient and causes air to flow through engineered routes from an area of lower contamination potential to an area of higher contamination potential. There will be no C4 areas in the pretreatment facility. The cascade system, in which air passes through more than one area, will reduce the number of separate ventilation streams and, hence, the amount of air requiring treatment.

C1 Ventilation System (C1V)

C1 areas are normally occupied. C1 areas will typically consist of administrative offices, control rooms, conference rooms, locker rooms, rest rooms, and equipment rooms. C1 areas will be operated slightly pressurized relative to atmosphere and other adjacent areas.

C2 Ventilation System (C2V)

C2 areas typically consist of nonprocess operating areas, access corridors, and control/instrumentation, and electrical rooms. Filtered air will be supplied to these areas by the C2 supply system and will be cascaded into adjacent C3 areas or HEPA filtered and exhausted by the C2 Exhaust system.

C3 Ventilation System (C3V)

C3 areas normally will be unoccupied, but operator access during maintenance will be allowed. C3 areas typically will consist of filter plant rooms, workshops, maintenance areas, and monitoring areas. Access from a C2 area to a C3 area will be via a C2/C3 subchange room. Air will generally be drawn from C2 areas and cascaded through the C3 areas into C5 areas. In general, air cascaded into the C3 areas will be from adjacent C2/C3 subchange rooms. In some areas, where higher flow may be required into C3 areas, a dedicated C2 supply will be provided with a backdraft damper on the C2 supply duct, which will be closed in the event of a loss of C3 extract. This system will shut down should there be a failure of the C5 exhaust system.

C5 Ventilation System (C5V)

The pretreatment facility C5 areas are designed with the cell or cave perimeter providing radiation shielding as well as a confinement zone for ventilation purposes. C5 areas typically consist of a series of process cells where waste will be stored and treated. The pretreatment facility hot cell will house major pumps and valves and other process equipment. Air will be cascaded into the C5 areas, generally from adjacent C3 areas, and extracted by the C5 extract system. The C5 exhaust system will be composed of primary and secondary HEPA Filters and variable speed exhaust fans. Fans designed to maintain continuous system operation will drive the airflow. This system will also be interlocked with the C3 HVAC system, to prevent backflow by shutting down the C3 system if the C5 HVAC system shuts down.

4D.4.2 Vessel Vent Process and Exhaust (PVP/PVV) System

Process flow diagrams of the Pretreatment Facility Vessel Vent Process and Exhaust (PVP/PVV) System are provided in DWP Operating Unit Group 10, Appendix 8.1.

The Pretreatment Vessel Vent Process (PVP) System and Exhaust (PVV) system provide air purging of the head spaces of various process vessels for radiolytic hydrogen control, collection of vent exhausts from process vessels, and process treatment and filtration of the vessel vent exhaust gases before discharging to the PTF stack.

The PVP and PVV systems are composed of tanks and miscellaneous treatment systems, as follows:

Tank Systems

- Vessel Vent HEME Drain Collection Vessel (PVP-VSL-00001).
- Pumps, piping, and instrumentation for waste transfers.

Miscellaneous Unit Systems

- Vessel Vent Caustic Scrubber (PVP-SCB-00002).
- Vessel Vent HEME (Mist Eliminators) (PVP-HEME-00001A/B/C).
- Vessel Vent Primary HEPA Filters (PVV-HEPA-00001A/B).
- Vessel Vent Secondary HEPA (PVV-HEPA-00002A/B).
- Vessel Vent Volatile Organic Compound (VOC) Oxidizer Unit (PVP-OXID-00001).
- Vessel Vent After-Cooler (PVP-CLR-00001).
- Vessel Vent Carbon Bed Adsorbers (PVP-ADBR-00001A/B).
- Vessel Vent Adsorber Outlet Filter (PVP-FILT-00001).

- Pumps, piping, and instrumentation for waste transfers.
- Vessel Vent Exhaust Fans (PVV-FAN-00001A/B).

Purge Air Supply

Continuous air purge to process vessels is the primary control strategy for radiolytic produced hydrogen. Additional airflow above the minimum hydrogen control rate may be introduced to each vessel to help balance the system and ensure that vessels are obtaining the minimum required flow.

The purge air in-bleed to vessels in the pretreatment area is a passive feature. The process vessels located in the C5 ventilation area will draw passive purge air in-bleed from the C5 ventilation area near the vessels via subheaders. Other vessels located in the C3 ventilation area and Process Condensate Tanks (RLD-TK-00006A/B) located outside the pretreatment building will draw air in-bleed from the C3 ventilation area nearest to the vessels through the inlet HEPA filters. The exhaust fans provide the motive force for airflow through each vessel by maintaining a negative pressure.

Forced purge air to the selected process vessels is also provided from the plant service air supply header. Each of the selected process vessels is provided with the required airflow to control the hydrogen concentration below 1% in the vessel during normal operation and below 4 % (lower flammability limit) during abnormal conditions. The supply line to each of these selected process vessels, which requires forced purge air during normal operation, is provided by two parallel trains of valves and flow elements to meet the high reliability requirements.

For the Waste Feed Evaporator Separator Vessels (FEP-SEP-00001A/B) and the Treated LAW Evaporator Separator Vessel (TLP-SEP-00001), which require forced purge air only during a shutdown or a loss of off-site power event, there are two separate trains of actuated valves and flow elements provided for each. The actuated valves for both of these trains are normally in closed position, but will fail open during the shutdown or loss of off-site power event.

Collection of Vent Gases

From the individual process vessel, a vent line routes exhaust gases to a subheader, usually one for each cell. The connection to the subheaders from the process vessels are arranged, where possible, to maintain airflow from normally lower activity vessels to (or past) normally higher activity level vessels. Vent exhaust gases from various process vessels are combined to flow via subheaders to the Vessel Vent Caustic Scrubber (PVP-SCB-00002). The vent gases from the vessels located in the C3 areas and the Process Condensate Tanks (RLD-TK-00006A/B), located outside the pretreatment building, will be collected via other subheaders that combine into the common exhaust header. Any condensate formed in the common exhaust header will flow by gravity into Plant Wash Vessel (PWD-VSL-00044).

Vessel Vent Caustic Scrubber (PVP-SCB-00002)

The vessel vent exhausts flow into the Vessel Vent Caustic Scrubber (PVP-SCB-00002). The Vessel Vent Caustic Scrubber (PVP-SCB-00002) is operated continuously to remove the nitrogen oxide and acid gases from the vessel vents. The vent gases flow to the inlet of the scrubber and flow upwards through a packed bed. Alkaline scrubbing liquid flows down through the packed bed. Contact between the gas and the scrubbing liquid in the bed causes part of the nitrogen oxide and acid gases present in the vent offgases to react with the caustic in the scrubbing liquid to adsorb and form sodium salts, which stay in solution. The scrubbing liquid solution is collected in the scrubber sump vessel located below the packed bed section of the scrubber.

Two scrubber recirculation pumps (one operating and one in standby) continuously recirculate the scrubbing liquid solution to the top of the packed bed section of the scrubber. The operating pump also directly recirculates part of the solution into the sump vessel located below the scrubber to provide adequate mixing of the liquid in the vessel. The scrubber pump also transfers the collected condensate and scrubbing liquid normally once a day or on high level to the Plant Wash Vessel (PWD-VSL-00044).

A section of dry packing located above the main packed section removes any entrained liquid droplets from the exit gases. A wash-water ring is provided above each of the packed sections to wash off any accumulation of solids. Fresh five molar caustic solution is added intermittently from the sodium hydroxide reagent process system (SHR). The caustic solution is added intermittently to scrubber sump vessel to maintain the pH range for the scrubbing liquid recirculating to the top of the main packed section.

When needed, demineralized water is also added to the Vessel Vent Caustic Scrubber (PVP-SCB-00002) wash rings to clean the dry packing or for makeup requirements.

The outlet gases from the Vessel Vent Caustic Scrubber (PVP-SCB-00002) flow to the Vessel Vent HEME (Mist Eliminator). The inlet, outlet, and bypass valves are provided for the Caustic Scrubber. The valves will be remotely operated by a manipulator in the pretreatment filter cave area.

Vessel Vent HEME (Mist Eliminators) (PVP-HEME-00001A/B/C) (HEME)

The HEMEs will be composed of deep-bed fiber filter elements configured in an annular shape to remove fine aerosols. Vent gases from the scrubber flow into two HEMEs, with the third HEME available as standby. Gases flow from the outside to the hollow core. The treated gas exits at the top and the liquid collects at the sealed bottom in a drainpipe. The HEMEs are operated wet at all times to allow drainage of soluble liquid aerosols that accumulate in the fibers, form a liquid film, and drop to the drain line below to the Vessel Ventilation HEME Drain Collection Vessel (PVP-VSL-00001). Atomizing spray of demineralized water is provided at the gas inlet nozzle for each operating HEME. An intermittent wash spray of the filter elements will be used to remove any accumulated debris, thus extending the service life of the HEME elements. Intermittent washing will normally be carried out off-line.

Three separate HEMEs will treat the vessel vent offgas stream. This configuration will permit washing each HEME while it is offline.

The HEME effluent will be discharged to the Vessel Vent HEME Drain Collection Vessel (PVP-VSL-00001) and then to the Plant Wash Vessel (PWD-VSL-00044) in the PWD system.

After treatment in HEMEs, heated air is added from the inbleed HEPA filters to prevent condensation in the downstream PVV HEPA filters.

Vessel Vent Primary HEPA Filters (PVV-HEPA-00001A/B)

The preheated vent exhaust gases from the heaters flow into one of the two Primary HEPA filter banks, which will be on line while the other one is available as standby. The HEPA filters will remove the particulates from the gas stream. The Vessel Vent Primary HEPA Filters will be located in the pretreatment filter cave area (room P-0335) for remote maintenance.

Vessel Vent Secondary HEPA Filters (PVV-HEPA-00002A/B)

The gases from the Vessel Vent Primary HEPA Filter flow into one of the two Vessel Vent Secondary HEPA Filter banks, which will be on line while the other one is available as standby. The Vessel Vent Secondary HEPA Filters will remove any remaining particulates from the exhaust gases.

After the Primary and Secondary HEPA Filters remove the particulates from the vessel vent exhaust stream in the PVV system, the filtered vent exhaust stream returns to the PVP system for abatement of volatile organic compounds. The volatile organic compound abatement process removes vapor-phase organic compounds from the PVP vent gas. This abatement process takes place within an oxidation system followed by an adsorption system. The oxidation system includes a VOC Oxidizer Unit (PVP-OXID-00001) and an After-Cooler (PVP-CLR-00001). The adsorption system includes Carbon Bed Adsorbers (PVP-ADBR-00001A/B) and a medium efficiency Adsorber Outlet Filters (PVP-FILT-00001A/B).

Vessel Vent VOC Oxidizer Unit (PVP-OXID-00001)

To remove volatile organic compounds (VOC) from the vessel vent stream, a skid-mounted electric, noncatalyzed oxidizer unit will be used. In this unit, volatile organic compounds in the off-gas are oxidized to carbon dioxide and water vapor at high temperature in the presence of excess oxygen.

The offgas then enters the heat recovery unit to transfer the heat to the bed, which will then be used for preheating the incoming offgas. The cooled gas stream is then directed to the Vessel Vent Aftercooler (PVP-CLR-00001). The treated gases are cooled by the cooling water. Any condensate generated by cooling of the gases will flow to the C3 Floor Drain Collection Vessel (PWD-VSL-00046).

Vessel Vent Carbon Bed Adsorbers (PVP-ADBR-00001A/B)

Two parallel Vessel Vent Carbon Bed Adsorbers are provided for the final treatment of vent gases. The adsorbers are filled with activated carbon. The Vessel Vent Carbon Bed Adsorber will further reduce volatile organic compounds from the vessel vent exhaust gases. The Vessel Vent VOC Oxidizer Unit (PVP-OXID-00001) will remove most of the volatile organic compounds from the vessel vent gases, and the Vessel Vent Carbon Bed Adsorbers (PVP-ADBR-00001A/B) will remove the remaining volatile organic compounds. Normal operation will be one unit online while the other is in maintenance mode.

Vessel Vent Adsorber Outlet Filter (PVP-FILT-00001)

The treated gases from the Vessel Vent Carbon Bed Adsorbers (PVP-ADBR-00001A/B) will flow into this filter, where fine carbon particles, if any are present in the vent gases, will be filtered. This filter is also provided with a bypass line and isolation valves to enable replacement of the filter.

Vessel Vent Exhaust Fans (PVV-FAN-00001A/B)

After the filtration in the Vessel Vent Adsorber Outlet Filter (PVP-FILT-00001), the vent gases will flow into the Vessel Vent Exhaust Fan (PVV-FAN-00001A/B) in the PVV system. Two Exhaust Fans are provided. One will be in operation while the second one will be on standby.

The Vessel Vent Exhaust Fans (PVV-FAN-00001A/B) provide the necessary motive force to extract the vent gases from the head spaces of various process vessels and provides for the required pressure drop through various treatment equipment in the PVP/PVV systems. The Vessel Vent Exhaust Fans (PVV-FAN-00001A/B) will maintain a constant suction pressure at the inlet to the Vessel Vent Caustic Scrubber (PVP-SCB-00002). The Vessel Vent Exhaust Fans (PVV-FAN-00001A/B) will have suitable speed control to accommodate variation in the vent gas flow rates from various vessels.

In addition to the instrumentation, alarms, controls, and interlocks addressed in Appendix 4D, the following will be provided for the PVP/PVV systems to indicate or prevent the following conditions:

- For purge air flow measurement:
  - Passive purge air flow rate will be measured for the process vessels including low flow alarm for each of these flow instruments.
  - Forced purge air flow rate will be measured and low flow alarmed for the process vessels that require the control of hydrogen concentration. These instruments will have important-to-safety instrument function.
- For the HEMEs:
  - The outlet pressure, pressure drop, and the flow rates will be monitored and controlled.
  - Demineralized water supply for HEMEs will have monitoring for the inlet pressure and flow rates.
- For the HEPA filters, the pressure drop will be monitored and controlled within the required limits.

- For the VOC Oxidizer Unit (PVP-OXID-00001):
  - The thermal oxidizer reaction zone, the outlet temperatures, and the pressure drop will be monitored and controlled.
  - The oxidizer bypass valve cannot be opened unless the reaction zone temperature has been attained.
- For the carbon bed adsorber:
  - The pressure drop through the bed will be monitored and controlled.
  - The differential temperature across the carbon bed will be monitored.
- For the adsorber outlet filter, the pressure drop will be monitored and controlled.

The PVP and PVV systems have the following design features:

- Provide the function of air purging of the head spaces of various process vessels for radiolytic hydrogen control.
- Collect vent exhausts from process vessels.
- Treat the combined exhaust gases to adsorb soluble nitrogen oxide(s) and acid gases, remove liquid droplets, condensate, mists, and solid particulates in the PVP system.
- Preheat vent gases to control relative humidity and then remove particulates with two stages of High-Efficiency Particulate Air (HEPA) filters.
- Provide additional treatment for the oxidation and removal of volatile organic compounds from the filtered exhaust gases in the PVP system. The filtered treated exhaust gases will then flow to the exhaust fans in the PVV system for venting to the atmosphere.
- Remote sampling capabilities via autosampler ASX-SMPLR-00019.

4D.4.3 Pulse Jet Ventilation (PJV) System

Process flow diagrams of the PJV System are provided in DWP Operating Unit Group 10, Appendix 8.1. The PJV system provides the safety function to treat the exhausts from reverse flow diverters and pulse jet mixers operating inside various process vessels before release to the atmosphere via the pretreatment facility stacks. The PJV system consists of process and HVAC equipment for removal of aerosols and particulates. The PJV system is composed of miscellaneous treatment systems, as follows:

Miscellaneous Unit Systems

- PJV Demisters (PJV-DMST-00002A/B/C).
- PJV Primary HEPA Filters (PJV-HEPA-00001A/B/C/D/E/F/G).
- PJV Secondary HEPA Filters (PJV-HEPA-00002A/B/C/D/E/F).
- PJV Exhaust Fans (PJV-FAN-00001A/B/C).
- Pumps, piping, and instrumentation for waste transfers.

The PJV system provides the containment and confinement of exhausts from various reverse flow diverters and pulse jet mixers operating inside the PTF process vessels. This system provides the removal of mists and aerosols from the combined PJV exhausts stream by demisters (medium-efficiency mist eliminators). The treated exhaust gases are mixed with hot air in-bleed from the C3 ventilation area to adjust their relative humidity followed by two stages of HEPA filtration to remove particulates. The filtered effluent gases are drawn by the PJV Exhaust Fans (PJV-FAN-00001A/B/C). The treated filtered exhaust stream will be monitored before it is discharged to the atmosphere.

Collection of Exhaust Gases (Exhaust Piping System)

The PJV system receives the exhaust via several subheaders from the reverse flow diverters and pulse jet mixers operating in various process vessels in the pretreatment area. The exhausts are combined from various subheaders to flow via the inlet header to the PJV Demisters (PJV-DMST-00002A/B/C). The low points of the inlet header and subheaders are provided with drain lines, which drain condensate collected in the header to the Ultimate Overflow Vessel (PWD-VSL-00033) in the Pretreatment Facility Wash and Disposal (PWD) System.

PJV Demisters (PJV-DMST-00002A/ B/ C)

The PJV system is provided with three PJV Demisters (PJV-DMST-00002A/B/C), which are medium-efficiency mist eliminators. Two of these demisters are in service at a given time and one is available as a standby off-line.

The PJV Demisters are used to remove fine aerosols and mist, and exhibit medium removal efficiencies for submicron aerosols. They are passive devices with low maintenance requirements and high reliability. The demisters will adequately protect the HEPA filters, located downstream in this system, from excessive activity buildup, and provide the desired HEPA filter life of 4 to 5 years.

All PJV Demisters (PJV-DMST-00002A/B/C) for this system are located, along with the HEPA filters, in the filter cave (room P-0335) in a C5 ventilation area due to the expected radionuclide loading. The PJV Demisters (PJV-DMST-00002A/B/C) are either isolated, or put into service, by opening or closing isolation valves provided at the inlet and outlet of each PJV Demister. These isolation valves are operated remotely by using the manipulator and the filter cave operating crane. The headers are designed without any bypass around the PJV Demisters (PJV-DMST-00002A/B/C) to prevent the downstream HEPAs from accelerated loading of particulates. Remote changeout capability for the Demister filter elements is provided.

The outlet gases from the Demisters (PJV-DMST-00002A/B/C) flow to the outlet header to the extract part of the PJV system, as described below.

Hot Air In-Bleed

Air in-bleed from a C3 ventilation area is filtered, heated, and then mixed with the exhaust gases from the Demister outlet to reduce the relative humidity of the stream flowing into the primary HEPA Filter banks. The in-bleed air is filtered with medium efficiency Air In-Bleed Filters (PJV-FLTH-00001A/B) and then heated to the temperature required to keep the humidity of the mixed gases below 70% and prevent the wetting of the primary HEPA Filters.

PJV Primary Exhaust HEPA Filters (PJV-HEPA-00001A/B/C/D/E/F/G)

There are seven PJV Primary HEPA Filter (PJV-HEPA-00001A/B/C/D/E/F/G) banks, arranged in parallel and configured in a running/standby arrangement to allow on-line filter change. There will be five PJV Primary HEPA Filter banks in operation, and two PJV Primary HEPA Filters will be on standby or in maintenance. The PJV Primary HEPA Filters (PJV-HEPA-00001A/B/C/D/E/F/G) will be remote change type located in the pretreatment filter cave area. Filter inserts are radial type. Inlet and outlet isolation valves for the PJV Primary HEPA Filters (PJV-HEPA-00001A/B/C/D/E/F/G) are remotely operated by a manipulator and maintenance crane in the pretreatment filter cave (room P-0335).

PJV Secondary Exhaust HEPA Filters (PJV-HEPA-00002A/B/C/D/E/F)

Exhaust gases from the PJV Primary Exhaust HEPA Filters (PJV-HEPA-00001A/B/C/D/E/F/G) are routed to the outlet header, then to the PJV Secondary Exhaust HEPA Filters (PJV-HEPA-00002A/B/C/D/E/F) located in a C3 ventilation area. There are six PJV Secondary Exhaust HEPA Filter (PJV-HEPA-00002A/B/C/D/E/F) banks, arranged in parallel and configured in a running/standby arrangement to allow on-line filter change. There will be four PJV Secondary Exhaust HEPA Filter

(PJV-HEPA-00002A/B/C/D/E/F) banks in operation, and two Secondary HEPA Filter banks will be on standby or in maintenance. PJV Secondary Exhaust HEPA Filters (PJV-HEPA-00002A/B/C/D/E/F) will be the safe change type.

PJV Exhaust Fans (PJV-FAN-00001A/B/C)

The filtered exhaust from the PJV Secondary Exhaust HEPA Filters (PJV-HEPA-00002A/B/C/D/E/F) will be drawn by three PJV Exhaust Fans (PJV-FAN-00001A/B/C). Two fans will be in operation while the third fan will be on standby. The PJV Exhaust Fans (PJV-FAN-00001A/B/C) provide the necessary motive force to extract the vent gases from the fluidics discharge racks and provide for the required pressure drop through the treatment equipment in the PJV system. The PJV Exhaust Fans (PJV-FAN-00001A/B/C) will maintain a constant suction pressure condition for the inlet gas stream to the Demisters. The PJV Exhaust Fans will have suitable speed control to accommodate variation in the exhaust flow rates from reverse flow diverters and pulse jet mixers operating inside various vessels.

In the event of failure of one of the two PJV Exhaust Fans (PJV-FAN-00001A/B/C) in operation, the standby fan automatically starts. Each fan is provided with manual isolating dampers on the fan inlet and pneumatic actuated isolating dampers on the fan outlet. From the PJV Exhaust Fans (PJV-FAN-00001A/B/C), pulse jet mixer and reverse flow diverter treated effluents flow via a dedicated, continuously monitored flue to the PTF stack.

The PJV system has the following design features:

- Instrumentation for monitoring process flows and equipment performance.
- Remote sampling system to confirm system performance.

In addition to the instrumentation, alarms, controls, and interlocks addressed in Appendix 4D, the following will be provided for the PJV system to indicate or prevent the following conditions:

- Flow rate for the combined exhaust gas entering the PJV Demisters (PJV-DMST-00002A/B/C) will be monitored. Suction pressure for the inlet gas will be maintained by varying the speed for the PJV Exhaust Fans (PJV-FAN-00001A/B/C).
- Pressure drop for the PJV Demisters (PJV-DMST-00002A/B/C) will be monitored.
- Each PJV HEPA filter bank will be monitored and alarmed on high differential pressure.

This page intentionally left blank.

1

Table 4D-1 Pretreatment Facility Tank Systems						
No.	**System**	**Vessel Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**	**Approximate Dimensions (Inside Diameter) × Height or Length in feet and inches (tangent line/tangent line)**
1.	FRP	FRP-VSL-00002A P-0108	Waste Feed Receipt Vessel	Stainless Steel	472,900	47’ x 26’ 10”
2.	FRP	FRP-VSL-00002B P-0108A	Waste Feed Receipt Vessel	Stainless Steel	472,900	47’ x 26’ 10”
3.	FRP	FRP-VSL-00002C P-0108B	Waste Feed Receipt Vessel	Stainless Steel	472,900	47’ x 26’ 10”
4.	FRP	FRP-VSL-00002D P-0108C	Waste Feed Receipt Vessel	Stainless Steel	472,900	47’ x 26’ 10”
5.	FEP	FEP-VSL-00017A P-0106	Waste Feed Evaporator Feed Vessel	Stainless Steel	85,496	22’ x 22’ 9”
6.	FEP	FEP-VSL-00017B P-0106	Waste Feed Evaporator Feed Vessel	Stainless Steel	85,496	22’ x 22’ 9”
7.	FEP	FEP-VSL-00005 P-0105B	Waste Feed Evaporator Condensate Vessel	Stainless Steel	5,022	8’ x 10’ 8”
8.	UFP	UFP-VSL-00062A P-0106	Ultrafilter Permeate Collection Vessel	Stainless Steel	34,700	15’ x 21’ 3”
9.	UFP	UFP-VSL-00062B P-0106	Ultrafilter Permeate Collection Vessel	Stainless Steel	34,700	15’ x 21’ 3”
10.	UFP	UFP-VSL-00062C P-0104	Ultrafilter Permeate Collection Vessel	Stainless Steel	34,700	15’ x 21’ 3”

Table 4D-1 Pretreatment Facility Tank Systems

No.	System	Vessel Number/Location	Description	Material	Total Volume (US Gallons)	Approximate Dimensions (Inside Diameter) × Height or Length in feet and inches (tangent line/tangent line)
11.	UFP	UFP-VSL-00001A P-0106	Ultrafiltration Feed Preparation Vessel	Stainless Steel	75,594	20’ x 25’ 9”
12.	UFP	UFP-VSL-00001B P-0104	Ultrafiltration Feed Preparation Vessel	Stainless Steel	75,594	20’ x 25’ 9”
13.	UFP	UFP-VSL-00002A P-0104	Ultrafiltration Feed Vessel	Stainless Steel	40,788	14’ x 30’ 9”
14.	UFP	UFP-VSL-00002B P-0104	Ultrafiltration Feed Vessel	Stainless Steel	40,788	14’ x 30’ 9”
15.	UFP	UFP-FILT-00001A P-0123	Ultrafilter	Stainless Steel	112	1’ 5” x 10’
16.	UFP	UFP-FILT-00001B P-0123	Ultrafilter	Stainless Steel	112	1’ 5” x 10’
17.	UFP	UFP-FILT-00002A P-0123	Ultrafilter	Stainless Steel	112	1’ 5” x 10’
18.	UFP	UFP-FILT-00002B P-0123	Ultrafilter	Stainless Steel	112	1’ 5” x 10’
19.	UFP	UFP-FILT-00003A P-0123	Ultrafilter	Stainless Steel	112	1’ 5” x 10’
20.	UFP	UFP-FILT-00003B P-0123	Ultrafilter	Stainless Steel	112	1’ 5” x 10’
21.	UFP	UFP-FILT-00004A P-0123	Ultrafilter	Stainless Steel	92	1’ 5” x 8’

Table 4D-1 Pretreatment Facility Tank Systems

No.	System	Vessel Number/Location	Description	Material	Total Volume (US Gallons)	Approximate Dimensions (Inside Diameter) × Height or Length in feet and inches (tangent line/tangent line)
22.	UFP	UFP-FILT-00004B P-0123	Ultrafilter	Stainless Steel	92	1’ 5” x 8’
23.	UFP	UFP-FILT-00005A P-0123	Ultrafilter	Stainless Steel	92	1’ 5” x 8’
24.	UFP	UFP-FILT-00005B P-0123	Ultrafilter	Stainless Steel	92	1’ 5” x 8’
25.	HLP	HLP-VSL-00028 P-0102A	HLW Feed Blend Vessel	Stainless Steel	142,200	26’ 6” x 29’
26.	HLP	HLP-VSL-00027A P-0102	HLW Lag Storage Vessel	Stainless Steel	127,260	25’ x 29’ 6”
27.	HLP	HLP-VSL-00027B P-0102	HLW Lag Storage Vessel	Stainless Steel	127,260	25’ x 29’ 6”
28.	HLP	HLP-VSL-00022 P-0102A	HLW Feed Receipt Vessel	Stainless Steel	268,800	38’ x 24’ 2”
29.	CXP	CXP-IXC-00001 P-0123	Cesium Ion Exchange Column	Stainless Steel	1024	4’ 5” x 9’
30.	CXP	CXP-IXC-00002 P-0123	Cesium Ion Exchange Column	Stainless Steel	1024	4’ 5” x 9’
31.	CXP	CXP-IXC-00003 P-0123	Cesium Ion Exchange Column	Stainless Steel	1024	4’ 5” x 9’
32.	CXP	CXP-IXC-00004 P-0123	Cesium Ion Exchange Column	Stainless Steel	1024	4’ 5” x 9’

Table 4D-1 Pretreatment Facility Tank Systems

No.	System	Vessel Number/Location	Description	Material	Total Volume (US Gallons)	Approximate Dimensions (Inside Diameter) × Height or Length in feet and inches (tangent line/tangent line)
33.	CXP	CXP-VSL-00004 P-0111	Cesium Ion Exchange Feed Vessel	Stainless Steel	10,633	10’ 6” x 14’ 3”
34.	CXP	CXP-VSL-00026A P-0114	Cesium Ion Exchange Treated LAW Collection Vessel	Stainless Steel	38,000	15’ x 24’ 6”
35.	CXP	CXP-VSL-00026B P-0114	Cesium Ion Exchange Treated LAW Collection Vessel	Stainless Steel	38,000	15’ x 24’ 6”
36.	CXP	CXP-VSL-00026C P-0114	Cesium Ion Exchange Treated LAW Collection Vessel	Stainless Steel	38,000	15’ x 24’ 6”
37.	CNP	CNP-VSL-00003 P-0111	Eluate Contingency Storage Vessel	Stainless Steel	21,713	14’ x 16’
38.	CNP	CNP-VSL-00004 P-0112	Cesium Evaporator Recovered Nitric Acid Vessel	Stainless Steel	11,115	9’ 6” x 19’
39.	CNP	CNP-VSL-00001 P-0112	Cesium Evaporator Eluant Lute Pot	Stainless Steel	109	4’ x 3’
40.	TLP	TLP-VSL-00002 P-0118	Treated LAW Evaporator Condensate Vessel	Stainless Steel	2,227	6’ x 9’ 3”
41.	TLP	TLP-VSL-00009A P-0117	LAW SBS Condensate Receipt Vessel	Stainless Steel	130,010	26’ x 27’ 4”
42.	TLP	TLP-VSL-00009B P-0117A	LAW SBS Condensate Receipt Vessel	Stainless Steel	130,010	26’ x 27’ 4”
43.	TCP	TCP-VSL-00001 P-0117A	Treated LAW Concentrate Storage Vessel	Stainless Steel	146,740	26’ 6” x 30’ 2”

Table 4D-1 Pretreatment Facility Tank Systems

No.	System	Vessel Number/Location	Description	Material	Total Volume (US Gallons)	Approximate Dimensions (Inside Diameter) × Height or Length in feet and inches (tangent line/tangent line)
44.	RDP	RDP-VSL-00002A P-0112	Spent Resin Slurry Vessel	Stainless Steel	15,230	12’ x 13’ 2”
45.	RDP	RDP-VSL-00002B P-0112	Spent Resin Slurry Vessel	Stainless Steel	15,230	12’ x 13’ 2”
46.	RDP	RDP-VSL-00002C P-0112	Spent Resin Slurry Vessel	Stainless Steel	15,230	12’ x 13’ 2”
47.	RDP	RDP-VSL-00004 P-0119	Spent Resin Dewatering Moisture Separation Vessel	Stainless Steel	101	2’ x 5’
48.	RLD	RLD-TK-00006A P-0150	Process Condensate Tank	Stainless Steel	343,734	42’ x 32’
49.	RLD	RLD-TK-00006B P-0150	Process Condensate Tank	Stainless Steel	343,734	42’ x 32’
50.	RLD	RLD-VSL-00017A P-0118	Alkaline Effluent Vessel	Stainless Steel	34,340	16’ x 17’ 6”
51.	RLD	RLD-VSL-00017B P-0118	Alkaline Effluent Vessel	Stainless Steel	34,340	16’ x 17’ 6”
52.	PWD	PWD-VSL-00033 P-B003	Ultimate Overflow Vessel	Stainless Steel	41,650	24’ x 7’ 5”
53.	PWD	PWD-VSL-00043 P-B003	HLW Effluent Transfer Vessel	Stainless Steel	41,650	24’ x 7’ 5”
54.	PWD	PWD-VSL-00015 P-0109	Acidic/Alkaline Effluent Vessel	Stainless Steel	119,150	22’ x 34’ 7”

Table 4D-1 Pretreatment Facility Tank Systems

No.	System	Vessel Number/Location	Description	Material	Total Volume (US Gallons)	Approximate Dimensions (Inside Diameter) × Height or Length in feet and inches (tangent line/tangent line)
55.	PWD	PWD-VSL-00044 P-0104	Plant Wash Vessel	Stainless Steel	103,024	23’ x 25’ 6”
56.	PWD	PWD-VSL-00046 P-B005	C3 Floor Drain Collection Vessel	Stainless Steel	4,982	8’ x 10’ 6”
57.	PWD	PWD-VSL-00016 P-0109	Acid/Alkaline Effluent Vessel	Stainless Steel	119,150	22’ x 34’ 7”
58.	PVP	PVP-VSL-00001 P-102A	Vessel Vent HEME Drain Collection Vessel	Stainless Steel	1,969	6’ x 7’ 4”
59.	PIH	PIH-TK-00001 P-0123A	Decontamination Soak Tank	Stainless Steel	TBD	8’x 4.1’

1

Table 4D-2 Pretreatment Facility Miscellaneous Units (Systems and Sub-Systems)					
No.	**System/ Subsystem**	**Component Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**
Pretreatment Facility					
1	CNP	CNP-EVAP-00001 P-0112	Cesium Evaporator Separator Vessel	Hastelloy	RESERVED
2	CNP	CNP-HX-00001 P-0123	Cesium Evaporator Concentrate Reboiler	Stainless Steel	NA
3	CNP	CNP-DISTC-00001 P-0320	Cesium Evaporator Nitric Acid Rectifier Column	Stainless Steel	877
4	CNP	CNP-HX-00002 P-0430	Cesium Evaporator Primary Condenser	Stainless Steel	NA
5	CNP	CNP-HX-00003 P-0430	Cesium Evaporator Inter-Condenser	Stainless Steel	NA
6	CNP	CNP-HX-00004 P-0430	Cesium Evaporator After-Condenser	Stainless Steel	NA
7	FEP	FEP-SEP-00001A P-0106	Waste Feed Evaporator Separator Vessel	Stainless Steel	14,512
8	FEP	FEP-SEP-00001B P-0106	Waste Feed Evaporator Separator Vessel	Stainless Steel	14,512
9	FEP	FEP-RBLR-00001A P-0123	Waste Feed Evaporator Reboiler	Stainless Steel	NA
10	FEP	FEP-RBLR-00001B P-0123	Waste Feed Evaporator Reboiler	Stainless Steel	NA
11	FEP	FEP-COND-00001A P-0304	Waste Feed Evaporator Primary Condenser	Stainless Steel	NA
12	FEP	FEP-COND-00001B	Waste Feed Evaporator Primary Condenser	Stainless Steel	NA

Table 4D-2 Pretreatment Facility Miscellaneous Units (Systems and Sub-Systems)					
No.	**System/ Subsystem**	**Component Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**
		P-0304			
13	FEP	FEP-COND-00002A P-0304	Waste Feed Evaporator Intercondenser	Stainless Steel	NA
14	FEP	FEP-COND-00002B P-0304	Waste Feed Evaporator Intercondenser	Stainless Steel	NA
15	FEP	FEP-COND-00003A P-0304	Waste Feed Evaporator Aftercondenser	Stainless Steel	NA
16	FEP	FEP-COND-00003B P-0304	Waste Feed Evaporator Aftercondenser	Stainless Steel	NA
17	PIH	PIH-TTBL-00001 PIH-TTBL-00002 PIH-BENCH-00003	Spray Decontamination and Sizing System	Stainless Steel	NA
18	PIH	NA	Hot Cell Floor	Stainless Steel	NA
19	PJV	PJV-HEPA-00001A P-0335	PJV Primary Exhaust HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
20	PJV	PJV-HEPA-00001B P-0335	PJV Primary Exhaust HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
21	PJV	PJV-HEPA-00001C P-0335	PJV Primary Exhaust HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
22	PJV	PJV-HEPA-00001D P-0335	PJV Primary Exhaust HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
23	PJV	PJV-HEPA-00001E P-0335	PJV Primary Exhaust HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
24	PJV	PJV-HEPA-00001F P-0335	PJV Primary Exhaust HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA

Table 4D-2 Pretreatment Facility Miscellaneous Units (Systems and Sub-Systems)					
No.	**System/ Subsystem**	**Component Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**
25	PJV	PJV-HEPA-00001G P-0335	PJV Primary Exhaust HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
26	PJV	PJV-HEPA-00002A P-0431A	PJV Second Exhaust HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
27	PJV	PJV-HEPA-00002B P-0431A	PJV Secondary Exhaust HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
28	PJV	PJV-HEPA-00002C P-0431A	PJV Secondary Exhaust HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
29	PJV	PJV-HEPA-00002D P-0431A	PJV Secondary Exhaust HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
30	PJV	PJV-HEPA-00002E P-0431A	PJV Secondary Exhaust HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
31	PJV	PJV-HEPA-00002F P-0431A	PJV Secondary Exhaust HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
32	PJV	PJV-FAN-00001A P-0433	PJV Exhaust Fan	Stainless Steel	NA
33	PJV	PJV-FAN-00001B P-0433	PJV Exhaust Fan	Stainless Steel	NA
34	PJV	PJV-FAN-00001C P-0433	PJV Exhaust Fan	Stainless Steel	NA
35	PJV	PJV-DMST-00002A P-0335	PJV Demister	Mesh Pad/ Stainless Steel	NA
36	PJV	PJV-DMST-00002B P-0335	PJV Demister	Mesh Pad/ Stainless Steel	NA
37	PJV	PJV-DMST-00002C P-0335	PJV Demister	Mesh Pad/ Stainless Steel	NA

Table 4D-2 Pretreatment Facility Miscellaneous Units (Systems and Sub-Systems)

No.	System/ Subsystem	Component Number/Location	Description	Material	Total Volume (US Gallons)
38	PVP	PVP-ADBR-00001A P-0328	Vessel Vent Carbon Bed Adsorber	TEDA/Stainless Steel	NA
39	PVP	PVP-ADBR-00001B P-0328	Vessel Vent Carbon Bed Adsorber	TEDA/Stainless Steel	NA
40	PVP	PVP-CLR-00001 P-0318	Vessel Vent Aftercooler	Stainless Steel	NA
41	PVP	PVP-OXID-00001 P-0326	Vessel Vent VOC Oxidizer Unit	Stainless Steel	NA
42	PVP	PVP-FILT-00001 P-0318	Vessel Vent Adsorber Outlet Filter	Synthetic Fibrous Materials/Stainless Steel	NA
43	PVP	PVP-HEME-00001A P-0335	Vessel Vent HEME (Mist Eliminator)	Packed Fiber Bed/Stainless Steel	NA
44	PVP	PVP-HEME-00001B P-0335	Vessel Vent HEME (Mist Eliminator)	Packed Fiber Bed/Stainless Steel	NA
45	PVP	PVP-HEME-00001C P-0335	Vessel Vent HEME (Mist Eliminator)	Packed Fiber Bed/Stainless Steel	NA
46	PVP	PVP-HX-00002 P-0302	Vessel Vent Scrubbing Liquid Cooler	Stainless Steel	NA
47	PVP	PVP-SCB-00002 P-0104	Vessel Vent Caustic Scrubber	Metal Intalox Packing/ Stainless Steel	3,237
48	PVV	PVV-HEPA-00001A P-0335	Vessel Vent Primary HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
49	PVV	PVV-HEPA-00001B P-0335	Vessel Vent Primary HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
50	PVV	PVV-HEPA-00002A P-0324	Vessel Vent Secondary HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA

Table 4D-2 Pretreatment Facility Miscellaneous Units (Systems and Sub-Systems)					
No.	**System/ Subsystem**	**Component Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**
51	PVV	PVV-HEPA-00002B P-0324	Vessel Vent Secondary HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
52	PVV	PVV-FAN-00001A P-0418	Vessel Vent Exhaust Fan	Stainless Steel	NA
53	PVV	PVV-FAN-00001B P-0418	Vessel Vent Exhaust Fan	Stainless Steel	NA
54	TLP	TLP-SEP-00001 P-0117	Treated LAW Evaporator Separator Vessel	Stainless Steel	13,359
55	TLP	TLP-RBLR-00001 P-0123	Treated LAW Evaporator Reboiler	Stainless Steel	NA
56	TLP	TLP-COND-00001 P-0325	Treated LAW Primary Condenser	Stainless Steel	NA
57	TLP	TLP-COND-00002 P-0325	Treated LAW Intercondenser	Stainless Steel	NA
58	TLP	TLP-COND-00003 P-0325	Treated LAW Aftercondenser	Stainless Steel	NA

1

Table 4D-3 Pretreatment Facility Secondary Containment Rooms/Areas				
Room/Area	**Approximate Room/Area Dimensions (L×W, in feet)**	**Miscellaneous Treatment Units or Tanks in Room/Area (Largest Plant Item)**	**Volume of Largest Plant Item in Room/Area (US Gallons)**	**Minimum Secondary Containment Height (feet)**
Pretreatment Facility				
1. P-B005 C2/C3 Drain Tank Room	Minimum secondary containment for these cells/caves has been deleted and superceded by *Flooding Volume for Below Grade and 0 Ft Level in PT Facility*, 24590-PTF-PER-M-02-005 (DWP Operating Unit Group 10, Appendix 8.8)			
2. P-B001 Inter-Facility Transfer Line Tunnel				
3. P-B001A Inter-Facility Transfer Line Tunnel				
4. P-B002 HLW Drain Vessel Pit				
5. P-B003 Overflow Vessel Pit				
6. P-B004 Future LAW Transfer Line Tunnel				
7. P-0102 HLW Receipt/Storage/Blending Cell				
8. P-0102A HLW Receipt/Storage/Blending Cell				
9. P-0104 Ultrafiltration Cell				
10. P-0106 Feed Evaporator/Ultrafiltration Cell				
11. P-0108 Feed Receipt Cell				
12. P-0108A Feed Receipt Cell				
13. P-0108B Feed Receipt Cell				
14. P-0108C Feed Receipt Cell				

Table 4D-3 Pretreatment Facility Secondary Containment Rooms/Areas

Room/Area	Approximate Room/Area Dimensions (L×W, in feet)	Miscellaneous Treatment Units or Tanks in Room/Area (Largest Plant Item)	Volume of Largest Plant Item in Room/Area (US Gallons)	Minimum Secondary Containment Height (feet)
15. P-0109 Acidic/Alkaline Effluent Collection Cell				
16. P-0111 Cesium Ion Exchange Cell				
17. P-0112 Cesium Eluant Collection Cell				
18. P-0113 Reserved Space				
19. P-0114 Treated LAW Collection Cell				
20. P-0117 Treated LAW Feed Cell				
21. P-0117A Treated LAW Feed Cell				
22. P-0118 Alkaline Effluent Collection Cell				
23. P-0123 Hot Cell				
24. P-0105, P-0105A, P-0105B, P-0105C Process Bulge Areas				
25. P-0119 Spent Resin Dewatering Equipment Room	See *Flooding Volume for Room P-0119 in PT Facility*, 24590-PTF-PER-M-04-005 (DWP Operating Unit Group, Appendix 8.8)			
26. P-0123A Remote Decon Maintenance Cell	See *Flooding Volume for Room P-0123A in PT Facility*, 24590-PTF-PER-M-04-007 (DWP Operating Unit Group, Appendix 8.8)			
27. P-0150 Radioactive Liquid Waste Disposal Area	See *Flooding Volume for Room P-0150 in PT Facility*, 24590-PTF-PER-M-04-008 (DWP Operating Unit Group, Appendix 8.8)			
27. P-0304 Waste Feed Evaporator Condenser Room	See *Flooding Volume for 56 Ft Level in PT Facility*, 24590-PTF-PER-M-04-001 (DWP Operating Unit Group, Appendix 8.8)			
28. P-0320 CNP Evaporator Rectifier Process Area				
29. P-0325 Treated LAW Evaporator Condenser Room				
30. P-0430 CNP Evaporator Condenser Room	See *Flooding Volume for 77 Ft Level for PT Facility*, 24590-PTF-PER-M-04-005 (DWP Operating Unit Group, Appendix 8.8)			

Table 4D-3 Pretreatment Facility Secondary Containment Rooms/Areas				
Room/Area	**Approximate Room/Area Dimensions (L×W, in feet)**	**Miscellaneous Treatment Units or Tanks in Room/Area (Largest Plant Item)**	**Volume of Largest Plant Item in Room/Area (US Gallons)**	**Minimum Secondary Containment Height (feet)**
31. ASX Sampler Cabinets • ASX-SMPLR-00015 (P-0311C) • ASX-SMPLR-00017 (P-0311B) • ASX-SMPLR-00019 (P-0302) • ASX-SMPLR-00020 (P-0301) • ASX-SMPLR-00025 (P-0307)	Secondary containment liners for Isolok flush tubing, no minimum liner height required. The PTF ASX sampler upper secondary containment area liner dimensions are approximately 33” X 34”. The lower containment area liner dimensions are approximately 39” X 68”			
32. Bulges • CRP-BULGE-00001 (P-0317) • CXP-BULGE-00004 (P-0317) • DIW-BULGE-00001 (P-0320) • DIW-BULGE-00002 (P-0430) • PVP-BULGE-00001 (P-0105) • PVP-BULGE-00002 (P-0101A) • PVP-BULGE-00014 (P-0302) • PVP-BULGE-00019 (P-0430) • PVP-BULGE-00020 (P-0303C) • PVP-BULGE-00021 (P-0303B) • TCP-BULGE-00004 (P-0116) • UFP-BULGE-00001 (P-0301) • UFP-BULGE-00002 (P-0301) • UFP-BULGE-00005 (P-0311) • UFP-BULGE-00006 (P-0311A)	Secondary containment for ancillary equipment, no minimum liner height required			

1

Table 4D-4 Pretreatment Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
Pretreatment Facility				
Sumps				
PWD-SUMP-00071 P-B005 (C2/C3 Floor Drain Collection Vessel Room, El. -19')	60	Radar	30" Dia x 18" Deep Epoxy Coating	**24590-PTF** -M6-PWD-00041
PWD-SUMP-00040 P-B002 (Pit-45, El. -45')	210	Bubbler	60"x 30"x 30" Stainless Steel	**24590-PTF** -M6-PWD-00012
PWD-SUMP-00001 P-0108B (Feed Receipt Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00008
PWD-SUMP-00001A P-0108C (Feed Receipt Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00010
PWD-SUMP-00002 P-0108A (Feed Receipt Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00008
PWD-SUMP-00002A P-0108 (Feed Receipt Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00010
PWD-SUMP-00003 P-0106 (Feed Evaporator/Ultra Filtration Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00008
PWD-SUMP-00004 P-0104 (Ultra Filtration Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00008
PWD-SUMP-00005	75	Radar	30" Dia. x 27" Deep	**24590-PTF**

Table 4D-4 Pretreatment Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
P-0102A (HLW Receipt/Blending Cell, El. 0')			Stainless Steel	-M6-PWD-00008
PWD-SUMP-00006 P-0102 (HLW Storage Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00008
PWD-SUMP-00007 P-0109 (Acidic/Alkaline Effluent Collection Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00009
PWD-SUMP-00008 P-0111 (Cs Ion Exchange Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00009
PWD-SUMP-00009 P-0112 (Resin Disposal/CNP Evaporated Process Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00009
PWD-SUMP-00010 P-0113 (Reserved Space, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00009
PWD-SUMP-00011 P-0114 (Treated LAW Collection Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00009
PWD-SUMP-00012 P-0117 (Treated LAW Evaporator Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00009
PWD-SUMP-00013 P-0117A (Treated LAW Concentrated Storage Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00010
PWD-SUMP-00026 P-0123 (Hot Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00014

Table 4D-4 Pretreatment Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
PWD-SUMP-00028 P-0123 (Hot Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00014
PWD-SUMP-00029 P-0123 (Hot Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00014
PWD-SUMP-00031 P-0119 (Spent Resin Dewatering Equipment Room, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00010
PWD-SUMP-00032 P-0123A (Remote Decon Maint Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00010
PWD-SUMP-00033 P-0123A (Remote Decon Maint Cell, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00010
PWD-SUMP-00034 P-0121A (Spent Resin Dewatering, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00012
PWD-SUMP-00035 P-0122A (Waste Packaging Area, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00012
PWD-SUMP-00036 P-0118 (Alkaline Effluent Collection, El. 0')	75	Radar	30" Dia. x 27" Deep Stainless Steel	**24590-PTF** -M6-PWD-00012
PWD-SUMP-00037 P-0124A (Decon Booth Sump, El. 0")	7.5	Radar	72" x 12" x 2" Deep Stainless Steel	**24590-PTF** -M6-PWD-00012
RLD-SUMP-00003 P-0150 (Radioactive Liquid Waste Disposal Area, El. 0', outdoor)	583	Radar	78" x 48" x 36" Deep Epoxy coating	**24590-PTF** -M6-RLD-00002003

Table 4D-4 Pretreatment Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
PWD-LDB-00001 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050
PWD-LDB-00002 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050
PWD-LDB-00003 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050
PWD-LDB-00004 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050
PWD-LDB-00005 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050
PWD-LDB-00006 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050
PWD-LDB-00007 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050

Table 4D-4 Pretreatment Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
PWD-LDB-00008 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050
PWD-LDB-00009 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050
PWD-LDB-00010 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050
PWD-LDB-00011 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00050
PWD-LDB-00012 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00051
PWD-LDB-00013 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00051
PWD-LDB-00014 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00051

Table 4D-4 Pretreatment Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
PWD-LDB-00015 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length Stainless Steel	**24590-PTF** -M6-PWD-00051
PWD-LDB-00016 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00051
PWD-LDB-00017 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00051
PWD-LDB-00018 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00051
PWD-LDB-00019 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	6	Thermal Dispersion	8" Dia. x 24" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00051
RLD-LDB-00012 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	9	Thermal Dispersion	8" Dia. x 34" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00058
RLD-LDB-00013 P-B001 (Inter Facility Transfer Line Tunnel, El. -45')	9	Thermal Dispersion	8" Dia. x 34" Length/ Stainless Steel	**24590-PTF** -M6-PWD-00058

Table 4D-4 Pretreatment Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
PVP-ZY-00037-S11B-03, PVP-BULGE-00001 Drain Line P-0105 (El. 0')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-PVP-00017002
PVP-ZY-00036-S11B-03, PVP-BULGE-00002 Drain Line P-0101A (El. 0')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-PVP-00018002
TCP-ZF-00032-S11B-03, TCP-BULGE-00004 Drain Line P-0116 (El. 0')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-TCP-00001002
DIW-ZF-01511-S11B-03, DIW-BULGE-00001 Drain Line P-0320 (El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-DIW-00004001
DIW-ZF-01511-S11B-03, DIW-BULGE-00002 Drain Line P-0320 (El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-DIW-00004001
CRP-ZF-00002-S11B-03, CRP-BULGE-00001 Drain Line P-0317 (El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-CXP-00003001
CXP-ZF-00012-S11B-03, CXP-BULGE-00004 Drain Line P-0317 (El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-CXP-00003003
UFP-ZF-00043-S11B-03, UFP-BULGE-00001 Drain Line P-0301 (El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-UFP-00016001

Table 4D-4 Pretreatment Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
UFP-ZF-00042-S11B-03, UFP-BULGE-00002 Drain Line P-0301 (El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-UFP-00017001
UFP-ZY-00002-S11B-03, UFP-BULGE-00005 Drain Line P-0311 (El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-UFP-00031001
UFP-ZY-00001-S11B-03, UFP-BULGE-00006 Drain Line P-0311A (El. 56')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-UFP-00032001
Floor Drains/Lines				
PWD-FD-00005/PWD-ZF-03000-S11B-06 Floor Drain/Line P-0123 (Hot Cell, El. 0')	N/A	N/A	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00011
PWD-FD-00006/PWD-ZF-03001-S11B-06 Floor Drain/Line P-0123 (Hot Cell, El. 0')	N/A	N/A	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00011
PWD-FD-00435 Floor Drain P-0105 (Ultra Filtration Process Area, El. 0')	N/A	NA	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044
PWD-FD-00349 Floor Drain P-0105 (Ultra Filtration Process Area, El. 0')	N/A	NA	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044
PWD-FD-00436 Floor Drain P-0105 (Ultra Filtration Process Area, El. 0')	N/A	NA	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044

Table 4D-4 Pretreatment Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
PWD-FD-00438 Floor Drain P-0105A (Feed Evaporation Ultra Filtration Process Area, El. 0')	N/A	NA	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044
PWD-FD-00348 Floor Drain P-0105A (Feed Evaporation Ultra Filtration Process Area, El. 0')	N/A	N/A	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044
PWD-FD-00437 Floor Drain P-0105B (Feed Receipt Process Area, El. 0')	N/A	N/A	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044
PWD-FD-347 Floor Drain P-0105B (Feed Receipt Process Area, El. 0')	N/A	N/A	6" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044
PWD-FD-346 Floor Drain P-0105C (Feed Receipt Process Area, El. 0')	N/A	N/A	4" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00044
Autosampler Drain Lines				
ASX-ZF-00013-S11B-03 ASX Sampler 00017 Lower Containment Drain Line (P-0311B, El. 56')	N/A	Thermal Dispersion	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00007001
ASX-ZF-00015-S11B-03 ASX Sampler 00019 Lower Containment Drain Line (P-0302, El. 56')	N/A	Thermal Dispersion	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00007001
ASX-ZF-00016-S11B-03 ASX Sampler 00020 Lower Containment Drain Line (P-0301, El. 56')	N/A	Thermal Dispersion	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00007001

Table 4D-4 Pretreatment Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
ASX-ZF-00027-S11B-03 ASX Sampler 00025 Lower Containment Drain Line (P-0307, El. 56')	N/A	Thermal Dispersion	3" Dia. Stainless Steel	**24590-PTF** -M6-PWD-00007001

Table 4D-5 Pretreatment Facility Containment Buildings Summary	
Location	**Approximate Room Dimensions (L × W × H in feet)**
Pretreatment Facility	
1. P-0123 Hot Cell	350 × 51 × 52
2. Pretreatment Maintenance Containment Building:	
PM0124 Hot Cell Crane Maintenance Mezzanine	27 × 51 × 33
P-0121A Spent Resin Dewatering	28 × 18 × 28
P-0122A Waste Packaging Area	26 × 51 × 28
P-0123A Remote Decontamination Maintenance Cell	55 × 51 × 52
P-0124 C3 Workshop	34 × 24 × 15
P-0124A C3 Workshop	(73 × 15 × 15) + (16 × 15 × 15)
P-0125 Cask Lidding Airlock & Equipment Chase	24 × 20 × 28
P-0125A Cask Lidding Room	28 × 18 × 25
P-0128A MSM Repair Area	24 × 18 × 28
P-0128 MSM Testing Room	24 × 17 × 27
3. P-0223 Spent Filter Drum Handling Area	54 × 18 × 26
4. P-0335 Filter Cave	198 × 51 × 52
5. P-0431A PJV Secondary HEPA Filter Room Containment Building	93 × 35 × 20

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 4E
LOW-ACTIVITY WASTE (LAW) VITRIFICATION FACILITY

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
12/15/2016	8C.2016.Q3

This page intentionally left blank.

APPENDIX 4E
LOW-ACTIVITY WASTE (LAW) VITRIFICATION FACILITY

This page intentionally left blank.

APPENDIX 4E
LOW-ACTIVITY WASTE (LAW) VITRIFICATION FACILITY

TABLE OF CONTENTS

4E Low-Activity Waste (LAW) Vitrification Facility 5
4E.1 Containers 6
4E.1.1 Description of Containers 6
4E.1.2 Container Management Practices 7
4E.1.3 Container Labeling 10
4E.1.4 Containment Requirements for Storing Waste 10
4E.1.5 Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes in Containers 12
4E.2 Tank Systems 12
4E.2.1 LAW Melter Feed Process 12
4E.2.2 LAW Melter Process System (LMP) 15
4E.2.3 Radioactive and Nonradioactive Liquid Waste Disposal (RLD and NLD) Systems 17
4E.2.4 Radioactive Solid Waste Handling (RWH) System 18
4E.2.5 ILAW Glass Container Handling 19
4E.2.6 LAW Melter Equipment Support Handling (LSH) System 24
4E.2.7 LAW Melter Handling (LMH) System 24
4E.3 Containment Buildings 25
4E.3.1 LAW LSM Gallery Containment Building (L-0112) 25
4E.3.2 LAW Container Finishing Line Containment Building (L-0109B, L-0109C, L-0109D, L-0109E, L-0115B, L-0115C, L-0115D, L-0115E) 27
4E.3.3 LAW Consumable Import/Export Containment Building (L-0119B) 29
4E.3.4 LAW C3 Workshop Containment Building (L-0226A) 31
4E.3.5 LAW Pour Cave Containment Building (L-B009B, L-B011B, L-B011C, L-B013B, L-B013C, L-B015A) 33
4E.3.6 LAW Container Buffer Storage Containment Building (L-B025C, L-B025D) 35
4E.4 Air Emission Control 37
4E.4.1 LAW Vitrification Facility Ventilation 37
4E.4.2 LAW Melter Offgas System 38

TABLES

Table 4E-1 LAW Vitrification Facility Tank Systems 47
Table 4E-2 LAW Vitrification Facility Miscellaneous Units (Systems and Sub-Systems) 49
Table 4E-3 LAW Vitrification Facility Secondary Containment Rooms/Areas 52
Table 4E-4 LAW Vitrification Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines 53
Table 4E-5 LAW Vitrification Facility Containment Buildings Summary 56

4E Low-Activity Waste (LAW) Vitrification Facility

The purpose of this appendix is to describe the major systems associated with the LAW vitrification facility. Figure 4A-3 located in Appendix 4A presents a simplified process flow diagram of the LAW vitrification processes. This facility will consist of several process systems designed to perform the following functions:

- Receive and store pretreated LAW feed.
- Convert blended LAW feed and glass formers into glass.
- Provide melter offgas treatment systems.
- Treat melter offgas.
- Handle Immobilized Low Activity Waste (ILAW) containers.
- Store ILAW containers.
- Provide supporting equipment in the melter gallery.
- Handle miscellaneous waste.
- Ventilate the LAW vitrification facility.

The following figures located in Appendix 4A and drawings found in Dangerous Waste Permit (DWP) Operating Unit Group 10, Appendix 9, provide additional detail for the LAW vitrification facility:

- Simplified flow diagrams for the Waste Treatment Plant (WTP) and the LAW vitrification facility.
- Process flow figures and drawings for process information.
- Typical system figures depicting common features for each regulated system.
- General arrangement figures and drawings showing locations of regulated equipment.
- Waste management area figures and drawings showing facility locations to be permitted.

Instrumentation, alarms, controls, and interlocks will be provided for the tank systems and miscellaneous treatment unit sub-systems to indicate or prevent the following conditions, as appropriate:

- Overfilling: Plant items are protected against overfilling by liquid level indication, high level instrumentation interlocks to shut off feed sources, and process control system control functions backed up by hard wired trips as required.
- Loss of containment: Plant items are protected against containment loss by liquid level indication, and by process control system control and alarm functions as required, including shut off of feed sources. Tanks or miscellaneous units (MUs) that manage liquid mixed or dangerous waste is provided with secondary containment. Ancillary equipment and miscellaneous unit ancillary equipment is provided with secondary containment or is visually inspected for leaks on a daily basis in accordance with Washington Administrative Code (WAC) 173-303-640(4)(f). Some LAW tanks or MUs utilize daily visual inspection for leak detection. Sumps associated with the management of mixed or dangerous waste are provided with liquid level instrumentation and an ejector or pump to empty the sump as needed.
- Inadvertent transfers of fluids: System sequential operations are properly interlocked to prevent inadvertent transfers at the wrong time or to the wrong location.
- Loss of mixing function: Tank systems are instrumented (air pressure/flow indication) to prevent hydrogen accumulation and solids settling. Tanks with agitators are instrumented to prevent agitator and/or vessel damage at low liquid level.
- Unsafe or off-normal melter operating conditions.
- Degraded emissions control equipment and/or operating conditions.

- Loss of air flow: The ventilation systems are designed to create a pressure gradient which causes air to flow through engineered routes from an area of lower contamination potential to an area of higher contamination potential.
- Loss of site power.

In addition to level control, temperature and pressure may be monitored for tank systems and miscellaneous treatment unit systems in some cases. Additional information may be found in the system logic descriptions located in DWP Operating Unit Group 10, Appendix 9.13. Regulated process and leak detection system instruments and parameters will be provided in DWP Table III.10.E.F for tank systems and in DWP Table III.10.H.C for miscellaneous treatment unit sub-systems.

Descriptions of the LAW vitrification process, melter offgas treatment systems, and ILAW glass container handling systems are provided in Sections 4E.2 through 4E.4. Table 4E-1 lists current tank design information (capacity, materials of construction, and dimensions). Table 4E-2 lists the current miscellaneous unit design information. The tanks and miscellaneous units are grouped by process systems in these tables.

Tanks or miscellaneous units that manage liquid mixed or dangerous waste are provided with secondary containments. Table 4E-3 summarizes the secondary containment rooms/areas and calculated minimum liner heights. Sumps, leak detection boxes, and secondary containment drain systems are listed in Table 4E-4.

4E.1 Containers

This section identifies the containers and container management practices that will be followed at the LAW vitrification facility. The term "container" is used as defined in WAC 173-303-040. Note that in this appendix and throughout the permit, terms other than containers may be used, such as canisters, boxes, bins, flasks, casks, and overpacks.

The following sections address waste management containers:

- Description of Containers - Section 4E.1.1
- Container Management Practices - Section 4E.1.2
- Container Labeling - Section 4E.1.3
- Containment Requirements for Storing Waste - Section 4E.1.4
- Prevention of Ignitable, Reactive, and Incompatible Wastes in Containers - Section 4E.1.5

4E.1.1 Description of Containers

These types of waste will be managed in containers:

- ILAW (immobilized glass)
- Miscellaneous mixed waste (secondary waste)
- Miscellaneous nonradioactive dangerous waste (secondary waste)

The waste form dictates the type of containers used for waste management. The following paragraphs describe these types of containerized waste that are managed at the LAW vitrification facility.

Immobilized Glass Waste

The immobilized glass waste is a mixed waste that will be managed in ILAW containers specially designed to remain stable during receipt of glass waste, and which are capable of remote handling.

The ILAW containers will be approximately 90 inches (in.) high and 48 in. in diameter, with a wall thickness of approximately 0.187 in. and a nominal capacity of 90 cubic feet (ft^3). ILAW containers will be constructed of austenitic (304L) stainless steel.

Miscellaneous Mixed Waste

Generally, miscellaneous mixed wastes are secondary wastes that may include, but are not limited to, the following items:

- Spent or failed equipment
- Offgas High Efficiency Particulate Air (HEPA) filters
- Melter consumables
- Spent melters

Spent equipment and offgas filters will typically be managed in commercially-available containers such as steel drums or steel boxes, of varying size. The containers for miscellaneous mixed waste will comply with transportation requirements, with receiving treatment, storage, and disposal (TSD) facility waste acceptance criteria, and will be compatible with the miscellaneous mixed waste. These containers may or may not include a liner. Final container selection, container and waste compatibility, and the need for liners, will be based on the physical, chemical, and radiological properties of the waste being managed.

Melter consumables are routinely generated wastes and include spent feed tubes, pressure transducers, bubblers, thermocouples, and discharge risers. LAW melter consumables will be placed into approved disposal containers of varying size.

The LAW Locally Shielded Melter (LSM) will be classified as hazardous debris for land disposal restrictions purposes. After a spent melter is deemed to meet criteria and regulations for onsite disposal, it will be placed in a welded carbon steel container (overpack) or other acceptable packaging in accordance with waste acceptance criteria for the receiving TSD facility. Regulatory issues and permitting actions associated with onsite disposal of spent and/or failed melters will be addressed in the future.

Each miscellaneous mixed waste container will have associated documentation that describes the contents, such as waste type, physical and chemical characterization, and radiological characterization. This information will be retained within the plant information network.

Most miscellaneous secondary mixed wastes will be spent equipment and consumables such as pumps, air lances, HEPA filters, etc., and are not expected to contain liquids. If wastes are generated that contain liquids, these wastes may be treated to remove or absorb liquids, to comply with the receiving TSD facility waste acceptance criteria.

Miscellaneous Nonradioactive Dangerous Waste

Each nonradioactive dangerous waste container will have associated documentation that describes the contents, such as waste type and physical and chemical characterization. Typically, commercially available containers will be used. The types of containers used for packaging nonradioactive dangerous waste will comply with the receiving TSD facility waste acceptance criteria and transportation requirements. However, final container selection, container and waste compatibility, and the need for liners will be based on the physical and chemical properties of the waste being managed.

4E.1.2 Container Management Practices

The following paragraphs describe how each of the containers used at the LAW vitrification facility are managed.

4E.1.2.1 Immobilized Glass Waste Containers

Immobilized glass waste ILAW containers will be moved remotely due to the high radiation content of the waste. A brief discussion of how the containers move through the WTP is presented below.

ILAW Containers

An empty container will be transported to a LAW glass pour cave and placed on a turntable designed to hold three containers. There are two LAW pour caves at each melter, each with the capacity to manage three containers at a time. The container will be sealed to the melter discharge with a pour head connection. The glass waste will fill the container during the course of approximately 10 hours.

The filled ILAW container will be lowered back onto the turntable. The filled container will cool for 10 to 30 hours to reach glass transition temperature (approximately 400°C to 500°C), which characterizes the transformation from an equilibrated melt to a "frozen" glass structure. At this stage, the waste glass does not contain liquid and is in a viscous state that ultimately stabilizes to a solid. Once the container has cooled, it will be rotated to the transfer position. The container will then be lifted by a remotely operated monorail hoist, moved to the transfer tunnel, lowered onto a container transfer bogie, and transported to a position within the transfer tunnel below the finishing line. In the event the finishing line becomes backed up, the container may be transported to the LAW container buffer storage containment building. The containers will not be stacked.

The container will be transported to the LAW container finishing line (see Section 4E.3), where the level of waste glass will be measured and additional inert filler will be added, if needed.

A sample of the glass may also be collected in this location prior to inert filling. Glass within the neck of the container will be removed by abrasion and the lid will be attached to the container. The debris generated from residual glass removal will be collected with a vacuum system and disposed of as a secondary waste.

After the lid is mechanically sealed, the container will be moved to the decontamination cell where contamination will be removed. Using a turntable, the container will revolve while a power manipulator tracks the entire surface with decontamination equipment. The dry decontamination process will use carbon dioxide pellets. The container will then be transported to the swabbing cell, where its surface will be swabbed. The radiation levels of the swab will be remotely monitored, and the results will determine whether the ILAW container will be ready for transportation to the disposal site, or go through decontamination again.

Other ILAW Container Storage Requirements

As stated in WAC 173-303-630(5)(c), a 30 in. separation is required between aisles of containers holding dangerous waste. In addition, WAC 173-303-340(3) requires a 30 in. separation to allow unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment in an emergency.

Evaluation of the 30-in. aisle spacing requirement by the United States Department of Energy (DOE), WTP, the United States Environmental Protection Agency (EPA), and the Washington State Department of Ecology (Ecology) for ILAW containers concluded that aisle spacing in the range of 4 to 16 in. was adequate based on the following factors:

- Personnel access into the immobilized glass canister storage cave will be restricted. High radiation dose rates from immobilized glass waste canisters will preclude personnel entry into the process and storage areas, and inspection of the ILAW containers will be performed remotely. (See Operating Unit Group 10, Chapter 6.0 for the inspection approach.)
- Water-based fire suppression systems will not be used in the ILAW container buffer storage containment building. Because of its inert nature, the glass waste will present a low fire hazard, and a minimal amount of combustible material will be present. The only potentially combustible material that may be present in the immobilized glass waste canister storage cave is insulation on crane motors and associated cables. To ensure no water is introduced into the canister storage cave, a dry chemical fire suppressant system may be installed.

- Spill control equipment will not be necessary within the ILAW container buffer storage containment building. Spills or leaks from the stored canisters will not occur because the glass waste will be in a solid form and will not contain free liquid. The glass transition temperature characterizes the transformation from an equilibrated melt to a "frozen" glass structure.

The ILAW containers will be stored in a storage rack to allow airflow. No stacking of the ILAW containers will occur. Closed circuit television cameras will enable general viewing of both areas.

Miscellaneous Nonradioactive Dangerous Waste Containers

Miscellaneous dangerous waste containers will typically be managed in non-permitted waste management units (satellite accumulation areas and less-than-90-day storage areas) located throughout the LAW vitrification facility. Containers will be kept closed unless waste is being added, removed, or sampled. They will routinely be moved by forklift or drum cart, and will be managed in a manner that prevents ruptures and leaks.

4E.1.2.2 Waste Tracking

The plant information network interfaces with the integrated control network and is designed to collect and maintain plant information. The plant information network is currently planned to the following systems (all systems used at the plants/facilities and balance of facilities are provided for information only):

- Plant data warehouse and reporting system
- Laboratory information management system
- Waste tracking and inventory system

Inventory and Batch Tracking

The waste tracking and inventory system will interface with the information system data historian to provide reporting information such as tank volumes, waste characteristics, and facility inventories of process waste. The waste tracking system will also be used to query operations parameters at any time information is needed, as specified by operations, to manage the process system. ILAW containers will be tracked within the facility using an operations developed system: for example, manually recording on a board, manually inputting into the information network, or if available, automated through the integrated control network.

Secondary Waste Stream Tracking

Containerized secondary waste streams and equipment will be tracked and managed through commercially available database management software. Containers will be mapped in each plant and updated during the inspection process using a commercially available drawing software application.

Laboratory Information Management System

The laboratory information management system (LIMS) will be an integral feature of the plant information network. The LIMS will serve as an essential tool for providing data management of regulatory and processing samples. The chosen LIMS will be a commercial off-the-shelf software package designed for performing laboratory information management tasks as described in American Standard Test Method (ASTM) E1578-93, *Standard Guide for Laboratory Information Management Systems (LIMS)*.

The LIMS will track the flow of samples through the laboratory. Samples received in the laboratory will be identified with a unique identification label. The identification label provides details of the sample process stream. Baseline analyses are defined by the requesting plant. Additional analyses, as required, will be input into LIMS by laboratory analysts. Data will be input into LIMS manually or by data transfer

using LIMS/instrument interface. Analyses will be performed using approved and validated analytical procedures.

Analytical results will be compiled by the LIMS and held pending checking and approval by appropriate staff. Approved results will be reported to the requesting plant.

4E.1.3 Container Labeling

Immobilized Waste Glass Containers

Due to the radioactivity and handling requirements of the immobilized waste containers, conventional labeling of the immobilized waste containers will not be feasible and an alternative to the standard labeling requirements will be used. This alternative labeling approach will use a unique numeric identifier for the ILAW container that will be welded onto each immobilized glass waste container.

The welded "identifier" will ensure that the number is always legible, will not be removed or damaged during container handling, will not be damaged by heat or radiation, emits no gas upon heating when waste glass enters the container, and will not degrade over time.

The identifier will be welded onto the shoulder and side wall of each immobilized glass container at two locations approximately 180 degrees apart. Characters will be approximately 2 in. high by 1.5 in. wide. The identifier will be formed by welding on stainless steel filler material at the time of container fabrication. This identifier will be used to track the container from receipt at the WTP, throughout its subsequent path at the WTP, until it leaves the plant to be disposed or stored.

Each identifier will be unique. This unique number will be maintained within the plant information network and will list data pertaining to the waste container including waste numbers and the major risk(s) associated with the waste.

Personnel access into the immobilized glass waste container storage areas will be limited and controlled administratively. Signs designating the hazards associated with the immobilized waste glass will be posted at appropriate locations outside the container storage areas.

Miscellaneous Mixed Waste Containers

The miscellaneous mixed waste containers will be labeled with the accumulation or generation start date, as appropriate, the major risk(s) associated with the waste, and the words "hazardous waste" or "dangerous waste." A waste tracking and inventory system will be implemented. Labels and markings will be positioned so that required information is visible. The label will meet the WAC 173-303-630(3) requirements, and the dangerous waste number will be clearly identified.

The labels on the overpack for the spent melters will carry the accumulation or generation start date, the major risk(s) associated with the waste, and the words "hazardous waste" or "dangerous waste". A waste tracking and inventory system will be implemented. Labels and markings will be positioned so that required information is visible, and the dangerous waste number will be clearly identified.

Miscellaneous Dangerous Waste Containers

The miscellaneous dangerous waste drums will be labeled with the accumulation or generation start date, as appropriate, the major risk(s) associated with the waste, and the words "hazardous waste" or "dangerous waste". A waste tracking and inventory system will be implemented. Labels and markings will be positioned so that required information is visible. The label will meet the WAC 173-303-630(3) requirements, and the dangerous waste number will be clearly identified.

4E.1.4 Containment Requirements for Storing Waste

Secondary containment requirements for the waste are discussed below.

4E.1.4.1 Secondary Containment System Design

Secondary containment is required for areas in which containers hold free liquids. It is also required for areas managing wastes exhibiting the characteristics of ignitability or reactivity as defined in WAC 173-303-090(5) and (7).

Miscellaneous Mixed Waste

Miscellaneous mixed waste storage areas may contain waste requiring secondary containment. If wastes containing liquids or wastes exhibiting the characteristics of ignitability or reactivity are generated, portable secondary containment that meets the requirements of WAC 173-303-630(7) will be provided.

Miscellaneous Dangerous Waste

Miscellaneous dangerous waste storage areas may contain waste requiring secondary containment. If wastes containing liquids or wastes exhibiting the characteristics of ignitability or reactivity are generated, portable secondary containment that meets the requirements of WAC 173-303-630(7) will be provided.

4E.1.4.2 System Design (Reserved)

Miscellaneous Dangerous Waste

Containers with liquids will be provided with portable secondary containment meeting the requirements of WAC 173-303-630(7).

4E.1.4.3 Structural Integrity of the Base

The storage areas will be constructed to support storage and transportation of containers within the container storage areas and will be designed with the following:

- Containment system capable of collecting and holding spills and leaks.
- Base will be free of cracks and gaps and sufficiently impervious to contain leaks.
- Positive drainage control.
- Sufficient containment volume.
- Sloped to drain or remove liquid, as necessary.

4E.1.4.4 Containment System Capacity

Miscellaneous Mixed Waste

Each container holding liquid dangerous waste will be placed into portable secondary containment that meets the requirements of WAC 173-303-630(7). The waste container will function as the primary containment while the portable containment device will function as the secondary containment.

Each portable secondary containment will have the capacity to contain 10% of the volume of all containers within the containment area, or the volume of the largest container, whichever is greater.

Miscellaneous Dangerous Waste

Each container holding liquid nonradioactive dangerous waste will be placed into portable secondary containment. The waste container will function as the primary containment while the portable sump will function as the secondary containment.

Each portable secondary containment will have the capacity to contain 10% of the volume of all containers within the containment area, or the volume of the largest container, whichever is greater. Typically, the waste containers will be steel drums.

4E.1.4.5 Control of Run-On

Miscellaneous Mixed Waste

Run-on will not reach the interior of the miscellaneous mixed waste storage areas, because they will be located within buildings, which will have roof gutters to remove precipitation.

Miscellaneous Dangerous Waste

Run-on will not reach the interior of the miscellaneous dangerous waste storage areas, because waste will be managed in buildings with walls and roof to remove precipitation.

4E.1.4.6 Removal of Liquids from Containment System

Miscellaneous Mixed Waste

Portable secondary containment sumps will be provided for individual containers that contain liquids. Hand pumps or similar devices will be used to remove liquid released to the portable secondary containments.

Miscellaneous Dangerous Waste

Portable secondary containment sumps will be provided for individual containers that contain liquids. Hand pumps or similar devices will be used to remove liquid released to the portable secondary containments.

4E.1.4.7 Demonstration that Containment is not Required because Containers do not Contain Free Liquids, Wastes that Exhibit Ignitability or Reactivity, or Wastes Designated F020-023, F026 or F027

Miscellaneous Mixed Waste

Secondary containment will be provided for individual containers that manage liquids. Wastes with the F020-F023, F026, and F027 numbers are not identified for the double shell tank (DST) system. Therefore, these waste numbers will not be present at the LAW vitrification facility.

Miscellaneous Dangerous Waste

Wastes with the F020-F023, F026, and F027 numbers are not identified for the DST system. Therefore, these waste numbers will not be present at the LAW vitrification facility.

4E.1.5 Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes in Containers

Ignitable, Reactive, or Incompatible Miscellaneous Mixed Waste and Miscellaneous Dangerous Waste

Potentially incompatible wastes are not expected to be managed in the miscellaneous mixed waste storage areas. If such wastes are managed in one of these areas, the containers of incompatible waste or chemicals will not be stored in close proximity to each other. Acids and bases will be stored on separate portable secondary containment sumps; oxidizers will be stored in areas separate from combustible materials; and corrosive chemicals will be stored on a separate secondary containment sump. These separate storage areas within the unit will be clearly marked with signs indicating the appropriate waste to be stored in each area. Potentially incompatible waste will be stored at least one aisle width apart.

4E.2 Tank Systems

4E.2.1 LAW Melter Feed Process

The LAW melter feed consists of the following systems:

- LAW concentrate receipt process system (LCP)
- LAW melter feed process system (LFP)
- Glass former reagent system (GFR) (the GFR system does not manage dangerous waste and is provided for information only)

Process flow diagram of the LAW Concentrate Receipt Process (LCP) System and the LAW Melter Feed Process (LFP) System are provided in DWP Operating Unit Group 10, Appendix 9.1. The LCP and LFP systems prepare feed for the LAW melters to produce a vitrified product. An analysis of the waste determines a glass additive formulation for the conversion of the waste to glass. The glass additives specified in the formulation are weighed and mixed with the waste. There are two melter feed trains to supply the two LAW melters. Each melter feed train consists of a melter concentrate receipt vessel, a melter feed preparation vessel, and a melter feed vessel.

The LCP system includes the melter concentrate receipt vessels. The LFP system includes the melter feed preparation vessel and the melter feed vessel for each of the two melters.

The LCP tank system consists of the following tanks and their associated ancillary equipment:

- Melter Concentrate Receipt Vessels (LCP-VSL-00001/2)

The LFP tank system consists of the following tanks and their associated ancillary equipment:

- Melter Feed Preparation Vessels (LFP-VSL-00001/3)
- Melter Feed Vessels (LFP-VSL-00002/4)

Melter Concentrate Receipt Vessels (LCP-VSL-00001/2)

DWP Operating Unit Group 10, Appendix 9.1 contains a process flow diagram of the Melter Concentrate Receipt Vessels (LCP-VSL-00001/2). The Melter Concentrate Receipt Vessels receive melter feed concentrate from the pretreatment facility. The Melter Feed Preparation Vessels are located in two process cells, and each process cell contains a Melter Concentrate Receipt Vessel, a Melter Feed Preparation Vessel, and a Melter Feed Vessel. The vessels are equipped with the following:

- Mechanical agitator
- Pumps to transfer LAW concentrate
- Instrumentation for liquid level
- Internal spray wash nozzles
- Overflow nozzle to C3/C5 Drains/ Sump Collection Vessel (RLD-VSL-00004)
- Spare nozzles

Valves are located in valve bulges LCP-BULGE-00001/2/3. Valving in LCP-BULGE-00001 receives LAW concentrate from the PTF and directs it to the LAW Concentrate Receipt Vessels (LCP-VSL-00001/2). Valving in bulges LCP-BULGE-00001/3 allows the LAW concentrate to be routed to the Melter Feed Preparation Vessels (LFP-VSL-00001/3), or to the Plant Wash Vessel (RLD-VSL-00003) if the Melter Concentrate Receipt Vessels (LCP-VSL-00001/2) are being cleaned out or if the contents of the vessels cannot be satisfactorily processed. In addition, LAW concentrate can be transferred between the two Melter Concentrate Receipt Vessels (LCP-VSL-00001/2), or directs it to the Autosampling System (ASX) system for sampling (ASX-SMPLR-00012/13).

Glass Former Reagent (GFR) System

The GFR system contains the glass former feed mixers that receive blended glass formers and sucrose by dense-phase pneumatic conveyors from the glass former system.

The feed mixers are equipped with filters to remove the dust from air used for pneumatic conveying and blending. A series of single filter cartridges will be mounted on the top of the mixers. The filters are cleaned by introducing compressed air through the cleaning nozzle to blow accumulated dust back into the hoppers.

The feed mixers are equipped with load cells to weigh the glass formers to confirm that the material in the upstream blending silo is conveyed to the feed hoppers and to confirm that the glass formers are transferred out of the feed hoppers to the Melter Feed Preparation Vessels.

The glass formers are gravity-fed with a rotary feeder into the Melter Feed Preparation Vessels, where the glass formers are mixed with the waste feed. This equipment is located in an isolated area that serves as a contamination barrier between the melter feed preparation vessels and the glass former supply. The rotary valve controls the rate of glass former addition into the melter feed preparation vessels.

Melter Feed Preparation Vessels (LFP-VSL-00001/3)

DWP Operating Unit Group 10, Appendix 9.1 contains a process flow diagram of the Melter Feed Preparation Vessels (LFP-VSL-00001/3). The Melter Feed Preparation Vessels mix LAW concentrate from the Melter Concentrate Receipt Vessels (LCP-VSL-00001/2) with glass formers and sucrose from the glass former feed hoppers. The vessels are equipped with the following:

- Mechanical agitator
- Pumps
- Instrumentation for liquid level measurement
- Internal spray wash nozzles
- Overflow nozzle to the C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004)
- Spare nozzles

The Vessel pumps LFP-PMP-00001A/B and LFP-PMP-00003A/B transfer wastes using valve bulges LFP-BULGE-00001/2. Valves in the bulge allow melter feed to be routed to the associated Melter Feed Vessel (LFP-VSL-00002/4) or to the Plant Wash Vessel (RLD-VSL-00003) if the Melter Feed Preparation Vessels (LFP-VSL-00001/3 are being cleaned out. The vessel contents can be circulated through the pump and injected back into the vessel in the recirculation mode. In addition, melter feed can be pumped between the two Melter Feed Preparation Vessels (LFP-VSL-00001/3), or directs it to the ASX system for sampling (ASX-SMPLR-00012/13).

Melter Feed Vessels (LFP-VSL-00002/4)

DWP Operating Unit Group 10, Appendix 9.1 contains a process flow diagram of the Melter Feed Vessels (LFP-VSL-00002/4). The Melter Feed Vessels receive blended melter feed, consisting of LAW concentrate and glass formers, from the Melter Feed Preparation Vessels (LFP-VSL-00001/3). The vessels are equipped with the following:

- Mechanical agitator
- Air displacement supply (ADS) pumps to transfer feed to the corresponding LAW melter
- Feed vessel pump
- Instrumentation for liquid level measurement
- Miscellaneous solution addition line
- Internal spray wash nozzles
- Overflow nozzle to the C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004)
- Spare nozzles

The feed vessel pumps (LFP-PMP-00002/4) transfer waste feed through the valve bulges LFP-BULGE-00001/2. Valving in the bulges allows the waste feed to be pumped between all four vessels: the two Melter Feed Preparation Vessels (LFP-VSL-00001/3) and the two Melter Feed Vessels (LFP-VSL-00002/4). Waste feed can also be transferred from the Melter Feed Vessels to the Plant Wash Vessel (RLD-VSL-00003) for vessel cleanout, or directs it to the ASX system for sampling (ASX-SMPLR-00012/13). Normally, ADS pumps transfer the melter feed from the melter feed vessel to the melter.

4E.2.2 LAW Melter Process System (LMP)

Figure 4A-21 located in Appendix 4A presents a simplified process flow diagram of the LAW Melter Process (LMP) System. DWP Operating Unit Group 10, Appendix 9.1 contains a process flow diagram of the LAW Melter Process System (LMP). The purpose of the LMP system is to convert a blended slurry of liquid LAW feed and glass former additives into a durable ILAW product.

The locally shielded LAW melter system design is based on operating two joule-heated melters located in a C3 environment. The melters are equipped with ceramic refractory that has two unique sections. These sections are the refractory in contact with the molten glass pool (glass pool refractory), and the refractory surrounding the gas space above the glass pool (plenum refractory). Glass pool refractory is designed to withstand corrosion from molten glass. The plenum is lined with refractory designed to withstand hot corrosive gases, thermal shock, and glass and feed splatter. Key functions of LMP include containment, joule heated melting, melter feed, and glass discharge.

Miscellaneous Treatment Unit Sub-Systems

- LAW Melters (LMP-MLTR-00001/2)

The LAW Melters (Appendix 4A, Figure 4A-48) have a nameplate capacity of 15 metric tons of glass per melter per day. Each LAW Melter has a single internal glass chamber with a rectangular surface area. The melter is powered by three pairs of electrodes that are mounded opposite each other along the long axis of each melter. The glass is discharged through either of two discharge chambers located within one of the long axis walls of the melter. The lid of the melter is composed of layers of refractory backed by a corrosion-resistant metal plate and support structure. The lid also supports the components that are submerged in the melt pool and suspended in the melter plenum. The melter is encased in an integral shielding and secondary containment enclosure.

The refractory is part of the melter containment and can be described as two separate sections. These sections are the refractory in contact with the molten glass pool and the refractory surrounding the gas space above the glass pool, which is referred to as the plenum. The glass pool refractory, used in conjunction with active cooling provided by a water jacket, will provide glass containment, thermal insulation, and electrical isolation. The plenum refractory is primarily designed to resist thermal breakdown, resist corrosion by offgases, and resist corrosion by splashed feed and glass.

The melter shell is comprised of the base, walls, lid, and gas barrier plates structurally supported by the enclosure. The melter shell inner surface is designed to allow operation of the melter at a negative pressure. This inner surface will also minimize the release of melter gases and contaminants in the event of melter pressurization. A small air purge will be provided for the annular space between the cooling panels and the shell to reduce the deposition of materials. This purge will be driven by melter vacuum.

The LAW melter system has been designed to shield and contain the melter so that no additional shielding or contamination control will be required for normal operations. This has been accomplished by enclosing the melter assembly in a steel box. Shielding is provided by the entire enclosure. Access panels are provided through the external shielding. When removed, these panels will allow access to equipment such as jack-bolts, electrodes, electrode thermocouples, viewing cameras.

The heat for the LAW melter startup is provided by temporarily installed radiant electric heaters mounted on the roof of the melter. These heaters melt glass formers sufficiently to make it ionically conductive between the melter's joule heating electrodes. When a conducting path is established, the melter is heated in a controlled manner by passing more and more current between the electrodes through the glass (a process known as *joule heating*). After some time, the melter reaches its operating temperature and slurry feeding can start. As water evaporates, the feed forms a "cold cap" on the surface of the melt. As more slurry is fed, molten glass is formed by dissolution and melting of the cold cap materials into the glass melt. When the melt level rises to a predetermined level, it is discharged into a container.

The melter plenum is maintained at a controlled vacuum with offgas system fans and injection of air into the offgas line near the melter exhaust. This assures containment and avoids pressurization.

Joule Heating

The joule heating system contains the melter electrodes, melter electrode power supplies, melter glass pool thermocouples, and the melter electrode control system.

The electrode configuration for each LAW Melter will consist of three pairs of plate electrodes mounted parallel to each other on the long axis of the melter. The electrodes will have forced-air cooled electrode extensions. The extensions will penetrate the side of the melter below the glass level to minimize the effects of thermal expansion and to minimize the potential for corrosion by sulfate. Active cooling of the extensions and the use of a water-cooling jacket will prevent glass from migrating through the refractory package adjacent to the electrode extension penetrations. Power to the electrodes will be single-phase alternating current applied across opposing electrodes. The nominal glass melt pool temperature is approximately 1,150°C. This is measured with thermocouples in thermowells submerged into the pool at various locations. The power to the electrodes is regulated to maintain the temperature within a selected range.

Melter Feed System

Feed will be introduced to the melter as a slurry through nozzles in the melter lid. Water and volatile constituents in the slurry will evaporate, leaving behind a layer of material known as the cold cap. Waste feed components in the cold cap will undergo chemical reactions, be converted to their respective oxides, and dissolve in the molten glass. The feed rate determines the cold cap coverage on the glass melt pool. The feed rate can be controlled based on the average plenum temperature measured by plenum thermocouples mounted in the melter lid. New slurry will be added at about the same rate as the cold cap dissolves, maintaining the quantity of cold cap material at a steady level. Air injectors will be used to mix and agitate the molten glass. When the melt level rises to a predetermined upper limit, an air lift mechanism is actuated and glass is discharged to a container.

Glass Discharge System

Melter glass pool level measurement will be used to indicate when to start and stop glass discharge. It also provides alarms for high or low glass pool levels. Each LAW Melter has two identical and independently operated glass discharge systems located adjacent to each other on one side of the melter. Each of these systems includes an airlift riser, a glass pour trough, a heated discharge chamber, and other components and instruments needed to control the discharge of glass. When a container is required for filling, it is retrieved from the clean container staging area and lowered through the import hatch onto one of the two pour turntable bogies. The bogie travels to a position in front of one of the pour caves. The container is retrieved by one of the four monorail hoists and transported to one of the four pour cave turntables. The container is then rotated into the pour position. A through-wall position sensor confirms that the container is in position prior to lock pin engagement. A through-wall lock pin engages the turntable in its pour position and prevents accidental rotation while the container elevator raises the container to the melter seal head and the container is filled with glass. The level of glass in the container is controlled by an infrared camera and the container load cell.

The glass discharge from the melter is initiated by injecting air or an inert gas at the bottom of the airlift riser. As the gas bubbles rise in the glass they will entrain glass in the riser, which is replaced by glass flowing in from the pool through the riser throat. The glass is lifted to the inlet of the trough, where the air bubbles disengage and the entrained glass flows into the trough. The glass then flows down the trough due to gravity and falls from the pour tip at the end of the trough into the container. The rate of glass discharge is controlled by adjusting the rate at which air is injected into the bottom of the riser.

Instrumentation, alarms, controls, and interlocks will be provided for the LMP to indicate or prevent the following conditions:

- Decrease or loss of melter plenum vacuum.
- Glass temperature that is too high or too low.
- Electrode extension temperature too high.
- Loss of melter cooling water.
- Plugged feed nozzle.
- Overfilling of glass container.

4E.2.3 Radioactive and Nonradioactive Liquid Waste Disposal (RLD and NLD) Systems

DWP Operating Unit Group 10, Appendix 9.1 contains a process flow diagram of the Radioactive and Nonradioactive Liquid Waste Disposal (RLD and NLD) System. The RLD receives LAW vitrification process effluents for storage and transfer.

The RLD tank system consists of three main vessels:

- Plant Wash Vessel (RLD-VSL-00003)
- LAW C3/ C5 Drains/ Sump Collection Vessel (RLD-VSL-00004)
- SBS Condensate Collection Vessel (RLD-VSL-00005)

The SBS Condensate Collection Vessel (RLD-VSL-00005) and the Plant Wash Vessel (RLD-VSL-00003) are located in the LAW effluent cell. The C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004) is located below grade to provide fire protection water collection and to collect effluents from the wet electrostatic precipitator, and C3/C5 gravity floor drains and sumps.

Sources of effluents into the RLD system are production and nonproduction-related activities. Production effluents are mixed waste liquids or slurries routinely or periodically generated by the waste treatment process. These effluents are routed directly or indirectly to the SBS Condensate Collection Vessel (RLD-VSL-00005). Liquid effluent from nonproduction activities, such as vessel, equipment and cell/ cave washes, and sump discharges, are routed to one of the three vessels, depending on the nature of the effluent. Dangerous or mixed waste is routed to either the Plant Wash Vessel (RLD-VSL-00003) or the C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004). Liquid that is nondangerous/nonradioactive is routed to the C1/C2 Floor Drain/Sump Collection Tank in the NLD system.

The functional purpose of the RLD system is to receive effluents for interim storage and to transfer the effluent to the pretreatment facility. In addition, mixing and sampling of the effluent may be performed in this system as required.

<u>Plant Wash Vessel (RLD-VSL-00003)</u>

DWP Operating Unit Group 10, Appendix 9.1 contains a process flow diagram of the Plant Wash Vessel (RLD-VSL-00003). This vessel is designed to receive the total volume of either the largest vessel in the LAW vitrification facility or the largest volume from the vessel/equipment wash or drain in the LAW vitrification facility. The largest volume is from the Submerged Bed Scrubber (SBS) Condensate Collection Vessel (RLD-VSL-00005). Effluent sources for the Plant Wash Vessel (RLD-VSL-00003) are

vessel washes and the overflow from the SBS Condensate Collection Vessel (RLD-VSL-00005). The vessel is fitted with level instrumentation. The vessel is vented into a common vessel ventilation header that drains into the C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004). During normal operation, the effluent characterized in the Plant Wash Vessel (RLD-VSL-00003) is expected to be transferred to the pretreatment facility.

LAW C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004)

DWP Operating Unit Group 10, Appendix 9.1 contains a process flow diagram of the LAW C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004). This vessel is designed to contain the maximum amount of fire protection water and the volume equivalent to the largest C3/C5 floor area wash. The C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004) routinely collects liquid drained from the Melter Wet Electrostatic Precipitators (LOP-WESP-00001/2). The overflow from the Melter Concentrate Receipt Vessels (LCP-VSL-00001/2) is also routed to the C3/C5 Drains/Sump Collection Vessel.

Routine process-related effluent from Wet Electrostatic Precipitator drains will be routed from this vessel to the SBS Condensate Collection Vessel. Effluent generated from other sources will drain to the Plant Wash Vessel (RLD-VSL-00003) until it reaches a predetermined level to maintain adequate capacity for fire protection water.

The C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004) is fitted with level instrumentation. The C3/C5 Drains/Sump Collection Vessel is vented into a common vessel ventilation header. Condensate that forms in the header drains into the C3/C5 Drains/Sump Collection Vessel. Sampling capability is provided using a sampling leg off the pump recirculation line to an autosampler unit.

The C3/C5 Drains/Sump Collection Vessel is located in an enclosed C3/C5 cell area. The C3/C5 Drains/Sump Collection Vessel overflows to a sump in the same cell. During normal operation, the effluent characterized in the C3/C5 Drains/Sump Collection Vessel is expected to be transferred to the Treated LAW Evaporation System (TLP) system via the SBS Condensate Collection Vessel (RLD-VSL-00005).

SBS Condensate Collection Vessel (RLD-VSL-00005)

DWP Operating Unit Group 10, Appendix 9.1 contains a process flow diagram of the SBS Condensate Collection Vessel (RLD-VSL-00005). This vessel is designed to store SBS column purge effluent. The SBS Condensate Collection Vessel (RLD-VSL-00005) routinely receives effluent from the Submerged Bed Scrubber (LOP-SCB-00001/2) and the C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004).

The SBS Condensate Collection Vessel is fitted with level instrumentation and is vented into a common vessel ventilation header that drains into the C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004). Sampling capability is provided using a sampling leg off the pump recirculation line to an autosampler unit. The SBS Condensate Collection Vessel overflows to the Plant Wash Vessel (RLD-VSL-00003). During normal operation, the effluent characterized in the SBS Condensate Collection Vessel is expected to be transferred to the TLP system.

4E.2.4 Radioactive Solid Waste Handling (RWH) System

The primary functions of this system will be to provide equipment for the change out of LAW process vessels and other miscellaneous mixed wastes. This system provides the equipment to move waste out of the building.

The vessels are designed for 40 years of service. However, in the event of a failure, the process vessel will be prepared for export by rinsing, disconnection of the process lines, and decontamination. The vessel will be lifted out of the process cell and covered to prevent a spread of contamination. The vessel will be placed in an approved package staged for vessel receipt. Once closed and secured, the package, containing the vessel, will be delivered to an appropriate TSD facility. A similar process in reverse will be used for the introduction and installation of new LAW process vessels.

It is anticipated that LAW Melters will require periodic replacement. When the end of a melter's operational life is reached, as much residual molten glass as is practical will be removed as immobilized glass product. The LAW Melter will be allowed to cool and then will be disconnected. Openings in the melter shell will be seal welded, and the melter shell will be decontaminated if required, and transported to an appropriate TSD facility.

Disposal of miscellaneous mixed waste streams created during operation will be done by packaging at the point of generation. Localized collection points and disposal routes will be established at logical and optimal locations to accommodate maintenance and operations. Waste containers will be transferred to a staging area where packages will be weighed, labeled, and decontaminated for nonfixed contamination, if needed, prior to export. The packaged waste will then be stored at the WTP, and as needed transported to a Hanford site or off-site commercial treatment facility prior to final disposal at the Hanford site.

4E.2.5 ILAW Glass Container Handling

The ILAW glass container handling activities will consist of the following systems:

- LAW container receipt handling system (LRH)
- LAW container pour handling system (LPH)
- LAW container finishing handling system (LFH)
- LAW container export handling system (LEH)

The individual systems and their primary functions are described below:

LAW Container Receipt Handling (LRH) System

The LRH system takes delivery of new ILAW containers and provides a means to transfer these empty containers to the LPH transfer bogie (wheeled cart for container transfer).

Container Receipt

After removal of the shipping over-wrap and initial receipt inspection, the containers are placed on a conveyor system and transferred into the facility as needed. New containers are then logged into the tracking system.

Container Import

Prior to the need for additional containers, a final inspection and transfer takes place in the container import bay. Each new container is moved to a container inspection stand. This allows an operator to assess the upper head/lifting flange area, including the "fill" opening, and to observe the inside of the container with a light.

The rest of the container is inspected as required, then the container is placed on the import line 1 or 2 staging conveyer, and the tracking log is updated. If the container inspection fails, it is logged and tagged appropriately and set aside.

Each time a container is placed on the conveyor, an operator initiates a conveyor transfer. The transfer serves to index containers on the staging conveyor forward so there is always a container in the "pickup" position on the airlock conveyor.

Container import instrumentation, alarms, controls, and/or interlocks will be provided as follows:

- The hatches are interlocked with the hoist and bogies so the hatch cannot be opened unless a process crane is positioned above the hatch. Conversely, the process cranes cannot leave hatch positions unless the hatch is closed and locked.

- The hatches are interlocked with the bogies so that the hatches cannot open unless a bogie is positioned below the hatch. The interlock prevents the bogie from leaving the hatch position unless the hatch is closed.

LAW Container Pour Handling (LPH) System

Each of the LAW melters has two glass discharges that operate independently. Each melter discharge chamber is aligned with a glass pour cave under the melter cell with associated features for filling a container with glass. Containers can be filled using one pour cave, using alternating caves, or both caves at the same time using alternating lifts. The LPH system handles and positions product containers for filling with LAW glass product. The major pieces of equipment include the container turntable, container elevator, transfer bogies, and monorail hoists.

Container Turntable, Container Elevator, Glass Pour Seal Head

A container turntable is provided in each pour cave for handling containers. The turntable accommodates three containers and rotates to position them at three stations: the container transfer station, the container fill station, and the container cooling station. At each container location in the turntable is a lower overpack section that locates the containers and provides support. Containers remain in the overpack during the elevating and glass filling cycle.

As containers are filled and cooled, the turntable rotates to the transfer station where container changeout occurs. Cooled, full product containers are removed from the turntable and replaced with empty containers. The turntable is rotated to position the empty container at the fill station. The container elevator raises the empty container and lower overpack up to the glass pour seal head for container filling.

The elevator is equipped with features to provide a weight of the product container being supported. Weight is used to verify that a container is present and that it is empty. The weight must be between established minimum and maximum values for glass pouring to occur. Additionally, the weight can be used to ensure that container filling is occurring and to provide the rate of glass pouring. The elevator weight is not intended to give an accurate weight of the container; it is merely used as an indication of container presence and condition.

The glass pour seal head is the interface between the melter discharge and the product container during glass pouring. The seal head consists of a metal bellows arrangement that is connected to the melter discharge with the other end of the bellows open for interface with product containers.

Container fill level is monitored by a thermal imaging camera. The camera provides a view of the diameter and the upper one-half of a container. The thermal imaging camera indicates container fill level for primary control of fill rate and pour shut off. In the event of primary level detection failure, a gamma detector activates a high-high level shutdown.

The container is filled using several pours. The pour process occurs more quickly than glass can be made in the melter, resulting in lag time between pours. Rapid pouring allows molten glass to flow out to all edges of the container. Following the final glass pour batch, the container remains in position to provide initial container cooling and containment of final glass discharges. The container is then lowered to the turntable. The turntable is again rotated, placing the recently filled container at the cooling/venting station. Container cooling continues while another container undergoes the fill cycle. Once cooled, the container is rotated to the transfer position for export and the process is repeated.

Container Transportation

Another function of the LPH system is to provide product container transportation between the container transfer bogie and the pour cave turntable. The system transfers empty product containers from the container transfer bogie to the melter turntable, and transfers full product containers from the turntable to the transfer bogie in a manner that supports the facility throughput goals.

Concrete walls separate the pour caves from the bogie transfer tunnel. These walls have doorways large enough to allow the hoist units loaded with new or filled product containers to pass through them. The doorways are fitted with steel shield doors.

Concrete walls also separate the monorail maintenance facility from the bogie transfer tunnel. These walls have openings sized to prevent an ILAW container from entering the maintenance area. These doorways are also fitted with steel shield doors that provide radiological shielding from sources in the transfer tunnel during hands-on maintenance activities in the monorail maintenance facility.

Pour cave transfer operations are conducted remotely with only a few exceptions. Maintenance and recovery operations in the bogie transfer tunnel, such as a jammed grapple, may require hands-on intervention. Monorail hoist maintenance operations conducted in the maintenance facility are completely hands-on. Monorail hoist recovery operations can become a hands-on/remote combination depending on the failure details.

The LPH system provides a buffer storage area for ILAW containers in the event downstream processing lines become backed up. Additionally, ILAW container rework is conducted in the buffer storage area. Anticipated activities include ILAW container transfers into the buffer storage area from the container transfer bogies, container transfers within the buffer storage area, container transfer from the buffer storage area to the transfer tunnel, and container rework. The buffer storage area is adjacent to a crane maintenance facility. The crane maintenance area is shielded from the buffer storage area to allow hands-on maintenance in the crane maintenance facility and transfer tunnel while containers are present in the buffer storage area.

The LPH transfer tunnel runs from the bogie maintenance area on the west end of the facility to the buffer storage area at the east end of the building. The buffer storage area import/export positions are located within the container transfer corridor. Concrete walls with passages for ILAW containers separate the north and south buffer storage areas and the container transfer corridor. The passages are equipped with manually operated steel shield doors to support maintenance or bogie recovery operations that might be required in this portion of the transfer tunnel. The LFH hoists operating in the lidding area above this section of the container transfer corridor transfer ILAW containers to and from the buffer storage area import/export position.

Buffer storage area container transfer operations are conducted with the use of a bridge crane. The crane rails begin in the crane maintenance facility adjacent to the north end of the buffer storage area and extend south. The runway provides crane coverage to the crane maintenance area, the ILAW container buffer storage area, the container transfer corridor, and the two container import/export positions. There are container storage positions in the north and south portions of the store, and one rework position also in the south portion of the store. The rework position is located in the southeast corner of the ILAW container buffer storage area/rework area. The rework position can be fitted with a powered turntable, a pair of master-slave manipulators. A shielded window is located in this area. Directly east of the rework position, on the cold side of the buffer storage area, is a rework area operating platform that provides operator access to the master-slave manipulators and shielded window.

A winch is provided to support maintenance operations on the buffer storage area bridge crane. A steel shield door and a concrete wall separate the crane maintenance facility from the buffer storage area, allowing maintenance operations to be conducted while the buffer storage area contains full ILAW containers.

LAW Container Finishing Handling (LFH) System

Figure 4A-24 located in Appendix 4A presents a simplified process flow diagram of the LAW container finishing handling system (LFH). There are two LFH finishing lines. The functions of the LFH system are to verify the container fill level, determine if inert fill is required, complete closure of the ILAW container, decontaminate the exterior of the container, and verify surface contamination levels before

exporting the container. The system also has the ability to sample the solidified glass, place the glass shards in a vial, and make these vials available for transfer to the laboratory.

The filled containers are raised from the transfer tunnel into one of two finishing lines and placed on a bogie. The bogie with the container travels to the shard sampling station. A sample of the glass may be taken with the glass shard sampler. Based on the measured level in the container, inert fill is added as needed. From there the bogie travels to the container lidding station where the lid is mechanically secured to the container. After mechanically sealing the lid to the container, the bogie travels to the decontamination area.

At the decontamination station, the container is decontaminated with carbon dioxide pellets. Debris produced during decontamination is collected with a HEPA filtered exhaust system. This gas stream is then routed to the plant vent system where it is passed through the facility's HEPA filters before being discharged through the stack.

Once the container is decontaminated, it is transported to the swabbing station where it is surveyed for loose surface contamination to verify it meets the contamination requirements. The swabbing machine uses a power manipulator to maneuver the swabs over the surface. The contaminated swabs are then monitored to determine gamma-beta levels for smearable contaminates. If contamination levels exceed C2 contamination criteria, the container can go through the carbon dioxide decontamination station. ILAW containers can be routed back through the decontamination stations until the radiological contamination levels are within specification. Once the container meets C2 contamination criteria, the bogie moves into the monitoring/export station.

The container is transported into the monitoring/export station from the swabbing station, and the gamma monitor measures the surface dose rate of the decontaminated container. If the container exceeds the dose rate, it is classified as an out-of-specification container. Otherwise, the dose rate is measured and is recorded with the container's records. The container is then exported for shipment to the disposal site.

In the off-normal event that an out-of-specification ILAW container is generated, the container will be segregated and a corrective action plan generated. Container characterization data will be evaluated to determine if it can be disposed in accordance with approved Hanford Site Solid Waste Acceptance Criteria.

Instrumentation, alarms, controls, and interlocks will be provided for the LFH system to indicate or prevent the following conditions:

- Opening of personnel access door when container is present in the line transfer station.
- Opening of personnel access door when either line transfer trap doors are open.
- Opening of both line transfer trap doors at the same time.
- Opening of personnel access door if airborne contamination levels are higher than design contamination classification within the line transfer station.

Decontamination Station

A decontamination station is located within each of the finishing lines in the LAW vitrification facility. After the ILAW container has been sealed, it is transported to the decontamination station. Equipment items located in the decontamination station include the carbon dioxide decontamination manipulator, turntable, and exhaust system. Most other items are located outside of the decontamination station, including the carbon dioxide pelletizer, the transport air compressor, and the liquid carbon dioxide storage and delivery system, exhaust fans, and HEPA filters.

The containers are decontaminated using carbon dioxide pellets. The carbon dioxide decontamination manipulator is fitted with an exhaust recovery hood to recover the effluent from the decontamination operation. Debris produced during decontamination is collected with a HEPA filtered exhaust system.

This gas stream is then routed to the plant vent system where it is passed through the plant's HEPA filters before being discharged through the stack.

Once the container is decontaminated, it is transported from the decontamination station to the swabbing station.

Instrumentation, alarms, controls, and interlocks will be provided for the decontamination station to indicate or prevent the following conditions:

- Opening of the decontamination or decontamination/ swabbing containment door during decontamination.
- Opening of the decontamination and decontamination/ swabbing containment door at the same time.

Swabbing and Swabbing-Monitoring Station

At the swabbing station, containers are surveyed for loose surface contamination to verify that they meet the contamination requirement. The swabbing machine maneuvers the swabs over the container surface. After a prescribed area is covered, the contaminated swabs are exported away from radioactive source for monitoring to determine gamma-beta levels for smearable contaminates. If contamination levels exceed C2 criteria, the container is transported back into the decontamination station for rework. If the container meets C2 criteria, the turntable bogie moves into the export station.

Once the container is transported into the monitoring/export station from the swabbing station, a gamma monitor measures the dose rate of the decontaminated container.

If the container exceeds the specified dose requirement, it is classified as an out-of-specification container; otherwise, the dose rate is measured and is recorded within the container's records. The container is then exported out of the monitoring/export station for shipment to the disposal site.

Instrumentation, alarms, controls, and interlocks will be provided for the swab monitoring station to indicate or prevent the following conditions:

- Personnel access when a container is present in swab monitoring station.
- Opening of decontamination/ swabbing or swabbing/ export containment door during swabbing.
- Opening of personnel access door when container is present in the swabbing station.
- Opening of personnel access door if airborne contamination levels are higher than design contamination classification within the decontamination area.
- Opening of personnel access door if high concentration of carbon dioxide is present within the decontamination area.
- Rotation of posting turntable during swabbing.
- Export of swab if radiation levels from swab are higher than design radiation classification in the operational area.

LAW Container Export Handling (LEH) System

The purpose of the LEH system is to load ILAW containers onto a transportation vehicle for transfer to a Hanford Site TSD unit. This system is contained in a truck bay on the east end of the LAW vitrification facility.

Under normal operations the ILAW container will be received from the LFH system through a hatch. Radiological dose rate and contamination level are determined and verified to be within limits prior to entering the LEH system. An overhead crane lifts the ILAW container through the hatch and places it on the transportation vehicle.

Operations are remote and maintenance is "hands-on" in the LEH system. The overhead crane is provided with closed circuit television cameras for operation when radiological conditions do not permit personnel access during the ILAW container loading.

4E.2.6 LAW Melter Equipment Support Handling (LSH) System

The primary function of the LSH system is to provide the equipment and support necessary to complete maintenance tasks on all melters and equipment in the melter gallery of the LAW vitrification facility. The primary equipment used in support of the maintenance efforts are:

- Consumable change-out boxes.
- Consumable change-out boxes storage racks.
- Consumable change-out boxes preparation stand.
- Melter gallery process cranes.
- Consumable change-out boxes handler.
- Lifting head.
- Melter gamma gate.
- Shield cover removal tool.

Melter consumables will be removed through the top of the melter shielding. Melter consumable items will be those that require routine and nonroutine maintenance, but provide necessary functions to continue melter operations. The routine consumable items will include bubbler assemblies. New bubbler assemblies will be shipped to the facility and will be installed into the melter.

Spent bubblers will be extracted from the melter, and transferred into a consumable change-out box (CCB) and then transferred into a box for treatment and disposal.

Refractory thermocouples, airlifts, level detectors, feed nozzles, and film coolers will be removed, bagged and loaded into the CCB and then transferred to a disposal box. These waste management tasks will be considered nonroutine and are replaced on an as-needed basis according to secondary waste management procedures and with appropriate LSH equipment.

4E.2.7 LAW Melter Handling (LMH) System

The Low Activity Waste (LAW) melter handling system (LMH) provides the mechanical handling equipment associated with the import of new Locally Shielded Melters (LSMs) and the export of failed or spent LSMs. The LMH system also provides specific facility structures to support LAW LSMs import and export operations, as well as miscellaneous mechanical handling equipment to support operations.

The function of System LMH include:

- Transfer new LAW melter from equipment pad to LAW Melter operating position (L-0112).
- Transfer equipment between C1/C2 airlock (L-0113) and monorail hoist maintenance rooms (L-B023A/ L-B023B).
- Transfer spent melters that are seal-welded and ready for transport from operating position (L-0112) to equipment pad.

The LAW Assembly/Staging Pad Area is located external to the LAW Facility at an elevation of +3'-0". New melters are assembled in the assembly/staging pad area. The East side of the pad is configured as a loading dock to permit transfer of a spent LAW melter to the Tank Operating Contractor (TOC) supplied melter transport system. The pad incorporates LAW melter rails and provides multiple embed locations to mount a winch assembly.

The LAW Winch Assembly provides the motive force for transferring the new or spent LSM along fixed melter rails. The winch assembly operates in conjunction with pulley block assemblies to transfer an LSM. The winch assembly is only installed for LSM transfer operations and then is removed and stored.

When the LAW melter has reached the end of its operating life, it is disconnected from all systems and all penetrations on the enclosure are seal welded before it is be moved out of the LAW vitrification facility. Prior to deployment the LSM is surveyed and decontaminated as required and is loaded on the TOC melter transport system.

4E.3 Containment Buildings

This section describes how these units are designed and operated, in accordance with the requirements of WAC 173-303-695, which incorporates 40 CFR 264 Subpart DD, "Containment Buildings", by reference. Regulatory citations in this section list the applicable section of the CFR to make it easier for readers to find the requirement. A typical containment building is illustrated in Appendix 4A, Figure 4A-59.

There are twenty-one containment buildings at the WTP: five located within the pretreatment facility; six in the LAW vitrification facility; and ten in the HLW vitrification facility. The regulated units in the LAW vitrification facility are:

- LAW LSM gallery containment building (L-0112)
- LAW container finishing containment building (L-0109B, L-0109C, L-0109D, L-0109E, L-0115B, L-0115C, L-0115D, L-0115E)
- LAW vitrification facility consumable import/export containment building (L-0119B)
- LAW vitrification facility C3 workshop containment building (L-0226A)
- LAW pour cave containment building (L-B015A, L-B013C, L-B013B, L-B011C, L-B011B, and L-B009B)
- LAW container buffer storage containment building (L-B025C, L-B025D)

Table 4E-5 summarizes the units within the LAW vitrification facility. The following figures and drawings found in DWP Operating Unit Group 10 provide further detail for the containment buildings:

- Figure 4A-59 depicting common features of containment buildings.
- General arrangement figures and drawings showing locations of containment buildings.
- Waste management area figures showing containment building locations to be permitted.

Control of fugitive emissions from containment buildings is described in *Fugitive Emissions Control Description* (24590-WTP-PER-HV-02-001) located in Operating Unit Group 10 Appendix 7.15.

The following sections address each of the containment buildings.

4E.3.1 LAW LSM Gallery Containment Building (L-0112)

There will be six containment buildings in the LAW vitrification facility. The first is the LAW locally shielded melter (LSM) gallery containment building, which will house the two LAW Melters. The LAW Melters are designed to include a roller or wheel assembly that travels on rails that will be used to move the melters in and out of the containment building. Spent LAW Melters will be disconnected from the offgas system, feed lines, electrical lines, and instrumentation. Open ports will be seal welded. The sealed exterior of the melter will be decontaminated, if needed, prior to removal from the containment building.

LAW LSM Gallery Containment Building Design

The LAW LSM gallery containment building will be completely enclosed within the LAW vitrification facility. The unit will be designed to prevent the release and exposure of dangerous constituents to the

outside environment. The design and construction of the LAW vitrification facility exterior will prevent water from running into the facility.

The roof of the LAW vitrification facility will consist of metal roofing, roof insulation, and a vapor barrier. Rainwater run-off will be collected by roof drains and a drainage system with overflow drains. The approximate dimensions of the unit are summarized in Table 4E-5.

The melter feed slurry will be introduced to the LAW melters through stainless steel feed lines and specialized reinforced flex hoses. The feed lines in between the melter feed vessel and the melter will pass through the Melter Feed Encasement Assembly (LMP-LDB-00001/00002) that functions as secondary containment and provides leak detection. The encasement assembly and associate bellows are provided with a conductivity cable lead detection system. A drain within the assembly has also been incorporated into the design to allow drainage to a sump located in the adjacent process room.

The containment building design requirements of 40 CFR 264.1101(b) do not apply because any dangerous wastes with free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7). The only anticipated source of liquids in the LSM gallery are the waterlines to the two film cooler pipes, and the melter and melter lid cooling water piping systems. These clean water lines (isolated from contact with dangerous wastes) will be instrumented to detect leaks. The melter annulus and the gas barrier contain cooling liquids within the locally shielded melter and are both provided with leak detection. The melter lid cooling system is also a clean water system that is provided with temperature indication, level transmitters, and flow and pressure indicators to identify a potential leak. A rupture of either water line or a waste feed line would be an abnormal event and the liquid would be contained within the locally shielded melter or in the encasement assembly and corrective measures would be initiated. Corrective action would start with closure of the supply line and draining of remaining water outside the melter, and could require feed cutoff and melter idling or shut down.

LAW LSM Gallery Containment Building Structure

The LAW LSM gallery containment building will be fully enclosed within the LAW vitrification facility. Therefore, structural requirements for the containment building will be met by the design standards of the LAW vitrification facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. Within the containment building will be partitions between the LSMs. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the LAW vitrification facility meet or exceed the Uniform Building Code Seismic Design Requirements.

LAW LSM Gallery Containment Building Materials

The LAW LSM gallery containment building will be constructed of steel-reinforced concrete. The interior floor and the walls of the unit will be covered with an epoxy coating to protect the concrete and facilitate decontamination.

Use of Incompatible Materials for the LAW LSM Gallery Containment Building

The epoxy coating will be applied to the concrete floor and a portion of the walls of the unit. The coating will be compatible with the wastes that will be managed in the containment building. The wastes to be managed in this containment building will include LAW LSM melters and consumables, which may be metallic parts and failed equipment. Reagents that could impact the epoxy decontamination coating will not be used within the unit.

Primary Barrier Integrity in the LAW LSM Gallery Containment Building

The LAW LSM gallery containment building will be designed to withstand loads from the movement of personnel, wastes, and handling equipment. The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the LAW LSM Gallery Containment Building

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the LAW LSM gallery containment building meets the design requirements of 40 CFR 264.1101(a), and (c) will be obtained. The requirements of 40 CFR 264.1101(b) do not apply to this design because any dangerous waste containing free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the LAW LSM Gallery Containment Building

Operational and maintenance controls and practices will be established and followed to ensure containment of the waste within the LAW LSM gallery containment building, as required by 40 CFR 264.1101(c)(1). Activities in the building will be remotely conducted.

Maintenance of the LAW LSM Gallery Containment Building

The epoxy decontamination coating will be constructed and maintained in a manner that will be free of significant cracks, gaps, corrosion, or other deterioration. The concrete coating will be free of corrosion or other deterioration because it will be compatible with materials that will be managed in the containment building, including the glass waste and containerized or uncontainerized waste and equipment.

Measures to Prevent Tracking Wastes from the LAW LSM Gallery Containment Building

The unit is designed to manage LAW melters. The melters will be disconnected from systems when determined to be waste. The ports where the melter was attached to systems will be sealed and glass waste will be contained within the melter. This design will prevent waste from entering the containment building and thus from being tracked from the unit.

The unit will be classified as a C3 contamination area, which allows only limited personnel access. Access will be required only for non-routine events such as when melters are determined to be waste, approximately every 5 years, or when equipment must be dismantled. Dry decontamination methods will be used to decontaminate the melter and gallery areas.

Procedures in the Event of Release or Potential for Release from the LAW LSM Gallery Containment Building

Conditions that could lead to a release from the LAW LSM gallery containment building will be corrected on a schedule intended to preclude a release that could be hazardous to public health or the environment.

In the unlikely event of a release of dangerous wastes from the containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods that will be used to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste. The methods will be followed to repair conditions that could lead to a release.

Inspections of the LAW LSM Gallery Containment Building

An inspection program will be established to detect conditions that could lead to release of wastes from the LAW LSM gallery containment building. The inspection and monitoring schedule and methods that will be used to detect releases from the unit are included in DWP Operating Unit Group 10, Chapter 6.0.

4E.3.2 LAW Container Finishing Line Containment Building (L-0109B, L-0109C, L-0109D, L-0109E, L-0115B, L-0115C, L-0115D, L-0115E)

The LAW container finishing line containment building will be located in the LAW vitrification facility. It will be used for managing ILAW containers that have cooled sufficiently to be closed and prepared for finishing. Typical waste management activities performed in this containment building include storage of open waste containers and container decontamination.

An ILAW container is transported from an inert filling and lidding room, to a decontamination room, and finally to a swab and monitor room, and then out of the containment building. This sequence of rooms is considered a finishing line. There are two finishing lines within the ILAW container finishing line containment building.

LAW Container Finishing Containment Building Design

The LAW container finishing containment building will be completely enclosed within the LAW vitrification facility. It will be designed to prevent the release and exposure of dangerous constituents to the outside environment. The design and construction of the LAW vitrification facility exterior will prevent water from running into the facility. The roof of the LAW vitrification facility will consist of metal roofing, roof insulation, and a vapor barrier. Roof drains and drainage system with overflow drains will collect run-off. The approximate dimensions of the unit are summarized in Table 4E-5.

LAW Container Finishing Containment Building Structure

Because the LAW container finishing containment building will be a concrete-walled structure fully enclosed within the LAW vitrification facility, its structural requirements will be met by the design standards of the LAW vitrification facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the LAW vitrification facility meet or exceed the Uniform Building Code Seismic Design Requirements.

LAW Container Finishing Containment Building Materials

The LAW container finishing containment building will be constructed of steel-reinforced concrete. The interior floor and a portion of the walls of the decontamination rooms will be coated with an epoxy coating to facilitate decontamination of the concrete.

Use of Incompatible Materials for the LAW Container Finishing Containment Building

The primary concrete barrier will have an epoxy decontamination coating. This epoxy coating will be compatible with the waste managed in the unit. The waste to be managed includes vitrified waste glass within the stainless steel containers. This coating will be present in the two inert fill rooms, the fixative application room, and the two swab and monitor rooms.

The epoxy coating will be provided to protect the concrete and facilitate decontamination. The coating will be compatible with the wastes that will be managed, which will include filled ILAW containers. Glass waste is not expected to be present on the exterior of the containers, due to the design of the melter pour stations. The interior is the only portion of the container that will be exposed to the glass waste. Additionally, the removal of glass will occur in the inert fill and lidding rooms. Carbon dioxide pellets, compatible with the stainless steel container, will be used to remove contamination from the container surface. Reagents that could cause the decontamination coating to leak, corrode, or otherwise fail will not be used within the unit.

Primary Barrier Integrity in the LAW Container Finishing Containment Building

The LAW containment building will be designed to withstand loads from the movement of personnel, wastes, and handling equipment. The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the LAW Container Finishing Containment Building

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the LAW containment building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained.

The requirements of 40 CFR 264.1101(b) do not apply to this design because any dangerous waste containing free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the LAW Container Finishing Containment Building

Operational and maintenance controls and practices will be established to ensure containment of the waste within the LAW containment building, as required by 40 CFR 264.1101(c)(1). Activities in the building will be remotely conducted.

Maintenance of the LAW Container Finishing Containment Building

The epoxy decontamination coated concrete floor and walls of the of the containment building will be constructed and maintained in a manner that will be free of significant cracks, gaps, corrosion, or other deterioration. The coated concrete will be free of corrosion or other deterioration because it will be compatible with materials that will be managed in the containment building, which will include ILAW containers, containerized secondary waste, and failed equipment. Waste containers managed in the containment building will not be stacked.

Measures to Prevent Tracking Wastes from the LAW Container Finishing Containment Building

The LAW containment building is designed to sample, mechanically seal, and decontaminate the filled ILAW containers. Conducting these activities in a C3 zone prevents the spread of contaminated materials from the unit as air flow is managed in the LAW vitrification facility ventilation system. The containment building is under negative pressure. Air flow through this containment building goes to a C5 air system, which passes through HEPA filters before exiting the facility stack.

A vacuum cleanup system, located in the two inert fill rooms, is expected to be infrequently used to collect dust from the inert filling activities, and thereby minimize the potential for dust to be tracked from the unit. The dust will be disposed of as secondary waste.

Additionally, personnel access to the containment building, which is classified as a C3 contamination area, will be allowed only under limited circumstances, reducing the potential for contacting the waste and tracking it from the unit.

Procedures in the Event of Release or Potential for Release from the LAW Container Finishing Containment Building

Conditions that could lead to a release from the LAW containment building will be corrected on a schedule intended to preclude a release that could be hazardous to public health or the environment. In the unlikely event of a release of dangerous wastes from the containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste. The methods will be followed to repair conditions that could lead to a release.

Inspections of the LAW Container Finishing Containment Building

An inspection program will be established to detect conditions that could lead to a release of wastes from the LAW container finishing containment building. The inspection and monitoring schedule and methods that will be used to detect releases from the unit are included in DWP Operating Unit Group 10, Chapter 6.0.

4E.3.3 LAW Consumable Import/Export Containment Building (L-0119B)

The LAW vitrification facility consumable import/export containment building will be located in the west end of the LAW vitrification facility on the 3 ft elevation. Typical waste management activities performed in this containment building include decontamination, size reduction, and packaging of spent equipment.

Simple dry wipe down decontamination of components will be performed to allow contact handling. Waste streams generated within the consumable import/export containment building will be transferred into a consumable change-out box (CCB) equipped with an internal bagging capabilities, and then packaged into a box for disposal. Waste typically generated in the consumable import/export area are managed in large waste boxes.

LAW Vitrification Facility Consumable Import/Export Containment Building Design

The LAW vitrification facility consumable import/export containment building will be designed as a completely enclosed area within the LAW vitrification facility. It is designed to prevent the release of dangerous constituents and their exposure to the outside environment. The design and construction of the LAW vitrification facility exterior will prevent water from running into the facility. The roof of the LAW vitrification facility will consist of metal roofing, roof insulation, and vapor barrier. Rainwater run-off will be collected by roof drains and drainage systems with overflow roof drains. The approximate dimensions of the unit are summarized in Table 4E-5.

LAW Vitrification Facility Consumable Import/Export Containment Building Structure

The LAW vitrification facility consumable import/export containment building will be a concrete-walled structure fully enclosed within the LAW vitrification facility. Therefore, structural requirements for the containment building will be met by the design standards of the LAW vitrification facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the LAW vitrification facility meet or exceed the Uniform Building Code Seismic Design Requirements.

LAW Vitrification Facility Consumable Import/Export Containment Building Materials

The LAW vitrification facility consumable import/export containment building will be constructed of steel-reinforced concrete. The interior floor and a portion of the walls of the unit will be coated with an epoxy coating to protect the concrete and facilitate decontamination.

Use of Incompatible Materials in the LAW Vitrification Facility Consumable Import/Export Containment Building

An epoxy decontamination coating will be provided for the floor of this unit. The coating will be compatible with the wastes that will be managed. Activities in the unit will be limited to decontamination and packaging the waste components into drums or waste boxes. Treatment reagents that could cause the coating to leak, corrode, or otherwise fail will not be used within the unit.

Primary Barrier Integrity in the LAW Vitrification Facility Consumable Import/Export Containment Building

The LAW vitrification facility consumable import/export containment building will be designed to withstand loads from the movement of personnel, wastes, and handling equipment. The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the LAW Vitrification Facility Consumable Import/Export Containment Building

Prior to receipt of dangerous and mixed waste, a certification by a qualified registered professional engineer that the LAW vitrification facility consumable import/export containment building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained. The requirements of 40 CFR 264.1101(b) do not apply to this design because any dangerous waste containing free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the LAW Vitrification Facility Consumable Import/Export Containment Building

Operational and maintenance controls and practices will be established and followed to ensure containment of the wastes within the LAW vitrification facility C3 containment building unit as required by 40 CFR 264.1101(c)(1).

Maintenance of the LAW Vitrification Facility Consumable Import/Export Containment Building

The epoxy decontamination coating of the unit will be constructed and maintained in a manner that will be free of significant cracks, gaps, corrosion, or other deterioration. The coating will remain free of corrosion or other deterioration because it is compatible with materials that will be managed in the containment building. The failed equipment that will be managed and packaged in the containment building unit will be compatible with the protective coating. Only decontamination chemicals that are compatible with the coating will be used.

Measures to Prevent Tracking Wastes from the LAW Vitrification Facility Consumable Import/ Export Containment Building

The LAW vitrification facility consumable import/export containment building will be designed to package failed equipment to prevent the spread of contaminated materials. Very little dust is expected to be generated in the unit.

The containment building will be classified as a C3 contamination area, which allows only limited access by personnel. Wastes leaving the unit will be enclosed within containers. If necessary, these containers will be decontaminated in the unit prior to release and transportation to a permitted treatment and disposal area.

Procedures in the Event of Release or Potential for Release from the LAW Vitrification Consumable Import/Export Containment Building

The design and operation of the unit makes it very unlikely that releases will occur. The design and operational measures will minimize the generation of dust and contain it within the unit. The ventilation system will also use negative air pressure to keep contamination from spreading to areas of lesser contamination.

Inspections will identify conditions that could lead to a release. Such conditions will be corrected on a schedule intended to preclude a release that could be hazardous to public health or the environment. In the unlikely event that a release of dangerous wastes from the containment building is detected, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods that will be used to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste. These methods will be followed to repair conditions that could lead to a release.

Inspections of the LAW Vitrification Facility Consumable Import/Export Containment Building

An inspection program will be established to detect conditions that could lead to a release of wastes from the LAW vitrification facility consumable import/export containment building. The inspection and monitoring schedule and methods that will be used to detect releases from the unit are included in DWP Operating Unit Group 10, Chapter 6.0.

4E.3.4 LAW C3 Workshop Containment Building (L-0226A)

The C3 workshop containment building will be located in the west side of the LAW vitrification facility at elevation 28 ft.

Typical waste management activities performed in this containment building include decontamination, size reduction, and packaging of spent equipment. Equipment will be transported to the unit contained in shielded containers, drums, or in waste boxes. In the workshop, the equipment will be decontaminated to enable hands-on maintenance.

Spent equipment and parts will be bagged and placed in standard waste containers or boxes for disposal. Size reduction may be performed to facilitate packaging. Other spent equipment will be packaged in drums or waste boxes.

C3 Workshop Containment Building Design

The C3 workshop containment building will be a completely enclosed area within the LAW vitrification facility. It will be designed to prevent the release of dangerous waste and their exposure to the outside environment. The design and construction of the LAW vitrification facility exterior will prevent water from running into the facility. The roof of the LAW vitrification facility will consist of metal roofing, roof insulation, and vapor barrier. Rainwater run-off will be collected by roof drains and drainage systems with overflow roof drains. The approximate dimensions of the unit are summarized in Table 4E-5.

C3 Workshop Containment Building Structure

The C3 workshop containment building will be fully enclosed within the LAW vitrification facility. Therefore, structural requirements for the containment building will be met by the design standards of the LAW vitrification facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the LAW vitrification facility meet or exceed the Uniform Building Code Seismic Design Requirements.

C3 Workshop Containment Building Materials

The C3 workshop containment building will be constructed of a steel-reinforced epoxy coated concrete floor and plasterboard partition walls. The floor will be coated with an epoxy coating to protect the concrete and facilitate decontamination.

Use of Incompatible Materials in the C3 Workshop Containment Building

Activities in the unit will be limited to decontamination, size reduction, and packaging the waste components into drums or waste boxes. Treatment reagents that could cause the epoxy coating to leak, corrode, or otherwise fail will not be used within the unit.

Primary Barrier Integrity in the C3 Workshop Containment Building

The C3 workshop containment building is designed to withstand loads from the movement of personnel, wastes, and handling equipment. The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the C3 Workshop Containment Building

Prior to initial receipt of dangerous and mixed waste, a certification by a qualified registered professional engineer that the C3 workshop containment building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained. The requirements of 40 CFR 264.1101(b) do not apply to this design because any dangerous waste containing free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the C3 Workshop Containment Building

Operational and maintenance controls and practices will be established and followed to ensure containment of the wastes within the C3 workshop containment building unit as required by 40 CFR 264.1101(c)(1).

Maintenance of the C3 Workshop Containment Building

The epoxy coated concrete will be constructed and maintained in a manner that will be free of significant cracks, gaps, corrosion, or other deterioration.

The concrete will remain free of corrosion or other deterioration because it is compatible with materials that will be managed in the containment building. The failed equipment that will be managed in the containment building unit will be compatible with the coated concrete. Only decontamination chemicals that are compatible with the concrete coating will be used.

Measures to Prevent Tracking Wastes from the C3 Workshop Containment Building

The C3 workshop containment building will be designed to isolate failed equipment from the accessible environment and to prevent the spread of contaminated materials. Very little dust is expected to be generated in the unit.

The containment building classified as a C3 contamination area, which allows only limited access by personnel. Personnel access will be via a C2/C3 sub-change room. Equipment will enter and exit the workshop via a C2/C3 airlock. Repaired equipment leaving the unit will be decontaminated, when necessary, before being released for removal from the containment building. Wastes leaving the unit will be packaged in waste containers or waste boxes. If necessary, the containers will be decontaminated in the unit prior to transportation to a permitted treatment or disposal area.

Procedures in the Event of Release or Potential for Release from the C3 Workshop Containment Building

The design and operation of the unit makes it very unlikely that releases will occur. The design and operational measures will minimize the generation of dust and contain it within the unit. The ventilation system will also use negative air pressure to keep contamination from areas of lesser contamination. Offgas will be routed to the LAW offgas treatment system.

Inspections will identify conditions that could lead to a release. Such conditions will be corrected on a schedule intended to preclude a release that could be hazardous to public health or the environment. In the unlikely event that a release of dangerous wastes from the containment building is detected, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods that will be used to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste. These methods will be followed to repair conditions that could lead to a release.

Inspections of the C3 Workshop Containment Building

An inspection program will be established to detect conditions that could lead to a release of wastes from the C3 workshop containment building. The inspection and monitoring schedule and methods that will be used to detect releases from the unit are included in DWP Operating Unit Group 10, Chapter 6.0.

4E.3.5 LAW Pour Cave Containment Building (L-B009B, L-B011B, L-B011C, L-B013B, L-B013C, L-B015A)

The LAW pour cave containment building (rooms L-B009B, L-B011B, L-B011C, L-B013B, L-B013C, L-B015A) will be located in the LAW vitrification facility, elevation -21 ft. It will be used for managing ILAW containers as they are filled with glass from the LAW Melters (LAW-MLTR-00001/2). The filled ILAW containers will be allowed to cool with the lids off the container. Cooled ILAW containers will be transferred to the LAW container finishing line containment building for lidding and preparation for export to a storage facility.

LAW Pour Cave Containment Building Design

The LAW pour cave containment building will be completely enclosed within the LAW vitrification facility, which will be designed to prevent the release and exposure of dangerous constituents to the

outside environment. The design and construction of the LAW vitrification facility exterior will prevent precipitation from entering into the facility. The roof of the LAW vitrification facility will consist of metal roofing, roof insulation, and a vapor barrier. Roof drains and drainage system with overflow drains will collect run-off. The approximate dimensions of the unit are summarized in Table 4E-5.

LAW Pour Cave Containment Building Structure

Because the LAW pour cave containment building will be a concrete-walled structure fully enclosed within the LAW vitrification facility, its structural requirements will be met by the design standards of the LAW vitrification facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the LAW vitrification facility meet or exceed the Uniform Building Code Seismic Design Requirements.

LAW Pour Cave Containment Building Materials

The LAW pour cave containment building will be constructed of steel-reinforced concrete that is provided with an insulated stainless steel liner to protect the concrete from thermal damage and support decontamination.

Use of Incompatible Materials for the LAW Pour Cave Containment Building

The waste to be managed includes vitrified waste glass within the stainless steel containers and insulated stainless cladding. No glass waste is expected to be present on the exterior of the containers, due to the design of the melter pour stations. The interior is the only portion of the container that will be exposed to the glass waste. Reagents that could cause corrosion or other failure will not be used within the unit.

Primary Barrier Integrity in the LAW Pour Cave Containment Building

The LAW pour cave containment building will be designed to withstand loads from the movement of personnel, wastes, and handling equipment. The seismic design criteria found in *RPP-WTP Compliance with Uniform Building Code Seismic Design Requirements*, DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the LAW Pour Cave Containment Building

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the LAW pour cave containment building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained. The requirements of 40 CFR 264.1101(b) do not apply to this design because any dangerous waste with free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the LAW Pour Cave Containment Building

Operational and maintenance controls and practices will be established to ensure containment of the waste within the LAW pour cave containment building, as required by 40 CFR 264.1101(c)(1). Activities in the building will be remotely conducted during normal operation when ILAW containers are present.

Maintenance of the LAW Pour Cave Containment Building

The insulated stainless steel clad concrete will be free of corrosion or other deterioration because it will be compatible with materials that will be managed in the containment building, which will include containerized glass waste and equipment.

Measures to Prevent Tracking Wastes from the LAW Pour Cave Containment Building

The LAW pour cave containment building is designed to manage the filling and movement of ILAW containers. Conducting these activities in a C5 zone prevents the spread of contaminated materials from

the unit as airflow is managed in the LAW vitrification facility ventilation system. The containment building is under negative pressure. Airflow through this containment building goes to a C5 air system, which passes through HEPA filters before exiting the facility stack. Personnel access will be restricted during normal operation since it is classified as a C5 contamination area. The containment building may be reclassified as a C3 area for equipment maintenance.

Procedures in the Event of Release or Potential for Release from the LAW Pour Cave Containment Building

Conditions that could lead to a release from the LAW pour cave containment building will be corrected on a schedule intended to preclude a release that could be hazardous to public health or the environment. In the unlikely event of a release of dangerous wastes from the containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste. The methods will be developed to repair conditions that could lead to a release.

Inspections of the LAW Pour Cave Containment Building

An inspection program will be established to detect conditions that could lead to a release of wastes from the LAW pour cave containment building. The inspection and monitoring schedule and methods that will be used to detect releases from the unit are included in DWP Operating Unit Group 10, Chapter 6.0.

4E.3.6 LAW Container Buffer Storage Containment Building (L-B025C, L-B025D)

The LAW container buffer storage containment building (rooms L-B025C, L-B025D) will be located in the LAW vitrification facility, elevation -21 ft. It will be used for managing ILAW containers as after they are filled with glass from the LAW Melters (LAW-MLTR-00001/2). The filled ILAW containers will be allowed to cool with the lids off the container. Cooled ILAW containers will be transferred to the LAW container finishing line containment building for lidding and preparation for export to a storage or disposal facility.

LAW Container Buffer Storage Containment Building Design

The LAW container buffer storage containment building will be completely enclosed within the LAW vitrification facility, which will be designed to prevent the release and exposure of dangerous constituents to the outside environment. The design and construction of the LAW vitrification facility exterior will prevent precipitation from entering into the facility. The roof of the LAW vitrification facility will consist of metal roofing, roof insulation, and a vapor barrier. Roof drains and drainage system with overflow drains will collect run-off. The approximate dimensions of the unit are summarized in Table 4E-5.

LAW Container Buffer Storage Containment Building Structure

Because the LAW container buffer storage containment building will be a concrete-walled structure fully enclosed within the LAW vitrification facility, its structural requirements will be met by the design standards of the LAW vitrification facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the LAW vitrification facility meet or exceed the Uniform Building Code Seismic Design Requirements.

LAW Container Buffer Storage Containment Building Materials

The LAW container buffer storage containment building will be constructed of steel-reinforced concrete provided with an epoxy coating to protect the concrete and facilitate decontamination.

Use of Incompatible Materials for the LAW Container Buffer Storage Containment Building

The waste to be managed includes vitrified waste glass within the stainless steel containers. No glass waste is expected to be present on the exterior of the containers. The interior is the only portion of the container that will be exposed to the glass waste. Reagents that could cause corrosion or other failure of the epoxy coating will not be used within the unit.

Primary Barrier Integrity in the LAW Container Buffer Storage Containment Building

The LAW container buffer storage containment building will be designed to withstand loads from the movement of personnel, wastes, and handling equipment. The seismic design criteria found in *RPP-WTP Compliance with Uniform Building Code Seismic Design Requirements*, DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the LAW Container Buffer Storage Containment Building

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the LAW container buffer storage containment building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained. The requirements of 40 CFR 264.1101(b) do not apply to this design because any dangerous waste containing free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the LAW Container Buffer Storage Containment Building

Operational and maintenance controls and practices will be established to ensure containment of the waste within the LAW container buffer storage containment building, as required by 40 CFR 264.1101(c)(1). Activities in the building will be remotely conducted during normal operation when ILAW containers are present.

Maintenance of the LAW Container Buffer Storage Containment Building

The epoxy coated concrete will be free of corrosion or other deterioration because it will be compatible with materials that will be managed in the containment building, which will include containerized glass waste and equipment. Wastes containers managed in the containment building will not be stacked.

Measures to Prevent Tracking Wastes from the LAW Container Buffer Storage Containment Building

The LAW container buffer storage containment building is designed to manage the movement and storage of ILAW containers. Conducting these activities in a C5 zone prevents the spread of contaminated materials from the unit as airflow is managed in the LAW vitrification facility ventilation system. The containment building is under negative pressure. Airflow through this containment building goes to a C5 air system, which passes through HEPA filters before exiting the facility stack. Personnel access will be restricted during normal operation since it is classified as a C5 contamination area. The containment building may be reclassified as a C3 area for equipment maintenance.

Procedures in the Event of Release or Potential for Release from the LAW Container Buffer Storage Containment Building

Conditions that could lead to a release from the LAW container buffer storage containment building will be corrected on a schedule intended to preclude a release that could be hazardous to public health or the environment. In the unlikely event of a release of dangerous wastes from the containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste. The methods will be developed to repair conditions that could lead to a release.

Inspections of the LAW Container Buffer Storage Containment Building

An inspection program will be established to detect conditions that could lead to a release of wastes from the LAW container buffer storage containment building. The inspection and monitoring schedule and methods that will be used to detect releases from the unit are included in DWP Operating Unit Group 10, Chapter 6.0.

4E.4 Air Emission Control

4E.4.1 LAW Vitrification Facility Ventilation

The LAW vitrification facility will be divided into four numbered zones (the C4 designation is not used) listed and defined below, with the higher number indicating greater radiological hazard potential and therefore a requirement for a greater degree of control or restriction. The zoning of the ventilation system will be based on the classifications assigned to building areas for potential radiological contamination. Zones classified as C5 are potentially the most contaminated and include the pour caves, buffer storage area, and process cells. Zones classified as C1 are uncontaminated areas.

Containment will be achieved by maintaining C5 areas at the greatest negative pressure, with airflows cascaded through engineered routes from C2 areas to C3 areas and on to the C5 areas. The cascade system, in which air passes through more than one area, will reduce the number of separate ventilation streams and hence the amount of air requiring treatment. Adherence to this concept in the design and operation of the LAW vitrification facility will ensure that the ventilation air does not become a significant source of exposure to operators, and that the air emissions do not endanger human health or the environment.

An exhaust air radiation monitoring system, consisting of sensors to monitor radiation in the exhaust air stream, or a representative sampling system is provided in the discharge header downstream of the exhaust fans. A monitoring system would consist of probe assemblies, vacuum pumps, a stack flow sensor, temperature sensor, and radiation sensors. A temperature transmitter is also provided in the discharge header downstream of the exhaust fans for continuous monitoring of exhaust air temperature.

C1 Ventilation (C1V) System

C1 areas are normally occupied. C1 areas will typically consist of administrative offices, control rooms, conference rooms, locker rooms, rest rooms, and equipment rooms. C1 areas will be operated slightly pressurized relative to atmosphere and other adjacent areas.

C2 Ventilation (C2V) System

C2 areas will typically consist of non-process operating areas, equipment rooms, stores, access corridors, and plant rooms adjacent to areas with higher contamination potential. The C2V is served by dedicated air handling units and exhaust fans. Ventilation air supplied to C2 areas will be exhausted by the C2 exhaust system and cascaded into adjacent C3 areas. The sum of the volumetric flow rates exhausted by the C2 exhaust system and cascaded into adjacent C3 areas will be greater than the volumetric flow rate supplied to C2 areas. This will cause the C2 areas to maintain a nominal negative pressure relative to atmosphere. C2 exhaust will pass through one stage of HEPA filters and be discharged to the atmosphere by the exhaust fans. Supply and exhaust fans are provided with variable frequency drives.

C3 Ventilation (C3V) System

C3 areas are normally unoccupied, but allow operator access, for instance during maintenance. C3 areas will typically consist of filter plant rooms, workshops, maintenance areas, and monitoring areas. Air will generally be drawn from C2 areas and, wherever possible, cascaded through the C3 areas into C5 areas, or alternatively exhausted from the C3 areas by the C3 exhaust system. In general, air cascaded into the C3 areas will be from adjacent C2/C3 subchange rooms. C3 exhaust will pass through one stage of

HEPA filters and be discharged to the atmosphere by the exhaust fans. C3 exhaust fans are provided with variable frequency drives.

C5 Ventilation (C5V) System

Where there is in-bleed air from the C3 system to the C5 system, fan cascade trip interlocks protect the system from backflow.

The C5 areas in the LAW vitrification facility will be composed of the following:

- Pour caves
- Container transfer tunnel
- Buffer storage area
- C3/ C5 drains/ sump collection vessel room
- Process cells
- Finishing line

Air will be cascaded into the C5 areas and exhausted by the C5 exhaust system. Engineered ventilation pipe entries (air in-bleeds) through the C5 confinement boundary will be protected by backflow isolation dampers. C5 exhaust will pass through two stages of HEPA filters and be discharged to the atmosphere by the exhaust fans. C5 exhaust fans are provided with variable frequency drives.

4E.4.2 LAW Melter Offgas System

The LAW Melter Offgas System consists of the following process systems:

- LAW Primary Offgas Process (LOP) System
- LAW Secondary Offgas/Vessel Vent Process (LVP) System

Process flow diagram of the LAW Primary Offgas Process (LOP) System are provided in DWP Operating Unit Group 10, Appendix 9.1. The LOP tank system consists of the following tanks and miscellaneous treatment unit sub-systems and their associated ancillary equipment:

Tank System

- LAW Melter SBS Condensate Vessels (LOP-VSL-00001/2)
- Pumps
- Eductor (LOP-EDUC-00001)

Miscellaneous Treatment Unit Sub-Systems

- Melter 1 and Melter 2 Primary and Standby Film Coolers (LOP-FCLR-00001/2/3/4), one set for each melter
- Melter 1 and Melter 2 Submerged Bed Scrubbers (SBS)(LOP-SCB-00001/2)
- Melter 1 and Melter 2 Wet Electrostatic Precipitators (WESP) (LOP-WESP-00001/2)

Process flow diagram of the LAW Secondary Offgas/Vessel Vent Process (LVP) System are provided in DWP Operating Unit Group 10, Appendix 9.1. The LVP tank system consists of the following tanks and miscellaneous treatment unit sub-systems and their associated ancillary equipment.

Tank System

- LAW Caustic Collection Tank (LVP-TK-00001)

Miscellaneous Treatment Unit Sub-Systems

- Melter Offgas HEPA Preheaters(LVP-HTR-00001A/1B)
- Melter Offgas HEPA Filters (LVP-HEPA-00001A/1B/2A/2B/3A)
- Offgas Mercury Adsorbers (LVP-ADBR-00001A/1B)
- Catalytic Oxidizer Electric Heater (LVP-HTR-000002)
- Thermal Catalytic Oxidizer (LVP-SCO-00001)
- NOx Selective Catalytic Reduction Unit (LVP-SCR-00001)
- Catalytic Oxidizer Heat Recovery Unit (LVP-HX-00001)
- Melter Offgas Exhausters (LVP-EXHR-00001A/B/C)
- Melter Offgas Caustic Scrubber (LVP-SCB-00001)

Melter offgas is generated from the vitrification of LAW feed in the two joule-heated ceramic melters and the vessel ventilation system. The rate of generation of gases in the melter is dynamic. The melters generate offgas resulting from decomposition, oxidation, and vaporization of feed material. Constituents of the offgas include:

- Nitrogen oxides from decomposition of metal nitrates in the melter feed
- Chloride, fluoride, and sulfur as oxides, acid gases, and salts
- Particulates and aerosols
- Entrained feed material and glass
- Mercury

In addition, the LAW Melters generate small quantities of other volatile compounds including iodine-129, carbon-14, tritium, and volatile organic compounds. Carbon-14 and tritium are in the form of carbon dioxide and water, respectively.

The purpose of the LAW Melter offgas system is to cool and treat the melter offgas and vessel ventilation offgas to a level that is protective of human health and the environment. The offgas system must also provide a pressure confinement boundary that will control melter pressure and prevent vapor release to the cell. The design of the melter offgas system must accommodate changes in offgas flow from individual melters without causing either melter to pressurize and without allowing variations in the flow from one melter to impact the other melter.

Separate systems are provided for the initial treatment of offgas from each melter. This is considered the primary offgas treatment system. This primary offgas system is designed to handle intermittent surges of seven times the normal steam generation rate and three times the normal non-condensable gas generation rate from the melter feed without causing interruption of melter operations. The primary system consists of Film Coolers (LOP-FCLR-00001/3), Submerged Bed Scrubbers (LOP-SCB-00001/2), and a Melter Wet Electrostatic Precipitator (LOP-WESP-00001/2). This system cools the offgas and removes particulates.

There is a second offgas line from the Melter to the Submerged Bed Scrubbers (LOP-SCB-00001/2) consisting of a Standby Film Cooler (LOP-FCLR-00002/4) and a butterfly valve as the isolation device. The melter is operated under negative pressure. In the event that the primary offgas line plugs or the melter surges beyond design basis, the butterfly valve opens allowing offgas flow to the submerged bed scrubber through the second offgas line, thereby preventing melter pressurization. The line is also designed to handle surges up to seven times the normal steam generation rate and three times the non-condensable gas generation rate from melter feed without causing interruption in melter operations. In the event that the melter surge exceeds the pressure relief set point the pressure relief device opens venting the offgas to the process cell. The pressure relief device closes as the melter pressure approaches

the desired set point. Offgas from the wet process cell is drawn through C5V HEPA Filters to remove particulates before discharged to the atmosphere.

The vessel ventilation system offgas consists primarily of air, water vapor, and minor amounts of aerosols generated by the agitation or movement of vessel contents. The vessel ventilation system header joins the primary offgas system after the Wet Electrostatic Precipitators (LOP-WESP-00001/2), and the combined offgas is routed to the secondary offgas treatment system.

The secondary offgas system (from HEPA preheater to final discharge) is designed to handle maximum sustained flowrate from the two melters assuming both melters are operating. The system is also capable of operating effectively if only one melter is running. The secondary offgas system consists of Melter Offgas Preheater (LVP-HTR-00001A/1B) with Melter Offgas HEPA Filter trains (LVP-HEPA-00001A/1 2A/3A and 00001B/2B), and the Melter Offgas Exhausters (LVP-EXHR-00001A/B/C). The balance of the secondary offgas system includes the Offgas Mercury Adsorbers (LVP-ADBR-00001A/B), LVP-SKID-00002 made up of a Thermal Catalytic Oxidizer (LVP-SCO-00001)/Selective CatalyticReducer (LVP-SCR-00001), the Catalytic Oxidizer Heat Recovery Unit (plate and frame heat exchanger) (LVP-HX-00001), Catalytic Oxidizer Electric Heater (LVP-HTR-00002), the catalyst for volatile organic compound oxidation and the catalyst for nitrogen oxides reduction; and a Melter Offgas Caustic Scrubber (LVP-SCB-00001).

The melter offgas exhausters will be located downstream of the LVP Caustic Scrubber (LVP-SCB-00001) and maintain negative pressure across the LVP primary and secondary offgas equipment upstream of the exhausters. The following sections provide descriptions of major melter offgas treatment components.

4E.4.2.1 LAW Primary Offgas Process (LOP) System

Process flow diagram of the LAW Primary Offgas Process (LOP) System are provided in DWP Operating Unit Group 10, Appendix 9.1. The purpose of the LOP tank system and miscellaneous treatment unit sub-systems is to cool the offgas and remove aerosols generated by each of the two LAW melters. The primary components consist of a film cooler, submerged bed scrubber, and a wet electrostatic precipitator.

<u>Melter Film Coolers (LOP-FCLR-00001/2/3/4)</u>

The primary function of the Film Cooler miscellaneous treatment unit sub-system is to cool the offgas and entrained molten glass droplets below the glass sticking temperature to minimize glass deposition on the offgas piping walls. The offgas exits the melter and is mixed with steam or steam/air mixture in the offgas Film Cooler. The Film Cooler is a double-walled pipe designed to introduce air/steam axially along the walls of the offgas pipe through a series of holes or slots in the inner wall. Each melter has a primary and a standby Film Cooler.

<u>Melter Submerged Bed Scrubber (LOP-SCB-00001/2)</u>

Each LAW Melter has a dedicated Submerged Bed Scrubber miscellaneous treatment unit sub-system. After each primary Film Cooler (LOP-FCLR-00001/3), the offgas enters the Submerged Bed Scrubber column for further cooling and solids removal. The Submerged Bed Scrubber is a passive device designed for aqueous scrubbing of entrained particulates from melter offgas, cooling and condensation of melter vapor emissions, and interim storage of condensed fluids. It will also quench the offgas to a desired discharge temperature through the use of cooling coils/jacket. The offgas leaves the Submerged Bed Scrubber in approximate thermal equilibrium with the scrubbing solution.

The Submerged Bed Scrubbers (LOP-SCB-00001/2) have two offgas inlets, one for the normal operations line and one for the standby line. Standby Film Coolers (LOP-FCLR-00002/4) can be routed to either Submerged Bed Scrubber. Each Standby Film cooler is normally routed to its respective submerged bed scrubber; however, each film cooler can be routed to the alternate submerged bed scrubber. The offgas enters the Submerged Bed Scrubber through the appropriate inlet pipe that runs down through the center of the bed to the packing support plate. The bed-retaining walls extend below the support plate creating a

lower skirt to allow the formation of a gas bubble underneath the packing. The entire bed is suspended off the floor of the Submerged Bed Scrubber to allow the scrubbing solution to circulate freely through the bed. After formation of the gas bubble beneath the packing, the injected offgas then bubbles up through the packed bed. The rising gas bubbles also cause the scrubbing liquid to circulate up through the packed bed, resulting in a general recirculation of the scrubbing solution. The packing breaks larger bubbles into smaller ones to increase the gas to water contacting surface, thereby increasing particulate removal and heat transfer efficiencies. The warmed scrubbing solution then flows downward outside of the packed bed past the cooling coils/jacket.

To maintain a constant liquid level within the Submerged Bed Scrubbers (LOP-SCB-00001/2), it will be equipped with overflow lines that allows for the continuous discharge of offgas condensate and some scrubbed particulates to the Melter SBS Condensate Vessels (LOP-VSL-00001/2) located next to the Submerged Bed Scrubber. The Melter SBS Condensate Vessels are equipped with a cooling jacket. The rate of condensate discharge is determined by how much the offgas temperature is lowered below its dew point. The condensate and some collected particulates overflow into the Melter SBS Condensate Vessels.

To minimize the buildup of the solids in the bottom of the Submerged Bed Scrubber, condensate from the Melter SBS Condensate Vessels (LOP-VSL-00001/2) will be re-circulated back to the Submerged Bed Scrubber and injected through multiple lances to agitate and suspend solids on the submerged bed scrubber floor. The collected solids will then be pumped directly off the Submerged Bed Scrubber vessel floor to the Melter SBS Condensate Collection Vessel (RLD-VSL-00005). This purging and recycling process occurs simultaneously. Submerged Bed Scrubber condensate from the SBS Condensate Collection Vessels (LOP-VSL-00001/2) ultimately flows to the TLP system. Venting of the Melter SBS Condensate Vessels is via the Submerged Bed Scrubber into the main offgas discharge pipe.

The scrubbed offgas discharges through the top of the Submerged Bed Scrubbers (LOP-SCB-00001/2) and is routed to the Melter Wet Electrostatic Precipitators (one per melter) (LOP-WESP-00001/2) for further particulate removal.

In addition to the instrumentation, alarms, controls, and interlocks addressed in Appendix 4E, the following will be provided for the Submerged Bed Scrubber to indicate or prevent the following conditions:

- High scrubber liquid temperature.
- Low and High scrubber liquid level.
- High condensate vessel liquid level.
- Loss of chilled water supply.
- Differential pressure across the unit.

Melter Wet Electrostatic Precipitators (LOP-WESP-00001/2)

The Submerged Bed Scrubber (LOP-SCB-00001/2) discharge is routed to the Melter Wet Electrostatic Precipitator miscellaneous treatment unit sub-system for removal of aerosols down to and including submicron size. Each melter system has a dedicated Melter Wet Electrostatic Precipitator (LOP-WESP-00001/2). The offgas enters the unit and passes through a distribution plate. The evenly distributed saturated gas then flows up through tubes which act as positive electrodes. Each of the tubes has a single negatively charged electrode, which runs down the center of the tube. A high voltage, direct current transformer supplies power to the electrodes. A strong electric field is generated along the electrodes giving a negative charge to the aerosols passing through the tubes. The negatively charged particles move towards the positively charged tube walls for collection. Collected particles are continuously washed from the tube walls along with collected mists. The final condensate continuously drains to the Melter Wet Electrostatic Precipitators' (LOP-WESP-00001/2) dished bottom area. A water

spray may be used periodically to facilitate washing collected aerosols from the tubes. The tube drain and wash solution are routed to the C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004).

In addition to the instrumentation, alarms, controls, and interlocks addressed in Appendix 4E, the following will be provided for the Melter Wet Electrostatic Precipitators to indicate or prevent the following conditions:

- Loss of electrical power to the unit.
- High differential pressure across the unit.
- Accumulation of liquid.
- Loss of process water supply.

Standby Offgas Line

The standby line consists of an offgas pipe from the melter to a Submerged Bed Scrubber (LOP-SCB-00001/2), a Standby Film Cooler (LOP-FCLR-00002/4), and a butterfly valve as the isolation device.

During an off-normal melter surge or if the primary offgas pipe becomes plugged, this valve will open rapidly, providing an alternative path for the melter offgas to flow to the Submerged Bed Scrubbers (LOP-SCB-00001/2). With this alternative routing, pressure control on the melter plenum can be maintained. This standby offgas pipe will extend to the bottom of the Submerged Bed Scrubber packed bed, identical to the main offgas line. It is the same size as the main offgas line, thus providing a doubling of flow cross-section for melter-generated gases.

The LAW Melters are also equipped with a maintenance bypass line allowing offgases from one melter to be routed to the other's Submerged Bed Scrubber for cooling. The gas will be processed through both a primary and secondary offgas treatment system in the same manner as the normal path. The purpose of this line is to provide melter ventilation during idling conditions in the unlikely event that a Submerged Bed Scrubber (LOP-SCB-00001/2) or Melter Wet Electrostatic Precipitator (LOP-WESP-00001/2) requires maintenance. Prior to initiating use of the maintenance bypass line, waste feed would be secured, and the melters placed into an idle condition. No waste feed would be fed to the melters when the maintenance bypass line is in use.

Idling emissions from the melter are mainly heated air at a lower gas volume than expected during slurry feeding. The gas will be processed through secondary offgas treatment system that includes HEPA filtration, thermal catalytic oxidation, and selective catalytic reduction.

4E.4.2.2 LAW Secondary Offgas/Vessel Vent Process (LVP) System

Process flow diagram of the LAW Secondary Offgas/Vessel Vent Process (LVP) System are provided in DWP Operating Unit Group 10, Appendix 9.1. The offgas system prevents migration of waste contaminants into the process cells and potentially operating areas. It does this by maintaining the various LAW process vessels under a slight vacuum relative to the cell. The composition of the ventilation air is expected to be primarily air with slight mixed waste particulate contamination.

The vessel ventilation air is combined with the melter offgas prior to entering the secondary offgas system HEPA filter electric preheaters. The combined air streams are treated together in the remaining sections of the secondary offgas treatment systems. A pressure control valve is used to regulate the pressure between the vessel ventilation offgas system and the melter offgas system.

The melter offgas stream that is treated through the primary offgas system is combined with the vessel ventilation offgas stream and treated through the LVP tanks and miscellaneous treatment sub-systems. The secondary offgas system removes the remaining particulate, mercury and miscellaneous acid gases, gaseous nitrogen oxide compounds, carbon monoxide, and volatile organic compounds.

Descriptions of the tanks and miscellaneous treatment sub-systems comprising the LVP are provided below:

Melter Offgas HEPA Filters, HEPA Preheaters, and Exhausters

The purpose of these miscellaneous treatment unit sub-systems is to provide a final protection against dispersion of particulate and to protect the downstream equipment from particulate contamination. The combined offgas stream is first passed through the LAW Melter Offgas HEPA Preheaters (LVP-HTR-00001A/1B). Preheating increases the gas temperature sufficiently above its dew point to avoid condensation in the melter offgas HEPA filters. The offgas then passes through radial flow HEPA Filters (LVP-HEPA-00001A/2A/3A or 00001B/2B). The system is composed of two parallel trains of two filter banks in series.

The offgas passes through one train while the other remains available as an installed backup. Motive force for the ventilation is provided by the Melter Offgas Exhausters (LVP-EXHR-00001A/B/C). The melter offgas exhausters will be located downstream of the LVP Caustic Scrubber (LVP-SCB-00001) and maintain negative pressure across the LVP primary and secondary offgas equipment upstream of the exhausters.

Instrumentation, alarms, controls, and interlocks will be provided for the LVP system to indicate or prevent the following conditions:

- High or low differential pressure across a HEPA filter alarms.
- Loss of electric heater element.

Additional information to the instrumentation, alarms, controls, and interlocks associated with a bypass of the LVP system addressed in Appendix 4E are described in the *LAW Vitrification Offgas Bypass Analysis*, 24590-LAW-PER-PR-03-001.

Offgas Mercury Adsorber (LVP-ADBR-0001A/B)

The Offgas Mercury Adsorbers (LVP-ADBR-00001A/B) make up LVP-SKID-00001 and are the miscellaneous treatment sub-system that removes volatile mercury, iodine, and some acid gases from the offgas. The offgas flows through two internal activated carbon beds normally operated in series. When gaseous mercury is detected breaking through the leading activated carbon bed, indicating that the carbon is loaded, the offgas flow is manually changed to make the trailing bed the leading bed. Only one activated carbon bed is used when the spent activated carbon media is removed, and replaced. The flow is then changed to make the fresh activated carbon bed the trailing bed.

The activated carbon is batch loaded into the adsorber by gravity. The spent activated carbon media is batch transferred by gravity into waste containers.

Instrumentation, alarms, controls, and interlocks will be provided for the Offgas Mercury Adsorbers (LVP-ADBR-00001A/B) to indicate or prevent the following conditions:

- Mercury breakthrough in the leading carbon bed signaling to switch to the trailing carbon bed.
- With the detection of high carbon monoxide/carbon dioxide concentrations the inlet and outlet valves are closed, isolating the carbon media and bypassing the carbon beds from the offgas stream. This limits the available oxygen to a carbon bed fire and is the primary fire suppression control.
- A water suppression system is available in the event of a carbon bed fire. Alarms notify an operator allowing the connection of the water fire suppression system and manual activation of the suppression system if needed.

Thermal Catalytic Oxidizer (LVP-SCO-00001) and NOx Selective Catalytic Reduction (SCR) Unit (LVP-SCR-00001)

The offgas passes through the catalytic oxidizer/reducer skid (LVP-SKID-00002) housing a heat recovery unit (LVP-HX-00001), an electric heater (LVP-HTR-00002), VOC catalyst (LVP-SCO-00001), and SCR catalyst (LVP-SCR-00001) miscellaneous treatment unit sub-systems to remove volatile organic compounds, carbon monoxide, nitrogen oxide compounds in the offgas stream.

The heat recovery exchange first raises the offgas temperature using the hot offgas from the catalyst beds. The electric heater is used to supplement the heat recovery exchange primarily during start-up and when operating with low NO_x concentrations. The heated offgas is passed through the VOC catalyst to oxidize VOCs and carbon monoxide to carbon dioxide and water vapor. The offgas is then injected with a mixture of ammonia vapor and C3 air from an ammonia/air dilution skid. Following ammonia injection, the offgas is passed through the SCR catalyst to reduce NO_x to nitrogen and water vapor.

The reduction reaction is exothermic, significantly increasing the offgas temperature. The outgoing hot offgas is cooled down in the heat exchanger and concurrently serves as the heating media for the incoming offgas. The cooled offgas stream is then directed to the Caustic Scrubber for acid gas removal and final cooling.

Instrumentation, alarms, controls, and interlocks will be provided for the Thermal Catalytic Oxidizer / Selective Catalytic Reducers to indicate or prevent the following conditions:

- High differential pressure across each catalyst bed.
- Loss of ammonia gas supply to the nitrogen oxides selective catalytic reduction unit.
- Failure of the electric heater.
- Ammonia analyzer to indicate ammonia slip in the outlet.
- Low offgas temperature entering the unit.
- High temperature differential across the unit.
- High nitrogen oxide concentration in the unit outlet stream.
- High volatile organic compound concentration in the unit outlet stream.

Offgas Caustic Scrubber (LVP-SCB-00001)

The LAW Melters' offgas Caustic Scrubber miscellaneous treatment unit sub-system further treats the offgas by removing iodine and acid gases and providing final offgas cooling. The offgas stream enters the bottom of the scrubber and flows upward through a packed bed. Contaminants in the offgas stream are absorbed into the liquid stream through interaction of the gas, liquid, and packing media. To neutralize the collected acid gases, a sodium hydroxide solution is added periodically to the LAW Caustic Collection Tank (LVP-TK-00001). The clean offgas is then discharged through an internal mist eliminator to prevent droplet carryover. The scrubbing liquid flows downward through the packing bed and drains into the LAW Caustic Collection Tank (LVP-TK-00001). The contents of this tank are periodically transferred to the pretreatment facility. After passing through the Caustic Scrubber (LVP-SCB-00001) and the Melter Offgas Exhausters (LVP-EXHR-00001A/B/C), the offgas is released to the environment via a flue in the plant stack.

In addition to the instrumentation, alarms, controls, and interlocks addressed in Appendix 4E, the following will be provided for the Caustic Scrubber to indicate or prevent the following conditions:

- Loss of recirculation pump.
- Loss of caustic supply.
- Loss of process water supply.

- High differential pressure across the column.
- Low scrubbing liquid level.
- High scrubbing liquid level.
- Loss of transfer pump.
- Low pH.
- High specific gravity (density).

This page intentionally left blank.

1

Table 4E-1 LAW Vitrification Facility Tank Systems						
No.	**System**	**Vessel Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**	**Approximate Dimensions (Inside Diameter) × Height or Length in feet and inches (tangent line/tangent line)**
1	LCP	LCP-VSL-00001 L-0123	LAW Melter 1 Concentrate Receipt Vessel	Stainless Steel	18,130	14’-0” 12’-9”
2	LCP	LCP-VSL-00002 L-0124	LAW Melter 2 Concentrate Receipt Vessel	Stainless Steel	18,130	14’-0” 12’-9”
3	LFP	LFP-VSL-00001 L-0123	Melter 1 Feed Preparation Vessel	Stainless Steel	9,123	11’-0” 10’-6”
4	LFP	LFP-VSL-00002 L-0123	Melter 1 Feed Vessel	Stainless Steel	9,123	11’-0” 10’-6”
5	LFP	LFP-VSL-00003 L-0124	Melter 2 Feed Preparation Vessel	Stainless Steel	9,123	11’-0” 10’-6”
6	LFP	LFP-VSL-00004 L-0124	Melter 2 Feed Vessel	Stainless Steel	9,123	11’-0” 10’-6”
7	LVP	LVP-TK-00001 L-0218	LAW Caustic Collection Tank	Stainless Steel	14,232	13’-0’ (od) 14’-4”
8	LOP	LOP-VSL-00001 L-0123	LAW Melter 1 SBS Condensate Vessel	Hastelloy	9,056	12’-0” 8’-2”
9	LOP	LOP-VSL-00002 L-0124	LAW Melter 2 SBS Condensate Vessel	Hastelloy	9,056	12’-0” 8’-2”
10	RLD	RLD-VSL-00003 L-0126	Plant Wash Vessel	6% Mo/Stainless Steel	25,780	16’-0” 15’-5”

Table 4E-1 LAW Vitrification Facility Tank Systems						
No.	**System**	**Vessel Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**	**Approximate Dimensions (Inside Diameter) × Height or Length in feet and inches (tangent line/tangent line)**
11	RLD	RLD-VSL-00004 L-B001B	LAW C3/C5 Drains/Sump Collection Vessel	Stainless Steel/Inconel 625	7,696	10’-0” 11’-0”
12	RLD	RLD-VSL-00005 L-0126	SBS Condensate Collection Vessel	6% Mo/Stainless Steel	25,780	16’-0” 15’-5”

1

Table 4E-2 LAW Vitrification Facility Miscellaneous Units (Systems and Sub-Systems)					
No.	**System/ Subsystem**	**Component Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**
LAW Vitrification Facility					
1	LOP	LOP-FCLR-00001 L-0112	Melter 1 Primary Film Cooler	Stainless Steel	NA
2	LOP	LOP-FCLR-00002 L-0112	Melter 1 Standby Film Cooler	Stainless Steel	NA
3	LOP	LOP-FCLR-00003 L-0112	Melter 2 Primary Film Cooler	Stainless Steel	NA
4	LOP	LOP-FCLR-00004 L-0112	Melter 2 Standby Film Cooler	Stainless Steel	NA
5	LOP	LOP-SCB-00001 L-0123	Melter 1 Submerged Bed Scrubber	Ceramic Packing/Hastelloy	4,948
6	LOP	LOP-SCB-00002 L-0124	Melter 2 Submerged Bed Scrubber	Ceramic Packing/Hastelloy	4,948
7	LOP	LOP-WESP-00001 L-0123	Melter 1 Wet Electrostatic Precipitator	6% Molybdenum/Stainless Steel	N/A
8	LOP	LOP-WESP-00002 L-0124	Melter 2 Wet Electrostatic Precipitator	6% Molybdenum/Stainless Steel	N/A
9	LMP	LMP-MLTR-00001 L-0112	LAW Melter 1	Stainless Steel/Alloys	1,860
10	LMP	LMP-MLTR-00002 L-0112	LAW Melter 2	Stainless Steel/Alloys	1,860
11	LVP	LVP-SCB-00001 L-0304F	Melter Offgas Caustic Scrubber	Hastelloy/Metal Intalox Packing/Stainless Steel	TBD

Table 4E-2 LAW Vitrification Facility Miscellaneous Units (Systems and Sub-Systems)					
No.	**System/ Subsystem**	**Component Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**
12	LVP	LVP-HEPA-00001A L-0304H	Melter Offgas HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
13	LVP	LVP-HEPA-00001B L-0304H	Melter Offgas HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
14	LVP	LVP-HEPA-00002A L-0304H	Melter Offgas HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
15	LVP	LVP-HEPA-00002B L-0304H	Melter Offgas HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
16	LVP	LVP-HEPA-00003A L-0304H	Melter Offgas HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
17	LVP	LVP-SCO-00001 (located on LVP SKID-00002) L-0304F	Thermal Catalytic Oxidizer	Stainless Steel	NA
18	LVP	LVP-SCR-00001 (located on LVP SKID-00002) L-0304F	NOx Selective Catalytic Reduction Unit	Stainless Steel	NA
19	LVP	LVP-HTR-00001A L-0304H	Melter Offgas HEPA Preheater	Stainless Steel/Incoloy 800	NA
20	LVP	LVP-HTR-00001B L-0304H	Melter Offgas HEPA Preheater	Stainless Steel/Incoloy 800	NA
21	LVP	LVP-HTR-00002 (located on LVP SKID-00002) L-0304F	Catalytic Oxidizer Electric Heater	Stainless Steel	NA
22	LVP	LVP-HX-00001 (located on LVP SKID-00002) L-0304F	Catalytic Oxidizer Heat Recovery Unit	Stainless Steel	NA

Table 4E-2 LAW Vitrification Facility Miscellaneous Units (Systems and Sub-Systems)					
No.	**System/ Subsystem**	**Component Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**
23	LVP	LVP-ADBR-00001A (located on LVP-SKID-00001) L-0304F	Offgas Mercury Adsorber	Stainless Steel	NA
24	LVP	LVP-ADBR-00001B (located on LVP-SKID-00001) L-0304F	Offgas Mercury Adsorber	Stainless Steel	NA
25	LVP	LVP-EXHR-00001A L-0304C	Melter Offgas Exhausters	Stainless Steel	NA
26	LVP	LVP-EXHR-00001B L-0304D	Melter Offgas Exhausters	Stainless Steel	NA
27	LVP	LVP-EXHR-00001C L-0304E	Melter Offgas Exhausters	Stainless Steel	NA

1

Table 4E-3 LAW Vitrification Facility Secondary Containment Rooms/Areas				
Room/Area	**Approximate Room/Area Dimensions (L×W, in feet)**	**Miscellaneous Treatment Units or Tanks in Room/Area (Largest Plant Item)**	**Volume of Largest Plant Item in Room/Area (US Gallons)**	**Minimum Secondary Containment Height (feet)**
LAW Vitrification Facility				
1. L-0123, Melter 1 Process Cell	Minimum secondary containment for these cells has been deleted and superceded by *Flooding Volume for LAW Facility*, 24590-LAW-PER-M-02-002 (DWP, Operating Unit Group, Appendix 9.8).			
2. L-0124, Melter 2 Process Cell				
3. L-0126, Effluent Cell				
4. L-B001B, C3/C5 Drains/Sump Collection Vessel Room				
5. L-0218, Caustic Scrub Blowdown Collection Berm				
6. L-0304 F, Caustic Scrubber Curb Area				
7. ASX Sampler Cabinets • ASX-SMPLR-00012 (L-0301) • ASX-SMPLR-00013 (L-0301)	Secondary containment liners for Isolok flush tubing, no minimum liner height required. The LAW ASX sampler upper secondary containment area liner dimensions are approximately 33” X 34”. The lower containment area liner dimensions are approximately 39” X 68”			
8. Bulges • LCP-BULGE-00001 (L-0202) • LCP-BULGE-00002 (L-0202) • LCP-BULGE-00003 (L-0202) • LFP-BULGE-00001 (L-0202) • LFP-BULGE-00002 (L-0202) • LOP-BULGE-00001 (L-0202) • LOP-BULGE-00002 (L-0202) • RLD-BULGE-00001 (L-B001A) • RLD-BULGE-00004 (L-0202)	Secondary containment for ancillary equipment, no minimum liner height required			

1

Table 4E-4 LAW Vitrification Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
LAW Vitrification Facility				
Sumps				
RLD-SUMP-00028 L-B001B (C3/C5 Drains/Sump Collection Vessel Cell, El. –21’)	59	Radar	24” Dia. x 30” Deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00002005
RLD-SUMP-00029 L-0123 (Process Cell, El. 3’	37	Radar	30” Dia. x 12” Deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002
RLD-SUMP-00030 L-0123 (Process Cell, El. 3’)	37	Radar	30” Dia. x 12” Deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002
RLD-SUMP-00031 L-0124 (Process Cell Sump, El. 3’)	37	Radar	30” Dia. x 12” Deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002
RLD-SUMP-00032 L-0124 (Process Cell, El. 3’)	37	Radar	30” Dia. x 12” Deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003002
RLD-SUMP-00035 L-0126 (Effluent Cell, El. 3’)	37	Radar	30” Dia. x 12” Deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003003

Table 4E-4 LAW Vitrification Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
RLD-SUMP-00036 L-0126 (Effluent Cell, El. 3')	37	Radar	30" Dia. x 12" Deep Stainless Steel (6% Mo)	**24590-LAW** -M6-RLD-00003003
Bulges/Floor Drains				
RLD-FD-00001 Floor Drain L-B001B (RLD-BULGE-00001 Drain, El. -21')	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-RLD-00002003
RLD-FD-00035 Floor Drain L-0126 (RLD-BULGE-0000-4 Drain, El. 3')	N/A	N/A	2" Dia. 6% Mo	**24590-LAW** -M6-RLD-00001005
LOF-FD-00001 Floor Drain L-0123 (LOP-BULGE-00001 Drain, El. 3)	N/A	N/A	2" Dia. 6% Mo	**24590-LAW** -M6-LOP-00001003
LCP-FD-00001 Floor Drain L-0123 (LCP-BULGE-00001 Drain, El. 3')	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-LCP-00001001
LCP-FD-00002 Floor Drain L-0123 (LCP-BULGE-00002 Drain, El. 3')	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-LCP-00001004
LFP-FD-00001 Floor Drain L-0123 (LFP-BULGE-00001 Drain, El. 3)	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-LFP-00001005
LOP-FD-00002 Floor Drain L-0124 (LOP-BULGE-00002 Drain, El. 3)	N/A	N/A	2" Dia. 6% Mo	**24590-LAW** -M6-LOP-00002003
LCP-FD-00003 Floor Drain L-0124 (LCP-BULGE-00003 Drain, El. 3)	N/A	N/A	2" Dia. 316L	**24590-LAW** -M6-LCP-00002001
LFP-FD-00002 Floor Drain	N/A	N/A	2" Dia.	**24590-LAW**

Table 4E-4 LAW Vitrification Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
L-0124 (LFP-BULGE-00002 Drain, El. 3)			316L	-M6-LFP-00003005
LVP-FD-00001 Floor Drain L-0218 (Berm floor drain for LVP-TK-00001, El. 28')	N/A	N/A	4" Dia. 316L	**24590-LAW** -M6-LVP-00002003
RLD-FD-00025 Floor Drain L-0304F (Curb floor drain for LVP-TK-00001, El. 48')	N/A	N/A	4" Dia. 316L	**24590-LAW** -M6-RLD-00003001
Drain Lines				
RLD-WS-20037-S11B-01 Drain Line L-0123 (Melter 1 Encasement Assembly Drain, El. 3')	N/A	N/A	1" Dia. 316L	**24590-LAW** -M6-LMP-00012001
RLD-WS-20033-S11B-11 Drain Line L-0124 (Melter 2 Encasement Assembly Drain, El. 3')	N/A	N/A	1" Dia. 316L	**24590-LAW** -M6-LMP-00042001
Autosampler Drain Lines				
RLD-WU-22123-S11B-03 ASX Sampler 00012 Lower Containment Drain Line (L-0301, El. 48')	N/A	Thermal Dispersion	3" Dia. Stainless Steel 316L	**24590-LAW** -M6-RLD-00003001
RLD-WU-22117-S11B-03 ASX Sampler 00013 Lower Containment Drain Line (L-0301, El. 48')	N/A	Thermal Dispersion	3" Dia. Stainless Steel 316L	**24590-LAW** -M6-RLD-00003001

1

Table 4E-5 LAW Vitrification Facility Containment Buildings Summary	
Location	**Approximate Room Dimensions (L × W × H in feet)**
LAW Vitrification Facility	
1. L-0112 LAW LSM Gallery Containment Building	150 x 62 x 24
2. LAW Container Finishing Containment Building:	
L-0109B Swabbing Area Line 2	21 × 15 × 24
L-0109C Decontamination Area Line 2	18 × 15 × 24
L-0109D Inert Fill Area Line 2	55 × 15 × 24
L-0115B Swabbing Area Line 1	21 × 15 × 24
L-0115C Decontamination Area Line 1	18 × 15 × 24
L-0115D Inert Fill Area Line 1	55 × 15 × 24
L-0109E Container Monitoring/Export Area	19 × 18 × 14
L-0115E Container Monitoring/Export Area	19 × 18 × 14
3. L-0119B LAW Consumable Import/Export Containment Building	30 x 28 x 17
4. L-0226A LAW C3 Workshop Containment Building	34 x 22 x 19
5. LAW Pour Cave Containment Building:	
L-B015A Melter 1 Pour Cave	16.5 × 20 x 23
L-B013C Melter 1 Pour Cave	16.5 × 20 x 23
L-B013B Melter 2 Pour Cave	16.5 × 20 x 23
L-B011C Melter 2 Pour Cave	16.5 × 20 x 23
L-B011B Future Melter 3 Pour Cave	16.5 × 20 x 23

Table 4E-5 LAW Vitrification Facility Containment Buildings Summary	
Location	**Approximate Room Dimensions (L × W × H in feet)**
L-B009B Future Melter 3 Pour Cave	16.5 × 20 x 23
6. LAW Container Buffer Storage Containment Building:	
L-B025C Container Buffer Store	22 x 22 x 23
L-B025D Container Rework	22 x 14 x 23

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 4F
HIGH-LEVEL WASTE (HLW) VITRIFICATION FACILITY

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
12/15/2016	8C.2016.Q3

This page intentionally left blank.

APPENDIX 4F
HIGH-LEVEL WASTE (HLW) VITRIFICATION FACILITY

This page intentionally left blank.

APPENDIX 4F
HIGH-LEVEL WASTE (HLW) VITRIFICATION FACILITY

TABLE OF CONTENTS

4F High-Level Waste (HLW) Vitrification Facility 5
4F.1 Containers 6
4F.1.1 Description of Containers 6
4F.1.2 Container Management Practices 7
4F.1.3 Container Labeling 10
4F.1.4 Containment Requirements for Storing Waste 11
4F.1.5 Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes in Containers 14
4F.2 Tank Systems 14
4F.2.1 HLW Melter Feed Process 14
4F.2.2 HLW Melter Process (HMP) System 16
4F.2.3 Radioactive Liquid Waste Disposal (RLD) System 18
4F.2.4 IHLW Glass Canister Handling Process 19
4F.2.5 HLW Melter Cave Mechanical Systems 23
4F.2.6 HLW Filter Handling (HFH) System 25
4F.2.7 Radioactive Solid Waste Handling (RWH) System 26
4F.3 Containment Buildings 27
4F.3.1 HLW Melter Cave 1 Containment Building (H-0117, H-0116B, H-0310A) and HLW Melter Cave 2 Containment Building (H-0106, H-0105B, H-0304A) 28
4F.3.2 IHLW Canister Handling Cave Containment Building (H-0136) 31
4F.3.3 IHLW Canister Swab and Monitoring Cave Containment Building (H-0133) 33
4F.3.4 C3 Workshop Containment Building (H-0311A, H-0311B) 34
4F.3.5 Filter Cave Containment Building (H-0104) 36
4F.3.6 HLW Pour Tunnel 1 Containment Building (H-B032) and HLW Pour Tunnel 2 Containment Building (H-B005A) 38
4F.3.7 HLW Drum Swabbing and Monitoring Area Containment Building (H-0126A, H-0126B, and H-B028) 40
4F.3.8 HLW Waste Handling Area Containment Building (H-410B, H-411) 42
4F.4 Air Emission Control 44
4F.4.1 HLW Facility Ventilation 44
4F.4.2 Melter Offgas Treatment Process (HOP) System 45

4F.4.3 Process Vessel Vent (PVV) System 50
4F.4.4 HLW Pulse Jet Ventilation (PJV) System 50

TABLES

Table 4F-1 HLW Vitrification Facility Tank Systems 53
Table 4F-2 HLW Vitrification Facility Miscellaneous Units (Systems and Sub-Systems) 55
Table 4F-3 HLW Vitrification Facility Secondary Containment Rooms/Areas 61
Table 4F-4 HLW Vitrification Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines 63
Table 4F-5 HLW Vitrification Facility Container Storage Areas 66
Table 4F-6 HLW Vitrification Facility Containment Buildings Summary 67

4F High-Level Waste (HLW) Vitrification Facility

The purpose of this appendix is to describe the major systems associated with the HLW vitrification facility. Figure 4A-4 located in Appendix 4A presents a simplified process flow diagram of the HLW vitrification processes. The HLW facility will consist of several process systems designed to perform the following functions:

- Receive pretreated HLW slurry.
- Convert blended HLW slurry and glass formers into glass.
- Treat melter offgas.
- Handle Immobilized High Level Waste (IHLW) canisters.
- Store IHLW canisters.
- Provide supporting equipment in the melter cave.
- Handle miscellaneous secondary waste.
- Ventilate the HLW facility.

The following figures located in Appendix 4A and design drawings found in Appendix 10 provide additional detail for the HLW facility:

- Waste Treatment Plant (WTP) Simplified Flow Diagram (Fig. 4A-1)
- HLW Facility Flow Diagram (Fig. 4A-4)
- Typical System Figures (Fig. 4A-53 and 4A-54) depicting common features for each regulated system

Instrumentation, alarms, controls, and interlocks will be provided for the tank systems and miscellaneous treatment systems to indicate or prevent the following conditions, as appropriate:

- Overfilling: Plant items are protected against overfilling by liquid level indication, high level instrumentation interlocks to shut off feed sources, and process control system control functions backed up by hard wired trips as required.
- Loss of containment: Plant items are protected against containment loss by liquid level indication, and by process control system control and alarm functions as required, including shut off of feed sources. Tanks or miscellaneous units (MUs) that manage liquid mixed or dangerous waste is provided with secondary containment. Tank and MU system ancillary equipment is provided with secondary containment or is visually inspected for leaks on a daily basis in accordance with Washington Administrative Code (WAC)173-303-640(4)(f). Some tanks or MUs may utilize daily visual inspection for leak detection. Sumps associated with the management of mixed or dangerous waste are provided with liquid level instrumentation and an ejector or pump to empty the sump as needed.
- Inadvertent transfers of fluids: System sequential operations are properly interlocked to prevent inadvertent transfers at the wrong time or to the wrong location.
- Loss of mixing function: Tank systems are instrumented (air pressure/flow indication) to prevent hydrogen accumulation and solids settling. Tanks with agitators are instrumented to prevent agitator and/or vessel damage at low liquid level.
- Unsafe or off-normal melter operating conditions.
- Degraded emissions control equipment and/or operating conditions.
- Loss of air flow: The ventilation system is designed to create a pressure gradient which causes air to flow through engineered routes from an area of lower contamination potential to an area of higher contamination potential.
- Loss of site power.

In addition to level control, temperature and pressure may be monitored for tank systems and miscellaneous treatment systems in some cases.

Regulated process and leak detection system instruments and parameters will be provided in DWP Table III.10.E.G for tank systems and in DWP Table III.10.J.C for miscellaneous treatment sub-systems.

Descriptions of the HLW vitrification process, melter offgas treatment systems, and IHLW glass canister handling systems are provided in Sections 4F.2 through 4F.4. Table 4F-1 lists current tank design information (capacity, materials of construction, and dimensions). Table 4F-2 lists the current miscellaneous unit design information. The tanks and miscellaneous units are grouped by process systems in these tables.

Tanks or miscellaneous units that manage liquid mixed or dangerous waste are provided with secondary containments. Table 4F-3 summarizes the secondary containment rooms/areas and calculated minimum liner heights. Sumps, leak detection boxes, and secondary containment drain systems are listed in Table 4F-4.

4F.1 Containers

This section identifies the containers and container management practices that will be followed at the HLW vitrification facility. The term "container" is used as defined in WAC 173-303-040. Note that in this appendix and throughout the permit, terms other than containers may be used, such as canisters, boxes, bins, flasks, casks, and overpacks.

The container storage areas located in the HLW vitrification plant consists of:

- IHLW canister storage cave (immobilized glass) (H-0132)
- HLW east corridor El. 0 ft (secondary waste) (HC-0108/09/10)
- HLW loading area (secondary waste) (H-0130)

Container storage area dimensions at the HLW vitrification facility are summarized in Table 4F-5.

The following sections address waste management containers:

- Description of Containers - Section 4F.1.1
- Container Management Practices - Section 4F.1.2
- Container Labeling - Section 4F.1.3
- Containment Requirements for Storing Waste - Section 4F.1.4
- Prevention of Ignitable, Reactive, and Incompatible Wastes in Containers - Section 4F.1.5

4F.1.1 Description of Containers

These types of waste will be managed in containers:

- IHLW (immobilized glass)
- Miscellaneous mixed waste (secondary waste)
- Miscellaneous nonradioactive dangerous waste (secondary waste)

The waste form dictates the type of containers used for waste management. The following paragraphs describe these types of containerized waste that are managed at the HLW vitrification facility.

Immobilized Glass Waste

The immobilized glass waste is a mixed waste that will be managed in IHLW canisters specially designed to remain stable during receipt of glass waste, and which are capable of remote handling. The Permittees are developing a petition to delist IHLW.

The IHLW canisters will be approximately 177 inches (in.) high and 24 in. in diameter, with a wall thickness of approximately 0.1345 in. and a nominal capacity of 43 cubic feet (ft^3). The IHLW canisters will be constructed of austenitic (304L) stainless steel.

Based on results from the programs at the Oak Ridge National Laboratory and Savannah River Technology Center, the 304L stainless steel is physically and chemically compatible with the IHLW glass waste.

Miscellaneous Mixed Waste

Generally, miscellaneous mixed wastes are secondary wastes that may include, but are not limited to, the following items:

- Spent or failed equipment
- Offgas High Efficiency Particulate Air (HEPA) filters
- Melter consumables
- Spent melters

Spent equipment and offgas filters will typically be managed in commercially-available containers such as steel drums or steel boxes, of varying size. The containers for miscellaneous mixed waste will comply with transportation requirements, with receiving treatment, storage, and disposal (TSD) facility waste acceptance criteria, and will be compatible with the miscellaneous mixed waste. These containers may or may not include a liner. Final container selection, container and waste compatibility, and the need for liners, will be based on the physical, chemical, and radiological properties of the waste being managed.

Melter consumables are routinely generated wastes and include spent feed tubes, pressure transducers, bubblers, thermocouples, and discharge risers. HLW melter consumables will be remotely size reduced, if necessary, and placed into steel baskets with lids. The baskets will be placed into drums and the drums placed into shielded casks for export from the facility.

After a spent HLW melter is deemed to meet criteria and regulations for onsite disposal, it will be placed in a welded carbon steel container (overpack) or other acceptable packaging in accordance with waste acceptance criteria for the receiving TSD facility. Regulatory issues and permitting actions associated with onsite disposal of spent and/or failed melters will be addressed in the future.

Each miscellaneous mixed waste container will have associated documentation that describes the contents, such as waste type, physical and chemical characterization, and radiological characterization. This information will be retained within the plant information network.

Most miscellaneous secondary mixed wastes will be spent equipment and consumables such as pumps, air lances, HEPA filters, etc., and are not expected to contain liquids. If wastes are generated that contain liquids, these wastes may be treated to remove or absorb liquids, to comply with the receiving TSD facility waste acceptance criteria.

Miscellaneous Nonradioactive Dangerous Waste

Each nonradioactive dangerous waste container will have associated documentation that describes the contents, such as waste type and physical and chemical characterization. Typically, commercially available containers will be used. The types of containers used for packaging nonradioactive dangerous waste will comply with the receiving TSD facility waste acceptance criteria and transportation requirements. However, final container selection, container and waste compatibility, and the need for liners will be based on the physical and chemical properties of the waste being managed.

4F.1.2 Container Management Practices

The following paragraphs describe how each of the containers used at the HLW vitrification facility are managed.

4F.1.2.1 Immobilized Glass Waste Containers

Immobilized glass waste IHLW canisters will be moved remotely due to the high radiation content of the waste. A brief discussion of how the containers move through the WTP is presented below.

IHLW Canisters

The empty canister will be remotely transported to the IHLW pour station located in Pour Tunnel 1 and 2. The canister will be sealed to the melter pour spout with a pour head. After filling, the canister will be allowed to cool to glass transition temperature (approximately 400°C to 500°C), which characterizes the transformation from an equilibrated melt to a "frozen" glass structure, prior to transportation to the IHLW Canister Handling Cave Containment Building (H-0136) (see Section 4F.3).

The IHLW canister will be transferred to the IHLW canister handling cave containment building unit by means of bogie. Here it will be stored on an open rack for up to three days, until it cools to normal operating temperature. Normal operating temperature is the temperature at which the canister can be lidded. This temperature range is 70°F to 350°F. In addition to providing a cooling area, the IHLW canister handling cave containment building unit can be used as a buffer to hold canisters awaiting lid welding or decontamination.

After it has cooled, the volume of glass in the canister will be determined. The canister will then be inspected for glass spatter on its exterior. If glass is found, it will be removed using a needle gun, and the debris generated will be collected with a vacuum system and disposed of as a secondary waste. The lid will be attached by welding, to seal the canister completely and permanently.

The sealed canister will be transported inside the bogie rinse vessel HDH-VSL-00001 to the canister decon cave (H-B035). The canisters, placed in canister decon vessel 1 or 2 (HDH-VSL-00002/4), are first rinsed with de-ionized water and then decontaminated using a cerium nitrate and nitric acid bath. It will then be rinsed with nitric acid, followed by a de-ionized water rinse, and then wiped or swabbed with a soft absorbent material in the canister swabbing and monitoring containment building (H-0133). The radiation levels of the swab will be monitored.

The canister will then be moved to the IHLW canister storage cave (H-0132) where it will be stored until transported off-site inside a shielded shipping cask. The canisters will not be stacked. Storage area dimensions and maximum waste storage volumes are summarized in Table 4F-5.

Other IHLW Canister Storage Requirements

As stated in WAC 173-303-630(5)(c), a 30 in. separation is required between aisles of containers holding dangerous waste. In addition, WAC 173-303-340(3) requires a 30 in. separation to allow unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment in an emergency.

Evaluation of the 30-in. aisle spacing requirement by the United States Department of Energy (DOE), WTP, the United States Environmental Protection Agency (EPA), and the Washington State Department of Ecology (Ecology) for IHLW canisters concluded that aisle spacing in the range of 4 to 16 in. was adequate based on the following factors:

- Personnel access into the immobilized glass canister storage cave will be restricted. High radiation dose rates from immobilized glass waste canisters will preclude personnel entry into the process and storage areas, and inspection of the IHLW canisters will be performed remotely. (See Operating Unit Group 10, Chapter 6.0 for the inspection approach.)
- Water-based fire suppression systems will not be used in the HLW canister storage cave. Because of its inert nature, the glass waste will present a low fire hazard, and a minimal amount of combustible material will be present. The only potentially combustible material that may be present in the immobilized glass waste canister storage cave is insulation on crane motors and

associated cables. To ensure no water is introduced into the canister storage cave, a dry chemical fire suppressant system may be installed.

- Spill control equipment will not be necessary within the IHLW canister storage cave. Spills or leaks from the stored canisters will not occur because the glass waste will be in a solid form and will not contain free liquid. The glass transition temperature characterizes the transformation from an equilibrated melt to a "frozen" glass structure.

No stacking of the IHLW canisters will occur. Closed circuit television cameras will enable general viewing of both areas.

Miscellaneous Mixed Waste Containers

Miscellaneous mixed waste (secondary waste) will be managed in:

- HLW East corridor (HC-0108/09/10)
- HLW loading area (H-0130)

Containers will be kept closed unless waste is being added, removed, or sampled while in the containment storage areas. Containers stored in these areas will be placed on pallets, or otherwise elevated to prevent contact with liquid, if present. Table 4F-5 summarizes the dimensions and maximum capacity of miscellaneous mixed waste storage areas. Containers will be managed in designated areas throughout the WTP, and then transferred to a suitable TSD facility.

The HLW East corridor (HC-0108/09/10) will be located in the eastern portion of the main floor (0 ft elevation) of the HLW vitrification facility. This unit will be used as a storage location prior to export of secondary waste containers out of the facility. Aisle space will be 30 in, and waste containers may or may not be stacked. This unit's storage capacity is listed in Table 4F-5.

The HLW loading area (H-0130) will be located in the eastern portion on the 0 ft elevation of the HLW vitrification facility. The unit will be used for storage of the miscellaneous waste containers prior to shipment to a suitable TSD facility. The aisle space will be 30 in. and waste containers may or may not be stacked. This unit's storage capacity is listed in Table 4F-5.

Miscellaneous Nonradioactive Dangerous Waste Containers

Miscellaneous dangerous waste containers will typically be managed in non-permitted waste management units (satellite accumulation areas and less-than-90-day storage areas) located throughout the HLW vitrification facility. Containers will be kept closed unless waste is being added, removed, or sampled. They will routinely be moved by forklift or drum cart, and will be managed in a manner that prevents ruptures and leaks.

4F.1.2.2 Waste Tracking

The plant information network interfaces with the integrated control network and is designed to collect and maintain plant information. The plant information network is currently planned to the following systems (all systems used at the plants/facilities and balance of facilities are provided for information only):

- Plant data warehouse and reporting system
- Laboratory information management system
- Waste tracking and inventory system

Inventory and Batch Tracking

The waste tracking and inventory system will interface with the information system data historian to provide reporting information such as tank volumes, waste characteristics, and facility inventories of process waste. The waste tracking system will also be used to query operations parameters at any time

information is needed, as specified by operations, to manage the process system. IHLW canisters will be tracked within the facility using an operations developed system: for example, manually recording on a board, manually inputting into the information network, or if available, automated through the integrated control network.

Secondary Waste Stream Tracking

Containerized secondary waste streams and equipment will be tracked and managed through commercially available database management software. Containers will be mapped in each plant and updated during the inspection process using a commercially available drawing software application.

Laboratory Information Management System

The laboratory information management system (LIMS) will be an integral feature of the plant information network. The LIMS will serve as an essential tool for providing data management of regulatory and processing samples. The chosen LIMS will be a commercial off-the-shelf software package designed for performing laboratory information management tasks as described in American Standard Test Method (ASTM) E1578-93, *Standard Guide for Laboratory Information Management Systems (LIMS)*.

The LIMS will track the flow of samples through the laboratory. Samples received in the laboratory will be identified with a unique identification label. The identification label provides details of the sample process stream. Baseline analyses are defined by the requesting plant. Additional analyses, as required, will be input into LIMS by laboratory analysts. Data will be input into LIMS manually or by data transfer using LIMS/instrument interface. Analyses will be performed using approved and validated analytical procedures.

Analytical results will be compiled by the LIMS and held pending checking and approval by appropriate staff. Approved results will be reported to the requesting plant.

4F.1.3 Container Labeling

Immobilized Waste Glass Containers

Due to the radioactivity and handling requirements of the immobilized waste containers, conventional labeling of the immobilized waste containers will not be feasible and an alternative to the standard labeling requirements will be used. This alternative labeling approach will use a unique alphanumeric identifier for the IHLW canister that will be welded onto each immobilized glass waste container.

The welded “identifier” will ensure that the number is always legible, will not be removed or damaged during container handling, will not be damaged by heat or radiation, emits no gas upon heating when waste glass enters the container, and will not degrade over time.

The identifier will be welded onto the shoulder and side wall of each immobilized glass container at two locations approximately 180 degrees apart. Characters will be approximately 2 in. high by 1.5 in. wide. The identifier will be formed by welding on stainless steel filler material at the time of container fabrication. This identifier will be used to track the container from receipt at the WTP, throughout its subsequent path at the WTP, until it leaves the plant to be disposed or stored.

Each identifier will be unique. This unique number will be maintained within the plant information network and will list data pertaining to the waste container including waste numbers and the major risk(s) associated with the waste.

Personnel access into the immobilized glass waste container storage areas will be limited and controlled administratively. Signs designating the hazards associated with the immobilized waste glass will be posted at appropriate locations outside the container storage areas.

Miscellaneous Mixed Waste Containers

The miscellaneous mixed waste containers will be labeled with the accumulation or generation start date, as appropriate, the major risk(s) associated with the waste, and the words "hazardous waste" or "dangerous waste." A waste tracking and inventory system will be implemented. Labels and markings will be positioned so that required information is visible. The label will meet the WAC 173-303-630(3) requirements, and the dangerous waste number will be clearly identified.

The labels on the overpack for the spent melters will carry the accumulation or generation start date, the major risk(s) associated with the waste, and the words "hazardous waste" or "dangerous waste". A waste tracking and inventory system will be implemented. Labels and markings will be positioned so that required information is visible, and the dangerous waste number will be clearly identified.

Miscellaneous Dangerous Waste Containers

The miscellaneous dangerous waste drums will be labeled with the accumulation or generation start date, as appropriate, the major risk(s) associated with the waste, and the words "hazardous waste" or "dangerous waste". A waste tracking and inventory system will be implemented. Labels and markings will be positioned so that required information is visible. The label will meet the WAC 173-303-630(3) requirements, and the dangerous waste number will be clearly identified.

4F.1.4 Containment Requirements for Storing Waste

Secondary containment requirements for the waste managed in the immobilized waste container storage areas and the limited amount of other materials present are discussed below.

4F.1.4.1 Secondary Containment System Design

Secondary containment is required for areas in which containers hold free liquids. It is also required for areas managing wastes exhibiting the characteristics of ignitability or reactivity as defined in WAC 173-303-090(5) and (7).

IHLW

Secondary containment requirements do not pertain to the IHLW canister storage cave, as these canisters will not contain free liquids or wastes that are designated ignitable or reactive.

Miscellaneous Mixed Waste

Miscellaneous mixed waste storage areas may contain waste requiring secondary containment. If wastes containing liquids or wastes exhibiting the characteristics of ignitability or reactivity are generated, portable secondary containment that meets the requirements of WAC 173-303-630(7) will be provided.

Miscellaneous Dangerous Waste

Miscellaneous dangerous waste storage areas may contain waste requiring secondary containment. If wastes containing liquids or wastes exhibiting the characteristics of ignitability or reactivity are generated, portable secondary containment that meets the requirements of WAC 173-303-630(7) will be provided.

4F.1.4.2 System Design

IHLW

There will be one container storage area for the IHLW canisters in the HLW vitrification facility, as follows:

- IHLW canister storage cave (H-0132)

The IHLW canister storage cave will be located in the HLW vitrification facility, which is designed to be seismically qualified, as outlined in DWP Operating Unit Group 10, Supplement 1. A secondary containment system will not be needed because the immobilized glass waste will not contain liquid. In

addition, because liquid will not be present in the IHLW container storage cave, the floor will not be sloped and will not contain drains or sumps.

Liquid will not be present within the IHLW container storage cave for the following reasons:

- Administrative controls will ensure that liquid does not enter inside filled IHLW canisters.
- The IHLW canister storage cave will be completely enclosed with a metal roof.
- Penetrations to the storage area will be sealed to prevent water ingress.
- Rainwater will be directed away using roof drains.

The location of the IHLW canister storage cave is shown on general arrangement drawings in DWP Operating Unit Group 10, Appendix 10.4.

Miscellaneous Mixed Waste

There will be two miscellaneous mixed waste (secondary waste) container storage areas at the HLW vitrification facility, as follows:

- HLW east corridor El. 0 ft (HC-0108/09/10)
- HLW loading area (H-0130)

The HLW waste container storage areas will be located within the HLW vitrification facility. Therefore, these units will be completely enclosed within the plants, which will have metal roofing, roof insulation, and a vapor barrier. Penetrations to the storage areas will be sealed to prevent water ingress, and rainwater will be directed away using roof drains.

Miscellaneous Dangerous Waste

Containers with liquids will be provided with portable secondary containment meeting the requirements of WAC 173-303-630(7).

4F.1.4.3 Structural Integrity of the Base

The storage areas will be constructed to support storage and transportation of containers within the container storage areas and will be designed with the following:

- Containment system capable of collecting and holding spills and leaks.
- Base will be free of cracks and gaps and sufficiently impervious to contain leaks.
- Positive drainage control.
- Sufficient containment volume.
- Sloped to drain or remove liquid, as necessary.

4F.1.4.4 Containment System Capacity

IHLW

Because liquids will not be present in the IHLW canister storage cave, a containment system capacity demonstration is not required.

Miscellaneous Mixed Waste

The HLW container storage areas do not require secondary containment because storage of liquids in these units is not anticipated. If the waste is found to contain liquid, portable secondary containment will be provided that meets the requirements of WAC 173-303-630(7). The waste container will function as the primary containment while the portable containment device will function as the secondary containment. Each portable secondary containment will have the capacity to contain 10% of the volume of all containers within the containment area, or the volume of the largest container, whichever is greater.

Each container holding liquid dangerous waste will be placed into portable secondary containment that meets the requirements of WAC 173-303-630(7). The waste container will function as the primary containment while the portable containment device will function as the secondary containment.

Miscellaneous Dangerous Waste

Each container holding liquid nonradioactive dangerous waste will be placed into portable secondary containment. The waste container will function as the primary containment while the portable sump will function as the secondary containment.

Each portable secondary containment will have the capacity to contain 10% of the volume of all containers within the containment area, or the volume of the largest container, whichever is greater. Typically, the waste containers will be steel drums.

4F.1.4.5 Control of Run-On

IHLW

The IHLW container storage cave will be located inside the HLW vitrification facility. The requirements for this section do not apply because the immobilized glass waste canister storage cave is within the HLW vitrification facility and therefore will not be exposed to run-on.

Miscellaneous Mixed Waste

Run-on will not reach the interior of the miscellaneous mixed waste storage areas, because they will be located within buildings, which will have roof gutters to remove precipitation.

Miscellaneous Dangerous Waste

Run-on will not reach the interior of the miscellaneous dangerous waste storage areas, because waste will be managed in buildings with walls and roof to remove precipitation.

4F.1.4.6 Removal of Liquids from Containment System

IHLW

No liquids will be present in the IHLW canister storage cave, therefore, the requirements of this section do not apply to the immobilized waste glass container storage area.

Miscellaneous Mixed Waste

Portable secondary containment sumps will be provided for individual containers that contain liquids. Hand pumps or similar devices will be used to remove liquid released to the portable secondary containments.

Miscellaneous Dangerous Waste

Portable secondary containment sumps will be provided for individual containers that contain liquids. Hand pumps or similar devices will be used to remove liquid released to the portable secondary containments.

4F.1.4.7 Demonstration that Containment is not Required because Containers do not Contain Free Liquids, Wastes that Exhibit Ignitability or Reactivity, or Wastes Designated F020-023, F026 or F027

IHLW

The IHLW glass canister storage cave will not contain liquids. The vitrification process volatilizes water or other liquid materials existing at ambient conditions in the waste slurry feed that enters the melter.

The waste numbers for ignitability (D001) and reactivity (D003) will not be managed in the immobilized glass canister storage cave. Wastes with the F020-F023, F026, and F027 numbers are not identified for the double shell tank (DST) system unit. Therefore, these waste numbers will not be present at the WTP.

Miscellaneous Mixed Waste

Liquids may be present in wastes in the HLW secondary mixed waste storage areas. Secondary containment will be provided for individual containers that manage liquids. Wastes with the F020-F023, F026, and F027 numbers are not identified for the DST system. Therefore, these waste numbers will not be present at the HLW vitrification facility.

Miscellaneous Dangerous Waste

Wastes with the F020-F023, F026, and F027 numbers are not identified for the DST system. Therefore, these waste numbers will not be present at the HLW vitrification facility.

4F.1.5 Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes in Containers

Ignitable, Reactive, or Incompatible IHLW

Immobilized glass waste will not be ignitable, reactive, or incompatible with the wastes managed in the IHLW canister storage cave. The requirements of this section are not applicable to the immobilized glass waste canisters, including spent melters.

Ignitable, Reactive, or Incompatible Miscellaneous Mixed Waste and Miscellaneous Dangerous Waste

Potentially incompatible wastes are not expected to be managed in the miscellaneous mixed waste storage areas. If such wastes are managed in one of these areas, the containers of incompatible waste or chemicals will not be stored in close proximity to each other. Acids and bases will be stored on separate portable secondary containment sumps; oxidizers will be stored in areas separate from combustible materials; and corrosive chemicals will be stored on a separate secondary containment sump. These separate storage areas within the unit will be clearly marked with signs indicating the appropriate waste to be stored in each area. Potentially incompatible waste will be stored at least one aisle width apart.

4F.2 Tank Systems

4F.2.1 HLW Melter Feed Process

Process flow diagrams of the HLW Melter Feed Process (HFP) System are provided in Appendix 10.1. The following HLW melter feed description is identical for both Melter 1 (HMP-MLTR-00001) and Melter 2 (HMP-MLTR-00002). The HLW melter feed process consists of the following:

- HLW Concentrate Receipt Process (HCP) System.
- HLW Melter Feed Process (HFP) System.
- HLW Glass Formers Reagent (GFR) System (the GFR system does not manage dangerous waste and is provided for information only).

HLW Concentrate Receipt Process (HCP) System

The HCP system consists of the transfer piping from Pretreatment Facility (PTF) to HLW, a sump (HCP-SUMP-00001), and its ancillary equipment.

HLW Melter Feed Process (HFP) System

The primary function of the HFP system is to receive HLW feed slurry via the HCP from the PTF, mix glass formers with HLW feed to form a uniform blend, and provide a blended feed to the HLW melter. An analysis of a waste sample determines a glass additive formulation for the conversion of the waste to

glass. The glass additives specified in the formulation are weighed, transferred to HLW, and mixed with the waste.

The HFP system consists of the following vessels and associated ancillary equipment:

- HLW Feed Preparation Vessel (HFP-VSL-00001/5)
- HLW Melter Feed Vessel (HFP-VSL-00002/6)
- Pumps, demisters, piping, and ancillary equipment

HLW Feed Preparation Vessel (HFP-VSL-00001/5)

The HLW Feed Blend Vessel (HLP-VSL-00028) or backup HLW Lag Storage Vessel (HLP-VSL-00027/AB) located in the PTF feed waste through the HLP/HCP underground waste transfer piping to the HLW HFP system Feed Preparation Vessels (HFP-VSL-00001/5). The HFP vessels are provided with sample supply and return lines to autosamplers ASX-SMPLR-00029 (HFP-VSL-00001/2) and ASX-SMPLR-00042 (HFP-VSL-00005/6). Samples of the waste are taken from the HLW Feed Preparation Vessel to determine the ratio of glass formers to waste. Blended glass formers are sent to the glass former feed mixers in HLW via the balance of facilities glass former system. The blend may include materials, such as silica, boric acid, calcium silicate, ferric oxide, lithium carbonate, and sucrose. The glass formers are gravity-fed to the HLW Feed Preparation Vessel (HFP-VSL-00001/5) and blended with the waste to form a uniform slurry.

HLW Melter Feed Vessel (HFP-VSL-00002/6)

The blended slurry is transferred from the HLW Feed Preparation Vessel (HFP-VSL-00001/5) to the corresponding HLW Melter Feed Vessel (HFP-VSL-00002/6) and then to a HLW melter (HMP-MLTR-00001/2).

All four HFP vessels are equipped with the following:

- Mechanical agitators and pumps
- Air spargers for purging hydrogen from the vessel head space during offnormal events
- Demister on the vessel vent line for de-entrainment
- Cooling jackets
- Steam ejectors
- Antifoaming agent addition capability
- Overflow line to sump HFP-SUMP-00002/5, equipped with flapper valve to prevent air in-leakage

HLW Glass Formers Reagent (GFR) System

The HLW GFR system contains glass former feed mixers located at the 73 ft. elevation of the HLW facility. The feed mixers receive blended glass formers by dense-phase pneumatic conveyors from transporters. The transporters are located in the glass formers room within the balance of facilities building.

Following the blending cycle, the glass formers are gravity-fed with a rotary feeder into the HLW Feed Preparation Vessels (HFP-VSL-00001/5), where the blended glass formers are mixed with the waste feed. This GFR equipment is located in an isolated area that serves as a contamination barrier between the Feed Preparation Vessels (HFP-VSL-00001/5) and the glass former supply. The rotary feeder valve controls the rate of glass former addition into the Feed Preparation Vessels (HFP-VSL-00001/5).

The HLW GFR mixers are equipped with filters to remove dust from the air used for pneumatic conveying and blending. It is anticipated that a series of single filter cartridges will be mounted on the top of the mixers. The filters are cleaned by introducing compressed air through the cleaning nozzle to

blow accumulated dust back into the mixers. The HLW GFR mixers are equipped with load cells to weigh the glass formers to confirm that the material in the upstream blending silo is conveyed to the feed mixers. The load cells also confirm that the glass formers are transferred out of the feed mixers to the HLW Feed Preparation Vessels (HFP-VSL-00001/5).

4F.2.2 HLW Melter Process (HMP) System

Figure 4A-27 located in Appendix 4A presents a simplified process flow diagram of the HLW melter process (HMP) system. Process flow diagrams of the HMP System are provided in Appendix 10.1. The primary functions of HMP miscellaneous treatment sub-system are to convert blended waste feed and glass formers into molten glass, deliver molten glass to HLW canisters, fill the canisters with molten glass waste, and monitor and control glass waste level during waste filling. The melter process system (HMP) is identical for both HLW Melters (HMP-MLTR-00001/2).

The HMP system includes the HLW Melters (HMP-MLTR-00001/2), two discharge chambers and two pour spouts per melter, and primary and secondary canister level detection systems. The melter and pour spout will be remotely operated in the C5/R5 melter cave. There will be no personnel access to this cell after processing of the HLW feed stream begins.

HLW Melters (HMP-MLTR-00001/2)

The two HLW Melters (HMP-MLTR-00001/2), located in melter cave 1 and melter cave 2, respectively, are encased in a rectangular steel shell. Each is lined inside with refractory material as thermal insulation and to withstand corrosion by molten glass. The melter is provided with water cooling to maintain a thermal gradient in the bricks, prevent migration of glass through the bricks, and reduce heat load to the process cell. The lid of the HLW Melter will be sealed to the melter shell in order to provide gas containment. The lid will provide a support structure through which subcomponents can be mounted. Penetrations are sealed by appropriate fittings that allow remote removal and replacement.

Waste feed will be introduced to the melter as a slurry through nozzles in the melter lid. Each feed nozzle will be individually supplied from a slurry pump. The water and volatile feed constituents in the slurry will evaporate, leaving behind a layer of material known as the cold cap. Waste feed components and glass formers will undergo chemical reactions, be converted to their respective oxides, and dissolve into the molten glass. New slurry will be added at about the same rate as the cold cap dissolves, maintaining the quantity of cold cap material at a steady level. The molten glass level in the melter is maintained between the top of the electrodes and below the upper edge of the glass contact refractory blocks. The rate of feed addition to the melter determines the cold cap coverage in the melt pool. The feed addition rate can be controlled based on the average plenum temperature measured by thermocouples mounted in the melter lid. Air injectors may be used to mix molten glass and improve heat distribution.

Each melter (HMP-MLTR-00001/2) includes three internal compartments: the melter chamber (glass pool), two discharge chambers, and a plenum just above the glass pool. Melter pool level measurement is used throughout melter operations in conjunction with alarms for high or low glass pool levels. Each discharge chamber is a heavily insulated box on the south side of the melter, housing the discharge trough and a connection flange for the pour spout assembly. The plenum is lined with refractory to withstand hot corrosive gases, thermal shock, and waste splatter.

The power to the electrodes is regulated by the process control system to maintain the temperature within range. The heat for the initial HLW Melter startup is provided by radiant electric heaters temporarily mounted on the lid of the melter. These heaters melt the glass formers sufficiently to make it ionically conductive between the Melter's joule heating electrodes. When a conducting path is established, the Melter is heated in a controlled manner by increasing the current between the electrodes through the glass (a process known as *joule heating*). The nominal glass melt pool temperature is approximately 1150°C. As the slurry is fed, molten glass is formed by vitrification of the cold cap materials into the glass melt. When the melt level rises to a predetermined level, it can be discharged into a canister.

The gas produced during melting is mainly steam and contains volatile components and airborne matter that require removal prior to discharge to the atmosphere. This offgas is diluted by air from four sources; air in-leakage through the Melter lid and discharge port, instrumentation and sparging, film cooler air, engineered air in-bleeds in the melter shell. The Melter plenum is maintained at a vacuum with offgas system blowers and control injection of air into the film cooler near the Melter exhaust. This ensures containment and avoids Melter pressurization. This vacuum is sensed at a location near the plenum where blockage and feed splatter is unlikely. The sensed vacuum is used to drive a control valve that regulates the in-flow in the Melter exhaust line.

The glass level in the Melters (HMP-MLTR-00001/2) is maintained between the top of the upper electrodes and below the upper edge of the melter's refractory blocks. The level is determined directly by bubbler tubes that indicate density and glass depth. Thermocouples housed in thermowells that penetrate the cold cap and are immersed in the molten glass also indirectly indicate molten glass level. Level measurement is used throughout melter operations in conjunction with alarms for high or low glass pool levels.

Glass Discharge System

Discharge is achieved by transferring glass from near the bottom of the melt pool up through a riser and out of the Melter through a side discharge chamber. Under each of the two discharge chambers there is a pour spout that directs the molten glass flow from the Melter discharge chamber to the respective HLW canister.

The glass level in the Melter is maintained between the top of the electrodes and the overflow level of the discharge trough. The Melter glass pool level will be measured to indicate when to start and stop glass discharge. Each Melter has two independently operated glass discharge systems, adjacent to each other on one side of the Melter.

Each system includes an airlift riser, an airlift lance, a glass pour trough, and a heated discharge chamber. Glass is discharged by introducing gas into the molten glass in the discharge riser. The gas increases the level in the riser, causing the molten glass to flow down the trough and fall from the tip of the trough into the canister. When the desired level in the canister is reached, the air lift gas is turned off, and the glass level in the riser recedes stopping the flow of glass to the canister. During pouring operations, a remote camera is used to view the pour stream within the pour spout assembly. The camera is for observation only and is not a regulated operation.

Canister Level Detection

The purpose of each canister level detection system is to monitor the molten glass level within the HLW canister and to prevent canister overfilling. During glass pour, the level detection system is used to monitor the glass level to ensure the canister is filled to the desired level. The level detection system also will be able to monitor the rate at which the glass level is rising in the canister. There is a primary and a secondary monitoring system, which is consistent with standard vessel level control. A primary system that operates through the process control system is used for normal operations, and a secondary "hard-wired" system is used to back up the primary system and automatically shut down the fill before the overflow limit is reached. The primary level detection system is a thermal imaging camera that provides continuous level monitoring over the upper 60% of the canister. In the event that the primary thermal imaging camera malfunctions, the backup discrete point radiation detection system will indicate a filled canister. The backup system is designed only to detect a discrete high glass level, producing a contact closure when the high level is sensed. When the high level has been reached, the system will automatically shut down the melter air lift which, in turn, will stop the glass pour. The system is limited to discrete levels of glass fill, not continuous monitoring.

During glass pour, the canister level detection system will display a thermal image on a monitor and will utilize a serial connection to interface with the process control system for indication and control purposes.

The imaging software will be used to continuously monitor the level of glass in the canister and will provide an output of the glass level to control loops in the process control system. A high-level condition will be indicated by the process control system, which will initiate alarms and/or control sequences to control the melter pour. The infrared image will be available through the plant closed circuit television system. The control system will be able to store the level of the glass in a canister between batch pours when the temperature in the canister could be cooled down sufficiently to prevent the thermal imaging system from detecting the glass level. The level is reset to zero with each new canister. The control system will also be used to monitor the average temperature of the glass near the top of the pour. If the temperature is lower than a set point value, an alarm will be initiated by the process control system.

Another function of the system is to detect the rate at which the glass level is rising in the canister. This rate gives an indication of deviation between expected normal pour rates. A deviation could indicate a malfunction of the glass discharge system, and an alarm would be initiated.

Instrumentation, alarms, controls, and interlocks will be provided for the HMP system to indicate or prevent the following conditions:

- The melter cannot pour without verification that the bogie is present.
- The melter cannot pour without verification that the canister is present.
- The melter cannot pour if the canister is greater than 95% full.

4F.2.3 Radioactive Liquid Waste Disposal (RLD) System

Process flow diagrams of the RLD System is provided in DWP Appendix 10.1. The primary functions of the RLD tank system are to receive, store, and transfer various effluents from different HLW treatment systems. Various operations, such as neutralization, mixing, and sampling of the waste, are performed by the RLD system as required. Sampling capabilities are provided for the RLD vessels (RLD-VSL-00007/8) by the HLW facility autosampler ASX-SMPLR-00028. The RLD system includes sample supply and return lines to RLD vessels RLD-VSL-00007/8.

The RLD system contains three tanks located in the HLW facility wet process cell:

- Acidic Waste Vessel (RLD-VSL-00007)
- Plant Wash and Drains Vessel (RLD-VSL-00008)
- Offgas Drains Collection Vessel (RLD-VSL-00002)

The RLD system receives mixed waste effluent from the HLW Melter Offgas Treatment Process (HOP) system, the HLW canister decontamination handling (HDH) system, and periodic plant and vessel washes within the HLW facility.

These effluents include the following:

- Purge liquid from the Submerged Bed Scrubbers (HOP-SCB-00001/2)
- Drains from the Wet Electrostatic Precipitators (HOP-WESP-00001/2)
- Drains from the High-Efficiency Mist Eliminators (HEME) (HOP-HEME-00001A/1B/2A/2B)
- Various plant and vessel washes and sump water
- Miscellaneous mixed waste streams, including PJV line drain, autosampler drains, canister decontamination effluents, and effluents from decontamination of equipment in the HSH Decontamination Tank (HSH-TK-00001/2)

<u>Acidic Waste Vessel (RLD-VSL-00007)</u>

This vessel collects liquid from the Submerged Bed Scrubber (HOP-SCB-00001/2) and the SBS Condensate Receiver Vessel (HOP-VSL-00903/4).

The collected liquid waste consists of submerged bed scrubber purge, wet electrostatic precipitator drain, high-efficiency mist eliminator drain, and neutralized canister decontamination waste. Sampling for pH will be performed prior to each transfer. The contents are transferred to the PWD system in the pretreatment facility for treatment, as required.

Plant Wash and Drains Vessel (RLD-VSL-00008)

This vessel collects liquids from vessels, sumps, and plant washes within the HLW facility, including wash water from cell floors, equipment exterior surfaces, and stainless steel liners. This vessel also collects the C3 area fire water. Sampling will be performed by an automated sample system to characterize the liquid waste. The contents are transferred to the PWD system in the pretreatment facility for treatment, as required.

Offgas Drains Collection Vessel (RLD-VSL-00002)

This vessel receives condensate from the HOP pipes and PJV drains downstream from the High-Efficiency Mist Eliminator (HOP-HEME-00001A/1B/2A/2B) during off-normal operation. The contents are transferred to the Plant Wash and Drains Vessel (RLD-VSL-00008) in the HLW facility for processing.

4F.2.4 IHLW Glass Canister Handling Process

The IHLW glass canister handling will consist of the following systems:

- HLW canister receipt handling (HRH) system
- HLW canister pour handling (HPH) system
- HLW canister decontamination handling (HDH) system
- HLW canister export handling (HEH) system

The individual systems and their primary functions are described below:

HLW Canister Receipt Handling (HRH) System

The HRH system consists of the equipment, controls, and interlocks required for importing a clean canister into the facility. This system consists of the canister import truck bay, the canister import room, and the canister import tunnel. These areas are located on the south side of the facility.

The sequence of operations and the equipment used for canister import are as follows:

- The shipping crates are unloaded from the transport truck with the canister import crane and placed in the staging area.
- The canisters are then individually removed from the shipping crate and set on the canister inspection/rotation table.
- The canister import room roller shutter door is opened and the canister inspection/rotation table rotates the canister to vertical. The canister import monorail hoist and grapple lift and transfer the canister to the canister import room. The canister is either set in the canister import buffer rack or placed in the canister import bogie. When the canister is transferred to the canister import tunnel, the shielded clean canister import hatch is opened and the canister is lowered into the canister import bogie below, and the hatch is closed and sealed.
- The canister import bogie is transferred under the canister handling cave to the shielded canister handling cave import hatch location. The canister handling cave hatch is then opened and the canister handling cave crane and grapple raises the canister into the canister handling cave. The canister handling cave import hatch is closed and the canister import bogie is returned to under the clean canister import hatch.

Instrumentation, alarms, controls, and/or interlocks will be provided for the HRH system.

HLW Canister Pour Handling (HPH) System

The primary functions of the HPH system are to transport empty product canisters and full IHLW canisters within the facility and perform product canister sampling, canister closure, and canister rework activities. The HPH system supports both HLW Melters (HMP-MLTR-00001/2). The HPH system includes the canister handling cave and Pour Tunnel 1 and 2. Each melter (HMP-MLTR-00001/2) is provided with a separate Pour Tunnel 1 or 2, appropriately, where molten glass is poured into the canisters. The crane decontamination and maintenance areas are also part of the HPH system, located west of the canister handling cave. Pour tunnels 1 and 2 include the bogie decontamination and maintenance areas.

The primary functions of the canister handling cave are as follows:

- Receive canisters from HRH system canister receipt handling.
- Transport empty canisters to import racks.
- Transfer empty canisters to Pour Tunnel 1 or 2 to be filled.
- Transport full canisters to cooling rack.
- Transport canisters to weld station tables.
- Transfer canisters to HDH system canister decontamination handling.
- Provide equipment for canister import and storage.

Pour Tunnel

Pour tunnel 1 (H-B032) is designed to provide facilities for glass pouring from the HLW Melter 1 and pour tunnel 2 (H-B005A) is designed to serve HLW melter 2. The pour tunnels are located at the -21 ft level and extend from north-south beneath the south end of the melter cave to an area below the canister handling cave. Bogie decontamination is performed in the tunnels, and bogie maintenance areas are provided in a designated shielded area at the south end of the tunnels. The tunnels will have a hatch that segregates the pour tunnels and the canister handling cave. The tunnels will also have a bogie maintenance shield door. The bogie maintenance area has a shield personnel access door and a roof access plug from the corridor above. The pour tunnels are designated as C5 areas.

Canister Transport

Canisters are transported within the canister handling cave by means of an overhead crane. A standby crane is available when the primary overhead crane is out of service. Viewing windows and camera are provided for viewing of equipment and operations within the cave area. Integrated networks of programmable logic controllers, which form part of the process control system, are used to control the mechanical handling.

Clean canisters are transferred from the HRH system to the HPH system through the canister import tunnel hatch. The hatch opens and the handling cave crane raises the canister into the canister handling cave. The hatch is closed and the canister is taken to the buffer storage area racks. When a canister is required for filling, it is taken out of the buffer rack using the canister handling cave crane and transferred above the appropriate pour tunnel hatch. The hatch is opened and the canister is lowered into the pour tunnel bogie below. The grapple is released and raised and the hatch is closed. The bogie travels to a position under the pour spout. As the bogie moves into position under the pour spout, the pour spout glass catch tray is pushed back and signals that a canister is present. A proximity switch detects that the bogie is in position, the bogie is then locked into position, and the canister is filled with glass. Canister filling is controlled and monitored by the canister level detection system (system HMP melter process). After completion of filling, the canister remains at the pour spout for approximately one hour to allow a "skin" to form over the glass that provides a seal to prevent additional offgassing. The filled canister is allowed to cool prior to removal from the pour tunnel.

After cooling, the canister is moved south in the pour tunnel until it is beneath the canister handling cave hatch. The hatch is opened, the canister handling cave crane removes the full canister, and the hatch is closed. The filled canister is then cooled in cooling racks in preparation for welding the lid in place.

After cooling, in the cooling racks, a crane transfers the canister for lid welding, sampling of glass, and/or rework. The canister is lowered into the welding station table and the grapple released from the canister. After the welding station operations, the crane transfers the canister to the buffer storage racks or to the decontamination system rinse bogie, via the decontamination hatch.

The canister handling cave is classified as a C5 area; therefore, activities in the handling cave will be conducted remotely. This will be accomplished with viewing windows, cameras, manipulators, and overhead cranes. Windows are strategically located above the transfer hatches for viewing the canisters as they are raised and lowered. The crane decontamination area is located on the west end of the canister handling cave. The decontamination area is classified as a C3/C5 area. The crane maintenance area is located west of the crane decontamination area. The crane maintenance area is classified as a C3 area.

Canister Weld, Glass Sampling, and Rework

The canister lid welding, glass sampling, canister inspections, and rework will be performed at one of two welding stations located along the south wall of the canister handling cave. Each station is located next to a shield window. Master-slave manipulators, closed circuit television, and lights are provided to assist weld station operations.

After the canister is cooled in the canister handling cave, the overhead crane moves the canister from the cooling rack into a port on the welding table. The canister is weighed and confirmed to be below the maximum allowable weight. While the canister is being lowered, cameras inspect the outside of the canister. Typically, glass waste residue is not expected on the exterior of the canister. However, prior to welding the lid on the canister, the canister is inspected. If glass is found on the canister, the glass will be removed using a needle descaler manually operated with the master-slave manipulator. A vacuum system will be used to capture the removed glass and prevent the spread of debris. The canister is then checked to confirm that its temperature is within the allowable range for welding. This is done using a thermocouple at the weld station. Glass samples are collected using a master-slave manipulator-operated glass sampling tool that uses a vacuum to draw shards of glass from the top surface. These shards are then transferred into sample vials and transferred to the laboratory using a pneumatic transfer system.

The lid is placed on the canister and welding is performed using an automated welder. The welding parameters are recorded in the plant tracking system. The finished weld is visually inspected using in-cave inspection cameras. Rejected welds may be repaired by re-melting the weld, mechanically removing the weld and re-welding, or welding a secondary lid over the primary lid. The sealed canister is then transferred to the HDH system.

Instrumentation, alarms, controls, and interlocks will be provided for the HLW canister handling system to indicate or prevent the following conditions:

- The crane decontamination shield doors are interlocked with the crane maintenance shield door to prevent both sets of doors from being open simultaneously.
- Interlocks will prevent the inadvertent access of personnel or equipment movement.
- The bogie maintenance shield door is interlocked with the shielded personnel access door to ensure that personnel do not enter the bogie maintenance area when the bogie maintenance shield door is open.
- Radiation monitoring equipment is interlocked to the shielded personnel access door to ensure no personnel are able to access the maintenance area if a radiation/contamination source above prescribed limits is present.

HLW Canister Decontamination Handling (HDH) System

A process flow diagram of the HDH System is provided in Appendix 10.1. The primary function of the HLW canister decontamination handling system (HDH) is to decontaminate the IHLW canisters and to swab and monitor decontaminated IHLW canisters for radiological contamination.

The HDH system includes the process and equipment to perform the cerium nitrate canister decontamination process, surface swabbing, and swab monitoring process. The following vessels and their associated ancillary equipment are included in the HDH system:

- Canister Rinse Vessel (HDH-VSL-00001)
- Waste Neutralization Vessel (HDH-VSL-00003)
- Canister Decon Vessels 1/2 (HDH-VSL-00002/4)

The HDH system consists of a canister rinse tunnel, canister decontamination station, swabbing and monitoring station, bogie maintenance areas, crane maintenance area, and canister transfer tunnel. The decontamination system consists of two stations: the decontamination station, which is located in-cave, and a chemical product mixing station, which is located out-cave. Vertical separation between the stations facilitates gravity flow of process solutions from the chemical product mixing station to the Canister Decontamination Vessels (HDH-VSL-00002/4). Beneath the canister decontamination cave is a canister rinse tunnel and a canister storage transfer tunnel. The canister rinse tunnel houses the canister rinse bogie, which transfers the canister from the canister handling cave to the canister decontamination cave while performing a prewash at an intermediate station. The canister storage transfer tunnel houses the canister storage transfer bogie, which transfers the decontaminated canisters from the canister decontamination cave to the canister export cave.

A filled, cooled, and welded IHLW canister is initially transported to the HDH system via a crane located in the canister handling cave. The IHLW canister is loaded into the canister rinse bogie and washed in a sealed vessel using low-pressure demineralized water to remove loose contamination. This water wash is performed in the Canister Rinse Vessel (HDH-VSL-00001) mounted on the canister rinse bogie, which travels from below the canister handling cave to below the canister decontamination cave. After the water wash, the canister is transferred by a crane to the canister decontamination vessel for further decontamination by chemically etching a thin layer of stainless steel from the canister surface, using cerium ion in a dilute nitric acid. The canister is then washed with nitric acid, followed by a second washing with de-mineralized water. After draining de-mineralized water from the Canister Decontamination Vessel (HDH-VSL-00002/4), the canister remains in the vessel to dry. The decontamination fluids are pumped into a Waste Neutralization Vessel (HDH-VSL-00003) to which hydrogen peroxide is added to neutralize remaining cerium ion. Following neutralization, the fluid is transferred to the plant waste stream to recycle back to the pretreatment facility. The decontaminated canister is transported by overhead crane to the canister swabbing and monitoring area.

After decontamination and drying, the canister is swabbed using an automated power manipulator. If the radiological contamination is below acceptable limits, the IHLW canister is placed into a canister storage transfer bogie located below the canister decon cave floor, and transported to the HLW canister export handling system (HEH). IHLW canisters exceeding the acceptable radiological contamination limits are returned to the HDH system for further decontamination.

In addition to the instrumentation, alarms, controls, and interlocks addressed in Section 4F, the following will be provided for the HDH system to indicate or prevent the following conditions:

- Interlocks will be provided on bogie decontamination/maintenance area shield door to protect facility personnel from radiation and contamination exposure.
- Interlocks will be provided on crane maintenance area shield door to protect facility personnel from contamination exposure.

HLW Canister Export Handling (HEH) System

The primary functions of this system are to store filled IHLW canisters in racks, transfer the IHLW canisters into the canister storage/export cave, load the IHLW canisters into shielded casks, evaluate casks for radiological contamination, and load IHLW casks into transport vehicles. The HEH system consists of a canister storage/export cave, a cask handling tunnel, a cask loading area, and a truck bay, and is equipped to support both HLW Melters.

Decontaminated IHLW canisters are transferred to the canister storage/export cave from the HDH system using a bogie and an overhead crane and placed in the canister storage racks. When an IHLW canister is ready for exporting to an appropriate Hanford Site TSD unit, a dedicated transport vehicle is dispatched to the IHLW truck bay. The empty shielded cask is removed from the vehicle and placed on a cask transfer bogie located in the cask handling tunnel. The bogie transfers the cask to a lid lifting station where the lid is removed, and then to a canister receiving station. The IHLW canister is visually inspected in the canister storage cave and its identification confirmed. After the inspection information is recorded, the canister is lifted by overhead crane and placed into the empty shielded cask. The bogie then returns the cask to the lid lifting station where the lid is replaced and bolted. The loaded cask is then transferred to the export station where the cask is lifted by an overhead crane and placed on the transport vehicle. The cask exterior is verified to be below the acceptable radioactive contamination and activity levels, the cask is transported to a Hanford Site storage facility.

Closed circuit television cameras will provide general viewing of the canisters and the storage area. Descriptions of inspections of IHLW canister storage areas are included in Chapter 6.0 of this permit. An IHLW canister tracking system will retain required information such as the IHLW identification number, weight, and dimensions of the IHLW canisters.

In addition to the instrumentation, alarms, controls, and interlocks addressed in Section 4F, the following will be provided for the HEH system to indicate or prevent the following conditions:

- Interlocks to prevent the canister storage/export cave import and export hatches from being open at the same time.
- Gamma monitoring/interlocks to prevent the cask export hatch from opening when high radiation levels exist.
- Gamma monitoring/interlocks to prevent cask handling bogie travel to the cask export hatch unless the cask lid is properly installed.
- Interlock to prevent both truck bay “exit” and “entrance” (external) roller shutter doors from being open at the same time.
- Interlock to prevent the truck bay inner roller shutter door from being open at the same time as either of the “exit” or “entrance” roller shutter doors.
- The shielded personnel access door in the canister export cave crane maintenance area is interlocked with the canister export cave crane maintenance horizontal and vertical shield door. The shielded personnel access door is also interlocked with a gamma monitor to prevent opening when a source is present.
- The process crane is prevented from striking the crane maintenance area shield door by end of travel and over-travel limit switches.

4F.2.5 HLW Melter Cave Mechanical Systems

Each HLW melter cave mechanical system will consist of the following individual systems:

- HLW melter handling (HMH) system
- HLW melter cave support handling (HSH) system

The individual systems and their primary functions are described below:

HLW Melter Handling (HMH) System

The primary function of the HMH system is identical for both Melters (HMP-MLTR-00001/2). The HMH system provides the equipment and controls necessary to:

- Transport new melter units into the HLW melter cave in conjunction with the HSH system.
- Remove spent melter units from the HLW melter cave.
- Decontaminate and monitor the spent melter overpacks.

A melter transporter will be used to move a new HLW Melter to the HLW facility loading dock. The melter will be transferred through the rollup doors to the melter cave airlock, transferred through the airlock, and docked to the melter cave shield door. After opening the shield and overpack doors, the melter will be moved out of its overpack and installed in the melter cave.

The process of removing a spent HLW Melter from a cave and loading it back into its overpack is the reverse of the installation. The overpack will provide a shielded disposal/storage canister for the spent melter. After the outside surfaces of the overpack have been checked for radiological contamination and decontaminated as required, the spent melter and its overpack will be moved through the melter airlock through the rollup doors and placed on the transporter, to be moved out of the HLW vitrification facility.

Decontamination of the overpack in the C3/C5 airlock, before it is exported, will be performed manually using moist cloths. The HLW Melter overpack's primary function is to serve as a shielded, box-like enclosure for the storage, transport, and disposal of the HLW Melter. The overpack performs a radiological shielding function of the highly radioactive spent HLW Melter. Due to the high radiation levels associated with a spent HLW Melter, the walls on all sides of the HLW Melter overpack will be seal-welded and have a nominal thickness of approximately 8 in. of carbon steel. The estimated weight of the HLW Melter overpack is 250 tons with an empty melter, and 350 tons when carrying a payload of the HLW Melter full of glass. The spent Melter weight when full of glass is a worst case in the event that the residual glass removal described in Section 4F.2.4 cannot be performed. After approximately 5 years of service, an HLW Melter is expected to reach the end of useful life service, and will be placed in the overpack before removing it from the HLW vitrification facility. The overpack, with the spent HLW Melter inside, will be moved to the HLW failed melter storage facility prior to land disposal. The overpack with spent HLW Melter will be disposed at the Hanford Site if it meets the land disposal facility waste acceptance criteria. Regulatory issues and permitting actions associated with onsite disposal of spent and/or failed HLW melters will be addressed in the future.

Justification for on-site burial of the 8 in. carbon steel overpack results from a corrosion study of submarine reactors based on chemical content, resistivity, aeration, and burial methods. The predicted maximum pitting corrosion penetration for a 100-year period was 0.350 in. for reactors buried in geologic conditions similar to those in which the overpacks will be buried. (*Prediction of Pitting Corrosion Performance of Submarine Reactor Compartments After Burial at Trench 94, Hanford, Washington, March 1992*).

Prior to disposal, the spent Melter will be stored in the failed melter storage facility. If a Melter fails to meet the receiving TSD waste acceptance criteria, it will be stored until the HLW facility operating conditions are suitable for the spent melter to be returned to the melter cave for further decontamination, treatment, repackaging, and/or other process to enable the spent melter to meet the receiving facility's waste acceptance criteria.

HLW Melter Cave Support Handling (HSH) System

The primary function of this system is to provide remotely operated equipment to perform these support activities in each melter cave:

- Melter maintenance and replacement.
- Melter component and consumable maintenance and replacement.
- Melter component and consumable dismantling, sorting, and loading.
- Equipment decontamination and hands-on maintenance.

Decontamination Tanks 1 and 2 (HSH-TK-00001/2) and associated ancillary equipment are included in the HSH system.

Each melter cave will contain an HLW Melter (HMP-MLTR-00001/2), Feed Preparation Vessels (HFP-VSL-00001/5), and HLW Melter Feed Vessels (HFP-VSL-00002/6), and the following offgas system components:

- Offgas Film Cooler/Standby Insert (HOP-FCLR-00001/2/3/4)
- Submerged Bed Scrubber (HOP-SCB-00001/2)
- High-Efficiency Mist Eliminators (HOP-HEME-00001A/1B/2A/2B)

Overhead cranes, hoists, and master-slave and power manipulators will be the primary equipment used to carry out various replacement, size reduction, and packaging tasks. Auxiliary tools will include impact wrenches, nut-runners, and hydraulic shears.

In addition, the HSH system will provide the means to dismantle and reduce the size of spent melter components or consumables for export out of the cave in waste canisters. Various size reduction tools will be used to cut down the equipment. The waste will be placed on a sorting table for screening and segregation prior to packaging and export.

Prior to melter replacement, residual glass heel will normally be removed from a spent Melter. Lid heaters will keep the glass pool at the desired temperature ranges. Air and vacuum lines will be inserted to draw the molten glass into a canister. The spent melter will then be disconnected and prepared for transport out of the cave.

A consumable bucket will be used to import and export melter consumables. The HFP vessels will be designed and organized such that power manipulators can disconnect connections and prepare failed vessels and components for export. Components of the HOP system found in this cave will also be designed and organized for similar activities.

The HSH system will provide a Decontamination Tank (HSH-TK-00001/2) in the equipment decontamination pit, to allow for decontamination of consumables and equipment before hands-on maintenance in the crane maintenance area. In the Decontamination Tank, the equipment will be soaked in demineralized water and/or nitric acid. The equipment decontamination pit will be used to additionally decontaminate equipment using manipulators before items can be removed for hands-on maintenance. A crane decontamination area is located above the C3/C5 airlock.

4F.2.6 HLW Filter Handling (HFH) System

The HFH system provides the remote maintenance capability for the equipment inside the filter cave located in room H-0104. The filter cave houses the HOP, PJV, and primary C5 Ventilation HEPA filters. The filter cave contains the spent filter export hatch, which interfaces with the drum transfer tunnel. The filter cave also contains a pair of shield doors at the interface between the filter cave and the crane maintenance area. The shield doors provide the barrier between the filter cave and the man-accessed maintenance area. The filter cave is designated as a C5 area. A decontamination area is located near the southeast corner of the filter cave with capabilities to perform radiological decontamination of the loaded filter disposal basket and other items, such as power manipulator, tools, and crane hook. Specialized decontamination equipment such as carbon dioxide or compressed air spray wands are provided to perform cleaning operations.

The filter housings will be of stainless steel. The filter lids will be flush with a stainless steel clad false floor (filter cave deck) that covers the entire cave at 14 ft elevation. The following equipment will be used for replacement of HEPA Filters and with other in-cave activities.

- Power manipulators
- Crane and cable reeling system
- Spent filter export hatch

Spent HEPA filters will be placed in a waste disposal basket sized to fit inside a 55 gal drum. Full waste disposal baskets will be lowered through the export hatch and into a drum located on a bogie inside the drum transfer tunnel. System RWH provides the final packaging and export of the solid wastes generated in the filter cave.

4F.2.7 Radioactive Solid Waste Handling (RWH) System

The HLW RWH system retrieves, transports, packages, and removes secondary solid waste from the HLW melter and filter caves. The primary functions are to:

- Provide waste disposal drums and shielded casks for removal of miscellaneous secondary solid waste from the HLW melter caves and filter cave.
- Transport filled and empty waste disposal drums and shielded casks.
- Provide external radiological monitoring of waste disposal drums and shielded casks.
- Decontaminate waste drums as required.
- Load waste drums into transport casks.

The RWH system consists of three major operational areas: the drum transfer tunnel, the swabbing and monitoring area, and the cask handling area. Mixed waste is generated in melter caves 1 and 2, the canister handling cave, and the filter cave. Mixed waste generated in the canister handling cave is transferred to either melter cave via the pour tunnels and then exported from the melter caves to the drum transfer tunnel. The drum transfer tunnel runs beneath these areas and provides a common area for receipt of waste to consolidate the separate waste streams into a single export path. The RWH system receives waste from the HSH system (melter caves 1 and 2) and the HFH system (filter cave) contained in lidded waste baskets that are lowered through the transfer ports in the ceiling of the drum transfer tunnel.

The RWH system introduces empty 55-gallon drums into the HLW facility for packaging radioactive solid waste for disposal. Empty 55-gallon drums are placed into shielded casks in the canister export truck bay. The cask is transferred on the cask transport vehicle into the cask import/export area for ultimate transfer from the facility.

The cask is positioned under the monorail hoist. It is then lifted, transferred to, and positioned onto the cask transfer bogie. A shield door is opened and the bogie is moved to the cask lidding station. The cask lid pintle is aligned with the lifting claw of the cask lidding machine and the cask lid is removed. The cask is then positioned under the cask transfer hatch. The drum, lid, and clamping ring are imported into the swabbing and monitoring area and manually staged on a stand in front of the shield window.

The drum transfer bogie rolls to position beneath a transfer hatch of either melter cave 1, melter cave 2, or the filter cave. With the drum positioned under the selected cave transfer port, a loaded waste disposal basket is lowered into the drum by the interfacing cave system's crane and grapple. With the waste disposal basket located in the drum, the grapple is detached and raised by the system crane. The full 55-gallon drum is relocated back to the position under the drum transfer hatch to the swab and monitoring area. The drum is lifted into the swab and monitoring area using the overhead crane and drum grapple.

The RWH system transports loaded drums into the lidding, swabbing, and monitoring area for lidding, swabbing, external monitoring, and decontamination (if required). The system then exports the filled 55-gallon drums through the import/export area.

The following drum swabbing, monitoring, and export operations are performed:

- The crane lifts the drum to the swabbing and monitoring station. Two master-slave manipulators will be mounted on the wall of the swabbing and monitoring area and will provide the operator interface for installation of the drum outer lid and clamping ring while the drum is positioned on the drum turntable.
- The robotic swabbing arm and turntable swab the surface of the drum. The swabs are placed in the shielded posting port of the swab analyzing station. Following preliminary measurement of the swab, the posting port is actuated to move the swab into the swabbing and monitoring glovebox where the sample is analyzed and bagged out for disposal.
- If the swabs are within acceptable limits, the crane lifts the drum from the drum swabbing turntable and positions the drum over the cask transfer hatch and places it in the shielded cask on the cask transport bogie.
- If the drum requires decontamination, additional swabbing of the drum will be performed to remove the contamination. Remote-handled decontamination equipment is available in the cave to be used if additional swabbing is insufficient to meet disposal requirements.
- The cask transfer bogie moves to the cask lidding station where the cask lid is replaced onto the cask. The bogie then moves to a gamma monitor where radiation levels are verified before the import/export shield door is opened and the cask transfer bogie moves into the import/export area. Once the cask is in the import/export area and the import/export shield door is closed, operators enter to bolt the lid onto the cask. The monorail then moves the cask to the cask handling truck. The cask handling truck positions the cask under the truck bay crane. From the cask import/export area, the crane positions the cask on a vehicle for transfer from the facility.

4F.3 Containment Buildings

This section describes how these units are designed and operated, in accordance with the requirements of WAC 173-303-695, which incorporates 40 CFR 264 Subpart DD, “Containment Buildings”, by reference. Regulatory citations in this section list the applicable section of the CFR to make it easier for readers to find the requirement. A typical containment building is illustrated in Appendix 4A, Figure 4A-59.

There are twenty-one containment buildings at the WTP: five located within the pretreatment facility; six in the LAW vitrification facility; and ten in the HLW vitrification facility. The regulated units in the HLW vitrification facility are:

- HLW melter cave 1 containment building (H-0117, H-0116B, H-0310A)
- HLW melter cave 2 containment building (H-0106, H-0105B, and H-0304A)
- IHLW canister handling cave containment building (H-0136)
- IHLW canister swabbing and monitoring cave containment building (H-0133)
- HLW C3 workshop containment building (H-0311A, H-0311B)
- HLW filter cave containment building (H-0104)
- HLW pour tunnel 1 containment building (H-B032)
- HLW pour tunnel 2 containment building (H-B005A)
- HLW drum swabbing and monitoring area containment building (H-0126A, H-0126B, H-B028)
- HLW waste handling area containment building (H-410B and H-411)

Table 4F-6 summarizes the units within the HLW vitrification facility. The following figures and drawings found in DWP Operating Unit Group 10 provide further detail for the containment buildings:

- Figure 4A-59 depicting common features of containment buildings.
- General arrangement figures and drawings showing locations of containment buildings.
- Waste management area figures showing containment building locations to be permitted.

Control of fugitive emissions from containment buildings is described in *Fugitive Emissions Control Description* (24590-WTP-PER-HV-02-001) located in Operating Unit Group 10 Appendix 7.15.

The following sections address each of the containment buildings.

4F.3.1 HLW Melter Cave 1 Containment Building (H-0117, H-0116B, H-0310A) and HLW Melter Cave 2 Containment Building (H-0106, H-0105B, H-0304A)

The HLW melter cave 1 and HLW melter cave 2 containment buildings are located in the central portion of the HLW vitrification facility. Each of the containment buildings will house an HLW melter cave, an overpack C3/C5 airlock, and an equipment decontamination pit.

Typical waste management activities performed in these containment buildings include the dismantling and packaging of spent consumables and decontamination of equipment for hands-on maintenance. The types of spent consumables will include waste recirculators, lid heaters, bubblers, thermocouples, and jumpers. When spent consumables are ready for change out, they will be placed on a consumable storage rack while awaiting size reduction. The consumables will be reduced in size by dismantling or cutting the spent equipment, or both. This process will be remotely conducted on tables in the containment building. The spent consumables will be placed in baskets and lowered into containers in a transfer tunnel that passes under the HLW melter cave 1 and 2 containment buildings (H-0117, H-0116B, H-0310A and H-0106, H-0105B, H-0304A). The C3/C5 airlocks will be used for packing or unpacking melters or their components.

In case of a HLW melter failure, the melter will be evaluated for meeting the receiving TSD waste acceptance criteria, particularly in terms of the radiological contamination in the HLW glass residue present in the melter, before it is placed in an overpack.

The equipment decontamination pit located within the melter cave containment building will house the Decontamination Tanks (HSH-TK-00001/2) where equipment removed from the melter cave will be decontaminated prior to maintenance. The equipment will be initially decontaminated by soaking in the decontamination tank. After evaluation, additional decontamination may be performed using manipulators before the levels are acceptable for hands-on maintenance.

Located within the melter cave containment building will be the HLW melter; the submerged bed scrubber and HEMEs, which will function as part of the melter offgas system, the Feed Preparation Vessels (HFP-VSL-00001/5), and the HLW Melter Feed Vessels (HFP-VSL-00002/6). These tank systems will have secondary containment.

HLW Melter Cave 1 and HLW Melter Cave 2 Containment Building Design

The two HLW melter containment buildings are completely enclosed within the HLW vitrification facility. Each of the melter cave containment buildings will house an HLW melter cave, an overpack C3/C5 airlock cell, and an equipment decontamination pit. Both melter cave containment buildings are designed to prevent the release of dangerous constituents and exposure to the outside environment. The design and construction of the HLW vitrification facility exterior will prevent water from running into the facility. The roof of the HLW vitrification facility will be metal. Run-off will be collected by roof drains and a drainage system with overflow roof drains. Approximate dimensions of the HLW melter cave 1 and 2 containment buildings are summarized in Table 4F-6.

The containment building design requirements of 40 CFR 264.1101(b) do not apply because the liquid dangerous wastes managed in the HLW melter containment building are addressed under tank systems.

HLW Melter Cave 1 and HLW Melter Cave 2 Containment Building Structure

The HLW melter cave no. 1 and 2 containment buildings will be a fully enclosed, concrete-walled structure within the HLW vitrification facility. Therefore, its structural requirements will be met by the design standards of the HLW vitrification facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the HLW vitrification facility meet or exceed the Uniform Building Code Seismic Design Requirements.

HLW Melter Cave 1 and HLW Melter Cave 2 Containment Building Materials

The HLW melter cave 1 and 2 containment buildings will be constructed of steel-reinforced concrete. The interior floor and a portion of the walls of the unit will be lined with stainless steel, except for the C3/C5 airlock. The height of the lining is summarized in Table 4F-3.

Use of Incompatible Materials for the HLW Melter Cave 1 and HLW Melter Cave 2 Containment Buildings

A partial stainless steel liner will be provided for the containment buildings, except for the C3/C5 airlock. The C3/C5 airlock will be partially lined with a protective coating. The stainless steel will be compatible with the wastes that will be managed, which will include spent melters and consumables, including air spargers, metallic parts, and refractory bricks. Treatment reagents that could cause the liner to leak, corrode, or otherwise fail will not be used within the unit.

Primary Barrier Integrity in the HLW Cave Melter 1 and HLW Melter Cave 2 Containment Buildings

The HLW melter cave 1 and 2 containment buildings are designed to withstand loads from the movement of personnel (C3/C5 Airlock), wastes, and handling equipment. The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the HLW Melter Cave 1 and HLW Melter Cave 2 Containment Buildings

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the HLW melter containment building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained.

The requirements of 40 CFR 264.1101(b) do not apply to this design because liquid dangerous wastes present in the containment building will be managed in tank systems with secondary containment systems.

Operation of the HLW Melter Cave 1 and HLW Melter Cave 2 Containment Buildings

Operational and maintenance controls and practices will be established and followed to ensure containment of the wastes within the HLW melter containment building, as required by 40 CFR 264.1101(c)(1).

Maintenance of the HLW Melter Cave 1 and HLW Melter Cave 2 Containment Buildings

The partial stainless steel lining of the containment building will be designed and constructed in a manner that will be free of significant cracks, gaps, corrosion, or other deterioration. The liner will be welded at each seam. The stainless steel liner will be free of corrosion or other deterioration because it will be compatible with materials that will be managed in the containment building, which will include spent

melters and spent equipment. Only decontamination chemicals that are compatible with the liner will be used.

Waste containers managed in the containment building will not be stacked. In general, waste will be placed in containers and removed from the containment building.

Measures to Prevent Tracking Wastes from the HLW Melter Cave 1 and HLW Melter Cave 2 Containment Building

The HLW melter cave 1 and 2 containment building design and operating methods include several measures that will prevent wastes from being tracked from the unit. Measures that will be implemented include:

- Limiting the movement of personnel and material from the C3/C5 airlock.
- Using shield doors to prevent the inadvertent spread of contamination.
- Decontaminating materials or containers before they are released from the unit.
- Using C5 ventilation as a primary containment method.

Personnel access to the HLW melter caves, which are classified as a C5 contamination area, will be restricted. Personnel operating in melter cave C3/C5 airlocks will not be in contact with spent melters because they will be encased in overpack containers.

Export of equipment from the melter caves will be kept to a minimum by performing in-cave maintenance to the maximum extent possible. The design of the cave and equipment includes master-slave manipulators, special tools, and a tool import port that will enable maintenance operations to be conducted remotely without removing the equipment from the cave. When equipment must be removed for hands-on maintenance, it will be transferred through shield doors into the Decontamination Tank (HSH-TK-00001/2) or the crane decontamination area (C3/C5) above the C3/C5 airlock. The equipment will be transferred to the maintenance room only after it has been decontaminated in Decontamination Tank HSH-TK-00001/2, and in the equipment decontamination pit, if needed.

Spent consumables and wastes will be size-reduced in the cave and exported to drums through an air lock, which is designed to provide containment of contamination between the C5 melter cave and the C3 drum transfer tunnel. Export of spent Melters will be controlled to prevent the spread of contamination. Melters will be transferred into overpack containers that are docked with the shield doors to the C3/C5 airlock.

Procedures in the Event of Release or Potential for Release from the HLW Melter Cave 1 and HLW Melter Cave 2 Containment Buildings

Conditions that could lead to a release from the HLW melter cave 1 and HLW melter cave 2 containment buildings will be corrected on a schedule intended to preclude a release that could be hazardous to public health or the environment.

In the unlikely event of a release of dangerous wastes from either containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste.

Inspections of the HLW Melter Cave 1 and HLW Melter Cave 2 Containment Buildings

An inspection program will be established as required under WAC 173-303-695 to detect conditions that could lead to the release of wastes from the HLW melter cave 1 and HLW melter cave 2 containment buildings. The inspection and monitoring schedule and methods that will be used to detect a release from the unit are included in DWP Operating Unit Group 10, Chapter 6.0.

4F.3.2 IHLW Canister Handling Cave Containment Building (H-0136)

The HLW canister handling cave containment building will be located in the southern portion of the HLW vitrification facility. Typical waste management activities performed within this containment building include the storage of waste canisters and containerized secondary waste. Located within the containment building will be two cooling and buffer storage areas and two container welding and rework stations. IHLW canisters that have cooled enough to leave the pour areas will be transported to the canister handling cave containment building by means of an overhead crane. The IHLW glass waste will continue to cool in the buffer storage areas. When adequately cooled, canisters will be moved to one of the two weld and rework stations, where the lid will be welded onto the canister. The IHLW canister will then be decontaminated in the HDH system and transported to the IHLW canister swabbing and monitoring cave containment building. Container management practices are discussed in Section 4F.1. The IHLW canister handling cave containment building will provide secondary containment for tank system ancillary equipment (piping).

The containment building design requirements of 40 CFR 264.1101(b) do not apply because the liquid dangerous wastes managed in the IHLW canister handling cave containment building are addressed under tank systems.

IHLW Canister Handling Cave Containment Building Design

The IHLW canister handling cave containment building will be completely enclosed within the HLW vitrification facility. The design and construction of the HLW vitrification facility exterior will prevent water from running into the facility. The roof of the HLW vitrification facility will be metal. Run-off will be collected by roof drains and a drainage system with overflow roof drains. The unit is designed to prevent the release and exposure of dangerous constituents to the outside environment. Its approximate dimensions are summarized in Table 4F-6.

IHLW Canister Handling Cave Containment Building Structure

Because the IHLW canister handling cave containment building will be a concrete-walled structure fully enclosed within the HLW vitrification facility, its structural requirements will be met by the design standards of the HLW vitrification facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the HLW vitrification facility meet or exceed the Uniform Building Code Seismic Design Requirements.

IHLW Canister Handling Cave Containment Building Unit Materials

The IHLW canister handling cave containment building will be constructed of steel-reinforced concrete. The interior floor and a portion of the walls of the unit will be lined with stainless steel. The height of the lining will be a minimum of 0.5 feet.

Use of Incompatible Materials for the IHLW Canister Handling Cave Containment Building

The partial stainless steel liner will be provided for the IHLW containment building that will be compatible with the steel canisters that will be managed. Treatment reagents that could cause the liner to leak, corrode, or otherwise fail will not be used in the unit.

Primary Barrier Integrity in the IHLW Canister Handling Cave Containment Building

The HLW vitrification facility is designed to withstand loads from the movement of personnel, wastes, and handling equipment. The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the IHLW Canister Handling Cave Containment Building

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the IHLW canister handling cave containment building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained. The requirements of 40 CFR 264.1101(b) do not apply to this design because any dangerous waste containers with free liquid will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the IHLW Canister Handling Cave Containment Building

Operational and maintenance controls and practices will be established to ensure containment of the wastes within the IHLW canister handling cave containment building, as required by 40 CFR 264.1101(c)(1).

Maintenance of the IHLW Canister Handling Cave Containment Building

The partial stainless steel lining of the containment building will be constructed and maintained in a manner that will be free of significant cracks, gaps, corrosion, or other deterioration.

The stainless steel liner will be welded at each seam, and will be free of corrosion or other deterioration because it will be compatible with materials that will be managed in the containment building, including the stainless steel containers. Only decontamination chemicals that are compatible with the liner will be used.

Waste containers that will be managed in the containment building will not be stacked higher than the unit wall; however, wastes are not anticipated to be stacked.

Measures to Prevent Tracking Wastes from the IHLW Canister Handling Cave Containment Building

The IHLW canister handling cave containment building is designed to store cooling IHLW glass waste containers and weld the lids onto the containers.

The outside of the canister will be inspected to see whether glass is present on the container. If glass is found, it will be removed using a needle gun or other mechanical method. The glass shards will be collected for disposal in a shop-type vacuum and disposed of as a secondary waste. The containment building will be classified as a C5 contamination area, and therefore personnel access will be restricted. Wastes leaving the unit will be within containers.

Procedures in the Event of Release or Potential for Release from the IHLW Canister Handling Cave Containment Building

Conditions that could lead to a release from the IHLW canister handling cave containment building will be corrected on a schedule intended to preclude any release that could be hazardous to public health or the environment.

In the unlikely event of a release of dangerous wastes from the containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste.

Inspections of the IHLW Canister Handling Cave Containment Building

An inspection program will be established as required under WAC 173-303-695 to detect conditions that could lead to the release of wastes from the IHLW canister handling cave containment building. The inspection and monitoring schedule and methods that will be used to detect a release from the unit are included in DWP Operating Unit Group 10, Chapter 6.0.

4F.3.3 IHLW Canister Swab and Monitoring Cave Containment Building (H-0133)

The IHLW canister swab and monitoring cave containment building is located in the southeast portion of the HLW vitrification facility (room H-0133). The systems associated with the swabbing and monitoring activities in the cave include overhead crane, grapples, power manipulator, swabbing turntable, and swabbing waste storage container.

After decontamination in the Canister Decon Vessels (HDH-VSL-00002/4), the canister is moved to the canister swab and monitoring building and placed on the turntable. The turntable provides a base on which the canister is set and rotated while the surface swabbing is performed. When surface radiological cleanliness has been verified, the canister is placed in the canister storage bogie and transferred to the canister storage cave.

IHLW Canister Swab and Monitoring Cave Containment Building Design

The IHLW canister swab and monitoring cave containment building will be completely enclosed within the HLW vitrification facility, and will be designed to prevent the release of dangerous constituents and their exposure to the outside environment. The design and construction of the HLW vitrification facility exterior will prevent water from running into the facility.

The roof of the HLW vitrification facility will consist of metal roofing, roof insulation, and a vapor barrier. Run-off will be collected by roof drains and a drainage system with overflow roof drains. Unit dimensions are summarized in Table 4F-6.

The containment building design requirements of 40 CFR 264.1101(b) do not apply because any dangerous waste containers with free liquid will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

IHLW Canister Swab and Monitoring Cave Containment Building Structure

Because the IHLW canister swab and monitoring cave building will be a concrete-walled structure fully enclosed within the HLW vitrification facility, its structural requirements will be met by the design standards of the HLW vitrification facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the HLW vitrification facility meet or exceed the Uniform Building Code Seismic Design Requirements.

IHLW Canister Swab and Monitoring Cave Containment Building Unit Materials

The IHLW canister swab and monitoring cave containment building will be constructed of steel-reinforced concrete. The interior floor and a portion of the walls of the unit will be covered with epoxy coating to protect the concrete and facilitate decontamination.

Use of Incompatible Materials for the IHLW Canister Swab and Monitoring Cave Containment Building

Treatment reagents that could cause the protective coating to leak, corrode, or otherwise fail will not be used within the unit.

Primary Barrier Integrity in the IHLW Canister Swab and Monitoring Cave Containment Building

The IHLW canister swab and monitoring cave building is designed to withstand loads from the movement of personnel, wastes, and handling equipment. The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the IHLW Canister Swab and Monitoring Cave Containment Building

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the IHLW canister swab and monitoring cave containment building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained. The requirements of 40 CFR 264.1101(b) do not apply to this design because any dangerous waste containers with free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the IHLW Canister Swab and Monitoring Cave Containment Building

Operational and maintenance controls and practices will be established to ensure containment of the wastes within the IHLW canister swab and monitoring cave containment building, as required by 40 CFR 264.1101(c)(1).

Maintenance of the IHLW Canister Swab and Monitoring Cave Containment Building

The protective coating of the containment building will be maintained in a manner that will be free of significant cracks, gaps, corrosion, or other deterioration. Only decontamination chemicals that are compatible with the protective coating will be used. Wastes are not expected to be stacked within the unit.

Measures to Prevent Tracking Wastes from the IHLW Canister Swab and Monitoring Cave Containment Building

The IHLW canister swab and monitoring cave containment building is designed to manage canisters that are swabbed to determine whether they meet the surface radiological requirements. The containment building will be classified as a C3 contamination area with limited personnel access. The air from the unit passes through HEPA filtration prior to discharge out of the plant stack.

Personnel access to the canister swab and monitoring cave containment building will be limited. Therefore, personnel moving into and out of the unit will not track contamination out of the unit.

Procedures in the Event of Release or Potential for Release from the IHLW Canister Swab and Monitoring Cave Containment Building

Conditions that could lead to a release from the IHLW canister swab and monitoring cave containment building will be corrected on a schedule intended to preclude any release that could be hazardous to public health or the environment.

In the unlikely event of a release of dangerous wastes from the containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Administrative and operating methods to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste.

Inspections of the IHLW Canister Swab and Monitoring Cave Containment Building

An inspection program will be established as required under WAC 173-303-695 to detect conditions that could lead to release of wastes from the IHLW canister swab and monitoring cave containment building. The inspection and monitoring schedule and methods that will be used to detect a release are included in DWP Operating Unit Group 10, Chapter 6.0.

4F.3.4 C3 Workshop Containment Building (H-0311A, H-0311B)

The C3 workshop containment building will be located in the northeast section of the HLW vitrification facility at elevation 37 ft.

Typical waste management activities performed in this containment building include decontamination, size reduction, and packaging of spent equipment. Equipment will be transported to the unit contained in shielded containers, drums, or in a standard waste box. In the workshop, the equipment will be decontaminated to enable hands-on maintenance. Spent equipment parts will be bagged and placed in

standard waste containers or boxes for disposal. Size reduction may be performed to facilitate packaging. Other spent equipment will be packaged in drums or standard waste boxes.

C3 Workshop Containment Building Design

The C3 workshop containment building will be designed as a completely enclosed area within the HLW vitrification facility. It will be designed to prevent the release of dangerous waste and their exposure to the outside environment. The design and construction of the HLW vitrification facility exterior will prevent water from running into the facility. The roof of the HLW vitrification facility will consist of metal roofing, roof insulation, and vapor barrier. Rainwater run-off will be collected by roof drains and drainage systems with overflow roof drains. The approximate dimensions of the unit are summarized in Table 4F-6.

C3 Workshop Containment Building Structure

The C3 workshop containment building will be a concrete-walled structure fully enclosed within the HLW vitrification facility. Therefore, structural requirements for the containment building will be met by the design standards of the HLW vitrification facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure.

DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the HLW vitrification facility meet or exceed the Uniform Building Code Seismic Design Requirements.

C3 Workshop Containment Building Materials

The C3 workshop containment building will be constructed of steel-reinforced concrete. The interior floor and a portion of the walls of the unit will be covered with epoxy coating to protect the concrete and facilitate decontamination.

Use of Incompatible Materials in the C3 Workshop Containment Building

The epoxy coating will be provided for this unit which will be compatible with the equipment and wastes that will be managed. Activities in the unit will be limited to decontamination, size reduction, and packaging the waste components into drums or waste boxes. Treatment reagents that could cause the liner or coating to leak, corrode, or otherwise fail will not be used within the unit.

Primary Barrier Integrity in the C3 Workshop Containment Building

The C3 workshop containment building is designed to withstand loads from the movement of personnel, wastes, and handling equipment. The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the C3 Workshop Containment Building

Prior to initial receipt of dangerous and mixed waste, a certification by a qualified registered professional engineer that the C3 workshop containment building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained. The requirements of 40 CFR 264.1101(b) do not apply to this design because the any dangerous waste containers with free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the C3 Workshop Containment Building

Operational and maintenance controls and practices will be established and followed to ensure containment of the dangerous wastes within the C3 workshop containment building unit as required by 40 CFR 264.1101(c)(1).

Maintenance of the C3 Workshop Containment Building

The concrete and protective coating, where used, will be constructed and maintained in a manner that will be free of significant cracks, gaps, corrosion, or other deterioration. The concrete and protective coating, where used, will remain free of corrosion or other deterioration because it is compatible with materials that will be managed in the containment building. The failed equipment that will be managed in the containment building unit will be compatible with the concrete or protective coating, where used. Only decontamination chemicals that are compatible with the concrete or protective, where used, will be applied.

Measures to Prevent Tracking Wastes from the C3 Workshop Containment Building

The C3 workshop containment building will be designed to isolate failed equipment from the accessible environment and to prevent the spread of contaminated materials. Personnel access to a C3 contamination area will be limited. Very little dust is expected to be generated in the unit.

The containment building will be classified as a C3 contamination area, which allows only limited access by personnel. Personnel access will be via a C2/C3 subchange room. Equipment will enter and exit the workshop via a C2/C3 airlock. Wastes leaving the unit will be enclosed within containers. If necessary, the containers will be decontaminated in the unit prior to transportation to a permitted storage area. Equipment leaving the unit will be decontaminated, when necessary, before being released for removal from the cells.

Procedures in the Event of Release or Potential for Release from the C3 Workshop Containment Building

The design and operation of the unit makes it very unlikely that releases will occur. The design and operational measures will minimize the generation of dust and contain it within the unit. In the unlikely event that a release of dangerous wastes from the containment building is detected, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods that will be used to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste. These methods will be followed to repair conditions that could lead to a release.

Inspections of the C3 Workshop Containment Building

An inspection program will be established to detect conditions that could lead to a release of wastes from the C3 workshop containment building. The inspection and monitoring schedule and methods that will be used to detect releases from the unit are included in DWP Operating Unit Group 10, Chapter 6.0.

4F.3.5 Filter Cave Containment Building (H-0104)

The filter cave containment building is located in the northwest portion of the facility. The filter cave containment building will manage spent HEPA filters via an overhead crane. The crane transports the spent filters to a disposal container. The disposal container is then transported via cart, through an air lock and shield doors and to a load-out area for storage pending final disposal.

Filter Cave Containment Building Design

The filter cave containment building will be completely enclosed within the HLW vitrification facility, and will be designed to prevent the release and exposure of dangerous constituents to the outside environment. The design and construction of the HLW vitrification facility exterior will prevent water from running into the facility. The roof of the HLW vitrification facility will consist of metal roofing, roof insulation, and a vapor barrier. Run-on will be collected by roof drains and a drainage system with overflow drains. The approximate dimensions of the containment building are summarized in Table 4F-6.

Filter Cave Containment Building Structure

Because the filter cave containment building will be a concrete-walled structure fully enclosed within the HLW vitrification facility, its requirements will be met by the design standards of the HLW vitrification facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the HLW vitrification facility meet or exceed the Uniform Building Code Seismic Design Requirements.

Filter Cave Containment Building Materials

The Filter Cave containment building will be constructed of steel-reinforced concrete. The interior floor and a portion of the walls will be covered with epoxy coating to protect the concrete and facilitate decontamination.

Use of Incompatible Materials for the Filter Cave Containment Building

The concrete structure and protective coating, where used, will be compatible with the wastes that will be managed in the unit, which will include spent HEPA filters. Activities in the unit will be limited to HEPA filter change out and waste packaging. Treatment reagents that could cause concrete or protective coating, where used, to leak, corrode, or otherwise fail will not be used within the unit.

Primary Barrier Integrity in the Filter Cave Containment Building

The filter cave containment building will be designed to withstand loads from the movement of personnel, wastes, and handling equipment.

The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the Filter Cave Containment Building

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the filter cave containment building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained. The requirements of 40 CFR 264.1101(b) do not apply to this design because any dangerous waste containers with free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the Filter Cave Containment Building

Operational and maintenance controls and practices will be established to ensure containment of the waste within the filter cave containment building, as required by 40 CFR 264.1101(c)(1).

Maintenance of the Filter Cave Containment Building

The concrete floor and walls of the unit will be constructed and maintained in a manner that will be free of significant cracks, gaps, corrosion, or other deterioration. The concrete structure will be compatible with materials that will be managed in the containment building, which will include spent HEPA filters. No decontamination chemicals that are incompatible with the concrete will be used.

Measures to Prevent Tracking Wastes from the Filter Cave Containment Building

The filter cave containment building is designed to manage spent HEPA filters. Conducting these activities in a C5 contamination zone will prevent the spread of contaminated materials. Controlled movement of equipment into and out of the unit will decrease the possibility that waste will be tracked from the unit. Personnel access to a C5 contamination area will be restricted.

Procedures in the Event of Release or Potential for Release from the Filter Cave Containment Building

Conditions that could lead to a release from the filter cave containment building will be corrected on a schedule intended to preclude any release that could be hazardous to public health or the environment. In the unlikely event of a release of dangerous wastes from the containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Specific administrative and operating methods that will be used to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste.

Inspections of the Filter Cave Containment Building

An inspection program will be established to detect conditions that could lead to a release of wastes from the filter cave containment building. The inspection and monitoring schedule and methods that will be used to detect releases from the unit are included in DWP Operating Unit Group 10, Chapter 6.0.

4F.3.6 HLW Pour Tunnel 1 Containment Building (H-B032) and HLW Pour Tunnel 2 Containment Building (H-B005A)

HLW pour tunnels 1 and 2 containment building contain bogies that transport empty canisters to the melter pour spout. Each of the two pour tunnels extends from the south end of the melter caves in a north-south direction to an area below the canister handling cave. The glass pouring into canisters takes place in the north half of the HLW pour tunnels 1 and 2 containment buildings. After filling with glass, the canisters are allowed to cool down prior to being transported to the south portion of the HLW pour tunnels 1 and 2 containment buildings and transferred through the hatch to the canister handling cave located above. The south portion of the HLW pour tunnels 1 and 2 containment buildings can be used for bogie decontamination, if required, prior to handling in the bogie maintenance area. The bogie maintenance area is segregated from HLW pour tunnels 1 and 2 containment buildings by a shield door. Bogie decontamination is not considered a dangerous waste management activity performed within the boundary of the HLW pour tunnels 1 and 2 containment buildings. Contaminated liquids which accumulate in the sumps located in the pour tunnels will be sent to RLD-VSL-00008.

HLW Pour Tunnel 1 and HLW Pour Tunnel2 Containment Building Design

The HLW pour tunnels 1 and 2 containment buildings will be completely enclosed within the HLW vitrification facility, and will be designed to prevent the release of dangerous constituents and their exposure to the outside environment. The design and construction of the HLW vitrification facility exterior will prevent water from running into the facility. The roof of the HLW vitrification facility will consist of metal roofing, roof insulation, and a vapor barrier. Runoff will be collected by roof drains and a drainage system with overflow roof drains. Unit dimensions are summarized in Table 4F-6.

The HLW pour tunnel 1 containment building will provide secondary containment for tank system ancillary equipment (piping). The containment building design requirements of 40 CFR 264.1101(b) do not apply because the liquid dangerous waste containers managed in the HLW pour tunnel 1 containment building will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

The HLW pour tunnel 2 containment buildings' design requirements of 40 CFR 264.1101(b) do not apply because any dangerous waste containers with free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

HLW Pour Tunnel 1 and HLW Pour Tunnel 2 Containment Building Structure

Because the HLW pour tunnels 1 and 2 containment buildings will be concrete-walled structures fully enclosed within the HLW vitrification facility, their structural requirements will be met by the design standards of the HLW vitrification facility. The design will ensure that the units have sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides

documentation that the seismic requirements for the HLW vitrification facility meet or exceed the Uniform Building Code Seismic Design Requirements.

HLW Pour Tunnel 1 and HLW Pour Tunnel 2 Containment Building Unit Materials

The HLW pour tunnels 1 and 2 containment buildings will be constructed of steel-reinforced concrete. The interior floors and a portion of the walls of the units will be lined with stainless steel to protect the insulation and concrete from the effects of high temperatures.

Use of Incompatible Materials for the HLW Pour Tunnel 1 and HLW Pour Tunnel 2 Containment Buildings

The partial stainless steel liner will be provided for the HLW pour tunnels 1 and 2 containment buildings that will be compatible with the steel canisters that will be managed. Treatment reagents that could cause the liner to leak, corrode, or otherwise fail will not be used in the unit. There will be no incompatible dangerous wastes managed within the HLW pour tunnels 1 and 2 containment buildings.

Primary Barrier Integrity in the HLW Pour Tunnel 1 and HLW Pour Tunnel 2 Containment Buildings

The HLW pour tunnels 1 and 2 containment buildings are designed to withstand loads from the movement of wastes and handling equipment. The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the HLW Pour Tunnel 1 and HLW Pour Tunnel 2 Containment Buildings

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the HLW pour tunnels 1 and 2 containment buildings meet the design requirements of 40 CFR 264.1101(a) and (c) will be obtained. The requirements of 40 CFR 264.1101(b) to this design because any dangerous waste containers with free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the HLW Pour Tunnel 1 and HLW Pour Tunnel 2 Containment Buildings

Operational and maintenance controls and practices will be established to ensure containment of the wastes within the HLW pour tunnels No.1 and No. 2 containment buildings, as required by 40 CFR 264.1101(c)(1).

Maintenance of the HLW Pour Tunnel 1 and HLW Pour Tunnel 2 Containment Buildings

The partial stainless-steel liner will be installed in the HLW pour tunnels 1 and 2 containment buildings to protect insulation and concrete from the effects of high temperatures. Waste canisters will not be stacked within the unit.

Measures to Prevent Tracking Wastes from the HLW Pour Tunnel 1 and HLW Pour Tunnel 2 Containment Buildings

The HLW vitrification facility HLW pour tunnels 1 and 2 containment buildings will be designed to isolate failed equipment from the accessible environment and to prevent the spread of contaminated materials. Very little dust is expected to be generated in the unit.

The HLW pour tunnel 1 and 2 containment buildings will be classified as C5 contamination areas with personnel access restricted. Personnel access to the HLW pour tunnels 1 and 2 containment buildings will not be allowed because of high radiation.

Control of Fugitive Dust from the HLW Pour Tunnel 1 and HLW Pour Tunnel 2 Containment Buildings

Operational controls of the HLW vitrification facility ventilation system will be used to control fugitive dust emissions from the units to meet the requirements of 40 CFR 264.1101(c)(1)(iv). The following measures will be used to prevent fugitive dust from escaping the HLW pour tunnels 1 and 2 containment buildings:

- A cascading air flow from areas of least to greatest potential contamination (that is, C2 to C3 to C5).
- Greater negative air pressure in the unit, compared to adjacent C3 units, to pull air into the unit and prevent backflow.
- Intake air through controlled air in-bleed units with backflow prevention dampers.
- Safety interlocks to shut down C3 extract fans to prevent backflow if the C5 system shuts down.
- Dual HEPA filtration of exhaust air before discharge to the atmosphere through a monitored stack.
- A multiple fan extraction system, designed to maintain negative pressure and cascading air flow, even during fan maintenance and repair.

Procedures in the Event of Release or Potential for Release from the HLW Pour Tunnel 1 and HLW Pour Tunnel 2 Containment Buildings

Conditions that could lead to a release from the HLW pour tunnels 1 and 2 containment buildings will be corrected on a schedule intended to preclude any release that could be hazardous to public health or the environment. In the unlikely event of a release of dangerous wastes from the containment buildings, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Administrative and operating methods to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste.

Inspections of the HLW Pour Tunnel 1 and HLW Pour Tunnel 2 Containment Buildings

An inspection program will be established as required under WAC 173-303-695 to detect conditions that could lead to the release of wastes from the HLW pour tunnel containment buildings. The inspection and monitoring schedule and methods that will be used to detect a release are included in DWP Operating Unit Group 10, Chapter 6.0.

4F.3.7 HLW Drum Swabbing and Monitoring Area Containment Building (H-0126A, H-0126B, and H-B028)

The HLW drum swabbing and monitoring area containment building is located in the northeast section of the HLW vitrification facility. Typical waste management activities performed in this containment building include the remote handling of 55 US gallon drums. The drums will be swabbed for surface contamination and decontaminated if needed.

Upon arrival in the HLW drum swabbing and monitoring area, the 55 US gallon drums are weighed, monitored, and then transferred through a hatch and placed into a shielded cask in the cask handling area.

In the cask handling area, drum transport casks are remotely lidded and moved to the truck loading bay for removal from the facility.

Drum Swabbing and Monitoring Area Containment Building Design

The drum swabbing and monitoring area containment building will be completely enclosed within the HLW vitrification facility, and will be designed to prevent the release of dangerous constituents and their exposure to the outside environment. The design and construction of the HLW vitrification facility

exterior will prevent water from running into the facility. The roof of the HLW vitrification facility will consist of metal roofing, roof insulation, and a vapor barrier. Runoff will be collected by roof drains and a drainage system with overflow roof drains. Unit dimensions are summarized in Table 4F-6.

The containment building design requirements of 40 CFR 264.1101(b) do not apply because the any dangerous waste with free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

HLW Drum Swabbing and Monitoring Area Containment Building Structure

Because the HLW drum swabbing and monitoring area will be a concrete-walled structure fully enclosed within the HLW vitrification facility, its structural requirements will be met by the design standards of the HLW vitrification facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the HLW vitrification facility meet or exceed the Uniform Building Code Seismic Design Requirements.

HLW Drum Swabbing and Monitoring Area Containment Building Unit Materials

The HLW drum swabbing and monitoring area containment building will be constructed of steel-reinforced concrete. The interior floor and a portion of the walls of the unit will be covered with epoxy coating to protect the concrete and facilitate decontamination.

Use of Incompatible Materials for the HLW Drum Swabbing and Monitoring Area Containment Building

There will be no incompatible reagents or dangerous wastes managed within the HLW drum swabbing and monitoring containment building.

Primary Barrier Integrity in the HLW Drum Swabbing and Monitoring Area Containment Building

The HLW drum swabbing and monitoring area containment building is designed to withstand loads from the movement of personnel, wastes, and handling equipment. The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the HLW Drum Swabbing and Monitoring Area Containment Building

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the HLW drum swabbing and monitoring area containment building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained. The requirements of 40 CFR 264.1101(b) do not apply to this design because any dangerous waste with free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the HLW Drum Swabbing and Monitoring Area Containment Building

Operational and maintenance controls and practices will be established to ensure containment of the wastes within the HLW drum swabbing and monitoring area containment building, as required by 40 CFR 264.1101(c)(1).

Maintenance of the HLW Drum Swabbing and Monitoring Area Containment Building

Personnel access to the containment building will not be allowed because of high radiation. Drums are not normally expected to be stacked within the unit.

Measures to Prevent Tracking Wastes from the HLW Drum Swabbing and Monitoring Area Containment Building

The HLW drum swabbing and monitoring area containment building will be classified as a C3/C5 contamination area with limited personnel access. The HLW drum swabbing and monitoring containment

building will be designed to isolate failed equipment from the accessible environment and to prevent the spread of contaminated materials. Very little dust is expected to be generated in the unit.

Control of Fugitive Dust from the HLW Drum Swabbing and Monitoring Area Containment Building

Operational controls of the HLW vitrification facility ventilation system will be used to control fugitive dust emissions from the unit to meet the requirements of 40 CFR 264.1001(c)(1)(iv). The following measures will be used to prevent fugitive dust from escaping the HLW drum swabbing and monitoring area containment building:

- A cascading air flow from areas of least to greatest potential contamination (that is, C2 to C3 to C5).
- Greater negative air pressure in the unit, compared to adjacent C3 units, to pull air into the unit and prevent backflow.
- Intake air through controlled air in-bleed units with backflow prevention dampers.
- Safety interlocks to shut down C3 extraction fans to prevent backflow, if the C5 system shuts down.
- Dual HEPA filtration of exhaust air before discharge to the atmosphere through a monitored stack.
- A multiple fan extraction system, designed to maintain negative pressure and cascading air flow, even during fan maintenance and repair.

Procedures in the Event of Release or Potential for Release from HLW Drum Swabbing and Monitoring Area Containment Building

Conditions that could lead to a release from the HLW drum swabbing and monitoring area containment building will be corrected on a schedule intended to preclude any release that could be hazardous to public health or the environment. In the unlikely event of a release of mixed or dangerous wastes from the containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Administrative and operating methods to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste.

Inspections of the HLW Drum Swabbing and Monitoring Area Containment Building

An inspection program will be established as required under WAC 173-303-695 to detect conditions that could lead to the release of wastes from the HLW drum swabbing and monitoring area containment building. The inspection and monitoring schedule and methods that will be used to detect a release are included in DWP Operating Unit Group 10, Chapter 6.0.

4F.3.8 HLW Waste Handling Area Containment Building (H-410B, H-411)

The HLW waste handling area containment building consists of rooms H-410B, and H-411 on the 58 ft elevation of the HLW vitrification facility. Typical waste management activities performed in this containment building include waste sorting, segregation, and providing temporary storage of mixed waste containers (e.g., spent silver mordenite). The HLW waste handling area containment building will contain floor space for segregated storage of empty and full containers, typically 55-gallon waste drums. Tools and equipment will also be stored in this containment building.

HLW Waste Handling Area Containment Building Design

The HLW waste handling area containment building will be completely enclosed within the HLW vitrification facility, and will be designed to prevent the release of dangerous constituents and their exposure to the outside environment. The design and construction of the HLW vitrification facility exterior will prevent water from running into the facility. The roof of the HLW vitrification facility will

consist of metal roofing, roof insulation, and a vapor barrier. Runoff will be collected by roof drains and a drainage system with overflow roof drains. Unit dimensions are summarized in Table 4F-6.

The containment building design requirements of 40 CFR 264.1101(b) do not apply because any dangerous waste with free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

HLW Waste Handling Area Containment Building Structure

Because the HLW waste handling area containment building will be a concrete-walled structure fully enclosed within the HLW vitrification facility, its structural requirements will be met by the design standards of the HLW vitrification facility. The design will ensure that the unit has sufficient structural strength to prevent collapse or failure. DWP Operating Unit Group 10, Supplement 1 provides documentation that the seismic requirements for the HLW vitrification facility meet or exceed the Uniform Building Code Seismic Design Requirements.

HLW Waste Handling Area Containment Building Unit Materials

The HLW waste handling area containment building will be constructed of steel-reinforced concrete. The interior floor and a portion of the walls of the unit will be covered with epoxy coatings to protect the concrete and facilitate decontamination.

Use of Incompatible Materials for the HLW Waste Handling Area Containment Building

There will be no incompatible reagents or dangerous wastes managed within the HLW waste handling area containment building.

Primary Barrier Integrity in the HLW Waste Handling Area Containment Building

The HLW waste handling area containment building is designed to withstand loads from the movement of personnel, wastes, and handling equipment. The seismic design criteria found in DWP Operating Unit Group 10, Supplement 1 ensures that appropriate design loads, load combinations, and structural acceptance criteria are employed at the WTP.

Certification of Design for the HLW Waste Handling Area Containment Building

Prior to initial receipt of dangerous and mixed waste, certification by a qualified registered professional engineer that the HLW waste handling area containment building meets the design requirements of 40 CFR 264.1101(a) and (c) will be obtained. The requirements of 40 CFR 264.1101(b) do not apply to this design because any dangerous waste with free liquids will be managed on portable secondary containment that meets the requirements of WAC 173-303-630(7).

Operation of the HLW Waste Handling Area Containment Building

Operational and maintenance controls and practices will be established to ensure containment of the wastes within the HLW waste handling area containment building, as required by 40 CFR 264.1101(c)(1).

Maintenance of the HLW Waste Handling Area Containment Building

Wastes are not normally expected to be stacked within the unit.

Measures to Prevent Tracking Wastes from the HLW Waste Handling Area Containment Building

The HLW waste handling area containment building will be classified as a C2/C3 contamination area with limited personnel access. Wastes leaving the HLW waste handling area containment building will be enclosed within containers. If necessary, these containers will be decontaminated in the unit prior to transportation to another permitted TSD facility.

Control of Fugitive Dust from the HLW Waste Handling Area Containment Building

Operational controls of the HLW vitrification facility ventilation system will be used to control fugitive dust emissions from the unit to meet the requirements of 40 CFR 264.1101(c)(1)(iv). The following measures will be used to prevent fugitive dust from escaping the waste handling area containment building:

- A cascading air flow from areas of least to greatest potential contamination (that is, C2 to C3 to C5).
- Greater negative air pressure in the unit, compared to adjacent C2 units, to pull air into the unit and prevent backflow.
- Intake air through controlled air in-bleed units with backflow prevention dampers.
- Safety interlocks to shut down C3 extraction fans to prevent backflow if the C5 system shuts down.
- HEPA filtration of exhaust air before discharge to the atmosphere through a monitored stack.
- A multiple fan extraction system, designed to maintain negative pressure and cascading air flow, even during fan maintenance and repair.
- Personnel ingress and egress through airlocks and subchange rooms.

Procedures in the Event of Release or Potential for Release from HLW Waste Handling Area Containment Building

Conditions that could lead to a release from the HLW waste handling area containment building will be corrected on a schedule intended to preclude any release that could be hazardous to public health or the environment. In the unlikely event of a release of dangerous wastes from the containment building, actions required by 40 CFR 264.1101(c)(3)(i) through (iii) will be taken. Administrative and operating methods to satisfy this requirement will be developed prior to initial receipt of dangerous and mixed waste.

Inspections of the HLW Waste Handling Area Containment Building

An inspection program will be established as required under WAC 173-303-695 to detect conditions that could lead to the release of wastes from the HLW waste handling area containment building. The inspection and monitoring schedule and methods that will be used to detect a release are included in DWP Operating Unit Group 10, Chapter 6.0.

4F.4 Air Emission Control

4F.4.1 HLW Facility Ventilation

The HLW facility will be divided into four numbered zones listed and defined below, with the higher number indicating greater radiological hazard potential and, therefore, a requirement for a greater degree of control or restriction. The zoning of the ventilation system will be based on the classifications assigned to building areas for potential radiological contamination. Zones classified as C5 are potentially the most contaminated and include the pour caves, buffer storage area, and process cells. Zones classified as C1 are uncontaminated areas.

Containment will be achieved by maintaining C5 areas at the greatest negative pressure, with airflows cascaded through engineered routes from C2 areas to C3 areas and on to the C5 areas. The cascade system, in which air passes through more than one area, will reduce the number of separate ventilation streams and, hence, the amount of air requiring treatment. Adherence to this concept in the design and operation of the HLW facility will ensure that the facility air does not become a significant source of exposure to operators, and that the air emissions do not endanger human health or the environment.

An exhaust air radiation monitoring system, consisting of sensors to monitor radiation in the exhaust air stream, or a representative sampling system is provided in the discharge header downstream of the exhaust fans. A monitoring system would consist of probe assemblies, vacuum pumps, a stack flow sensor, temperature sensor, and radiation sensors. A temperature transmitter is also provided in the discharge header downstream of the exhaust fans for continuous monitoring of exhaust air temperature.

C1 Ventilation (C1V) System

C1 areas will typically consist of offices, workshops, control rooms, and equipment rooms. They will be slightly pressurized if they are adjacent to areas with higher contamination potential to eliminate backflow from those areas.

C2 Ventilation (C2V) System

C2 areas will typically consist of operating areas, equipment rooms, stores, access corridors, and facility rooms adjacent to areas with higher contamination potential. The C2V is served by dedicated exhaust fans. Air supplied to the C2 areas that is not cascaded to the C3 or C5 areas is discharged to the atmosphere by the exhaust fans. Both exhaust fans are provided with variable frequency drives. A manual isolation damper is provided upstream of each exhaust fan, and a pneumatically actuated isolation damper is provided downstream. Each damper is provided with local/remote position monitoring.

C3 Ventilation (C3V) System

C3 areas are normally unoccupied, but allow operator access, for instance during maintenance. C3 areas will typically consist of filter facility rooms, workshops, maintenance areas, and monitoring areas. Air will generally be drawn from C2 areas and, wherever possible, cascaded through the C3 areas into C5 areas, or alternatively exhausted from the C3 areas by the C3 exhaust system. In general, air cascaded into the C3 areas will be from adjacent C2/C3 subchange rooms. When sufficient air cannot be cascaded into C3 areas, a dedicated C2 supply equipped with appropriate backflow prevention will be used.

C5 Ventilation (C5V) System

Where there is in-bleed air from the C3 to C5 system, fan cascade trip interlocks protect the system from backflow.

The C5 areas in the HLW facility will be composed of the following:

- Pour tunnels 1 and 2
- Drum transfer tunnel
- Canister handling cave
- Melter caves 1 and 2
- Filter cave
- Wet process cell
- SBS drain collection cells 1 and 2
- Active services cell 1 and 2

Air will be cascaded into the C5 areas and exhausted by the C5 exhaust system. Engineered duct entries (air in-bleeds) through the C5 confinement boundary will be protected by backflow filter isolation dampers, with penetrations through the boundary sealed.

4F.4.2 Melter Offgas Treatment Process (HOP) System

Process flow diagrams of the HOP System are provided in Appendix 10.1. The HOP system is composed of vessels and miscellaneous units (sub-systems), separated into the primary and secondary melter offgas treatment systems.

Melter offgas is generated from the vitrification of HLW in the joule-heated melter. The rate of generation of gases in the melter is dynamic depending on water content and not steady. Each HLW Melter (HMP-MLTR-00001/2) generates offgas resulting from decomposition, oxidation, and vaporization of feed material. The typical constituents contained in the HLW offgas stream are as follows:

- Nitrogen oxides from decomposition of metal nitrates in the melter feed.
- Chloride, fluoride, and sulfur as oxides, acid gases, and salts.
- Entrained feed material and glass.

In addition, the HLW Melters (HMP-MLTR-00001/2) generate small quantities of other volatile compounds including iodine-129, carbon-14, tritium, and volatile organic compounds. The carbon-14 and tritium emissions are in the form of carbon dioxide and water, respectively.

The HOP system is divided into a primary system and a secondary system. The purpose of the HOP system is to cool and treat the Melter offgas and vessel ventilation offgas to a level that is protective of human health and the environment. The offgas system must also provide a pressure confinement boundary that will control Melter pressure and prevent vapor releases inside the plant. The design of the melter offgas system must accommodate changes in offgas flow from the Melter (HMP-MLTR-00001/2) without causing the melter to pressurize.

Controls developed to prevent or mitigate equipment malfunction are incorporated into the design. The *Description of HLW Vitrification Bypass Events*, 24590-HLW-PER-PR-03-001 (Appendix 10.18), identifies operating conditions that would divert the melter offgas to an alternate flow path. The bypasses are automatically activated via interlocks or remotely operated via a valve when an upset or maintenance situation occurs.

Initial treatment of offgas from the melter is provided by the primary offgas treatment system. This primary offgas system is designed to handle intermittent surges of up to seven times steam normal flow and up to three times non-condensable flow from feed. Each primary offgas system consists of a film cooler, submerged bed scrubber, a wet electrostatic precipitator, a high efficiency mist eliminator (HEME), and high efficiency particulate air (HEPA) filters. This system cools the offgas and removes aerosols and particulates.

Additionally, a standby line from the Melter (HMP-MLTR-00001/2) to the Submerged Bed Scrubber (HOP-SCB-00001/2) is provided in the unlikely case that the primary offgas line plugs. This standby line includes an actuated valve as the isolation device. As soon as the Melter vacuum decreases to a set point, the valve is actuated open and offgas flow is allowed through both lines to the Submerged Bed Scrubber, thereby preventing melter pressurization. In the event that a Melter surge is much higher than the system is designed to handle, a pressure relief valve acts as the pressure relief point venting the offgas to the melter cave. Any offgas that diverts to the Melter cave is drawn through C5V HEPA Filters to remove particulates and then is discharged through the stack to the atmosphere. Once the Melter pressure is relieved, the valve closes.

Offgas from vessel ventilation system (PVV) consists primarily of air, water vapor, and minor amounts of aerosols generated by the mixing or movement of vessel contents. The vessel ventilation header joins the primary offgas system after the Wet Electrostatic Precipitators (HOP-WESP-00001/2) and prior to the HEMEs. After the HEPA Filters (HOP-HEPA-00001A/1B/2A/2B/7A/7B/8A/8B), the offgas is routed to the secondary offgas treatment system.

The following sections provide descriptions of major melter offgas treatment components and are identical for both Melter 1 (HMP-MLTR-00001) and Melter 2 (HMP-MLTR-00002).

4F.4.2.1 Primary Melter Offgas Treatment (HOP) System

The purpose of the primary offgas treatment system is to cool the melter offgas and to remove offgas aerosols and particulates generated by the Melter (HMP-MLTR-00001/2) and from the vessel ventilation air. This treatment system consists of the following:

Tank System:

- SBS Condensate Receiver Vessel (HOP-VSL-00903/4)

Miscellaneous Treatment Units (Sub-Systems):

- Offgas Film Cooler (HOP-FCLR-00001/2) and Standby Offgas Insert (HOP-FCLR-00003/4)
- Submerged Bed Scrubber (HOP-SCB-00001/2)
- Wet Electrostatic Precipitator (HOP-WESP-00001/2)
- High-Efficiency Mist Eliminator (HEME) (HOP-HEME-00001A/1B/2A/2B)
- HEPA Preheater (HOP-HTR-00001B/2A/5A/5B)
- High Efficiency Particulate Air (HEPA) Filters (HOP-HEPA-00001A/1B/2A/2B/7A/7B/8A/8B)

Film Cooler (HOP-FCLR-00001/2/3/4)

The function of the Film Cooler (HOP-FCLR-00001/2) is to cool the offgas and entrained molten glass droplets below the glass adhesion temperature to minimize glass deposition on the offgas piping walls. The offgas exits the Melter (HMP-MLTR-00001/2) and is mixed with air in the offgas Film Cooler. The Film Cooler is a double-walled pipe designed to introduce injected gas axially along the walls of the offgas pipe through a series of holes or slots in the inner wall. Each melter has a single Film Cooler.

A mechanical reamer may be mounted on the Film Cooler (HOP-FCLR-00001/2) to periodically remove solids build-up on the inner film cooler wall. The reaming device (wire brush or drill) would be periodically inserted into the film cooler for mechanical solids removal.

Submerged Bed Scrubber (HOP-SCB-00001/2)

The offgas from the HLW melter Film Cooler (HOP-FCLR-00001/2) enters the Submerged Bed Scrubber (HOP-SCB-00001/2) for further cooling and solids removal. The Submerged Bed Scrubber is a passive device designed for removal of large entrained particulate from melter offgas, cooling and condensation of melter vapor emissions, and interim storage of condensed fluids. It will also quench the offgas to a desired discharge temperature through the use of cooling coils/jacket.

The Submerged Bed Scrubber (HOP-SCB-00001/2) has two offgas inlets. The offgas normally enters the Submerged Bed Scrubber through the primary inlet pipe that runs down through the center of the bed to the packing support plate. The bed-retaining walls extend below the support plate, creating a lower skirt to allow the formation of a gas bubble underneath the packing. The entire bed is suspended off the floor of the Submerged Bed Scrubber to allow the scrubbing solution to circulate freely through the bed. After formation of the gas bubble beneath the packing, the offgas then buoys up through the packed bed. The packing breaks larger bubbles into smaller ones to increase the gas to water contacting surface, thereby increasing particulate removal and heat transfer efficiencies.

To maintain a constant liquid level within the Submerged Bed Scrubber (HOP-SCB-00001/2), it will be equipped with an overflow line that allows for the continuous discharge of offgas condensate and some scrubbed particulates to the SBS Condensate Receiver Vessels (HOP-VSL-00903/4). The SBS Condensate Receiver Vessels are also equipped with a cooling jacket. The rate of condensate discharge is determined by how much the offgas temperature is lowered below its dew point.

To minimize the buildup of the solids in the bottom of the Submerged Bed Scrubber, condensate from the SBS Condensate Receiver Vessels (HOP-VSL-00903/4) will be re-circulated back to the Submerged Bed

Scrubber and injected through multiple lances to agitate and suspend solids on the Submerged Bed Scrubber vessel floor. The solids will then be pumped directly off the Submerged Bed Scrubber vessel floor to the Plant Wash and Drains Vessel (RLD-VSL-00008). This purging and recycling process occurs simultaneously. Venting of this condensate receiver vessel is via the submerged bed scrubber into the main offgas discharge pipe.

The scrubbed offgas discharges through the top of the submerged bed scrubber and is routed to the Wet Electrostatic Precipitator (HOP-WESP-00001/2) for further particulate removal.

Wet Electrostatic Precipitator (HOP-WESP-00001/2)

The Submerged Bed Scrubber offgas is routed to the Wet Electrostatic Precipitator (HOP-WESP-00001/2) for removal of aerosols down to and including submicron size. The offgas enters the unit and passes through a distribution plate. The evenly distributed saturated gas then flows up through the tubes which act as the positive electrodes. Each of these tubes has a single negatively charged electrode, which runs down the centerline of each tube. A high-voltage, direct current transformer supplies the power to the electrodes. A strong electric field generated along the electrodes gives a negative charge to the aerosols. The negatively charged particles move toward the positively charged tube walls for collection. Collected particles are then washed from the tube walls along with collected mists. As the gas passes through the tubes, the first particles captured are the water droplets. As the water droplets gravity drain through the electrode tubes the collected particles are washed off and the final condensate is collected in the wet electrostatic precipitator dished bottom area. A water spray may be used periodically to facilitate washing collected aerosols from the tubes. The tube drain and wash solution is routed to the SBS Condensate Receiver Vessels (HOP-VSL-00903/4).

High-Efficiency Mist Eliminator (HOP-HEME-00001A/1B/2A/2B)

Further removal of aerosols is accomplished using the High-Efficiency Mist Eliminator (HEME). The HEMEs also reduce the particle loading rate on the HEPA filters. Each HEME is a high-efficiency demister that has a removal efficiency of greater than 99% for aerosols down to the submicron size. As the offgas passes through the HEME (HOP-HEME-00001A/1B/2A/2B), the liquid droplets and other aerosols within the offgas interact with High-Efficiency Mist Eliminators' filter elements. As the aerosols contact the filaments they adhere to the filaments surface by surface tension. As the droplets agglomerate and grow, they eventually acquire enough mass to fall by gravity to the bottom of the unit. These collected droplets are estimated to contain the majority of the water soluble offgas radioactivity and will be collected in the bottom of the High-Efficiency Mist Eliminators (HOP-HEME-00001A/1B/2A/2B). The collected condensate will gravity drain into the SBS Condensate Receiver Vessel (HOP-VSL-00903/4). As the condensate flows down through the bed, a washing action is initiated that will help collect solids from the filter elements. However, some solids may accumulate in the bed over time, causing the differential pressure drop across the bed to increase. When the pressure drop across the High-Efficiency Mist Eliminators reaches a predefined level, it is washed with water to facilitate removal of accumulated solids. Some insoluble solids may remain, and their accumulation will eventually lead to the replacement of the High-Efficiency Mist Eliminators' filter elements.

HEPA Preheater (HOP-HTR-00001B/2A/5A/5B) and Filters (HOP-HEPA-00001A/1B/2A/2B/7A/7B/8A/8B)

Next, the offgas is heated using HEPA Preheaters (HOP-HTR-00001B/2A/5A/5B) to avoid condensation in the HEPA Filters a temperature above the gas streams dew point and then passed through a dual set of HEPA Filters (HOP-HEPA-00001A/1B/2A/2B/7A/7B/8A/8B) to provide high-efficiency submicron removal.

When the differential pressure drop across the filters becomes too high, they will be remotely changed out. The system is composed of two parallel HEME/HEPA Preheater/HEPA Filter trains. The offgas passes through one train while the other remains available as an installed backup.

Maintenance Ventilation Bypass

A maintenance bypass will also be installed, allowing the Melter offgas to bypass the Film Cooler (HOP-FCLR-00001/2), the Submerged Bed Scrubber (HOP-SCB-00001/2), and the Wet Electrostatic Precipitator (HOP-WESP-00001/2). The bypass line would feed into the HEME/HEPA filtration and other gas cleaning steps. Prior to initiating use of the maintenance ventilation line, waste feed would be secured, and the melter placed into an idle condition. No waste feed would be fed to the affected melter when the maintenance ventilation line is in use. The *Description of HLW Vitrification Bypass Events*, 24590-HLW-PER-PER-03-001 (Appendix 10.18), provides additional information on HLW bypass events.

4F.4.2.2 Secondary Offgas Treatment (HOP) System

There is one secondary offgas treatment train for each HLW Melter. The combined primary offgas stream and vessel ventilation offgas stream is discharged to the secondary offgas treatment system. The secondary offgas system will treat the combined offgas to a level protective of human health and the environment. Specifically, the secondary offgas treatment system will remove radioactive iodine, oxides of nitrogen (NOx), volatile organic compounds, and acid gases, as required, to meet the facility's air discharge requirements. The secondary offgas treatment system consists of the following miscellaneous treatment sub-systems:

- Booster Extraction Fans (HOP-FAN-00001A/1B/1C/9A/9B/9C)
- Activated Carbon Adsorber (HOP-ADBR-00001A/1B/2A/2B)
- Silver Mordenite Preheater (HOP-HX-00002/4)
- Silver Mordenite Column (HOP-ABS-00002/3)
- Catalyst Skid Preheater (HOP-HX-00001/3)
- Catalyst Skid Electric Heater (HOP-HTR-00001/7)
- Thermal Catalytic Oxidizer (HOP-SCO-00001/4)
- NOx Selective Catalytic Reducer (HOP-SCR-00001/2)
- Stack Extraction Fans (HOP-FAN-00008A/8B/8C/10A/10B/10C)

Activated Carbon Adsorber (HOP-ADBR-00001A/1B/2A/2B)

The Activated Carbon Adsorber miscellaneous unit (sub-system) removes mercury from the offgas. The activated carbon adsorber will contain a total of four units (two per Melter). The offgas from each melter normally flows through two activated carbon adsorber units in series. When gaseous mercury is detected breaking through the leading unit, the offgas flow is manually changed to place the trailing unit into the lead. In this configuration, only one adsorber is used while the exhausted adsorber media in the off-line unit is removed and replaced. The newly loaded unit is then placed back on-line in the lag position.

The new activated carbon media are gravity batch loaded into the top of the unit. The spent activated carbon is gravity unloaded at the bottom of the unit into containers for disposal. Each activated adsorber is provided with a means to add water for the fire suppression system.

Silver Mordenite Column (HOP-ABS-00002/3)

Two Silver Mordenite Column assemblies (one for each Melter) will be located in the HLW vitrification facility. The Silver Mordenite Columns will be used to remove gaseous radioactive iodine (I-129) and other gaseous halogens, such as fluorine and chlorine.

The Silver Mordenite Columns (HOP-ABS-00002/3) will consist of approximately 36 silver mordenite adsorbers mounted in a bank configuration to a mounting frame within a housing. Offgas will enter the upper (or inlet) plenum of each Silver Mordenite Column, flow in parallel through the adsorbers to the lower (or exit) plenum, pass through a replaceable roughing filter, and exit. The columns' design will

allow manual removal and replacement of adsorbers. Adsorbers will be sized to fit into standard 55-gallon waste drums for disposal.

The silver mordenite adsorbers are essentially cartridges filled with silver mordenite. Silver mordenite is a silver zeolite adsorption media in the form of cylindrical pellets. Halogens will react with the silver in the bed and become trapped within the matrix. Halogens are not loaded uniformly within the Silver Mordenite Adsorber cartridges. Adsorption reactions occur within an action zone (or mass transfer zone) that varies in length depending on the temperature of the bed and the gas velocity through the bed. Halogens will begin loading at the beginning of the silver mordenite beds and progressively load the silver through the column until breakthrough is reached at the end of the column. Once halogen breakthrough occurs or a predetermined lifespan is reached, the silver mordenite adsorbers will require replacement.

Thermal Catalytic Oxidizer (HOP-SCO-00001/4) and NOx Selective Catalytic Reducer (HOP-SCR-00001/2)

The offgas is passed through catalytic oxidizer/reducer skids (HOP-SKID-00005/7) housing a heat recovery exchanger (HOP-HX-00001/3), an electric heater (HOP-HTR-00001/7), Thermal Catalytic Oxidizer (HOP-SCO-00001/4), and NOx Selective Catalytic Reducer (HOP-SCR-00001/2) miscellaneous treatment unit sub-systems to remove volatile organic compounds (VOC), carbon monoxide, nitrogen oxide compounds, and acid gases in the offgas stream.

The heat recovery exchange first raises the offgas temperature using the hot offgas from the catalyst beds. The electric heater is used to supplement the heat recovery exchange primarily during start-up and when operating with low NO_x concentrations. The heated offgas is passed through the VOC catalyst to oxidize VOCs and carbon monoxide to carbon dioxide and water vapor. The offgas is then injected with a mixture of ammonia vapor and C3 air from an ammonia/air dilution skid. Following ammonia injection, the offgas is passed through the SCR catalyst to reduce NO_x to nitrogen and water vapor. The reduction reaction is exothermic, significantly increasing the offgas temperature. The outgoing hot offgas is cooled down in the heat exchanger and concurrently serves as the heating media for the incoming offgas. The cooled offgas stream is then directed to the exhaust stack through the stack monitoring system.

4F.4.3 Process Vessel Vent (PVV) System

The process vessel vent system consists of vessel ventilation piping and the header that is combined with the primary offgas treatment system. The vessel ventilation header joins the primary offgas system after the Wet Electrostatic Precipitators (HOP-WESP-00001/2) prior to entering high efficiency mist eliminators (HOP-HEME-00001A/B/2A/B). The vessel ventilation system offgas consists primarily of air, water vapor, and minor amounts of aerosols generated by the movement of vessel contents.

The process vessel vent system provides a vacuum on connected vessels relative to the host cell. The vacuum is controlled by an automatic pressure control valve system on the vessel vent header. The vessels attached to the vessel vent system are the melter feed and feed preparation vessels (HFP-VSL-00001/2/5/6), waste neutralization vessel (HDH-VSL-00003), acidic waste vessel (RLD-VSL-00007), the plant wash and drains vessel (RLD-VSL-00008) indirectly via the acidic waste vessel, and breakpots.

4F.4.4 HLW Pulse Jet Ventilation (PJV) System

A process flow diagram of the PJV System is provided in Appendix 10.1. The PJV system consists of the following miscellaneous treatment units (sub-systems):

- HEPA Filter (PJV-HEPA-00004A/4B/5A/5B)
- Pulse Ventilation HEPA Electric Preheater (PJV-HTR-00002)
- Pulse Vent Extraction Fan (PJV-FAN-00002A/B)

The PJV system draws exhaust air from selected HLW vessels, primarily those that use fluidic equipment, pulse jet mixers (PJMs) and reverse flow diverters (RFDs), for mixing and transfer of process fluids out of vessels for processing or sampling. Fluidic equipment use a column of air to lift and drop the liquid level in PJM or RFD vessels, which are located inside process vessels. Fluidic equipment will produce gaseous exhaust air as part of their normal operations. Fluidic exhaust air from individual vessels combines in a common header. Prior to discharge to the atmosphere, the exhaust air is heated in the pulse ventilation electric preheater (PJV-HTR-00002) to eliminate aerosols and reduce relative humidity of the gas stream and filtered by the HEPA filters (PJV-HEPA-00004A/4B/5A/5B) to remove particulates that may be present. The exhaust air is then pulled through the pulse jet extraction fans (PJV-FAN-00001A/B) and discharged through a dedicated stack. The HLW vessels attached to the PJV system are SBS condensate receiver vessels (HOP-VSL-00903/904), SBS (HOP-SBC-00001/2), acidic waste vessel (RLD-VSL-00007), plant wash and drains vessel (RLD-VSL-00008) and canister decontamination vessels (HDH-VSL-00002/4).

This page intentionally left blank.

1

Table 4F-1 HLW Vitrification Facility Tank Systems						
No.	**System**	**Vessel Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**	**Approximate Dimensions (Inside Diameter) × Height or Length in feet and inches (tangent line/tangent line)**
1	HOP	HOP-VSL-00903 H-B021	Melter 1 SBS Condensate Receiver Vessel 1	Hastelloy	9,891	23’ x 7’ 9”
2	HOP	HOP-VSL-00904 H-B005	Melter 2 SBS Condensate Receiver Vessel 2	Hastelloy	9.891	23’ x 7’ 9”
3	HDH	HDH-VSL-00001 H-B039B	Canister Rinse Vessel	Stainless Steel	3,314	5’ 11” x 17’
4	HDH	HDH-VSL-00003 H-B035	Waste Neutralization Vessel	Stainless Steel	5,315	7’ x 17’
5	HDH	HDH-VSL-00002 H-B035	Canister Decon Vessel 1	Titanium	630	2’ 6” x 16’ 9”
6	HDH	HDH-VSL-00004 H-B035	Canister Decon Vessel 2	Titanium	630	2’ 6” x 16’ 9”
7	RLD	RLD-VSL-00007 H-B014	Acidic Waste Vessel	Stainless Steel	18,145	13’ x 15’ 6”
8	RLD	RLD-VSL-00008 H-B014	Plant Wash and Drains Vessel	Stainless Steel	13,774	13’ x 9’ 9”
9	RLD	RLD-VSL-00002 H-B014	Off-gas Drains Collection Vessel	Stainless Steel	334	3’ 6” x 4’
10	HFP	HFP-VSL-00001 H-0117	HLW Melter 1 Feed Preparation Vessel	Stainless Steel	8,311	11’ x 9’ 6”

Table 4F-1 HLW Vitrification Facility Tank Systems

No.	System	Vessel Number/Location	Description	Material	Total Volume (US Gallons)	Approximate Dimensions (Inside Diameter) × Height or Length in feet and inches (tangent line/tangent line)
11	HFP	HFP-VSL-00002 H-0117	HLW Melter 1 Feed Vessel	Stainless Steel	8,311	11’ x 9’ 6”
12	HFP	HFP-VSL-00005 H-0106	HLW Melter 2 Feed Preparation Vessel	Stainless Steel	8,311	11’ x 9’ 6”
13	HFP	HFP-VSL-00006 H-0106	HLW Melter 2 Feed Vessel	Stainless Steel	8,311	11’ x 9’ 6”
14	HSH	HSH-TK-00001 H-0310A	Decontamination Tank Melter Cave 1	Stainless Steel	4,000	6’ x 22’ 10”
15	HSH	HSH-TK-00002 H-0304A	Decontamination Tank Melter Cave 2	Stainless Steel	4,000	6’ x 22’ 10”

1

Table 4F-2 HLW Vitrification Facility Miscellaneous Units (Systems and Sub-Systems)					
No.	**System/ Subsystem**	**Component Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**
HLW Vitrification Facility					
1	HMP	HMP-MLTR-00001 H-0117	HLW Melter 1	Stainless Steel/Alloys	1,078
2	HMP	HMP-MLTR-00002 H-0106	HLW Melter 2	Stainless Steel/Alloys	1,078
3	HOP	HOP-WESP-00001 H-0308	Melter 1 Wet Electrostatic Precipitator (WESP)	6% Molybdenum/ Stainless Steel	NA
4	HOP	HOP-WESP-00002 H-0302	Melter 2 Wet Electrostatic Precipitator (WESP)	6% Molybdenum/Stainless Steel	NA
5	HOP	HOP-SCO-00001 (located on Catalyst Skid HOP-SKID-00005) H-A123	Thermal Catalytic Oxidizer	Stainless Steel	NA
6	HOP	HOP-SCO-00004 (located on Catalyst Skid HOP-SKID-00007) H-A123	Thermal Catalytic Oxidizer	Stainless Steel	NA
7	HOP	HOP-SCR-00001 (located on Catalyst Skid HOP-SKID-00005) H-A123	NOx Selective Catalytic Reducer	Stainless Steel	NA
8	HOP	HOP-SCR-00002 (located on Catalyst Skid HOP-SKID-00007) H-A123	NOx Selective Catalytic Reducer	Stainless Steel	NA
9	HOP	HOP-ABS-00002	Silver Mordenite Column	Calcium Silicate/ Stainless Steel	NA

Table 4F-2 HLW Vitrification Facility Miscellaneous Units (Systems and Sub-Systems)					
No.	**System/ Subsystem**	**Component Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**
		H-B001B			
10	HOP	HOP-ABS-00003 H-B001B	Silver Mordenite Column	Calcium Silicate/ Stainless Steel	NA
11	HOP	HOP-FCLR-00001 H-0117	Melter 1 Offgas Film Cooler	Stainless Steel	NA
12	HOP	HOP-FCLR-00002 H-0106	Melter 2 Offgas Film Cooler	Stainless Steel	NA
13	HOP	HOP-FCLR-00003 H-0117	Melter 1 Standby Offgas Insert	Stainless Steel	NA
14	HOP	HOP-FCLR-00004 H-0106	Melter 2 Standby Offgas Insert	Stainless Steel	NA
15	HOP	HOP-HEPA-00001A H-0104	Primary Offgas HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
16	HOP	HOP-HEPA-00001B H-0104	Primary Offgas HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
17	HOP	HOP-HEPA-00002A H-0104	Secondary Offgas HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
18	HOP	HOP-HEPA-00002B H-0104	Secondary Offgas HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
19	HOP	HOP-HEPA-00007A H-0104	Primary Offgas HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
20	HOP	HOP-HEPA-00007B H-0104	Primary Offgas HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
21	HOP	HOP-HEPA-00008A H-0104	Secondary Offgas HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA

Table 4F-2 HLW Vitrification Facility Miscellaneous Units (Systems and Sub-Systems)					
No.	**System/ Subsystem**	**Component Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**
22	HOP	HOP-HEPA-00008B H-0104	Secondary Offgas HEPA Filter	Synthetic Fibrous Materials/Stainless Steel	NA
23	HOP	HOP-HTR-00001B H-0104	HEPA Preheater	Stainless Steel	NA
24	HOP	HOP-HTR-00002A H-0104	HEPA Preheater	Stainless Steel	NA
25	HOP	HOP-HTR-00005A H-0104	HEPA Preheater	Stainless Steel	NA
26	HOP	HOP-HTR-00005B H-0104	HEPA Preheater	Stainless Steel	NA
27	HOP	HOP-HX-00001 (located on Catalyst Skid HOP-SKID-00005) H-A123	Catalyst Skid Preheater	Stainless Steel	NA
28	HOP	HOP-HX-00002 H-0104	Silver Mordenite Preheater	Stainless Steel	NA
29	HOP	HOP-HX-00003 (located on Catalyst Skid HOP-SKID-00007) H-A123	Catalyst Skid Preheater	Stainless Steel	NA
30	HOP	HOP-HX-00004 H-0104	Silver Mordenite Preheater	Stainless Steel	NA
31	HOP	HOP-FAN-00001A H-B001C	Booster Extraction Fan	Stainless Steel	NA
32	HOP	HOP-FAN-00001B H-B001C	Booster Extraction Fan	Stainless Steel	NA
33	HOP	HOP-FAN-00001C	Booster Extraction Fan	Stainless Steel	NA

Table 4F-2 HLW Vitrification Facility Miscellaneous Units (Systems and Sub-Systems)					
No.	**System/ Subsystem**	**Component Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**
		H-B001C			
34	HOP	HOP-FAN-00008A H-0429	Stack Extraction Fan	Stainless Steel	NA
35	HOP	HOP-FAN-00008B H-0429	Stack Extraction Fan	Stainless Steel	NA
36	HOP	HOP-FAN-00008C H-0329	Stack Extraction Fan	Stainless Steel	NA
37	HOP	HOP-FAN-00009A H-B001C	Booster Extraction Fan	Stainless Steel	NA
38	HOP	HOP-FAN-00009B H-B001C	Booster Extraction Fan	Stainless Steel	NA
39	HOP	HOP-FAN-00009C H-B001C	Booster Extraction Fan	Stainless Steel	NA
40	HOP	HOP-FAN-000010A H-0429	Stack Extraction Fan	Stainless Steel	NA
41	HOP	HOP-FAN-000010B H-0429	Stack Extraction Fan	Stainless Steel	NA
42	HOP	HOP-FAN-000010C H-0429	Stack Extraction Fan	Stainless Steel	NA
43	HOP	HOP-ADBR-00001A (located on Activated Carbon Adsorber Skid HOP-ADBR-00001) H-A123	Activated Carbon Adsorber	Stainless Steel	NA
44	HOP	HOP-ADBR-00001B (located on Activated Carbon Adsorber Skid	Activated Carbon Adsorber	Stainless Steel	NA

Table 4F-2 HLW Vitrification Facility Miscellaneous Units (Systems and Sub-Systems)					
No.	**System/ Subsystem**	**Component Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**
		HOP-ADBR-00001) H-A123			
45	HOP	HOP-ADBR-00002A (located on Activated Carbon Adsorber Skid HOP-ADBR-00002) H-A123	Activated Carbon Adsorber	Stainless Steel	NA
46	HOP	HOP-ADBR-00002B (located on Activated Carbon Adsorber Skid HOP-ADBR-00002) H-A123	Activated Carbon Adsorber	Stainless Steel	NA
47	HOP	HOP-HEME-00001A H-0117	Melter 1 High Efficiency Mist Eliminator (HEME)	Packed Fiber Bed/Stainless Steel	NA
48	HOP	HOP-HEME-00001B H-0117	Melter 1 High Efficiency Mist Eliminator (HEME)	Packed Fiber Bed/Stainless Steel	NA
49	HOP	HOP-HEME-00002A H-0106	Melter 2 High Efficiency Mist Eliminator (HEME)	Packed Fiber Bed/Stainless Steel	NA
50	HOP	HOP-HEME-00002B H-0106	Melter 2 High Efficiency Mist Eliminator (HEME)	Packed Fiber Bed/Stainless Steel	NA
51	HOP	HOP-SCB-00001 H-0117	Melter 1 Submerged Bed Scrubber (SBS)	Ceramic Packing/Hastelloy	4,516
52	HOP	HOP-SCB-00002 H-0106	Melter 2 Submerged Bed Scrubber (SBS)	Ceramic Packing/Hastelloy	4,516
53	HOP	HOP-HTR-00001 (located on Catalyst Skid HOP-SKID-00005) H-A123	Catalyst Skid Electric Heater	Stainless Steel	NA

Table 4F-2 HLW Vitrification Facility Miscellaneous Units (Systems and Sub-Systems)					
No.	**System/ Subsystem**	**Component Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**
54	HOP	HOP-HTR-00007 (located on Catalyst Skid HOP-SKID-00007) H-A123	Catalyst Skid Electric Heater	Stainless Steel	NA
55	PJV	PJV-HEPA-00004A H-0104	PJV System HEPA Filter (Primary)	Synthetic Fibrous Materials/Stainless Steel	NA
56	PJV	PJV-HEPA-00004B H-0104	PJV System HEPA Filter (Standby Primary)	Synthetic Fibrous Materials/Stainless Steel	NA
57	PJV	PJV-HEPA-00005A H-0104	PJV System HEPA Filter (Primary)	Synthetic Fibrous Materials/Stainless Steel	NA
58	PJV	PJV-HEPA-00005B H-0104	PJV System HEPA Filter (Standby Primary)	Synthetic Fibrous Materials/Stainless Steel	NA
59	PJV	PJV-HTR-00002 H-0104	Pulse Ventilation HEPA Electric Preheater	Stainless Steel	NA
60	PJV	PJV-FAN-00002A H-0424	Pulse Vent Extraction Fan	Stainless Steel	NA
61	PJV	PJV-FAN-00002B H-0424	Pulse Vent Extraction Fan	Stainless Steel	NA

1

Table 4F-3 HLW Vitrification Facility Secondary Containment Rooms/Areas				
Room/Area	**Approximate Room/Area Dimensions (L×W, in feet)**	**Miscellaneous Treatment Units or Tanks in Room/Area (Largest Plant Item)**	**Volume of Largest Plant Item in Room/Area (US Gallons)**	**Minimum Secondary Containment Height (feet)**
HLW Vitrification Facility				
1. H-B014 Wet Process Cell	Minimum secondary containment for these cells/caves has been deleted and superseded by *Flooding Volume for HLW Facility*, 24590-HLW-PER-M-02-003 (DWP, Operating Unit Group, Appendix 10.8).			
2. H-B021 SBS Drains Collection Cell 1				
3. H-B035 Canister Decon Cave				
4. H-B039A, Canister Rinse Bogie Maintenance Room				
5. H-B039B, Canister Rinse Tunnel				
6. H-0304A, Melter 2 Equipment Decon Pit				
7. H-0117, Melter Cave 1				
8. H-0310A, Melter 1 Equipment Decon Pit				
9. H-0106, Melter Cave 2				
10. H-0302, Melter 2 - Active Services Cell				
11. H-0308, Melter 1 - Active Services Cell				
12. H-B005, SBS Drains Collection Cell 2				
13. H-0115 Shielded Pipeway				
14. H-0121 Shielded Pipeway				
15. H-0136 Canister Handling Cave				
16. H-0137 Shielded Pipeway	Secondary containment for ancillary equipment, no minimum liner height required			
17. H-B032 Pour Tunnel 1				
18. HCH14 Melter Cave No 1 Vertical Pipe Chase				

Table 4F-3 HLW Vitrification Facility Secondary Containment Rooms/Areas				
Room/Area	**Approximate Room/Area Dimensions (L×W, in feet)**	**Miscellaneous Treatment Units or Tanks in Room/Area (Largest Plant Item)**	**Volume of Largest Plant Item in Room/Area (US Gallons)**	**Minimum Secondary Containment Height (feet)**
19. HCH15 Melter Cave No 2 Vertical Pipe Chase				
20. ASX Sampler Cabinets • ASX-SMPLR-00028 (H-0305A) • ASX-SMPLR-00029 (H-0315) • ASX-SMPLR-00042 (H-0318)	Secondary containment liners for Isolok flush tubing, no minimum liner height required. The HLW ASX sampler upper secondary containment area liner dimensions are approximately 33” X 34”. The lower containment area liner dimensions are approximately 39” X 68”			

1

Table 4F-4 HLW Vitrification Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
HLW Vitrification Facility				
Sumps				
HCP-SUMP-00001 H-B014 (Wet Process Cell, El. -21’)	75	Radar	30” Dia. x 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00015001
RLD-SUMP-00001 H-B014 (Wet Process Cell, El. -21’)	75	Radar	30” Dia. x 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00015001
HOP-SUMP-00003 H-B021 (SBS Drain Collection Cell 1, El. -21’)	75	Radar	30” Dia. x 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00015001
HOP-SUMP-00008 H-B005 (SBS Drain Collection Cell 2, El. -21’	75	Radar	30” Dia. x 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-20004001
HDH-SUMP-00001 H-B039B (Canister Rinse Tunnel, El. -16.5’)	75	Radar	30” Dia. x 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00016001
HDH-SUMP-00002 H-B039A (Canister Rinse Bogie Maintenance Room, El. -16’)	75	Radar	30” Dia. x 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00016001
HDH-SUMP-00003 H-B035 (Canister Decon Cave, El. -16’)	75	Radar	30” Dia. x 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00004002
HFP-SUMP-00002 H-0117 (Melter Cave 1, El. 5’)	50	Radar	30” x 24” x 16” Deep Stainless Steel	**24590-HLW** -M6-RLD-00008002

Table 4F-4 HLW Vitrification Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
HFP-SUMP-00005 H-0106 (Melter Cave 2 El. 5’)	50	Radar	30” x 24” x 16” Deep Stainless Steel	**24590-HLW** -M6-RLD-20005001
HSH-SUMP-00003 H-0117 (Melter Cave 1, El. 3’)	50	Bubbler	20.5” x 20.5” x 16” Deep Stainless Steel	**24590-HLW** -M6-RLD-00008002
HSH-SUMP-00007 H-0106 (Melter Cave 2, El. 3’)	50	Bubbler	20.5” x 20.5” x 16” Deep Stainless Steel	**24590-HLW** -M6-RLD-20005001
HSH-SUMP-00008 H-310A (Melter 1 Equipment Decon Pit, El. 0’)	50	Radar	20.5” x 20.5” x 16” Deep Stainless Steel	**24590-HLW** -M6-RLD-00003001
HSH-SUMP-00009 H-0304A (Melter 2 Equipment Decon Pit, El. 0’)	50	Radar	20.5” x 20.5” x 16” Deep Stainless Steel	**24590-HLW** -M6-RLD-20003001
HPH-SUMP-00001 H-0136 (Canister Handling Cave, El. -3’)	75	Radar	30” Dia. x 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00016001
HPH-SUMP-00005 H-0136 (Canister Handling Cave, El. -3’)	75	Radar	30” Dia. x 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00004001
HPH-SUMP-00003 H-B032 (Pour Tunnel 1, El. -21’)	75	Radar	30” Dia. x 18” Deep Stainless Steel	**24590-HLW** -M6-RLD-00016001
Floor Drain Lines				
RLD-ZF-03330-S11B-03 Floor Drain Line H-B021 (SBS Drain Collection Cell 1, El. -21’)	N/A	N/A	3” Dia. 316L Stainless Steel	**24590-HLW** -M6-RLD-00017001
RLD-ZF-03447-S11B-03 Floor Drain Line H-B005 (SBS Drain Collection Cell 2, El. -21’)	N/A	N/A	3” Dia. 316L Stainless Steel	**24590-HLW** -M6-RLD-20005001

Table 4F-4 HLW Vitrification Facility Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
RLD-FD-0186 Floor Drain/Line RLD-ZF-00033-S11B-03 H-0308 (Melter 1 - Active Services Cell, El. 37')	N/A	N/A	3" Dia. Stainless Steel	**24590-HLW** -M6-RLD-00015001
RLD-FD-0187 Floor Drain/Line RLD-ZF-003428-S11B-03 H-0302 (Melter 2 - Active Services Cell, El. 37')	N/A	N/A	3" Dia. Stainless Steel	**24590-HLW** -M6-RLD-20004001
Autosampler Drain Lines				
RLD-ZF-04118-S11B-03 ASX Sampler 00028 Lower Containment Drain Line (H-0305A, El. 37')	N/A	Thermal Dispersion	3" Dia. Stainless Steel	**24590-HLW** -M6-RLD-00002002
RLD-ZF-04119-S11B-03 ASX Sampler 00029 Lower Containment Drain Line (H-0315, El. 37')	N/A	Thermal Dispersion	3" Dia. Stainless Steel	**24590-HLW** -M6-RLD-00002002
RLD-ZF-04120-S11B-03 ASX Sampler 00042 Lower Containment Drain Line (H-0318, El. 37')	N/A	Thermal Dispersion	3" Dia. Stainless Steel	**24590-HLW** -M6-RLD-00002002

Table 4F-5 HLW Vitrification Facility Container Storage Areas		
Container Storage Area	**Maximum Waste Volume (US Gallons) [1]**	**Approximate Dimensions (L × W × H, in feet) [2]**
HLW Vitrification Facility		
1. IHLW Canister Storage Cave (H-0132)	163,599	66’ x 22’ x 15’
2. HLW East Corridor El. 0’ (HC-0108/09/10)	183,721	(30’ x 34’ x 10’) + (65’ x 16’ x 10’) + (12’ x 32’ x 10’)
3. HLW Loading Area (H-0130)	142,204	70’ x 32’ x 10’

[1] The conversion factor used to convert from cubic feet to gallons is 7.4805 gal/ft^3.

[2] The dimension for height (H) is based on the height of the largest waste container stored in the area (i.e., LAW container is 7.5 ft, HLW canister is 15 ft, melters are assumed to be 16 ft, and a B-25 box is 5 ft - stacked a maximum of two high is 10 ft).

1

Table 4F-6 HLW Vitrification Facility Containment Buildings Summary	
Location	**Approximate Room Dimensions (L × W × H in feet)**
HLW Vitrification Facility	
1. HLW Melter Cave 1 Containment Building:	
H-0117 Melter Cave 1	75 x 32 x 54
H-0116B Melter Cave 1 C3/C5 Airlock	24 x 25 x 54
H-0310A Melter Cave 1 Equipment Decon Pit	20 x 9 x 69
2. HLW Melter Cave 2 Containment Building:	
H-0106 Melter Cave No 2	75 x 32 x 54
H-0105B Melter Cave 2 C3/C5 Airlock	24 x 25 x 54
H-0304A Melter Cave 2 Equipment Decon Pit	20 x 9 x 69
3. H-0136 IHLW Canister Handling Cave Containment Building	18 x 140 x 54
4. H-0133 IHLW Canister Swab and Monitoring Cave Containment Building	41 x 11 x 54
5. HLW C3 Workshop Containment Building:	
H-0311A C3 Workshop	19 x 30 x 22
H-0311B C3 MSM Maintenance Workshop	58 x 69 x 22
6. H-0104 HLW Filter Cave Containment Building	105 x 36 x 36
7. H-B032 HLW Pour Tunnel 1 Containment Building	85 x 11 x 30
8. H-B005A HLW Pour Tunnel 2 Containment Building	85 x 11 x 30
9. HLW Waste Handling Area Containment Building:	
H-0410B E&I Room	17 x 20 x 10
H-0411 Waste Handling Room	25 x 54 x 10

Table 4F-6 HLW Vitrification Facility Containment Buildings Summary	
Location	**Approximate Room Dimensions (L × W × H in feet)**
10. HLW Drum Swabbing and Monitoring Area Containment Building:	
H-0126A Crane Maintenance Room	15 x 20 x 31
H-0126B Swabbing and Monitoring Room	30 x 18 x 31
H-B028 Cask Import/Export Room	15 x 45 x 43

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 4G
DIRECT-FEED LOW-ACTIVITY WASTE (EFFLUENT MANAGEMENT FACILITY)

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
12/15/2016	8C.2016.Q3

This page intentionally left blank.

APPENDIX 4G
DIRECT-FEED LOW-ACTIVITY WASTE (EFFLUENT MANAGEMENT FACILITY)

[RESERVED]

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 4H
ANALYTICAL LABORATORY (LAB)

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
12/15/2016	8C.2016.Q3

This page intentionally left blank.

APPENDIX 4H
ANALYTICAL LABORATORY (LAB)

This page intentionally left blank.

APPENDIX 4H
ANALYTICAL LABORATORY (LAB)

TABLE OF CONTENTS

4H Analytical Laboratory (Lab) 5
4H.1 Containers 12
4H.1.1 Description of Containers 13
4H.1.2 Container Management Practices 13
4H.1.3 Container Labeling 15
4H.1.4 Containment Requirements for Storing Waste 15
4H.1.5 Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes in Containers 17
4H.2 Tank Systems 17
4H.2.1 Radioactive Liquid Waste Disposal (RLD) System 17
4H.2.2 Autosampling (ASX) System 18
4H.3 Air Emission Control 20
4H.4 Laboratory Maintenance 20
4H.5 Solid Waste Management 21
4H.5.1 Hotcell Solid Waste Management 21
4H.5.2 Container Storage Area for the Analytical Laboratory 21

TABLES

Table 4H-1 Analytical Laboratory Tank Systems 24
Table 4H-2 Analytical Laboratory Secondary Containment Rooms/Areas 25
Table 4H-3 Analytical Laboratory Sumps, Leak Detection Boxes, and Floor Drains/Lines 26
Table 4H-4 Analytical Laboratory Container Storage Areas 28

This page intentionally left blank.

4H Analytical Laboratory (Lab)

The Lab is designed to incorporate the features and capability necessary to ensure efficient Waste Treatment and Immobilization Plant (WTP) operations and meet permitting, process control, authorization basis, and waste form qualification requirements. The Lab is designed for "24/7" - 365 days per year operation to support peak throughput for each WTP facility. The Lab is a process support facility. The Resource Conservation and Recovery Act (RCRA) permitted portion of the Lab include the Radioactive Liquid Waste Disposal (RLD) tank system (tank and ancillary equipment) and the container storage areas. The Lab will also include satellite accumulation areas for the accumulation of secondary wastes generated by laboratory activities.

The workstations will be logically segregated to provide a degree of isolation from possible cross contamination that could reduce the validity of the analytical results. This isolation will be a design consideration. Isolation is also provided to enhance the ability of the laboratory to function even when a room or workstation is nonfunctioning. Redundant capabilities will be provided, as appropriate, to mitigate contamination incidents to maintain required support to the processes when one system fails.

A sample prepared in either the Analytical Hotcell Laboratory (AHL) or Analytical Radiological Laboratory (ARL) may be delivered to an off-site facility. The sample is packaged according to the dose rate and destination in "strong tight containers" or shielded shipping containers. The day the shipment is scheduled to be made, the packaged sample will be surveyed for final radiological release, shipping papers including chain-of-custody forms will be verified for completion, and transferred with the shipment package.

The laboratory design will be validated with information from tank utilization modeling of the process tanks and operational research modeling of the treatment process, as appropriate. General arrangement drawings 24590-LAB-P1-60-00007 and -00008 in Dangerous Waste Permit (DWP) Operating Group 10, Appendix 11.4 provide a general layout of the 0'-0" and -19'-2" elevations of the Lab where analytical, maintenance, administrative, and waste management activities take place. The following attributes are outlined in the facility design figures described above:

- Workstations have been defined as required by the sampling and analysis plan for WTP process control and waste form qualification.
- Capability to provide limited process technology will be provided.
- Contamination controls have been incorporated for reliability of laboratory service to the WTP processes.
- Management of samples for off-site analysis by an outsource laboratory including feed receipt samples.

Drawings and other documents, found in DWP Operating Group10, Appendix 11.0 provide additional detail for the Lab:

- General arrangement drawings showing locations of tank systems, secondary waste management and analytical laboratory activities.
- Process flow diagrams for process information.
- Piping and instrumentation diagrams (P&IDs), mechanical drawings, typical system figures depicting the analytical laboratory tank system and ancillary equipment.

The Lab contains both high-activity and low-activity laboratories. High-activity samples will be managed in the AHL. Low-activity samples will be managed and analyzed in the ARL, also known as the Rad Labs. The ARL also includes a sample receiving/shipping area designed to manage the inflow of manually transported samples. The facility is also being designed to coordinate the management of samples that will be outsourced and analyzed at off-site laboratories. Outsource laboratories will be used

to analyze the majority of very low-activity samples such as water quality and air emission samples. Outsource laboratories will also be used to analyze double shell tank (DST) system unit characterization samples. Analytical methods and equipment selected to support laboratory analyses will be in accordance with applicable requirements. A laboratory information management system (LIMS) network is provided to track and maintain an inventory of samples, reagents, and materials in the Lab area including sample analyses and data collection. In addition, the Lab includes waste drum management, maintenance, and support areas for facility operation.

The second floor of the Lab will be dedicated to the mechanical room, which will contain the C1 and C2 air handling units.

The RLD system vessels are located at approximately 19 ft below grade. Table 4H-1 lists current tank design information (capacity, materials of construction, and dimensions). Tank systems that manage liquid mixed or dangerous waste are provided with secondary containments. Table 4H-2 summarizes the secondary containment rooms/areas and calculated minimum liner heights. Sumps, leak detection boxes, and secondary containment drain systems are listed in Table 4H-3.

Samples will be transported to the Lab in two ways. The majority of samples will be collected and transported from the processing facilities via the autosampling (ASX) system. Samples will be collected in a sample bottle or vial and transferred into a sample carrier. High-activity samples from the Pretreatment Facility (PTF) and High-Level Waste (HLW) vitrification facility will be pneumatically transferred to the hotcell sample receipt area through a dedicated transfer system for high-activity samples. Low-activity samples from the Low-Activity Waste (LAW) vitrification facility will be transferred directly to the sample receipt laboratory area through a dedicated low-activity transfer system. A small percentage of samples will be transported to the laboratory manually in appropriately shielded transportation casks or containers.

General Description of the Analytical Radiological Laboratory (ARL)

The ARL is one of the two analytical areas contained within the Lab. The ARL will consist of thirteen laboratories commonly referred to as Rad Labs. The other area is the AHL.

The Rad Labs (designation RL) are designed to support the preparation and analysis of low-activity mixed waste samples. The Rad Labs also support the analyses of samples diluted, digested, and prepared in the hotcell facility. Samples will be manually transferred from the hotcell facility to the Rad Labs. The Rad Labs will be capable of receiving these low-activity samples transferred from the process facilities via the ASX system as well as manually transported low-activity samples from the process facilities. Equipment used in the preparation of samples for analyses will be located inside the fume hoods vented to the C3 ventilation system. All analyses except counting will be completed with equipment located in ventilation hoods. Barcode readers and computer workstations are provided in designated areas to input and retrieve data from the LIMS.

The Rad Labs include utilities and equipment required to support activities such as:

- Sample receipt and (manual) transport
- Dissolution/dilution
- Distillation/titration
- Standard/reagent preparation
- X-ray fluorescence spectrometry (XRF)
- Fourier transformation infrared spectrometry (FT-IR)
- Total Inorganic Carbon/Total Organic Carbon analyses (TIC/TOC)
- Analyses of elements and anions

- Ultraviolet and visible spectroscopy
- Preparation of samples for elemental analysis
- General physical properties analysis
- Radionuclide separation and counting
- Management of outsourced samples
- Satellite accumulation areas for secondary wastes

Sample Receipt Laboratory (RL-1)

The Sample Receipt Laboratory will serve as the sample receipt and staging area for the ARL. This laboratory will be provided with hoods for sample receipt, inspection/evaluation, sample staging and transfers. RL-1 will also contain four shielded cabinets each ventilated to the C3V system, and refrigerators for storage of samples requiring sample preservation. Sample preparations are completed with equipment located in hoods vented to the C3 ventilation system. Satellite Accumulation Area(s) (SAAs) will be available in the laboratory to accumulate solid wastes generated during the sample receipt, evaluation, and dispatch. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the Rad Lab sink drains (RLD system) and recycled back into the WTP process.

Dissolution/Dilution Lab (RL-2)

The Dissolution/Dilution Lab supports general wet chemistry activities including the preparation of samples for analyses that will be performed in the other Rad Labs. RL-2 will house instrumentation and supplies to support a variety of sample preparation techniques. The two primary sample preparation methods to be performed in RL-2 are microwave-assisted acid dissolution and fusion dissolution. Sample preparations are completed with equipment located in hoods vented to the C3 ventilation system. SAA(s) will be available in the laboratory to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the Rad Lab sink drains (RLD system) and recycled back into the WTP process.

Distillation/Titration Lab (RL-3)

The Distillation/Titration Lab provides sample preparation including distillation, titration, and physical measurements of samples. Sample preparation performed in this laboratory involves determining the aliquot or sub-sample weight, measurement of the specific gravity/density of sample solutions, and acid and base titrations. Sample preparations are completed with equipment located in hoods vented to the C3 ventilation system. SAA(s) will be available in the laboratory to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the Rad Lab sink drains (RLD system) and recycled back into the WTP process.

Standard/Reagent Preparation Laboratory (RL-4)

The Standard/Reagent Preparation Laboratory provides for prepared standards and reagents prior to their distribution to the other laboratories. Sources used for infrequent calibration of counting equipment will be stored in this laboratory. Sample preparations are completed with equipment located in hoods vented to the C3 ventilation system. SAA(s) will be available in the laboratory to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the Rad Lab sink drains (RLD system) and recycled back into the WTP process.

X-ray Laboratory (RL-5)

The X-ray Laboratory is used for quantifying elemental concentrations utilizing the X-ray Fluorescence (XRF) system. Optical microscopes are used for qualitatively identifying crystals as needed during process troubleshooting. Analyses are completed with equipment located in hoods vented to the C3 ventilation system. SAA(s) will be available in the laboratory to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the Rad Lab sink drains (RLD system) and recycled back into the WTP process.

Instrument Laboratory (RL-6)

The Instrument Laboratory supports unique functions associated with non-routine analyses. These functions include sample preparation and analysis functions such as the preparation of KBr pellets, preparation of dilutions and reagents for UV/VIS spectrophotometry, FT-IR Spectrometry for the quantitation of compounds in liquid, gas, or solid phases, and UV/VIS spectrometry for quantitation of compounds in liquids. Analyses and sample preparations are completed with equipment located in hoods vented to the C3 ventilation system. SAA(s) will be available in the laboratory to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the Rad Lab sink drains (RLD system) and recycled back into the WTP process.

Process Technology Laboratory (RL-7)

The Process Technology Laboratory provides non-routine measurement of physical characteristics of low-activity process samples and process tests. This laboratory is used for differential scanning calorimeter/thermal gravimetric analysis (DSC/TGA), particle size analysis, and rheology and pH measurements. Analysis and testing are completed with equipment located in hoods vented to the C3 ventilation system. SAA(s) will be available in the laboratory to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the Rad Lab sink drains (RLD system) and recycled back into the WTP process.

Process Technology Laboratory (RL-8)

The Process Technology Laboratory provides testing on laboratory scale equipment to observe the behavior of low-activity materials during processing through a process unit operation and to define anomalies to routine processing. All analyses are completed with equipment located in hoods vented to the C3 ventilation system. SAA(s) will be available in the laboratory to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the Rad Lab sink drains (RLD system) and recycled back into the WTP process.

Elemental Analysis Laboratories (RL-9 and RL-9A)

The Elemental Analysis Laboratories are used for the preparation and analysis of medium level radioactive samples using an inductively coupled plasma/atomic emission spectrometer (ICP/AES) instrument for the analysis of elements, inductively coupled plasma/mass spectrometer (ICP/MS) instrument for the analysis of elements and specific radionuclides, and mercury analyzer for the analysis of mercury. The Elemental Analysis Laboratory RL-9A is a duplicate of Elemental Analysis Laboratory RL-9; RL-9A is a backup to RL-9. The space is available for the setup of process development evaluations. SAA(s) will be available in the laboratories to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the Rad Lab sink drains (RLD system) and recycled back into the WTP process.

General Chemistry Lab (RL-10)

The General Chemistry Lab is used to prepare and analyze samples using Ion Chromatography (IC) for analysis of selected anions and organic acids, and Total Carbon analyzer (TC) for total inorganic carbon, and total organic carbon (TIC/TOC) analysis. RL-10 equipment is split such that instrument electronics are on benches adjacent to fume hoods and the components for sample contact are inside hoods vented to the C3 ventilation system. SAA(s) will be available in the laboratory to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the Rad Lab sink drains (RLD system) and recycled back into the WTP process.

Rad Preparation Laboratories (RL-11 and RL-12)

The Rad Preparation Laboratories are used for sample preparation and separation of various radionuclides for analysis by nuclear spectroscopy (counting). Both of the laboratories will be identical in size and will have the capability to provide limited redundancy or both labs can be used to provide additional capacity. SAA(s) will be available in the laboratories to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the Rad Lab sink drains (RLD system) and recycled back into the WTP process.

Rad Counting Laboratory (RL-13)

The Rad Counting Laboratory is used for analyzing prepared samples, standards, and control sources. This laboratory will accommodate instrumentation for measurements of alpha, beta, and gamma radiation in samples transferred from the Rad Preparation Laboratories RL-11 and RL-12. There will be no hoods, water distribution, or sinks in this room. Samples will be manually transported on a cart from the Rad Preparation Laboratories. Shielded storage areas will be provided for temporary staging of samples, calibration and control check sources. Analyses will be completed using gamma spectrometer systems, gas-flow proportional counters for gross alpha/beta analysis, alpha spectroscopy multi-detector systems, and liquid scintillation counting systems for beta analysis. SAA(s) will be available in the room to accumulate solid waste generated during the receiving and packaging operations.

Sample Shipping and Receiving Area (Rm A-0141F)

The Sample Shipping and Receiving Area is located adjacent to the primary airlock and is used for receiving manually delivered samples. This room will provide space for loading casks for off-site transport of samples as required. This room will also provide an area with low contamination potential and reduces the need for decontamination of casks and containers for off-site radiological release. This area provides equipment to receive and transfer samples, chain of custody, staging for shipment to off-site facilities, and transfer to RL-1 or into the Sample Receipt Hotcell (HC-1) if the radioactivity level is determined to require shielding.

If the sample is to be shipped to another facility, the sample will be placed on shelving or in the refrigerator awaiting shipping. If a sample originating in the Lab is to be shipped to another laboratory, the exterior of the sample container will be decontaminated and brought to this location for staging for shipment. SAA(s) will be available in the room to accumulate solid waste generated during the receiving and packaging operations. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the Rad Lab sink drains (RLD system) and recycled back into the WTP process.

General Description of the Analytical Hotcell Laboratory (AHL)

Process samples from the WTP PTF and HLW facility taken by the ASX system are delivered to the Hotcell Receipt Station (HCRS) by a pneumatic transfer system. Samples from outside the WTP that require shielding are delivered to the hotcell in shielded sample carriers called pigs. Barcode readers are

provided in each hotcell and a computer workstation is provided to input and retrieve data from the LIMS. A trolley is provided for inter-cell transfers of samples and smaller equipment items. A monorail is provided to move large equipment. Each hotcell is provided with an appropriate number of master slave manipulators (MSMs) to accomplish in-cell tasks remotely. The equipment used to perform the functions described in the following sections is representative of typical activities for safely performing operations on highly radioactive samples.

The AHL consists of 14 hotcells (HC), one hood assembly, and three glovebox assemblies adjoining the hotcell structure. The facility includes equipment in Hotcells 1 through 14 with the Hotcell 14 functioning as the secondary waste management area, and a more detailed description of Hotcell 14 waste management activities is provided in Appendix 4H.4, Solid Waste Management. Gloveboxes adjoining HC-12 and HC-13 will house the ICP/AES and ICP/MS instruments.

Samples will be moved into and between the hotcells using the trolley or monorail. Ventilation flow from the hotcell area, including the waste cell, will be routed to the C5 HEPA filtration system.

Sample Receipt (HC-1)

The Sample Receipt Hotcell is located at the north end of the series of analytical hotcells. One glovebox assembly on HC-1 will be used to transfer samples and material out of the hotcells. One hood assembly on HC-1 will be used to introduce manually drawn samples into HC-1. This hotcell is outfitted with four MSM arms (two pairs) on the east and west sides to provide full floor coverage. The HCRS on top of HC-1 provides for the delivery of samples from the ASX system. The mechanical de-capping of sample bottles, transferring samples to transparent container, and capping with a screw-type lid is performed in HC-1. HC-1 also provides radiation dose rate probe and meter to estimate the radiation level of both incoming and outgoing samples, pH meter for measurement of samples, and a barcode reader (or similar device) to identify and track sample containers.

The ASX HCRS is located on top of HC-1. The sample carrier will be delivered from an HLW or PTF ASX sampler to the HCRS. The HCRS will remove the sample bottle from the carrier utilizing robotics and place it in a chute attached to HC-1. SAA(s) will be available in the hotcell to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the hotcell floor drain (RLD system) and recycled back into the WTP process.

Sample Preparation (HC-2 and HC-3)

The Sample Preparation Hotcells are located south of the sample receiving hotcell and each hotcell will be outfitted with two MSMs. Activities carried out in these hotcells include the generation of individual sample aliquots using sample homogenizer, electronic scales, centrifuge, filtration, stirring, and desiccators. Individual sample aliquots are then transferred to other hotcells for further analysis. SAA(s) will be available in the hotcell to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the hotcell floor drain (RLD system) and recycled back into the WTP process.

Limited Process Technology (HC-4)

The limited process technology hotcell provides space for the evaluation of anomalies occurring in the processing facilities such as potential plugging of ultrafilters, ion exchange malfunction and material foaming, etc. This hotcell may also be used to prepare coupons for analyses in hotcells 12 and 13. This cell has one pair of MSMs and necessary sample preparation equipment (furnaces, drying ovens, balances, etc.) to complete process testing. SAA(s) will be available in the hotcell to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the hotcell floor drain (RLD system) and recycled back into the WTP process.

Physical Properties (HC-5)

The physical properties hotcell provides space for measurements such as rheology, solids, and particle size measurements to support process operations. This hotcell is provided with a pair of MSMs, and necessary sample preparation equipment (furnaces, drying ovens, balances, etc.) to complete process testing. SAA(s) will be available in the hotcell to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the hotcell floor drain (RLD system) and recycled back into the WTP process.

Dissolution and Dilution Hotcells (HC-6 and HC-7)

The dissolution and dilution hotcells will be used to perform thermal-assisted acid digestion and alkali fusion dissolutions of WTP process samples. Each hotcell contains a pair of MSMs and work surface for dissolving slurry feed samples (such as from the melter feed preparation vessels) and glass shards.

The equipment used to prepare samples in the dissolution/dilution hotcells includes microwave and/or convection ovens and accessories for heating and testing sample mixtures such as furnaces, drying ovens, balances, pH meters. SAA(s) will be available in the hotcell to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the hotcell floor drain (RLD system) and recycled back into the WTP process.

Radionuclide Preparation Hotcells (HC-8 and HC-9)

The radionuclide preparation hotcells will be used to separate radionuclides for further isolation and also to reduce the radiological dose rate of samples for export from the hotcells for counting and analyses in ARL. The equipment required to prepare samples consists of small pre-packed ion exchange columns and other support equipment such as balances and glassware. SAA(s) will be available in the hotcells to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the hotcell floor drain (RLD system) and recycled back into the WTP process.

Ion Chromatography and Total Inorganic Carbon/Total Organic Carbon Preparation (HC-10)

The Ion Chromatography and Total Inorganic and Organic Carbon Preparation hotcell is used to prepare samples for IC or TIC/TOC analyses in the ARL. Liquid samples for anion and TIC/TOC analyses are diluted and transferred to the Rad Lab. Solids are digested, diluted and transferred to the Rad Lab for analyses. This preparation is needed to reduce dose rates to an acceptable level for analysis in Rad Labs. The equipment required to prepare samples consists of containers for performing water digestions, volumetric flasks and pipettes for diluting the samples and addition of control reagents, and filtration apparatus and vacuums for assisting in sample filtration. SAA(s) will be available in the hotcell to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the hotcell floor drain (RLD system) and recycled back into the WTP process.

Boildown and Physical Properties (HC-11)

This hotcell will provide the capability to determine the volume reduction of sample material achievable before solids form, to test the compatibility of different waste types and to develop analytical methods. The hotcell will be outfitted with the general equipment capabilities. Equipment required to prepare and/or test samples will include stirrers to homogenize sample materials, vessels to composite samples, and filtration systems to separate solids from liquids. SAA(s) will be available in the hotcell to accumulate solid wastes generated during the sample preparation and analyses. Organic liquids will be segregated and managed as Lab Packs; other liquid wastes will be disposed in the hotcell floor drain (RLD system) and recycled back into the WTP process.

ICP Preparation and Analyses (HC-12 and HC-13)

The ICP Preparation and Analysis hotcell receives samples prepared in hotcells 2, 3, 4, 6 & 7. These hotcells will receive samples previously diluted in the sample preparation hotcells (HC-2 and HC-3) or made into coupons in Limited Process Technology hotcell (HC-4) or from the dissolution/dilution hotcells (HC-6 and HC-7). A glovebox approximately 4 feet (ft) by 4 ft will be attached perpendicular to the exterior of each hotcell. An ICP/AES and an ICP/MS will be integrated with the gloveboxes at hotcells 13 and 14. Equipment necessary to prepare and/or analyze samples in HC-12 and HC-13 will include:

- Volumetric glassware to perform sample dilutions.
- Pipettes to add spikes and reagents to samples.
- Stirrers to homogenize solutions.
- Analytical balance to perform dilutions by weight.
- Attached glovebox exterior to the hotcell.
- ICP/AES instrument integrated with the glovebox.
- ICP/MS instrument integrated with the glovebox.
- Laser system to ablate particulates from the surface of a prepared glass coupon.
- Sample positioning and focusing system to properly ablate glass particulates.
- Optical viewing system to observe and align area of the glass coupon for ablation.

Hotcell Solid Waste Management (HC-14)

Mixed and dangerous solid waste will be accumulated in hotcells and periodically placed in waste drums. Solid waste management in the hotcell will require remote handling. Details about secondary waste management in the Hotcell Solid Waste Management area is provided in Section 4H.4.1.

4H.1 Containers

This section identifies the containers and container management practices that will be followed at the Lab. The term “container” is used as defined in Washington Administrative Code (WAC) 173-303-040. Note that in this appendix and throughout the permit, terms other than containers may be used, such as canisters, boxes, bins, flasks, casks, and overpacks.

The container storage area (secondary waste) located within the Lab consists of the following rooms:

- Waste Drum Management Room (A-0139)
- Lab Pack Room (A-0139A)
- Airlock (A-0139B)
- Volume Reduction Room (A-0139C)
- Airlock/Clean Drum Export Room (A-0139D)

Container storage area dimensions at the Lab are summarized in Table 4H-4.

The following sections address waste management containers:

- Description of Containers - Section 4H.1.1
- Container Management Practices - Section 4H.1.2
- Container Labeling - Section 4H.1.3
- Containment Requirements for Storing Waste - Section 4H.1.4
- Prevention of Ignitable, Reactive, and Incompatible Wastes in Containers - Section 4H.1.5

4H.1.1 Description of Containers

These types of waste will be managed in containers:

- Miscellaneous mixed waste (secondary waste)
- Miscellaneous nonradioactive dangerous waste (secondary waste)

The waste form dictates the type of containers used for waste management. The following paragraphs describe these types of containerized waste that are managed at the Lab.

Miscellaneous Mixed Waste

Generally, miscellaneous mixed wastes are secondary wastes that may include, but are not limited to, the following items:

- Spent or failed equipment
- Offgas HEPA filters
- Analytical laboratory waste

Spent equipment and offgas filters will typically be managed in commercially-available containers such as steel drums or steel boxes, of varying size. The containers for miscellaneous mixed waste will comply with transportation requirements, with receiving treatment, storage, and disposal (TSD) facility waste acceptance criteria, and will be compatible with the miscellaneous mixed waste. These containers may or may not include a liner. Final container selection, container and waste compatibility, and the need for liners, will be based on the physical, chemical, and radiological properties of the waste being managed.

Each miscellaneous mixed waste container will have associated documentation that describes the contents, such as waste type, physical and chemical characterization, and radiological characterization. This information will be retained within the plant information network.

Most miscellaneous secondary mixed wastes will be spent equipment and consumables such as pumps, air lances, HEPA filters, etc., and are not expected to contain liquids. If wastes are generated that contain liquids, these wastes may be treated to remove or absorb liquids, to comply with the receiving TSD facility waste acceptance criteria. In addition, the analytical laboratory will generate containerized liquid waste (Lab Packs).

Miscellaneous Nonradioactive Dangerous Waste

Each nonradioactive dangerous waste container will have associated documentation that describes the contents, such as waste type and physical and chemical characterization. Typically, commercially available containers will be used. The types of containers used for packaging nonradioactive dangerous waste will comply with the receiving TSD facility waste acceptance criteria and transportation requirements. However, final container selection, container and waste compatibility, and the need for liners will be based on the physical and chemical properties of the waste being managed.

4H.1.2 Container Management Practices

The following paragraphs describe how each of the containers used at the Lab are managed.

4H.1.2.1 Miscellaneous Mixed Waste and Miscellaneous Nonradioactive Dangerous Waste Containers

Miscellaneous Mixed Waste Containers

Miscellaneous mixed waste (secondary waste) will be managed in:

- Laboratory waste management area (A-0139 and A-0139A/B/C/D)

Containers will be kept closed unless waste is being added, removed, or sampled while in the containment storage areas. Containers stored in these areas will be placed on pallets, or otherwise elevated to prevent contact with liquid, if present. Table 4H-4 summarizes the dimensions and maximum capacity of miscellaneous mixed waste storage areas. Containers will be managed in designated areas throughout the Lab, and then transferred to a suitable TSD facility.

The laboratory waste management area (A-0139 and A-0139A/B/C/D) will be located in the southern portion on the 0 ft elevation of the Lab. The unit will be used for storage of miscellaneous waste containers prior to disposition to a receiving TSD facility. The aisle space will be 30 inches (in.) and waste containers may or may not be stacked. This unit's storage capacity is listed in Table 4H-4.

Miscellaneous Nonradioactive Dangerous Waste Containers

Miscellaneous dangerous waste containers will typically be managed in permitted or non-permitted waste management units (SAAs and less-than-90-day storage areas) located throughout the Lab. Containers will be kept closed unless waste is being added, removed, or sampled. They will routinely be moved by forklift or drum cart, and will be managed in a manner that prevents ruptures and leaks.

4H.1.2.2 Waste Tracking

The plant information network interfaces with the integrated control network and is designed to collect and maintain plant information. The plant information network is currently planned to the following systems (all systems used at the plants/facilities and balance of facilities are provided for information only):

- Plant data warehouse and reporting system
- Laboratory information management system
- Waste tracking and inventory system

Inventory and Batch Tracking

The waste tracking and inventory system will interface with the information system data historian to provide reporting information such as tank volumes, waste characteristics, and facility inventories of process waste. The waste tracking system will also be used to query operations parameters at any time information is needed, as specified by operations, to manage the process system.

Secondary Waste Stream Tracking

Containerized secondary waste streams and equipment will be tracked and managed through commercially available database management software. Containers will be mapped in each plant and updated during the inspection process using a commercially available drawing software application.

Laboratory Information Management System

The laboratory information management system (LIMS) will be an integral feature of the plant information network. The LIMS will serve as an essential tool for providing data management of regulatory and processing samples. The chosen LIMS will be a commercial off-the-shelf software package designed for performing laboratory information management tasks as described in ASTM E1578-93, *Standard Guide for Laboratory Information Management Systems (LIMS)*.

The LIMS will track the flow of samples through the laboratory. Samples received in the laboratory will be identified with a unique identification label. The identification label provides details of the sample process stream. Baseline analyses are defined by the requesting plant. Additional analyses, as required, will be input into LIMS by laboratory analysts. Data will be input into LIMS manually or by data transfer using LIMS/instrument interface. Analyses will be performed using approved and validated analytical procedures.

Analytical results will be compiled by the LIMS and held pending checking and approval by appropriate staff. Approved results will be reported to the requesting plant.

4H.1.3 Container Labeling

Miscellaneous Mixed Waste Containers

The miscellaneous mixed waste containers will be labeled with the accumulation or generation start date, as appropriate, the major risk(s) associated with the waste, and the words "hazardous waste" or "dangerous waste." A waste tracking and inventory system will be implemented. Labels and markings will be positioned so that required information is visible. The label will meet the WAC 173-303-630(3) requirements, and the dangerous waste number will be clearly identified.

Miscellaneous Dangerous Waste Containers

The miscellaneous dangerous waste drums will be labeled with the accumulation or generation start date, as appropriate, the major risk(s) associated with the waste, and the words "hazardous waste" or "dangerous waste". A waste tracking and inventory system will be implemented. Labels and markings will be positioned so that required information is visible. The label will meet the WAC 173-303-630(3) requirements, and the dangerous waste number will be clearly identified.

4H.1.4 Containment Requirements for Storing Waste

Secondary containment requirements for the waste are discussed below.

4H.1.4.1 Secondary Containment System Design

Secondary containment is required for areas in which containers hold free liquids. It is also required for areas managing wastes exhibiting the characteristics of ignitability or reactivity as defined in WAC 173-303-090(5) and (7).

Miscellaneous Mixed Waste

Miscellaneous mixed waste storage areas may contain waste requiring secondary containment. If wastes containing liquids or wastes exhibiting the characteristics of ignitability or reactivity are generated, portable secondary containment that meets the requirements of WAC 173-303-630(7) will be provided.

Miscellaneous Dangerous Waste

Miscellaneous dangerous waste storage areas may contain waste requiring secondary containment. If wastes containing liquids or wastes exhibiting the characteristics of ignitability or reactivity are generated, portable secondary containment that meets the requirements of WAC 173-303-630(7) will be provided.

4H.1.4.2 System Design

Miscellaneous Mixed Waste

There will be a miscellaneous mixed waste (secondary waste) container storage area at the Lab, as follows:

- Laboratory waste management area (A-0139 and A-0139A/B/C/D)

Miscellaneous Dangerous Waste

Containers with liquids will be provided with portable secondary containment meeting the requirements of WAC 173-303-630(7).

4H.1.4.3 Structural Integrity of the Base

The storage areas will be constructed to support storage and transportation of containers within the container storage areas and will be designed with the following:

- Containment system capable of collecting and holding spills and leaks.
- Base will be free of cracks and gaps and sufficiently impervious to contain leaks.
- Positive drainage control.
- Sufficient containment volume.
- Sloped to drain or remove liquid, as necessary.

4H.1.4.4 Containment System Capacity

Miscellaneous Mixed Waste

Liquid waste may be stored in the laboratory waste management area. Each container holding liquid dangerous waste will be placed into portable secondary containment that meets the requirements of WAC 173-303-630(7). The waste container will function as the primary containment while the portable containment device will function as the secondary containment.

Each portable secondary containment will have the capacity to contain 10% of the volume of all containers within the containment area, or the volume of the largest container, whichever is greater.

Miscellaneous Dangerous Waste

Each container holding liquid nonradioactive dangerous waste will be placed into portable secondary containment. The waste container will function as the primary containment while the portable sump will function as the secondary containment.

Each portable secondary containment will have the capacity to contain 10% of the volume of all containers within the containment area, or the volume of the largest container, whichever is greater. Typically, the waste containers will be steel drums.

4H.1.4.5 Control of Run-On

Miscellaneous Mixed Waste

Run-on will not reach the interior of the miscellaneous mixed waste storage areas, because they will be located within buildings, which will have roof gutters to remove precipitation.

Miscellaneous Dangerous Waste

Run-on will not reach the interior of the miscellaneous dangerous waste storage areas, because waste will be managed in buildings with walls and roof to remove precipitation.

4H.1.4.6 Removal of Liquids from Containment System

Miscellaneous Mixed Waste

Portable secondary containment sumps will be provided for individual containers that contain liquids. Hand pumps or similar devices will be used to remove liquid released to the portable secondary containments.

Miscellaneous Dangerous Waste

Portable secondary containment sumps will be provided for individual containers that contain liquids. Hand pumps or similar devices will be used to remove liquid released to the portable secondary containments.

4H.1.4.7 Demonstration that Containment is not Required because Containers do not Contain Free Liquids, Wastes that Exhibit Ignitability or Reactivity, or Wastes Designated F020-023, F026 or F027

Miscellaneous Mixed Waste

Liquids may be present in wastes in the laboratory waste management area. Secondary containment will be provided for individual containers that manage liquids. The laboratory waste management area may manage D001 and D003 waste. Wastes with the F020-F023, F026, and F027 numbers are not identified for the DST system. Therefore, these waste numbers will not be present at the Lab.

Miscellaneous Dangerous Waste

Wastes with the F020-F023, F026, and F027 numbers are not identified for the DST system. Therefore, these waste numbers will not be present at the Lab.

4H.1.5 Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes in Containers

Ignitable, Reactive, or Incompatible Miscellaneous Mixed Waste and Miscellaneous Dangerous Waste

Potentially incompatible wastes are not expected to be managed in the miscellaneous mixed waste storage areas, except for the laboratory waste management area. If such wastes are managed in this area, the containers of incompatible waste or chemicals will not be stored in close proximity to each other. Acids and bases will be stored on separate portable secondary containment sumps; oxidizers will be stored in areas separate from combustible materials; and corrosive chemicals will be stored on a separate secondary containment sump. These separate storage areas within the unit will be clearly marked with signs indicating the appropriate waste to be stored in each area. Potentially incompatible waste will be stored at least one aisle width apart.

4H.2 Tank Systems

4H.2.1 Radioactive Liquid Waste Disposal (RLD) System

The analytical laboratory RLD system is primarily composed of the following:

- Floor Drain Collection Vessel (RLD-VSL-00163)
- Laboratory Area Sink Collection Vessel (RLD-VSL-00164)
- Hotcell Drain Collection Vessel (RLD-VSL-00165)
- Associated ancillary equipment

The Floor Drain Collection Vessel (RLD-VSL-00163) collects, contains, and transfers noncontaminated liquid effluent. The floor drain collection vessel is identified as part of the RLD system. It is not designed or permitted to manage mixed or dangerous wastes. If a spill or release were to occur that contaminated this vessel, the vessel will be discharged to the Laboratory Area Sink Collection Vessel (RLD-VSL-00164) or the Hotcell Drain Collection Vessel (RLD-VSL-00165) and rinsed with water prior to being returned to service. This vessel collects effluent from radiological laboratory floor drains, eyewash, and safety shower equipment. The vessel also collects effluent from the C2 area floor drains located in areas such as the laboratory area corridors, hotcell bay area, and the filter room.

Liquid waste management in the hotcell will require remote handling prior to disposal to the Hotcell Drain Collection Vessel (RLD-VSL-00165) from low point drains. Aqueous liquid waste consists of samples (unused and residues), dilutions, and dissolution aliquots prepared for analysis. Liquids will be partially neutralized to reduce corrosivity before they are discharged to the liquid waste system. Containers of aqueous liquids for disposal are moved to and poured down low-point drain using the MSMs along with a minimum of 0.5 gallon flush water for each 20 milliliters (mL) of waste. Liquid

waste information (including quantity of liquid waste per disposal and identification of the sample that generated the waste) is updated in LIMS using the computer workstation.

4H.2.2 Autosampling (ASX) System

The ASX is considered one of the laboratory systems; however, it includes components in the other WTP facilities. The ASX system includes the autosampling assemblies in each of the WTP chemical process facilities and the Pneumatic Transfer System (PTS) that transports samples between those facilities and the Lab. The ASX is a support system that collects and manages samples from each of the process facilities. The DWP regulates the secondary containment of sample feed and sample return process piping and sample line flush piping internal to the PTF, HLW, and LAW sampler as described in Section 4H.2.2.1, Autosampler Secondary Containment and Leak Detection Functions.

Four ASX samplers are located in the PTF, three are located in the HLW facility, and two are located in the LAW facility. Each sampler interfaces with the process systems that require sampling of their contents via a process sample pipe loop. The loop will deliver process waste for sample collection to the sampler and return the pumped fluid, minus the collected sample, to the vessel from which it originated.

The PTS is a network of transport tubes, diverters, exhausters, HEPA filters, and controlled arrival stations that work concurrently to transfer the carriers and sample bottles to and from the analytical laboratory. Low-activity samples are delivered to the Fumehood Receipt Station in the analytical laboratory. The HCRS is the analytical laboratory receipt station for HLW and PTF samples. The Autosampling Control System (ASJ) will control and monitor the ASX process.

For high-frequency sampling and for highly radioactive, medium activity and transuranic-bearing streams, the sampling process is automated. Manual sampling techniques are primarily reserved for low-activity, low frequency, and large volume sample applications, or where needle-sampling techniques are inappropriate.

The WTP sampling systems for high-activity (HA) and low-activity (LA) sampling are independent and segregated because of the requirements for handling the HA samples when they reach the Lab. Both the HA and LA sample lines will transfer only one sample carrier at a time. The HA sampling system collects and pneumatically transfers samples from the PTF and HLW facilities to the Sample Receipt Hotcell (HC-1). The LA sample line transfers samples collected from the LAW facility directly to the radiological laboratory. Diverters will provide junction points that enable the sample carriers to be routed to and from destinations on the transfer line. Tracking switches along the transfer lines will be used to track sample carrier movement. In addition to the primary HA and LA sample lines, samples from the tank farms or other locations, and grab samples taken from WTP facilities, will be manually delivered to the Lab in shielded sample carriers.

Process liquids will be circulated through pipe lines into and out of the autosampler enclosures. Samples are collected by the ISOLOK samplers located in these recirculation loops. A supply line isolation valve will secure the recirculation process upon completion of sampling.

The mechanical process for ASX sample collection will commence by dispatching a carrier and sample bottle from the storage/dispatch magazine in the Lab and receiving it at the sampler docking station. The robotic arm will interface with the carrier at the glovebox docking port to retrieve the empty sample bottle from the carrier. The robotic arm will drive the sample bottle on to the ISOLOK sample injection needle. The ISOLOK captures, retains, and injects a specific volume of process material into the sample bottle. The ISOLOK sampler uses a pneumatically driven plunger to “grab” a measured sample volume of flowing material with each extension and retraction. The quantity collected for a sample, then, will be determined by the number of strokes set for the sample drawn.

The robotic arm replaces the filled sample bottle into the carrier, at the glovebox docking port, and the carrier is then flown through the PTS flight tube back to the HA or LA Lab receipt station where the

sample will be retrieved for analysis. The carrier will also contain any potential leakage in the event of sample bottle damage or malfunction.

In conjunction with this sample collection sequence, two seal tests are performed. The Arm Interspace Seal Test (AIST) occurs at the initiation of a sample sequence. It confirms that the robotic arm has an effective seal on the docking port. The Carrier Interspace Seal Test (CIST) is performed when the carrier has been sealed against the docking port. It confirms that both the robotic arm and the carrier are sealed against the docking port. The CIST occurs prior to lifting the robotic arm off the docking port. The seal tests are performed to ensure that air from the glovebox confinement cannot be drawn into the PTS.

The ISOLOK sampler is flushed after sample collection to prevent needle plugging and to prevent cross contamination of subsequent samples. To flush the ISOLOK sampler, the sample vial with a triple septum cap will be repositioned with respect to the discharge needle so that water can be applied at a port that allows flow through the vent needle opening. The septum is punctured by the sample collection needles, and the vial is held in place while activating the flush valve. The sample plunger will be partially extended to align the ISOLOK port for this flush operation, which will continue until water runs clear, generating approximately 250 ml of secondary waste.

4H.2.2.1 Autosampler Secondary Containment and Leak Detection Functions

The ASX samplers in the PTF, HLW and LAW facilities contain both upper and lower secondary containment liners and leak detection systems. The upper containment area is designed to collect a potential leak from the incoming sample feed and return lines where they connect to the ISOLOK sampling device. If a leak occurs in the upper containment area, the leak flows to the sloped liner which diverts the leak to the annular space of the coaxial sample return lines. Leaks flow down the secondary containment pipe and discharge to secondary containment with leak detection, typically a sump with a radar level detector. The ASX sample feed and sample return lines, and the routing of potential leaks in the annular space of the return lines are shown on the associated process system P&IDs provided in Operating Unit Group 10, Appendices 8.2, 9.2, and 10.2.

The sloped stainless steel liner in the lower containment area is designed to divert liquids to a sloped collection trough. The trough contains a removable weir that allows liquids to collect and activate the thermal level detection switch and alarms to indicate that a leak has occurred. Effluent from a leak flows to the same drain line that manages ISOLOK flush solutions. The ISOLOK flush lines terminate below the top of the trough drain to ensure that the leak detection system is not activated when flushing the ISOLOK. The ASX lower containment area drain lines are shown on the associated process system P&IDs provided in Operating Unit Group 10, Appendices 8.2, 9.2, and 10.2. Typical autosampler secondary containment design details are provided in the Secondary Containment Design permit document provided in Operating Unit Group 10, Appendix 7.5.

The ASX secondary containment liner, liner trough, weir, leak detection instruments, coaxial sample feed and sample return piping make up the secondary containment and leak detection systems for the PTF, HLW and LAW ASX samplers. The balance of the ASX sampler equipment in each facility; the ASX pneumatic sample transfer lines between facilities, and the ASX sample receipt system in the Lab are not part of the ASX secondary containment system, and are excluded from the WTP permit by the sample exclusion [WAC 173-303-071(l)]. ASX upper and lower secondary containment liner dimensions are provided in Table 4H-2. Drain line and leak detection instrument design details are provided in Table 4H-3.

If a spill occurs in either the upper and lower containment area, these areas can be rinsed. In the upper containment area, a wash wand will be provided to allow for localized wash if required. In the lower containment area, a spray ring and spray wands are provided to rinse this containment area. Wash solutions will be directed to the required location by the operator. Valves mounted externally to the

autosampler allow the operator to deliver a wash stream to targeted areas that may require decontamination.

4H.3 Air Emission Control

The analytical laboratory ventilation systems include C1V, C2V, C3V, and C5V systems that aid in the containment and confinement of radiological and hazardous chemical constituents. Clean occupied areas without contamination potential are classified as C1 and will be isolated from areas with the potential for contamination (C2) and from areas with restricted occupancy, normal radiological hazards and higher contamination potential (C3 and C5).

C3 areas are restricted occupied areas and allow operator access under administrative controls as required for scheduled maintenance and operations. C5 areas have the highest contamination potential and will normally be unoccupied. These areas have, by virtue of their location and the activities performed within them, an increased potential for the release of contamination. The design objectives of the analytical laboratory HVAC system, and therefore the C5 area ventilation system, will be as follows:

- Aid in the confinement and containment of radiological and hazardous chemical contamination sources.
- Remove airborne particulates from the discharge air to ensure that emissions are within prescribed limits.
- Maintain space temperatures within the indoor design conditions.
- Satisfy safety requirements and codes and standards that are a part of the Safety Requirements Document.

The C5 area ventilation system is being designed to maintain a negative pressure in the C5 areas with respect to the surrounding areas. Hotcell ventilation, the Hotcell Drain Collection Vessel (RLD-VSL-00165), and the C3 maintenance shop glovebox will be exhausted to the C5 ventilation system. Fume hoods within the Rad Labs, the waste reduction and lab pack room, and the C3 maintenance shop will be exhausted to the C3 ventilation system. The ventilation from C2 and C3 areas will be filtered through a single stage of HEPA filters and exhausted through the analytical laboratory stacks. Air cascading into the C5 areas from the adjacent C2 and/or C3 areas will be exhausted through the analytical laboratory building stacks by the C5 exhaust fans after passing through two stages of HEPA filter banks.

4H.4 Laboratory Maintenance

The analytical laboratory maintenance shop provides space for performing preventive and corrective maintenance on laboratory equipment. There will be two shops, located in different potential contamination areas. The C3 shop allows decontamination, maintenance, and storage of contaminated equipment such as hotcell manipulators. The C3 maintenance shop will be ventilated to the C3 ventilation system, and effluent from the C3 maintenance shop discharges to the Laboratory Area Sink Collection Vessel (RLD-VSL-00164). The C2 shop will provide space for the maintenance of equipment that is not expected to be radioactively contaminated such as electrical components, utilities systems components, and instruments, and will be ventilated to the C2 ventilation system.

A list of proposed maintenance activities that will be performed in the analytical laboratory maintenance shops is provided below.

Analytical Laboratory Maintenance and Waste Management Activity Summary		
Task Description	**Lab C3 Shop**	**In-Situ Activities**
Filter change out [a]		X
Manipulator maintenance and repair [b]	X	X
Valve maintenance and repair		X
Pump maintenance and repair	X	X
Exhaust fan maintenance and repair		X
Repair and maintenance of fabricated equipment	X	X
Instrument maintenance and calibration	X	X

a Spent filters will be disposed of following filter changeout using approved maintenance, waste management, and radiological procedures.

b Manipulators requiring extensive repairs will be pulled and transferred to the C3 workshop for decontamination. Once the contamination levels are reduced to within acceptable limits for hands-on maintenance, the manipulator will be repaired using approved maintenance and radiological procedures.

4H.5 Solid Waste Management

Mixed and dangerous solid waste will be accumulated in hotcells and periodically placed in waste drums. Waste from the individual hotcells will be transferred to a waste management cell where waste management, consolidation, and packaging activities are conducted. The waste cell contains tools and equipment to complete size reduction. These solid mixed and dangerous wastes as well as organic lab pack wastes will be transferred into waste drums prior to being transferred to the laboratory waste drum management area. Mixed and dangerous solid waste and organic lab pack wastes from the Rad Labs and maintenance areas will be accumulated in the individual labs and shops until they are transferred to the laboratory waste management area for waste consolidation and volume reduction. Waste consolidation will be completed in the volume reduction and lab pack rooms in the waste drum management area.

Laboratory secondary solid wastes will be transferred to Hanford site and off-site treatment facilities for treatment as needed. Treated secondary wastes will be transferred to Hanford site TSD site (Integrated Disposal Facility or Low-Level Burial Grounds) for disposal. Low-level radioactive wastes will be transferred to a Hanford site low-level radioactive disposal facility.

4H.5.1 Hotcell Solid Waste Management

Mixed and dangerous solid waste will be accumulated in hotcells and periodically placed in waste drums. Solid waste management in the hotcell will require remote handling. Waste from the individual hotcells will be transferred to HC-14 where waste management, consolidation, and packaging activities are conducted. The waste cell contains tools and equipment to complete size reduction. These wastes will be transferred into waste drums prior to being transferred to the laboratory waste drum management area.

Wastes generated in the hotcell area of the Lab are not packaged in the Waste Drum Management Area. Packaging and volume reduction of hotcell wastes, including high-activity wastes is completed in HC-14 prior to being transferred to the Waste Drum Management Area for storage.

4H.5.2 Container Storage Area for the Analytical Laboratory

The Lab Container Storage Area is located at the 0’-0” elevation and is referred to as the Waste Drum Management Area on laboratory facility drawings, and in laboratory system description documents. The

Waste Drum Management Area includes five waste management rooms (139, 139A, B, C &D) located inside of the Lab facility. Room A-0139, the Waste Drum Management Room, is the primary dangerous and mixed secondary waste storage room, and is used to provide segregation of wastes. Separation of wastes will be provided to meet the separation distances provided in Uniform Fire Code and applicable sections of WAC 173-303.

The potential for precipitation inflow into the area is mitigated by a dry sump located inside the roll-up door on the south side of the airlock/clean drum export area.

Segregation and secondary containment for waste drums containing liquids will be provided by commercially available portable spill containment pallets/devices designed to contain 10 percent of the volume of all of the containers within the containment system or the volume of the largest container, whichever is greater. The exterior walls of the waste drum storage area are constructed of reinforced concrete and the entire floor area of the waste drum storage area is coated with a special protective coating. This coating is not designed to provide secondary containment. Coatings are provided to support the clean-up and decontamination of a potential spill.

Room A-0139A is equipped with a walk-in fume hood to support the packaging of organic liquids and lab pack wastes. The room will be used to package and add absorbent to waste packages to comply with Hanford Site Solid Waste Acceptance Criteria (HSSWAC) and/or off-site disposal facility waste acceptance criteria for liquid and lab pack wastes. Room A-0139B is an airlock separating the main waste drum area and the lab pack and volume reduction areas. Room A-0139C is equipped with an in-drum compaction unit design to reduce the volume of low-activity wastes generated in the Rad Lab areas. Because volume reduction and the packaging of wastes to meet transportation and/or disposal facility waste acceptance criteria is not a permitted activity. The fifth room is Room A-139D, the airlock/clean drum export area. This area is used to provide additional storage, segregation, and management of waste containers prior to transfer to WTP, Hanford Site, or off-site waste disposal facilities.

This page intentionally left blank.

Table 4H-1 Analytical Laboratory Tank Systems						
No.	**System**	**Vessel Number/Location**	**Description**	**Material**	**Total Volume (US Gallons)**	**Approximate Dimensions (Inside Diameter) × Height or Length in feet and inches (tangent line/tangent line)**
1	RLD	RLD-VSL-00164 A-B003	Laboratory Area Sink Drain Collection Vessel	6% Mo	3,180	8’ 6” x 5’ 9”
2	RLD	RLD-VSL-00165 A-B004	Hotcell Drain Collection Vessel	6% Mo	9,100	16’ 0” x 2’ 3”

Table 4H-2 Analytical Laboratory Secondary Containment Rooms/Areas				
Room/Area	**Approximate Room/Area Dimensions (L×W, in feet)**	**Miscellaneous Treatment Units or Tanks in Room/Area (Largest Plant Item)**	**Volume of Largest Plant Item in Room/Area (US Gallons)**	**Minimum Secondary Containment Height (feet)**
Analytical Laboratory				
1. A-B003 Lab Area Sink Drain Collection Vessel Cell	Minimum secondary containment for these cells has been deleted and superceded by *Flooding Volume for Lab Facility*, 24590-LAB-PER-M-02-001 (DWP, Operating Unit Group, Appendix 11.8).			
2. A-B004 Hotcell Drain Collection, Vessel Cell				
3. A-B002 C3 Pump Pit	Secondary containment for ancillary equipment, no minimum liner height required			
4. A-B005 C5 Pump Pit	Secondary containment for ancillary equipment, no minimum liner height required			
5. A-B006 C5 Piping Pit	Secondary containment for ancillary equipment, no minimum liner height required			
6. A-B007 C5 Pump Pit	Secondary containment for ancillary equipment, no minimum liner height required			

1

Table 4H-3 Analytical Laboratory Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
Analytical Laboratory				
Sumps				
RLD-SUMP-00041 A-B003 (C3 Effluent Vessel Cell, El. -18’7”)	30	Radar	30” Dia. x 13” Deep Stainless Steel	**24590-LAB** -M6-RLD-00002001
RLD-SUMP-00042 A-B004 (C5 Effluent Vessel Cell, El. -19’2”)	30	Radar	30” Dia. x 13” Deep Stainless Steel	**24590-LAB** -M6-RLD-00001001
RLD-SUMP-00045 A-B002 (C3 Pump Pit Sump, EL -6’-81/2”LP)	1.60	Radar	2’-0” x 2’-6” x 1/2” Stainless Steel	**24590-LAB** -M6-RLD-00002003
RLD-SUMP-00043A A-B007 (C5 Pump Pit Sump, EL -6’-7”LP)	1.60	Radar	1’-6” x 3’-0” x 1/2” Stainless Steel	**24590-LAB** -M6-RLD-00001002
RLD-SUMP-00043B A-B005 (C5 Pump Pit Sump, EL -6’-7” LP)	1.60	Radar	1’-6” x 3’-0” x 1/2” Stainless Steel	**24590-LAB** -M6-RLD-00001003
RLD-SUMP-00044 A-B006 (C5 Piping Pit Sump, EL -6’-7” LP)	1.60	Radar	2’-0” x 2’-6” x 1/2” Stainless Steel	**24590-LAB** -M6-RLD-00001004
Leak Detection Boxes				
RLD-LDB-00002 A-B004 (C5 Effluent Vessel Cell, El. -10’)	6	Thermal Dispersion	8” Dia. x 24” Length/ Stainless Steel	**24590-LAB** -M6-RLD-00008001
RLD-LDB-00004 A-B004 (C5 Effluent Vessel Cell, El. -10’)	6	Thermal Dispersion	8” Dia. x 24” Length/ Stainless Steel	**24590-LAB** -M6-RLD-00008001

Table 4H-3 Analytical Laboratory Sumps, Leak Detection Boxes, and Floor Drains/Lines				
Sump/Leak Detection Box or Floor Drain/Line I.D.#, Room, and Elevation	**Maximum Sump/Leak Detection Box Capacity (US Gallons)**	**Sump/Leak Detection Box Level Detection Type**	**Sump/Leak Detection Box or Floor Drain/Line Dimensions (approximate) and Materials of Construction**	**Piping and Instrumentation Diagram Number**
RLD-LDB-00005 A-B003 (C3 Effluent Vessel Cell, El. -10’)	6	Thermal Dispersion	8” Dia. x 24” Length/ Stainless Steel	**24590-LAB** -M6-RLD-00007001
RLD-LDB-00006 A-B003 (C3 Effluent Vessel Cell, El. -10’)	6	Thermal Dispersion	8” Dia. x 24” Length/ Stainless Steel	**24590-LAB** -M6-RLD-00007001
RLD-LDB-00007 A-B003 (C3 Effluent Vessel Cell, El. -10’)	6	Thermal Dispersion	8” Dia. x 24” Length/ Stainless Steel	**24590-LAB** -M6-RLD-00007001
RLD-LDB-00008 A-B003 (C3 Effluent Vessel Cell, El. -10’)	6	Thermal Dispersion	8” Dia. x 24” Length/ Stainless Steel	**24590-LAB** -M6-RLD-00007001
RLD-LDB-00009 A-B004 (C5 Effluent Vessel Cell, El. -10’)	6	Thermal Dispersion	8” Dia. x 24” Length/ Stainless Steel	**24590-LAB** -M6-RLD-00008001
RLD-LDB-00011 A-B003 (C3 Effluent Vessel Cell, El. -10’)	6	Thermal Dispersion	8” Dia. x 24” Length/ Stainless Steel	**24590-LAB** -M6-RLD-00007001
Drain Lines				
RLD-WU-02207-S11E-04 Drain Line A-B003, (C3 Effluent Vessel Cell, El. -18’7”)	N/A	N/A	4” Dia. 316L	**24590-LAB** -M6-RLD-00002001
RLD-ZN-02203-S11E-04 Drain Line A-B004, (C5 Effluent Vessel Cell, El. -19’2”)	N/A	N/A	4” Dia. 316L	**24590-LAB** -M6-RLD-00001001
RLD-ZN-03393-S11E-04 Drain Line A-B004, (C5 Effluent Vessel Cell, El. -19’2”)	N/A	N/A	4” Dia. 316L	**24590-LAB** -M6-RLD-00001001
RLD-ZN-03394-S11E-04 Drain Line A-B004, (C5 Effluent Vessel Cell, El. -19’2”)	N/A	N/A	4” Dia. 316L	**24590-LAB** -M6-RLD-00001001

Table 4H-4 Analytical Laboratory Container Storage Areas		
Container Storage Area	**Maximum Waste Volume (US Gallons) [1]**	**Approximate Dimensions (L × W × H, in feet) [2]**
Analytical Laboratory		
1. Laboratory Waste Management Area (A-0139 and A-0139A/B/C/D)	139,586	49’ x 38’ x 10’

[1] The conversion factor used to convert from cubic feet to gallons is 7.4805 gal/ft^3.

[2] The dimension for height (H) is based on the height of the largest waste container stored in the area (i.e., LAW container is 7.5 ft, HLW canister is 15 ft, melters are assumed to be 16 ft, and a B-25 box is 5 ft - stacked a maximum of two high is 10 ft).

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 4I
BALANCE OF FACILITIES

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
12/15/2016	8C.2016.Q3

This page intentionally left blank.

APPENDIX 4I
BALANCE OF FACILITIES

This page intentionally left blank.

APPENDIX 4I
BALANCE OF FACILITIES

TABLE OF CONTENTS

4I Balance of Facilities (BOF) 5
4I.1 Containers 5
4I.1.1 Description of Containers 5
4I.1.2 Container Management Practices 6
4I.1.3 Container Labeling 8
4I.1.4 Containment Requirements for Storing Waste 8
4I.1.5 Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes in Containers 10
4I.2 Plant Service Air (PSA) Systems 10
4I.3 Plant Cooling Water System (PCW) 11
4I.4 Low-Pressure Steam System (LPS) 11
4I.5 High-Pressure Steam System (HPS) 11
4I.6 Demineralized Water System (DIW) 11
4I.7 Process Service Water System (PSW) 12
4I.8 Chilled Water (CHW) System 12
4I.9 Glass Former Reagent (GFR) System 12

TABLE

Table 4I-1 BOF Container Storage Areas 13

This page intentionally left blank.

4I Balance of Facilities (BOF)

The BOF will provide support systems and utilities required for the waste treatment processes within the pretreatment facility, Low Activity Waste (LAW) vitrification facility, High-Level Waste (HLW) vitrification facility, and analytical laboratory. These will include, but will not be limited to, heating and cooling, process steam, process ventilation, chilled water, primary and secondary power supplies, and compressed air. The primary BOF process support facilities are described in Sections 4I.2 through 4I.9. These support and utility systems do not manage dangerous waste and are described below for information only.

4I.1 Containers

This section identifies the containers and container management practices that will be followed at the BOF. The term "container" is used as defined in Washington Administrative Code (WAC) 173-303-040. Note that in this appendix and throughout the permit, terms other than containers may be used, such as canisters, boxes, bins, flasks, casks, and overpacks.

The container storage areas (secondary waste) located within the BOF consists of:

- Nonradioactive dangerous waste storage area
- Failed melter storage facility

Container storage area dimensions at the BOF are summarized in Table 4I-1.

The following sections address waste management containers:

- Description of Containers - Section 4I.1.1
- Container Management Practices - Section 4I.1.2
- Container Labeling - Section 4I.1.3
- Containment Requirements for Storing Waste - Section 4I.1.4
- Prevention of Ignitable, Reactive, and Incompatible Wastes in Containers - Section 4I.1.5

4I.1.1 Description of Containers

These types of waste will be managed in containers:

- Miscellaneous mixed waste (secondary waste)
- Miscellaneous nonradioactive dangerous waste (secondary waste)

The waste form dictates the type of containers used for waste management. The following paragraphs describe these types of containerized waste that are managed at the BOF.

Miscellaneous Mixed Waste

Generally, miscellaneous mixed wastes are secondary wastes that may include, but are not limited to, the following items:

- Spent or failed equipment
- Offgas High Efficiency Particulate Air (HEPA) filters
- Melter consumables
- Spent melters

Spent equipment and offgas filters will typically be managed in commercially-available containers such as steel drums or steel boxes, of varying size. The containers for miscellaneous mixed waste will comply with transportation requirements, with receiving treatment, storage, and disposal (TSD) facility waste acceptance criteria, and will be compatible with the miscellaneous mixed waste. These containers may or

may not include a liner. Final container selection, container and waste compatibility, and the need for liners, will be based on the physical, chemical, and radiological properties of the waste being managed.

Melter consumables are routinely generated wastes and include spent feed tubes, pressure transducers, bubblers, thermocouples, and discharge risers. LAW melter consumables will be placed into approved disposal containers of varying size.

HLW melter consumables will be remotely size reduced, if necessary, and placed into steel baskets with lids. The baskets will be placed into drums and the drums placed into shielded casks for export from the facility.

The LAW Locally Shielded Melter (LSM) will be classified as hazardous debris for land disposal restrictions purposes. After a spent HLW Melter is deemed to meet criteria and regulations for onsite disposal, it will be placed in a welded carbon steel container (overpack) or other acceptable packaging in accordance with waste acceptance criteria for the receiving TSD facility. Regulatory issues and permitting actions associated with onsite disposal of spent and/or failed melters will be addressed in the future.

Each miscellaneous mixed waste container will have associated documentation that describes the contents, such as waste type, physical and chemical characterization, and radiological characterization. This information will be retained within the plant information network.

Most miscellaneous secondary mixed wastes will be spent equipment and consumables such as pumps, air lances, HEPA filters, etc., and are not expected to contain liquids. If wastes are generated that contain liquids, these wastes may be treated to remove or absorb liquids, to comply with the receiving TSD facility waste acceptance criteria.

Miscellaneous Nonradioactive Dangerous Waste

Each nonradioactive dangerous waste container will have associated documentation that describes the contents, such as waste type and physical and chemical characterization. Typically, commercially available containers will be used. The types of containers used for packaging nonradioactive dangerous waste will comply with the receiving TSD facility waste acceptance criteria and transportation requirements. However, final container selection, container and waste compatibility, and the need for liners will be based on the physical and chemical properties of the waste being managed.

4I.1.2 Container Management Practices

The following paragraphs describe how each of the containers used at the BOF are managed.

4I.1.2.1 Miscellaneous Mixed Waste and Miscellaneous Nonradioactive Dangerous Waste Containers

Miscellaneous Mixed Waste Containers

Miscellaneous mixed waste (secondary waste) will be managed in:

- Failed melter storage facility (BOF)

Containers will be kept closed unless waste is being added, removed, or sampled while in the containment storage areas. Containers stored in these areas will be placed on pallets, or otherwise elevated to prevent contact with liquid, if present. Table 4I-1 summarizes the dimensions and maximum capacity of miscellaneous mixed waste storage areas. Containers will be managed in designated areas throughout the BOF, and then transferred to a suitable TSD facility.

The failed melter storage facility will be a stand-alone building. It will be used primarily to manage HLW melters that have completed their useful service life. The failed melters storage facility may also receive containerized miscellaneous mixed waste, if needed.

Miscellaneous Nonradioactive Dangerous Waste Containers

Miscellaneous dangerous waste containers will typically be managed in the nonradioactive dangerous waste container storage area, or in non-permitted waste management units (satellite accumulation areas and less-than-90-day storage areas) located throughout the BOF. The nonradioactive dangerous waste container storage area will consist of a concrete pad approximately 25 feet (ft) by 30 ft. The area may include a metal roof or portable storage buildings such as cargo containers or storage lockers. Containers will be kept closed unless waste is being added, removed, or sampled. They will routinely be moved by forklift or drum cart, and will be managed in a manner that prevents ruptures and leaks. The storage capacity for the nonradioactive dangerous waste container storage area is listed in Table 4I-1. The containers in that area may be stacked two high and aisle spacing will be at least 30 inches (in.) between rows of containers. Containers stored in this area will be placed on pallets, or otherwise elevated to prevent contact with liquid, if present.

4I.1.2.2 Waste Tracking

The plant information network interfaces with the integrated control network and is designed to collect and maintain plant information. The plant information network is currently planned to the following systems (all systems used at the plants/facilities and BOF are provided for information only):

- Plant data warehouse and reporting system
- Laboratory information management system
- Waste tracking and inventory system

Inventory and Batch Tracking

The waste tracking and inventory system will interface with the information system data historian to provide reporting information such as tank volumes, waste characteristics, and facility inventories of process waste. The waste tracking system will also be used to query operations parameters at any time information is needed, as specified by operations, to manage the process system.

Secondary Waste Stream Tracking

Containerized secondary waste streams and equipment will be tracked and managed through commercially available database management software. Containers will be mapped in each plant and updated during the inspection process using a commercially available drawing software application.

Laboratory Information Management System

The laboratory information management system (LIMS) will be an integral feature of the plant information network. The LIMS will serve as an essential tool for providing data management of regulatory and processing samples. The chosen LIMS will be a commercial off-the-shelf software package designed for performing laboratory information management tasks as described in American Standard Test Method (ASTM) E1578-93, *Standard Guide for Laboratory Information Management Systems (LIMS)*.

The LIMS will track the flow of samples through the laboratory. Samples received in the laboratory will be identified with a unique identification label. The identification label provides details of the sample process stream. Baseline analyses are defined by the requesting plant. Additional analyses, as required, will be input into LIMS by laboratory analysts. Data will be input into LIMS manually or by data transfer using LIMS/instrument interface. Analyses will be performed using approved and validated analytical procedures.

Analytical results will be compiled by the LIMS and held pending checking and approval by appropriate staff. Approved results will be reported to the requesting plant.

4I.1.3 Container Labeling

Miscellaneous Mixed Waste Containers

The miscellaneous mixed waste containers will be labeled with the accumulation or generation start date, as appropriate, the major risk(s) associated with the waste, and the words "hazardous waste" or "dangerous waste." A waste tracking and inventory system will be implemented. Labels and markings will be positioned so that required information is visible. The label will meet the WAC 173-303-630(3) requirements, and the dangerous waste number will be clearly identified.

Miscellaneous Dangerous Waste Containers

The miscellaneous dangerous waste drums will be labeled with the accumulation or generation start date, as appropriate, the major risk(s) associated with the waste, and the words "hazardous waste" or "dangerous waste". A waste tracking and inventory system will be implemented. Labels and markings will be positioned so that required information is visible. The label will meet the WAC 173-303-630(3) requirements, and the dangerous waste number will be clearly identified.

4I.1.4 Containment Requirements for Storing Waste

Secondary containment requirements for the waste are discussed below.

4I.1.4.1 Secondary Containment System Design [

Secondary containment is required for areas in which containers hold free liquids. It is also required for areas managing wastes exhibiting the characteristics of ignitability or reactivity as defined in WAC 173-303-090(5) and (7).

Miscellaneous Mixed Waste

Miscellaneous mixed waste storage areas may contain waste requiring secondary containment. If wastes containing liquids or wastes exhibiting the characteristics of ignitability or reactivity are generated, portable secondary containment that meets the requirements of WAC 173-303-630(7) will be provided.

Miscellaneous Dangerous Waste

The nonradioactive dangerous waste storage area may contain waste requiring secondary containment. If wastes containing liquids or wastes exhibiting the characteristics of ignitability or reactivity are generated, portable secondary containment that meets the requirements of WAC 173-303-630(7) will be provided.

4I.1.4.2 System Design

Miscellaneous Mixed Waste

There will be one miscellaneous mixed waste (secondary waste) container storage area at the BOF, as follows:

- Failed melter storage facility

The failed melter storage facility will be used primarily to manage HLW Melters that have completed their useful service life. These units will be received in carbon steel overpack containers allowing limited hands-on contact. These overpacks will not be opened while the waste melters are located in this storage facility. The facility is capable of storing up to three waste melters at any given time. The spent HLW Melters will not be stacked.

The failed melter storage facility may also receive containerized miscellaneous mixed waste, if needed. These waste containers will be sealed prior to transport to the failed melter storage facility. The containers will not be opened while at this storage facility. The waste containers will not be stacked more than two containers high. The failed melter storage facility will be a stand-alone building located in the southern portion of the Waste Treatment Plant (WTP).

Miscellaneous Dangerous Waste

Waste containing liquid may be present in the nonradioactive dangerous waste storage area. Containers with liquids will be provided with portable secondary containment meeting the requirements of WAC 173-303-630(7).

4I.1.4.3 Structural Integrity of the Base

The storage areas will be constructed to support storage and transportation of containers within the container storage areas and will be designed with the following:

- Containment system capable of collecting and holding spills and leaks.
- Base will be free of cracks and gaps and sufficiently impervious to contain leaks.
- Positive drainage control.
- Sufficient containment volume.
- Sloped to drain or remove liquid, as necessary.

4I.1.4.4 Containment System Capacity

Miscellaneous Mixed Waste

Each container holding liquid dangerous waste will be placed into portable secondary containment that meets the requirements of WAC 173-303-630(7). The waste container will function as the primary containment while the portable containment device will function as the secondary containment.

Each portable secondary containment will have the capacity to contain 10% of the volume of all containers within the containment area, or the volume of the largest container, whichever is greater.

Miscellaneous Dangerous Waste

Waste containing liquid may be present in the nonradioactive dangerous waste container storage area. Each container holding liquid nonradioactive dangerous waste will be placed into portable secondary containment. The waste container will function as the primary containment while the portable sump will function as the secondary containment.

Each portable secondary containment will have the capacity to contain 10% of the volume of all containers within the containment area, or the volume of the largest container, whichever is greater. Typically, the waste containers will be steel drums.

4I.1.4.5 Control of Run-On

Miscellaneous Mixed Waste

Run-on will not reach the interior of the miscellaneous mixed waste storage areas, because they will be located within buildings, which will have roof gutters to remove precipitation.

Miscellaneous Dangerous Waste

Run-on will not reach the interior of the nonradioactive dangerous waste container storage area, because waste will be managed in buildings with walls and roof to remove precipitation.

4I.1.4.6 Removal of Liquids from Containment System

Miscellaneous Mixed Waste

Portable secondary containment sumps will be provided for individual containers that contain liquids. Hand pumps or similar devices will be used to remove liquid released to the portable secondary containments.

Miscellaneous Dangerous Waste

Portable secondary containment sumps will be provided for individual containers that contain liquids. Hand pumps or similar devices will be used to remove liquid released to the portable secondary containments.

4I.1.4.7 Demonstration that Containment is not Required because Containers do not Contain Free Liquids, Wastes that Exhibit Ignitability or Reactivity, or Wastes Designated F020-023, F026 or F027

Miscellaneous Mixed Waste

Secondary containment will be provided for individual containers that manage liquids. Wastes with the F020-F023, F026, and F027 numbers are not identified for the double shell tank (DST) system. Therefore, these waste numbers will not be present at the BOF.

Miscellaneous Dangerous Waste

The nonradioactive dangerous waste container storage area may manage liquids and D001 and D003 waste; therefore, secondary containment will be provided. Wastes with the F020-F023, F026, and F027 numbers are not identified for the DST system. Therefore, these waste numbers will not be present at the BOF.

4I.1.5 Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes in Containers

The requirements of this section are not applicable to the spent melters.

Ignitable, Reactive, or Incompatible Miscellaneous Mixed Waste and Miscellaneous Dangerous Waste

Potentially incompatible wastes are not expected to be managed in the miscellaneous mixed waste storage areas, except for the nonradioactive dangerous waste container storage area. If such wastes are managed in this area, the containers of incompatible waste or chemicals will not be stored in close proximity to each other. Acids and bases will be stored on separate portable secondary containment sumps; oxidizers will be stored in areas separate from combustible materials; and corrosive chemicals will be stored on a separate secondary containment sump. These separate storage areas within the unit will be clearly marked with signs indicating the appropriate waste to be stored in each area. Potentially incompatible waste will be stored at least one aisle width apart.

4I.2 Plant Service Air (PSA) Systems

The BOF plant service air (PSA) system will provide a continuous supply of clean, dry air for the process systems in the pretreatment facility, analytical laboratory, LAW vitrification facility, and HLW vitrification facility. Each facility will maintain a reservoir of PSA to accommodate load fluctuations and distributes the compressed air to the designated end users. The air distributed from the BOF PSA system to each facility is the source of the PSA and the Instrument Service Air (ISA) within each facility. The pretreatment facility PSA/ISA system is the source of back-up PSA and ISA for certain applications at the PTF and HLW facilities when normal BOF PSA supply is not available.

The PSA system components consist of compressors, dryers, air receiver vessels, distribution piping, pressure control stations, air amplifiers, valves, filters, and monitoring instruments.

The air supplied by PSA and ISA systems within each facility supports operation of tanks and miscellaneous unit systems, instruments and ancillary equipment.

4I.3 Plant Cooling Water System (PCW)

The BOF plant cooling water system (PCW) provides a continuous supply of cooling water to selected plant equipment for heat removal. The PCW system supplies cooling water to the air and chiller compressors, steam plant and process areas. In PTF, the PCW is used in the waste feed evaporation process (FEP), treated LAW evaporation process (TLP), cesium nitric acid recovery process (CNP), and pretreatment vessel vent process (PVP) systems.

Cooling water for the HLW facility supports the HLW concentrate receipt process (HCP), HLW melter feed process (HFP), HLW melter process (HMP), and the HLW melter offgas treatment system (HOP). For the LAW facility, the major user is the LAW melter process system (LMP).

The cooling water system is designed with primary and secondary loops to remain uncontaminated by mixed waste constituents. The primary loop circulates cooling water through heat exchangers within the HLW, LAW, and pretreatment facilities and through equipment in the BOF chiller compressor plant. The system also provides cooling water to quench the steam plant blow down. The HLW, LAW, and pretreatment facilities also have closed secondary loops that distribute cooling water to process equipment. Cooling water will be chemically treated to promote system operability and service life of 40 years.

4I.4 Low-Pressure Steam System (LPS)

This system will provide a continuous supply of low-pressure steam for various users in the pretreatment facility, LAW vitrification facility, and HLW vitrification facility. The process facilities main use of steam will be for tank heating for the evaporation process, and for HVAC heating coils.

The low-pressure steam system will be supplied from the high-pressure steam system through pressure-reducing stations. The steam condensate and feed system will collect condensate from the low-pressure steam users, monitor for mixed waste contamination, and return it to the steam plant for re-use.

4I.5 High-Pressure Steam System (HPS)

The system will provide a continuous supply of high-pressure steam for ejectors used for fluid transfers, and hot water heaters in the pretreatment, LAW, Lab, and HLW facilities.

The BOF steam plant facility (SPF) houses the boilers that produce the steam.

4I.6 Demineralized Water System (DIW)

This system treats process service water to produce and distribute demineralized water to users in pretreatment, HLW, LAW, Lab, and BOF facilities. Demineralized water is produced by pumping process service water through 5-micron, 2-micron, and 1-micron cartridge filters. Water is further treated by one of two reverse osmosis units. Demineralized water is stored in the BOF demineralized storage tank. Prior to distribution to process facilities, demineralized water is treated using an ultraviolet (UV) sterilization and an additional 2-micron filter.

The primary systems that utilize demineralized water include:

- Fresh ion exchange resin addition
- Chemical reagent makeup
- Wet electrostatic precipitator misting
- Wash rings
- Decontamination
- Melters
- Analytical laboratory

- Process and transfer piping and tank system flushes
- Boiler make-up

4I.7 Process Service Water System (PSW)

This system will supply filtered water to end users. This water will serve processes such as offgas treatment, plant wash systems, and make-up to chilled water systems. The BOF process service water system receives water directly from the Hanford site domestic (potable) water system (DOW). The water is stored and distributed to the pretreatment, LAW, HLW, and Lab facilities, the chiller compressor plant (CCP), the demineralized water system (DIW), and water treatment building (WTB).

4I.8 Chilled Water (CHW) System

This closed-loop system will supply chilled water to various HVAC unit cooling coils and plant equipment coolers for the WTP. Chilled water will be used in various systems throughout the WTP. The chilled water system is designed to remain uncontaminated by mixed waste constituents. The chilled water will be chemically treated to promote system operability and provide a service life of 40 years.

4I.9 Glass Former Reagent (GFR) System

The glass former reagent system provides glass former reagents and sucrose to the LAW and HLW vitrification facilities. The system also provides silica to the LAW container finishing handling system (LFH) for inert void fill for ILAW containers. The GFR system is comprised of the equipment needed to receive, store, blend, and transport glass formers to the vitrification facilities. The GFR system includes the glass former handling equipment in BOF, the glass former mixers located in HLW and LAW facilities and the inert fill day hoppers in LAW facility.

Table 4I-1 BOF Container Storage Areas		
Container Storage Area	**Maximum Waste Volume (US Gallons) [1]**	**Approximate Dimensions (L × W × H, in feet) [2]**
Other Areas		
1. Nonradioactive Dangerous Waste Container Storage Area (located on the Part A Figures)	56,104	25’ × 30’ × 10’
2. Failed Melter Storage Facility (located on the Part A Figures)	403,947	75’ × 45’ × 16’

[1] The conversion factor used to convert from cubic feet to gallons is 7.4805 gal/ft^3.

[2] The dimension for height (H) is based on the height of the largest waste container stored in the area (i.e., LAW container is 7.5 ft, HLW canister is 15 ft, melters are assumed to be 16 ft, and a B-25 box is 5 ft - stacked a maximum of two high is 10 ft).

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
CHAPTER 6.0
PROCEDURES TO PREVENT HAZARDS

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
08/2011	

This page intentionally left blank.

CHAPTER 6.0
PROCEDURES TO PREVENT HAZARDS

This page intentionally left blank.

CHAPTER 6.0
PROCEDURES TO PREVENT HAZARDS

TABLE OF CONTENTS

6.0 INTRODUCTION 5
6.1 Security 5
6.1.1 Security Procedures and Equipment 5
6.1.2 Waiver 6
6.2 Inspection Plan 6
6.2.1 General Inspection Requirements 6
6.2.2 Inspection Log 7
6.2.3 Schedule for Remedial Action for Problems Revealed 7
6.2.4 Specific Process or Waste Type Inspection Requirements 8
6.3 Preparedness and Prevention Requirements 11
6.3.1 Equipment Requirements 11
6.3.2 Aisle Space Requirement 12
6.4 Preventive Procedures, Structures, and Equipment 12
6.4.1 Unloading/Loading Operations 12
6.4.2 Runoff 12
6.4.3 Contamination of Water Supplies 13
6.4.4 Equipment and Power Failures 13
6.4.5 Personal Protection Equipment 14
6.4.6 Prevent Releases to the Atmosphere [WAC 173-303-806(4)(a)(viii)(F)] 14
6.5 Prevention of Reaction of Ignitable, Reactive, and/or Incompatible Waste 14

This page intentionally left blank.

6.0 INTRODUCTION

This chapter addresses hazard prevention at the River Protection Project - Waste Treatment Plant (WTP). It covers the following topics: security; preparedness and prevention requirements; preventive procedures, structures, and equipment; and prevention of reaction of the ignitable, reactive, and incompatible waste at the WTP.

Information is presented in two formats: narrative and table. See Appendix 6A for example inspection tables.

6.1 Security

This section describes WTP security procedures and equipment. Hanford Site security measures are discussed in the *Hanford Facility Dangerous Waste Permit Application, General Information Portion (DOE-RL 1998).*

6.1.1 Security Procedures and Equipment

The following sections describe the barrier and warning signs that support security and control access to the WTP.

6.1.1.1 24-Hour Surveillance System

The entire Hanford Site is a controlled-access area. For surveillance information, refer to the Site-wide Permit.

6.1.1.2 Barrier and Means to Control Entry

The WTP will use two fences, one around the facility's perimeter, and a second inner fence that controls access to dangerous waste management areas. The inner fence will be of sufficient height and construction to prevent people, livestock, and wildlife accidental access to the WTP. Vehicle access to the WTP administration building will be through a normally open gate in the perimeter fence. Visitors must check in at the administration building and will be escorted as required.

WTP personnel entry to the process areas will be through a controlled pedestrian gate. Service vehicles delivering supplies will enter process areas through a controlled gate. See the topographic map in Chapter 2.0 for further information regarding barriers and vehicular access.

6.1.1.3 Warning Signs

Warning signs, written in English, stating, "DANGER - UNAUTHORIZED PERSONNEL KEEP OUT" (or an equivalent legend), are provided in sufficient numbers to be seen from areas that contain dangerous or mixed waste, are legible from a distance of at least 25 feet, and visible from any angle of approach to the WTP. These warning signs will be posted in locations such as:

- Around the perimeter of the WTP fenced areas.
- On each entrance, gate, and other access points to portions of the WTP facility actively managing dangerous waste.
- On entrances to other enclosed areas within the plant that contain dangerous or mixed waste.

Points of access into waste handling and storage areas will have clearly marked warnings for radiation exposure and the major health risks associated with the waste. Access points into these areas will be strictly controlled. In addition, signs will be posted at the main site access entrance, instructing visitors to report to the WTP administration building to gain access to the WTP (Washington Administrative Code (WAC) 173-303-310(2)(a)).

6.1.2 Waiver

No waivers of the security procedures and equipment requirements for the WTP are requested.

6.2 Inspection Plan

The following sections describe the WTP dangerous waste inspection plan. The WTP will use a graded approach to preventing and detecting malfunctions, deterioration, operator errors, and discharges that will range from daily inspections to integrity assessments. This graded approach is comprised of activities that, at a minimum, will meet the inspection requirements and will include more precautions for equipment at higher risk of failure. Monitoring via instrumentation will be used to perform remote inspections in areas of high radioactivity, including, but not limited to, the Pretreatment areas, the LAW vitrification area, and the HLW vitrification area. Due to the radioactive nature of the waste and consistent with as low as reasonable achievable (ALARA) principles, monitoring by instrumentation will be the primary means of fulfilling the inspection requirements in these areas. The WTP will also use cameras, windows, process control, function checks, and preventive maintenance to comply with inspection requirements.

Example inspection schedules, which are part of the inspection plan, are presented as tables in Appendix 6A. Each table addresses a particular dangerous waste management unit, or group of units, such as tanks. Within each management unit table, the inspections are presented by system, and are further broken down by individual component in each system.

6.2.1 General Inspection Requirements

This section describes general, WTP-wide inspection requirements used to help prevent, detect, or respond to environmental or human health hazards related to dangerous waste handling, treatment, and storage at the WTP. The inspection schedules are provided in Table 6A-1.

Instruments, such as those used for overfill detection; will be connected to the Process Control System (PCJ). The PCJ will be the computer system that continuously monitors the instruments' data. Should the PCJ detect a reading outside the range of acceptable operation, control personnel will be alerted (in real time) by alarm in the control room. The monitoring system will provide trending of selected monitoring data, graphics, and equipment summary displays. The WTP will use a maintenance management system to plan and track preventive maintenance activities and function testing at the WTP. Other methods of performing inspections at the WTP will be visual where safe and effective to do so.

6.2.1.1 Items to be Inspected

The WTP inspection plan will include specific inspection schedules that meet the requirements. In Appendix 6A are example inspection schedules of the types of items to be inspected. The following are listed in the inspection schedule tables:

- General inspections for safety and emergency equipment, security, and preparedness and prevention
- Tank systems
- Containers
- Container storage areas
- Miscellaneous units
- Containment building areas

6.2.1.2 Types of Problems to Look for During Inspections

The example inspection tables in Appendix 6A include a column titled "inspections". This column specifies the type of inspection activities to be performed (such as verifying the operability of equipment and problems to look for) for each inspected item.

6.2.1.3 Frequency of Inspections

In the example inspection tables in Appendix 6A, the column titled "frequency" provides the frequency of inspection for each item. Inspection frequencies were developed using a graded approach that will be finalized prior to the start of operations, and are based on the following:

- Regulatory requirements where specified.
- Rate of possible deterioration of equipment.
- Probability of a release to the environment.
- Potential to cause harm to human health and the environment.
- Manufacturer's specifications.
- Integrity assessments of tank systems.
- Operating experience and knowledge.

6.2.1.4 Schedule Location

Controlled copies of the inspection plan will be kept at the WTP facility. The project document control manager, or equivalent, will be responsible for ensuring that controlled copies of the inspection plan are kept current when revisions to the inspection plan are made.

6.2.1.5 Employee Positions Responsible for Conducting Inspections

Personnel performing dangerous waste inspections will have the appropriate facility-specific training as required by the *Personnel Training Plan* (Chapter 8.0) and as defined in the *Waste Treatment Plant Dangerous Waste Training Plan*. The training program will identify the individuals qualified to perform dangerous waste-related inspections.

6.2.2 Inspection Log

Hand written records of inspections (the inspection log) will include the date and time of inspection; the legible, printed name and hand written signature of the inspector; a notation of the observations made; and an account of spills or discharges. Most of the daily inspections will be recorded as part of the process control data recording system and will therefore be fully retrievable and auditable. Repairs, and remedial or corrective actions needed, will become part of the WTP's corrective action system and the date and nature of repairs or remedial actions taken will be recorded in the inspection log. The inspection log will be stored in the WTP operating record for at least 5 years from the date of inspection.

Electronic media and hard copy media may be used for recording inspections at the WTP, electronic media will be used where it is sensible, cost-effective, and/or consistent with ALARA practices. Inspection records will be readily retrievable. Dangerous waste inspection requirements will be incorporated into the operating procedures and documentation. The procedures and operating requirements that satisfy compliance with WAC 173-303 (including inspection requirements) will be identified so that they are distinguishable within the larger universe of facility operational requirements.

6.2.3 Schedule for Remedial Action for Problems Revealed

Remedial action will be taken as soon as practicable by facility management to implement the *Waste Treatment Plant Emergency Response Plan* (ERP) (Chapter 7.0) if an inspection identifies an unplanned spill, release, fire, or explosion, unplanned spill or release involving a dangerous waste, or an imminent hazard to human health or the environment.

An investigation will begin within 24 hours upon detection of unplanned release in the plant. Depending upon the scope of the hazard, volume of the release, or the characterization of the release, cleanup may be completed within 24 hours, or as soon as practicable, after completion of the initial investigation period. However, the time required to cleanup the release will depend on factors such as analytical turnaround time, radioactivity, and volume.

When inspections reveal problems that do not present an immediate threat to human health or the environment, nor result in a release of hazardous material (cracks in secondary containment coatings, nonfunctioning instrumentation, and labeling errors or omissions), such inspection findings will be logged and response actions scheduled and tracked within 24 hours as corrective actions. The following steps are used, in general, to resolve corrective actions:

- Problem identification and documentation
- Classification
- Cause analysis
- Corrective action
- Follow-up investigation

Non-emergency corrective actions will be completed within 24 hours if possible; however, additional response time may be required because of the radioactive component of the waste being managed at the WTP.

The precise title of the personnel that will be responsible for authorizing such corrective actions has not been decided; however, the position will be one equivalent to a shift operations manager.

6.2.4 Specific Process or Waste Type Inspection Requirements

The following sections describe specific process inspection requirements.

6.2.4.1 Container Inspections

The WTP will store immobilized low-activity waste (ILAW) in containers, immobilized high-level waste (IHLW) in canisters, and secondary dangerous and mixed waste in containers. For purposes of IHLW, the term canisters is used to specifically address the unique disposal requirements of the filled containers. Throughout this section, general references to containers apply to the IHLW canisters. Secondary waste refers to newly generated waste (or a waste by-product from treating the Hanford tank waste) that is designated as dangerous waste or mixed waste. Secondary waste also will be generated by laboratory activities, from maintenance waste, and failed contaminated equipment. The location and design description of the containers and their associated storage areas are included in Chapter 4.0. Inspections of container storage areas will be performed weekly when waste is in the storage areas. Table 6A-2 provides examples of container and container storage area inspection schedules for ILAW, IHLW, and secondary waste.

<u>Immobilized Low-Activity Containers and High-Level Waste Canisters</u>

Filled ILAW containers and IHLW canisters will be radioactive and thus, inspections must be performed remotely. Therefore, in lieu of conventional container inspections while the containers are in storage, each container will be inspected before and after filling, and when it is moved into and out of the ILAW and IHLW containment buildings or container storage areas. The containers will not contain free liquids, will be chemically and physically stable (not ignitable or reactive), and will have either a welded closure (IHLW) or pressed fitted closure seal (ILAW). The IHLW canisters will be placed in special racks inside the storage areas that will prevent them from toppling. The immobilized waste containers and storage areas are described in Chapter 4.0.

The WTP will inspect the ILAW and IHLW container storage or containment building areas, when they are in use, weekly by remote means. These remotely managed process storage areas do not include thirty-inch aisle spacing. The example inspection schedules (Appendix 6A) specify the problems for which to look and how inspections are performed.

The dangerous waste container labeling requirements will be met by using a unique alphanumeric identifier that will be welded to each container. Deterioration of the identifier is not expected due to the permanent nature of these markings and provisions for subsequent handling that will safeguard against damage to the containers and the identifying marks.

Using the identification on each container, a tracking system will record key movements of each immobilized waste container through the facility. Information about the waste canister tracking system is in Chapter 4.0. For each container of ILAW and IHLW produced, the system will track the following:

- The location of each container in process and storage areas.
- The date that waste was first placed in the container.
- The date the container was shipped from the facility, and its destination.
- The nature of waste in the container, including dangerous waste designation codes, and land disposal restriction requirements.

Secondary and Miscellaneous Waste in Containers

Example inspection schedules for secondary dangerous waste and mixed waste container storage areas are given in Table 6A-2.

6.2.4.2 Tank Systems Inspections and Corrective Actions

A description of the tank systems, and their safety and interlock controls, at the WTP can be found in Addendum C. Examples of tank system inspections, inspection frequencies, and problems to look for are given in Table 6A-3. Following is a brief discussion of the tank system inspections.

Inspection procedures and the complete inspection schedule will be available at the WTP prior to starting operation. Each tank, or grouping of identical tanks, is shown as a line item in the inspection schedule tables. Each inspection item includes a description of problems to look for, and the frequency of inspection.

Cathodic Protection

Cathodic protection systems will be used to prevent or mitigate metal corrosion on underground dangerous waste transfer lines where the outermost pipes are in contact with the soil. The cathodic protection systems are described in Addendum C. Example inspection schedules for cathodic protection systems and sources of impressed current are in Table 6A-4.

Tank Integrity Assessments

A periodic integrity assessment approach will be developed for the WTP waste tanks to ensure that the tanks' systems remain fit-for-use. The schedule for performing periodic integrity assessments will be developed during the new tank design assessment placed in Appendix 7.15.

6.2.4.3 Tank Systems – Corrective Actions

Operating procedures describing corrective actions will be developed prior to operations.

6.2.4.4 Storage of Ignitable or Reactive Wastes

Dangerous waste codes assigned to the waste in the *Double-Shell Tank System Dangerous Waste Part A* Permit Application (DOE-RL 1996) apply to the waste feed the WTP will receive. The waste feed will include the waste codes for ignitability (D001) and reactivity (D003), but the waste is not expected to

exhibit the characteristics listed in WAC 173-303-090 for these two waste codes. Based on past process knowledge that includes the age, temperature, history, and chemical composition of the waste feed stored in the Double Shelled Tank (DST) system, the waste codes D001 and D003 will be removed by the WTP. See the Waste Analysis Plan (Appendix 3A) for specific information on the waste codes and their removal.

Consequently, only the waste feed receipt tanks will be inspected for tanks storing ignitable and reactive waste. The remainder of the process tanks will not contain ignitable or reactive waste. Ignitable or reactive secondary waste may be stored in tanks or containers at the WTP. Annual inspections of all areas managing D001 and D003 waste will be conducted by personnel familiar with the Uniform Fire Code, or in the presence of the local, state, or federal fire marshal. Inspections will be entered into the WTP operating record and maintained at the WTP for 5 years (see Table 6A-5 for the inspection schedule for ignitable or reactive wastes).

6.2.4.5 Air Emissions Control and Detection - Inspections, Monitoring, and Corrective Actions

Air Emissions from Process Vents (Subpart AA)

The WTP does not use any of the regulated devices or processes listed; therefore, the WTP will not be subject to regulation under Subpart AA (40 CFR 264).

Air Emission Standards for Equipment Leaks (Subpart BB)

WAC 173-303-691 and Subpart BB (40 CFR 264) applies to equipment that contains or contacts hazardous wastes with organic concentrations of at least 10 percent by weight. This provision will not apply to the facility because the WTP will not accept or treat wastes with organic concentrations at or above 10 percent by weight. Compliance with this provision will be documented through analyses of verification samples, as described in the Waste Analysis Plan.

Air Emission Standards for Tanks, Impoundments, and Containers (Subpart CC)

The regulations specified under WAC 173-303-692 and 40 CFR Part 264 Subpart CC, incorporated by reference, do not apply to the WTP mixed waste tank systems and containers. These tanks and containers qualify as waste management units that are "used solely for the management of radioactive dangerous waste in accordance with all applicable regulations under the authority of the Atomic Energy Act and the Nuclear Waste Policy Act" and are excluded under WAC 173-303-692(1)(b)(vi). Containers or tanks bearing nonradioactive, dangerous waste, such as maintenance and laboratory waste, that are not excluded under WAC 173-303-692(1)(b)(ii) or 40 CFR 264.1082(c), will comply with the container and tank standards specified under 40 CFR part 264 Subpart CC.

6.2.4.6 Miscellaneous Unit Inspections

The WTP melters are miscellaneous units under WAC 173-303-680. Remote inspections and monitoring will be performed by instrumentation that will be supplemented by camera(s) and viewing through shielded windows because of the high levels of radiation in process areas. Other miscellaneous units will be visually or remotely inspected based on accessibility. Inspections will verify the integrity of melter equipment and detect malfunctions, deterioration, leaks, or operator errors that have the potential to release dangerous waste into the facility or the environment. An example miscellaneous unit inspection schedule is provided in Table 6A-6.

6.2.4.7 Containment Building Inspection

Containment buildings will be inspected for items listed in Table 6A-7. The WTP containment building example inspection schedules include the requirements from 40 CFR 264 Subpart DD. Example inspection schedules for tank systems and miscellaneous units located within containment buildings are in Tables 6A-3 and Table 6A-7.

6.2.4.8 Waste Pile Inspection

Operation of the WTP does not involve the placement of mixed waste in piles. Therefore, this section is not applicable to the WTP.

6.2.4.9 Surface Impoundment Inspection

Operation of the WTP does not involve the placement of mixed waste in a surface impoundment. Therefore, this section is not applicable to the WTP.

6.2.4.10 Incinerator Inspection

Operation of the WTP does not involve using a waste incinerator. Therefore, this section is not applicable to the WTP.

6.2.4.11 Landfill Inspection

Operation of the WTP does not involve the placement of mixed waste in a landfill. Therefore, this section is not applicable to the WTP.

6.2.4.12 Land Treatment Facility Inspection

Operation of the WTP does not involve the land treatment of mixed waste. Therefore, this section is not applicable to the WTP.

6.3 Preparedness and Prevention Requirements

The following sections document the preparedness and prevention measures to be taken at the WTP.

6.3.1 Equipment Requirements

The following sections describe internal and external communications, and emergency equipment required and located at WTP.

6.3.1.1 Internal Communications

The onsite communication system at the WTP provides immediate emergency information to facility personnel, and includes public address and alarm systems. The public address system provides for verbal instruction and communication to WTP personnel. The internal communication system also notifies personnel of the following local or plant-wide alarm-activated emergency situations: building evacuations, fire or explosion, radioactive discharges, and high airborne contamination. The ERP provides additional information on the response activities.

6.3.1.2 External Communications

The WTP is equipped with devices for summoning emergency assistance from the Hanford Fire Department, the Hanford Hazardous Materials Response Team, or local emergency response teams, as necessary. External communication will be via a telephone communication system. Telephones will be available for staff use at numerous locations throughout the facility. Under no circumstances will only one staff member be at the WTP site. In addition, the current Hanford communication system will be utilized as described in the *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 5.2.

6.3.1.3 Emergency Equipment

Portable fire extinguishers, fire control equipment, spill control equipment, and decontamination equipment are available to personnel at the WTP. A list of emergency and decontamination equipment is provided in the ERP.

6.3.1.4 Water for Fire Control

The primary water supply for fire protection will be provided from the 200 East Area raw water distribution system. The fire water supply system comprises two water storage tanks designed to

National Fire Protection Association (NFPA) 22, *Standard for Water Tanks for Private Fire Protection* (NFPA 1998); and Factory Mutual (FM) Data Sheet 3-2, *Water Tanks for Fire Protection* (FM 2001a). Each water storage tank will be capable of supplying fire-water for a minimum of two hours at the maximum anticipated demand.

The pumping system is being designed to NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection* (NFPA 1999a), and Factory Mutual Data Sheet 3-7N, *Stationary Pumps for Fire Protection* (FM 2001b). A fire pump will be installed and connected to each water storage tank. Each pump will be capable of providing the maximum system demand and will be connected to the underground distribution system in a manner that will prevent single failure from disabling both water supplies.

The underground distribution piping and valving will be designed and installed according to NFPA 24, *Standard for Installation of Private Fire Service Mains and Their Appurtenances* (NFPA 1995); and Factory Mutual Data Sheet 3-10, *Installation and Maintenance of Private Fire Service Mains and Their Appurtenances* (FM 2000).

The distribution system in the various buildings and structures are being designed following the various appropriate codes and standards that apply to their specific occupancy. The standards include NFPA 13, *Standard for the Installation of Sprinkler Systems* (NFPA 1999b); NFPA 14, *Standard for the Installation of Standpipe, private Hydrant, and Hose Systems* (NFPA 2000); NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection* (NFPA 1996); and the appropriate Factory Mutual standards, as required.

6.3.2 Aisle Space Requirement

Sufficient aisle space will be maintained throughout the facility buildings to allow access of personnel and equipment responding to fires, spills, or other emergencies.

Alternate aisle space for IHLW and ILAW container storage area is explained in Chapter 4.0. Secondary wastes stored in container storage areas will meet the 30-inch minimum aisle space requirement.

6.4 Preventive Procedures, Structures, and Equipment

The following sections describe preventive procedures, structures, and equipment. Refer to Chapter 4.0 for additional information on feed transfer piping and tank overfill protection structures, equipment, and instrumentation.

6.4.1 Unloading/Loading Operations

Waste feed to be treated at the WTP will be received from the DST system staging tank through a pipeline with secondary containment; leak detection; and cathodic protection, where transfer lines are in contact with the soil. The WTP will not receive waste for treatment in containers.

The filled ILAW and IHLW containers and canisters will be loaded for transport using special shielding and heavy lifting equipment. The immobilized waste will present no hazards from spills, leaks, run-off, or chemical exposures to personnel from the dangerous waste constituents because the waste will be solid (contain no free liquids) and the containers will be permanently sealed.

Containers of secondary waste bound for transport to another treatment, storage, and disposal facility (TSD) will be packaged according to the federal, state, and local regulations in place at the time. (Because the WTP will not begin generating secondary waste for several years, information such as the procedures, structures, and equipment is not yet available.)

6.4.2 Runoff

Waste stored and treated inside the plants cannot contact precipitation and therefore, cannot contaminate runoff from WTP structures, nor can precipitation enter secondary containment for the process and

storage areas within the plants. Additionally, the process condensate vessels located outside the Pretreatment Plant will be surrounded by a concrete berm lined with a protective coating for secondary containment. The secondary containment will collect and hold leaks and precipitation until the liquid can be removed. There will be no contaminated runoff from the outside tanks.

6.4.3 Contamination of Water Supplies

The active portions of the facility are being designed with robust structural features such as thick, reinforced concrete floors and walls; secondary containment (lined with stainless steel or other protective coating); and off-gas treatment systems. The structural features alone are designed to prevent waste feed from contacting the environment. Operation of the WTP is also intended to prevent a release of waste to the environment. The WTP design, construction, and operation will prevent waste feed and secondary waste from contaminating groundwater and drinking water supplies (see Chapter 4.0 for structural design information).

Raw and potable water will be supplied to the WTP via separate underground lines from the 200 East Area water treatment and distribution system. Backflow preventers or interconnection breaks ensure that in the event water is contaminated at the WTP, the water cannot flow back into the water systems' sources. There will be no connections between potable water and raw water systems, or between the potable water system and piping that will contain mixed waste.

6.4.4 Equipment and Power Failures

Should there be a partial or total loss of electrical power to the WTP, automatic measures ensure the plant is in a safe operational configuration. (Safe operational configuration is defined as a shutdown to minimal operations that will prevent releases and prevent unnecessary damage to the equipment.)

The emergency power system will consist of two diesel turbine- automatically controlled emergency diesel generators and one diesel engine standby generator. The automatic and standby generators are connected to three separate 4.16kV emergency switchgears. Upon loss of power the emergency diesel turbine generators will automatically start. The emergency diesel turbine generators are capable of starting, accelerating, and being loaded with the design load in a specified time limit. The standby diesel generator is started manually or automatically in the event of a prolonged loss of offsite power. The emergency power system will be connected to essential loads in order to ensure only a short-term power interruption for those loads designated as essential. Critical indications and controls are backed up by uninterruptible power supplies and batteries. The plant will remain in a safe condition during loss of electrical power.

Egress lighting will consist of self-contained fixtures with battery packs and charging systems. These lighting systems will be located in stairways, exit routes, and fire alarm stations and will come on automatically upon loss of normal power to the fixture. A selected part of the normal lighting will operate as essential lighting, and will provide a minimum level of illumination throughout the plant to aid in restoring the plant to normal operation. Essential lighting will be powered by the emergency power system and will be available after an offsite power loss, following a delay required to start the emergency power supply diesel generators and for the generators to pick up the essential loads.

Selected instrumentation and controls will be unaffected by a loss of offsite power, since many of these instruments and controls will be powered by uninterruptible power supply systems. The uninterruptible power supply systems will be battery backed, and the battery chargers will be connected to the emergency power supply. Emergency lighting, such as in the central control room, will be connected to an uninterruptible power supply system. Radiation monitoring using continuous air monitors and area radiation monitors are also powered by these systems and continue operating during power failure.

6.4.5 Personal Protection Equipment

Facility design, operating practices, and administrative controls are the primary means of preventing personnel exposure to dangerous and mixed waste. The following practices, structures, and equipment are intended to minimize personnel exposure to chemicals, radioactive contamination, and radiation exposure:

- Remote operation and viewing.
- Active ventilation that moves air from uncontaminated zones to progressively more contaminated zones.
- Waste cutoff systems that automatically keep operations in a safe condition.
- Secondary containment for liquids.
- Offices, control rooms, change rooms, and lunchrooms that are situated to minimize casual exposure of personnel.

Before the start of an operation that might expose employees to the risk of injury or illness, a review of the operation will be performed to ensure the appropriate protective gear is selected. Personnel will be instructed to wear personal protective equipment in accordance with training, posting, and instructions. The inspection schedule for personal protective equipment is found in Table 6A-1; however, the specific items listed as personal protective equipment will be in the ERP (Chapter 7.0) and not duplicated here.

6.4.6 Prevent Releases to the Atmosphere [WAC 173-303-806(4)(a)(viii)(F)]

The WTP off-gas treatment systems are the primary means of preventing contaminated releases to the atmosphere. The procedures, structures, and equipment used in these systems will be described in Chapter 4.0.

6.5 Prevention of Reaction of Ignitable, Reactive, and/or Incompatible Waste

The WTP will receive waste feed that is designated as ignitable or reactive; the WTP may store, in containers, secondary waste that is designated as ignitable, reactive, or incompatible (see Chapter 3.0 and Waste Treatment Plant Waste Analysis Plan, Appendix 3A).

Process knowledge, administrative controls, and the active ventilation system prevent the formation or release of ignitable vapors that could harm human health or the environment.

WASTE TREATMENT OF IMMOBILIZATION PLANT
APPENDIX 6A
INSPECTION SCHEDULES

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
08/2011	

This page intentionally left blank.

APPENDIX 6A
INSPECTION SCHEDULES

This page intentionally left blank.

APPENDIX 6A
INSPECTION SCHEDULES

TABLE OF CONTENTS

1.0 Inspection Schedules 5

TABLES

Table 6A-1 Example WTP General Inspection Schedule 6
Table 6A-2 Example Canister and Container Storage Inspection Schedules 7
Table 6A-3 Example Tank Systems and Ancillary Equipment Inspection Schedule 9
Table 6A-4 Example Cathodic Protection Inspection Schedule-Dangerous Waste Transfer Lines 16
Table 6A-5 Example Ignitable or Reactive Wastes Inspection Schedule 16
Table 6A-6 Example Miscellaneous Treatment Unit Schedule 17
Table 6A-7 Example Containment Buildings Inspection Schedule 22

This page intentionally left blank.

1.0 INSPECTION SCHEDULES

This section provides example WTP inspection schedules showing inspection frequencies and what to look for. These example inspection schedules list the monitoring equipment, safety and emergency equipment, security devices, preparedness and prevention equipment, and operating and structural equipment that help prevent, detect, or respond to environmental or human health hazards related to mixed and dangerous waste. A copy of the current and complete inspection schedules will be retained at the WTP or other approved locations.

Table 6A-1 contains examples of the general inspection requirements. The remaining tables are organized by type of waste management unit. Following is a list of tables and their locations included in this Appendix.

Table 6A-1 Example WTP General Inspection Schedule

Component Name	Inspection	Frequency
Security Devices		
WTP inner fence	Check for damaged fencing	Monthly
Posted warning signs (see Chapter 6.0, section 1.1.3) that say: "DANGER - UNAUTHORIZED PERSONNEL KEEP OUT" (or equivalent)	Verify signs are present, legible from a distance of 25 ft, and visible; ensure buildings or rooms containing dangerous or mixed waste are posted	Monthly
Points of access to active portions turnstiles, doors, and/or magnetic encoded bar readers	Verify operability	Monthly
Emergency Preparedness Equipment		
Safety showers and eyewash stations	Verify operability and sufficient pressure	At least every seven days
Automatic fire suppression system(s)	Verify operability	Annually
Portable fire extinguishers (all types)	Check for adequate charge	Monthly
Emergency lighting	Test operability	Monthly
Spill kit and spill control equipment	Verify contents complete	Quarterly
Emergency sirens and alarms	Verify operability	Monthly
Voice paging system (pagers or PA system)	Verify operability	Monthly
Emergency telephones	Verify operability	Monthly
Personal protective clothing and equipment	Ensure supplies meet ERP listing and requirements	Quarterly
Power Supply Inspections		
Emergency uninterruptible power supply system(s)	Verify operability	Annual
Emergency diesel generator	Perform no-load test and verify sufficient fuel	Annual

Table 6A-2 Example Canister and Container Storage Inspection Schedules

Name	Inspection	Frequency
Dangerous and/or Mixed Waste Container Storage Inspections		
• HLW East corridor El. 0 ft (HC-0108/09/10) • HLW Loading Area (H-0130) • Laboratory waste management area • Non-radioactive dangerous waste container storage area • Failed melter storage facility • Container storage in HLW, PTF, and LAW Containment Building described in Table III.10.D.A	Verify major risk labels present and legible, ensure all containers are closed (except when waste is being added to container); Check that container storage areas are free of liquid and debris; Check for significant cracks, gaps, and other signs of deterioration of storage area floors; Verify minimum 30 inches of aisle space between containers, except for IHLW canisters and ILAW containers; Verify that any dangerous and or mixed waste container holding free liquids have portable secondary containment and no liquids accumulated in portable secondary containment	At least every seven days
Immobilized ILAW Container Storage in Containment Buildings		
ILAW containers	Inspect that unique alphanumeric identifier is welded to ILAW container and is legible	Prior to placing in storage
Filled ILAW containers	Inspect (visually, by camera surveillance, or cell window) each container for cracks, leaks, bulges, or other abnormalities	After sealing container
	Record in tracking system each container's location when placed in storage; Record in tracking system all container location changes if container(s) are moved while in storage; Verify container in recorded location when transporting container out of WTP storage.	Within 48 hours of placing or moving each container
Container Monitoring/Export Areas (L-0109E and L-0115E)	Inspect (visually, by camera surveillance, or cell window) for deformities in storage area floors or debris in storage area	At least every seven days when facility is storing waste in immobilized waste container monitoring/export area
HLW Vitrification Plant Canister Storage Area		
IHLW canisters	Inspect that unique alphanumeric identifier is welded to IHLW canister and is legible	Prior to placing in storage

Table 6A-2 Example Canister and Container Storage Inspection Schedules

Name	Inspection	Frequency
Filled IHLW Canister	Inspect (visually, by camera surveillance, or cell window) each canister for cracks, leaks, bulges, or other abnormalities	After sealing canister
	Record in tracking system each canister's location when placed in storage; Record in tracking system all canister location changes if canister(s) are moved while in storage; Verify canister in recorded location when transporting canister out of WTP storage.	Within 48 hours of placing or moving each canister
IHLW Canister Storage Cave (H-0132)	Inspect (visually, by camera surveillance, or cell window) for deformities in storage area floors or debris in storage area	At least every seven days when facility is storing waste in immobilized waste canister storage area

Table 6A-3 Example Tank Systems and Ancillary Equipment Inspection Schedule

Component Name	Plant item number	Inspection	Frequency
Pretreatment Plant Tank System			
FRP			
Waste feed receipt vessels	FRP-VSL-00002A FRP-VSL-00002B FRP-VSL-00002C FRP-VSL-00002D	Inspect tank level monitoring data to prevent overflow	Daily
FEP			
Waste feed evaporator feed vessels	FEP-VSL-00017A FEP-VSL-00017B	Inspect tank level monitoring data to prevent overflow	Daily
Waste feed evaporator condensate vessel	FEP-VSL-00005	Inspect tank level monitoring data to prevent overflow	Daily
HLP			
HLW Lag storage vessel	HLP-VSL-00027A HLP-VSL-00027B	Inspect tank level monitoring data to prevent overflow	Daily
HLW feed receipt vessel	HLP-VSL-00022	Inspect tank level monitoring data to prevent overflow	Daily
HLW feed blend vessel	HLP-VSL-00028	Inspect tank level monitoring data to prevent overflow	Daily
UFP			
Ultrafiltration feed preparation vessels	UFP-VSL-00001A UFP-VSL-00001B	Inspect tank level monitoring data to prevent overflow	Daily
Ultrafiltration feed vessels	UFP-VSL-00002A UFP-VSL-00002B	Inspect tank level monitoring data to prevent overflow	Daily
Ultrafilter permeate collection vessel	UFP-VSL-00062A UFP-VSL-00062B UFP-VSL-00062C	Inspect tank level monitoring data to prevent overflow	Daily

Table 6A-3 Example Tank Systems and Ancillary Equipment Inspection Schedule

Component Name	Plant item number	Inspection	Frequency
Ultrafilters	UFP-FILT-00001A UFP-FILT-00001B UFP-FILT-00002A UFP-FILT-00002B UFP-FILT-00003A UFP-FILT-00003B UFP-FILT-00004A UFP-FILT-00004B UFP-FILT-00005A UFP-FILT-00005B	Inspect tank level monitoring data to prevent overflow	Daily
CXP			
Cesium ion exchange feed vessel	CXP-VSL-00001	Inspect tank level monitoring data to prevent overflow	Daily
Cesium ion exchange columns	CXP-IXC-00001 CXP-IXC-00002 CXP-IXC-00003 CXP-IXC-00004	Inspect column monitoring data to prevent release	Daily
Cesium reagent vessel	CXP-VSL-00005	Inspect tank level monitoring data to prevent overflow	Daily
Cesium ion exchange caustic rinse collection vessel	CXP-VSL-00004	Inspect tank level monitoring data to prevent overflow	Daily
Cesium ion exchange treated LAW collection vessels	CXP-VSL-00026A CXP-VSL-00026B CXP-VSL-00026C	Inspect tank level monitoring data to prevent overflow	Daily
CNP			
Cesium evaporator eluate lute vessel	CNP-VSL-00001	Inspect tank level monitoring data to prevent overflow	Daily
Cesium evaporator recovered nitric acid vessel	CNP-VSL-00004	Inspect tank level monitoring data to prevent overflow	Daily
Eluate contingency storage vessel	CNP-VSL-00003	Inspect tank level monitoring data to prevent overflow	Daily

Table 6A-3 Example Tank Systems and Ancillary Equipment Inspection Schedule

Component Name	Plant item number	Inspection	Frequency
PVP			
Vessel ventilation HEME drain collection vessel	PVP-VSL-00001	Inspect tank level monitoring data to prevent overflow	Daily
PWD			
Ultimate overflow vessel	PWD-VSL-00033	Inspect tank level monitoring data to prevent overflow	Daily
Plant wash vessel	PWD-VSL-00044	Inspect tank level monitoring data to prevent overflow	Daily
Acidic/alkaline effluent vessel	PWD-VSL-00015	Inspect tank level monitoring data to prevent overflow	Daily
Acidic/alkaline effluent vessel	PWD-VSL-00016	Inspect tank level monitoring data to prevent overflow	Daily
C3 floor drains tank	PWD-VSL-00046	Inspect tank level monitoring data to prevent overflow	Daily
HLW effluent transfer vessel	PWD-VSL-00043	Inspect tank level monitoring data to prevent overflow	Daily
TLP			
Treated LAW evaporator condensate vessel	TLP-VSL-00002	Inspect tank level monitoring data to prevent overflow	Daily
LAW SBS condensate receipt vessel	TLP-VSL-00009A TLP-VSL-00009B	Inspect tank level monitoring data to prevent overflow	Daily
TCP			
Treated LAW concentrate storage vessel	TCP-VSL-00001	Inspect tank level monitoring data to prevent overflow	Daily
RDP			
Spent resin slurry vessels	RDP-VSL-00002A RDP-VSL-00002B RDP-VSL-00002C	Inspect tank level monitoring data to prevent overflow	Daily

Table 6A-3 Example Tank Systems and Ancillary Equipment Inspection Schedule

Component Name	Plant item number	Inspection	Frequency
Spent resin dewatering moisture separation vessel	RDP-VSL-00004	RESERVED	Daily
RLD			
Process condensate vessels	RDP-TK-00006A RDP-TK-00006B	Inspect tank level monitoring data to prevent overflow	Daily
Alkaline effluent vessels	RLD-VSL-00017A RLD-VSL-00017B	Inspect tank level monitoring data to prevent overflow	Daily
PIH			
Decontaminatio n soak tank	PIH-TK-00001	Inspect tank level monitoring data to prevent overflow	Daily
LAW Vitrification Plant Tank System			
LCP			
LAW Melter 1 concentrate receipt vessel	LCP-VSL-00001	Inspect tank level monitoring data to prevent overflow	Daily
LAW Melter 2 concentrate receipt vessel	LCP-VSL-00002	Inspect tank level monitoring data to prevent overflow	Daily
LFP			
Melter 1 feed preparation vessel	LFP-VSL-00001	Inspect tank level monitoring data to prevent overflow	Daily
Melter 1 feed vessel	LFP-VSL-00002	Inspect tank level monitoring data to prevent overflow	Daily
Melter 2 feed preparation vessel	LFP-VSL-00003	Inspect tank level monitoring data to prevent overflow	Daily
Melter 2 feed vessel	LFP-VSL-00004	Inspect tank level monitoring data to prevent overflow	Daily
LVP			
LAW caustic collection tank	LVP-TK-00001	Inspect tank level monitoring data to prevent overflow	Daily

Table 6A-3 Example Tank Systems and Ancillary Equipment Inspection Schedule

Component Name	Plant item number	Inspection	Frequency
LOP			
LAW Melter 1 SBS condensate vessel	LOP-VSL-00001	Inspect tank level monitoring data to prevent overflow	Daily
LAW Melter 2 SBS condensate vessel	LOP-VSL-00002	Inspect tank level monitoring data to prevent overflow	Daily
RLD			
Plant wash vessel	RLD-VSL-00003	Inspect tank level monitoring data to prevent overflow	Daily
C3/C5 drains/sump collection vessel	RLD-VSL-00004	Inspect tank level monitoring data to prevent overflow	Daily
SBS condensate collection vessel	RLD-VSL-00005	Inspect tank level monitoring data to prevent overflow	Daily
HLW Vitrification Plant Tank System			
HOP			
Melter 1 SBS condensate receiver vessel 1	HOP-VSL-00903	Inspect tank level monitoring data to prevent overflow	Daily
Melter 2 SBS condensate receiver vessel 2	HOP-VSL-00904	Inspect tank level monitoring data to prevent overflow	Daily
HDH			
Canister decon vessel 1	HDH-VSL-00002	Inspect tank level monitoring data to prevent overflow	Daily
Canister decon vessel 2	HDH-VSL-00004	Inspect tank level monitoring data to prevent overflow	Daily
Waste neutralization vessel	HDH-VSL-00003	Inspect tank level monitoring data to prevent overflow	Daily
Canister rinse vessel	HDH-VSL-00001	Inspect tank level monitoring data to prevent overflow	Daily
RLD			
Acidic waste vessel	RLD-VSL-00007	Inspect tank level monitoring data to prevent overflow	Daily

Table 6A-3 Example Tank Systems and Ancillary Equipment Inspection Schedule

Component Name	Plant item number	Inspection	Frequency
Plant wash and drains vessel	RLD-VSL-00008	Inspect tank level monitoring data to prevent overflow	Daily
Offgas drains collection vessel	RLD-VSL-00002	Inspect tank level monitoring data to prevent overflow	Daily
HFP			
HLW Melter 1 feed preparation vessel	HFP-VSL-00001	Inspect tank level monitoring data to prevent overflow	Daily
HLW Melter 2 feed preparation vessel	HFP-VSL-00005	Inspect tank level monitoring data to prevent overflow	
HLW Melter 1 feed vessel	HFP-VSL-00002	Inspect tank level monitoring data to prevent overflow	Daily
HLW Melter 2 feed vessel	HFP-VSL-00006	Inspect tank level monitoring data to prevent overflow	
HSH			
Decontamination Tank Melter cave 1	HSH-TK-00001	Inspect tank level monitoring data to prevent overflow	Daily
Decontamination Tank Melter cave 2	HSH-TK-00002	Inspect tank level monitoring data to prevent overflow	Daily
Analytical Laboratory Tank System			
RLD			
Lab area sink drain collection vessel	RLD-VSL-00164	Inspect tank level monitoring data to prevent overflow	Daily
Hot cell drain collection vessel	RLD-VSL-00165	Inspect tank level monitoring data to prevent overflow	Daily
Primary Containment Sumps as identified the WTP Permit (Reserved)			
Secondary Containment			

Table 6A-3 Example Tank Systems and Ancillary Equipment Inspection Schedule

Component Name	Plant item number	Inspection	Frequency
Leak detectors for all tank systems, miscellaneous units, and containment buildings managing dangerous and/or mixed waste	See Chapter 4.0	Monitor leak detection instrumentation or monitoring data to detect leaks	Daily
Underground Piping (receiving from DST and transferring out)			
Leak detectors		Monitor leak detection instrumentation or monitoring data to detect leaks	Daily

Table 6A-4 Example Cathodic Protection Inspection Schedule-Dangerous Waste Transfer Lines

Component Name and Line Number	Inspection	Frequency
Cathodic protection systems for dangerous and mixed waste transfer lines	Verify proper operation	Initial (less than 6 months after installation) Annually (from date of initial installation inspection, above)
All sources of impressed current supporting cathodically protected dangerous and mixed waste transfer lines	Test for proper function	Bi-monthly

Table 6A-5 Example Ignitable or Reactive Wastes Inspection Schedule

Component Name	Inspection	Frequency
Receipt tanks	Inspect, by qualified personnel or in the presence of fire marshal, for compliance with Uniform Fire Code and enter inspection into operating record	365 days
Container storage areas storing ignitable or reactive waste	Inspect, by professional person or in the presence of fire marshal for compliance with Uniform Fire Code and enter inspection into operating record. Inspect container storage areas for compliance with WAC 173-303-630 (8) requirements.	365 days

Table 6A-6 Example Miscellaneous Treatment Unit Schedule

Component Name	Plant Item Number	Inspection	Frequency
Pretreatment Facility Miscellaneous Treatment Unit Systems			
TLP			
Treated LAW evaporator separator vessel	TLP-SEP-00001	Inspect vessel level monitoring data to prevent overflow	Daily
Treated LAW Reboiler	TLP-RBLR-00001	TBD	TBD
Treated LAW Primary Condenser	TLP-COND-00001	TBD	TBD
Treated LAW Inter-Condenser	TLP-COND-00003	TBD	TBD
Treated LAW After-Condenser	TLP-COND-00002	TBD	TBD
FEP			
Waste Feed Evaporator Separator Vessels	FEP-SEP-00001A FEP-SEP-00001B	TBD	TBD
Waste Feed Evaporator Reboilers	FEP-RBLR-00001A FEP-RBLR-00001B	TBD	TBD
Waste Feed Evaporator Primary Condensers	FEP-COND-00001A FEP-COND-00001B	TBD	TBD
Waste Feed Evaporator Inter-Condensers	FEP-COND-00002A FEP-COND-00002B	TBD	TBD
Waste Feed Evaporator After-Condensers	FEP-COND-00003A FEP-COND-00003B	TBD	TBD
PJV			
PJV Primary HEPA filters	PJV-HEPA-00001A PJV-HEPA-00001B PJV-HEPA-00001C PJV-HEPA-00001D PJV-HEPA-00001E PJV-HEPA-00001F PJV-HEPA-00001G	TBD	TBD
PJV Secondary Exhaust HEPA filters	PJV-HEPA-00002A PJV-HEPA-00002B PJV-HEPA-00002C PJV-HEPA-00002D PJV-HEPA-00002E PJV-HEPA-00002F	TBD	TBD

Table 6A-6 Example Miscellaneous Treatment Unit Schedule

Component Name	Plant Item Number	Inspection	Frequency
PJV Exhaust fans	PJV-FAN-00001A PJV-FAN-00001B PJV-FAN-00001C	TBD	TBD
PJV Demisters	PJV-DMST-00002A PJV-DMST-00002B PJV-DMST-00002C	TBD	TBD
PVP			
Electric heaters	PVP-HTR-00001A PVP-HTR-00001B PVP-HTR-00001C	TBD	TBD
Vessel Vent After-cooler	PVP-CLR-00001	TBD	TBD
Vessel Vent Carbon Bed Adsorbers	PVP-ADBR-00001A PVP-ADBR-00001B	TBD	TBD
Vessel Vent VOC Oxidizer unit	PVP-OXID-00001	TBD	TBD
Vessel Vent Adsorber Outlet filters	PVP-FILT-00001	TBD	TBD
Vessel Vent HEME (mist eliminator)	PVP-HEME-00001A PVP-HEME-00001B PVP-HEME-00001C	TBD	TBD
Vessel Vent Scrubbing Liquid Cooler	PVP-HX-00002	TBD	TBD
Vessel Vent Caustic Scrubber	PVP-SCB-00002	TBD	TBD
PVV			
Vessel Vent HEPA primary filters	PVV-HEPA-00001A PVV-HEPA-00001B	TBD	TBD
Vessel Vent HEPA secondary filters	PVV-HEPA-00002A PVV-HEPA-00002B	TBD	TBD
Vessel Vent Exhaust fans	PVV-FAN-00001A PVV-FAN-00001B	TBD	TBD
CNP			
Cesium evaporator Separator Vessel	CNP-EVAP-00001	TBD	TBD
Cesium evaporator concentrate reboiler	CNP-HX-00001	TBD	TBD
Cesium evaporator nitric acid rectifier column	CNP-DISTC-00001	TBD	TBD
Cesium evaporator primary condenser	CNP-HX-00002	TBD	TBD

Table 6A-6 Example Miscellaneous Treatment Unit Schedule

Component Name	Plant Item Number	Inspection	Frequency
Cesium evaporator inter-condenser	CNP-HX-00003	TBD	TBD
Cesium evaporator after-condenser	CNP-HX-00004	TBD	TBD
LAW Vitrification Plant Miscellaneous Treatment Unit Subsystems			
LMP			
LAW Melter 1 LAW Melter 2	LMP-MLTR-00001 LMP-MLTR-00002	Visual inspection (via cave window or CCTV if provided) for damage, leaks, or abnormalities Inspect melter level monitoring data to prevent overflow	Daily
LOP			
Melter 1 and melter 2 submerged bed scrubbers	LOP-SCB-00001 LOP-SCB-00002	TBD	TBD
Melter 1 and melter 2 wet electrostatic precipitators	LOP-WESP-00001 LOP-WESP-00002	TBD	TBD
Primary/standby film coolers	LOP-FCLR-00001 LOP-FCLR-00002 LOP-FCLR-00003 LOP-FCLR-00004	TBD	TBD
LVP			
Melter Offgas Caustic scrubber	LVP-SCB-00001	TBD	TBD
Melter Offgas HEPA filters	LVP-HEPA-00001A LVP-HEPA-00001B LVP-HEPA-00002A LVP-HEPA-00002B LVP-HEPA-00003A	TBD	TBD
Thermal catalytic oxidizer	LVP-SCO-00001	TBD	TBD
NO_xselective catalytic reduction unit	LVP-SCR-00001	TBD	TBD
Melter Offgas HEPA Preheaters	LVP-HTR-00001A LVP-HTR-00001B	TBD	TBD
Catalytic oxidizer electric heater	LVP-HTR-00002	TBD	TBD
Catalytic oxidizer heat recovery unit	LVP-HX-00001	TBD	TBD
Offgas Mercury Adsorbers	LVP-ADBR-0000A1/1B	TBD	TBD

Table 6A-6 Example Miscellaneous Treatment Unit Schedule

Component Name	Plant Item Number	Inspection	Frequency
Melter Offgas Exhausters	LVP-EXHR-00001A LVP-EXHR-00001B LVP-EXHR-00001C	TBD	TBD
HLW Vitrification Plant Miscellaneous Treatment Unit Subsystems			
HMP			
HLW Melter 1	HMP-MLTR-00001	Visual inspection (via cave window or CCTV if provided) for damage, leaks, or abnormalities Inspect melter level monitoring data to prevent overflow	Daily
HLW Melter 2	HMP-MLTR-00002		
HOP			
Submerged Bed Scrubber	HOP-SCB-00001 HOP-SCB-00002	TBD	TBD
Wet Electrostatic Precipitators (WESP)	HOP-WESP-00001 HOP-WESP-00002	TBD	TBD
Thermal Catalytic Oxidizer	HOP-SCO-00001 HOP-SCO-00004	TBD	TBD
NOx Selective Catalytic Reduction Units	HOP-SCR-00001 HOP-SCR-00002	TBD	TBD
Silver Mordenite Columns	HOP-ABS-00002 HOP-ABS-00003	TBD	TBD
HEPA Filters	HOP-HEPA-00001A HOP-HEPA-00001B HOP-HEPA-00002A HOP-HEPA-00002B HOP-HEPA-00007A HOP-HEPA-00007B HOP-HEPA-00008A HOP-HEPA-00008B	TBD	TBD
Melter Offgas Film Coolers	HOP-FCLR-00001/3 HOP-FCLR-00002/4	TBD	TBD
Catalyst Skid Preheaters	HOP-HX-00001 HOP-HX-00003	TBD	TBD
HEPA Preheaters	HOP-HTR-00001B HOP-HTR-00002A HOP-HTR-00005A HOP-HTR-00005B	TBD	TBD

Table 6A-6 Example Miscellaneous Treatment Unit Schedule

Component Name	Plant Item Number	Inspection	Frequency
Catalyst Skid Electric Heaters	HOP-HTR-00007 HOP-HTR-00001		
Silver Mordenite Preheaters	HOP-HX-00002 HOP-HX-00004	TBD	TBD
Stack Extraction Fans	HOP-FAN-00008A HOP-FAN-00008B HOP-FAN-00008C HOP-FAN-00010A HOP-FAN-00010B HOP-FAN-00010C	TBD	TBD
Booster Extraction Fans	HOP-FAN-00001A HOP-FAN-00001B HOP-FAN-00001C HOP-FAN-00009A HOP-FAN-00009B HOP-FAN-00009C	TBD	TBD
Activated Carbon Adsorber	HOP-ADBR-00001A HOP-ADBR-00001B HOP-ADBR-00002A HOP-ADBR-00002B	TBD	TBD
High Efficiency Mist Eliminators (HEME)	HOP-HEME-00001A HOP-HEME-00001B HOP-HEME-00002A HOP-HEME-00002B	TBD	TBD
PJV			
PJV HEPA Filters	PJV-HEPA-00004A PJV-HEPA-00004B PJV-HEPA-00005A PJV-HEPA-00005B	TBD	TBD
Pulse Ventilation HEPA Electric Preheater	PJV-HTR-00002	TBD	TBD
Pulse Vent Extraction Fans	PJV-FAN-00002A PJV-FAN-00002B	TBD	TBD

Table 6A-7 Example Containment Buildings Inspection Schedule

Component Name	Inspection	Frequency
Containment building areas as designated in Chapter 4.0	Inspect and record in the operating record data gathered from monitoring equipment and leak detection equipment as well as the containment building and the area immediately surrounding the containment building to detect signs of releases of dangerous waste. All areas should be inspected for significant cracks, gaps, corrosion, or other signs of deterioration; look for liquids on floor. Check differential pressure monitoring records to ensure negative pressure in containment building area.	At least every seven days

WASTE TREATMENT AND IMMOBILIZATION PLANT
CHAPTER 7.0
CONTINGENCY PLAN

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
08/2011	

This page intentionally left blank.

CHAPTER 7.0
CONTINGENCY PLAN

This page intentionally left blank.

CHAPTER 7.0
CONTINGENCY PLAN

TABLE OF CONTENTS

7.0 Contingency Plan 5

TABLES

Table 7-1 Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3) 7

APPENDIX

Appendix 7A Emergency Response Plan 10-7A-i

This page intentionally left blank.

7.0 CONTINGENCY PLAN

The contingency plan requirements provided in Washington Administrative Code (WAC) 173-303-350, *Contingency Plan and Emergency Procedures*, are satisfied in portions of the following documents:

- *River Protection Project - Waste Treatment Plant (RPP-WTP) Emergency Response Plan* (Appendix 7A of this document).
- *Hanford Emergency Management Plan* (DOE/RL-94-02 1999)*(Attachment 4 of the Dangerous Waste Portion of the Resource Conservation and Recovery Act (RCRA) Permit for the Treatment, Storage, and Disposal of Dangerous Waste)(Ecology 1994a)*

A detailed outline of the Emergency Response Plan was provided to meet Compliance Schedule Item 5. A final Emergency Response Plan will be provided prior to receipt of waste to demonstrate compliance with WAC-173-303-340, Preparedness and Prevention; WAC-173-303-350, Contingency Plan and Emergency Procedures; and WAC-173-303-360, Emergencies.

The *RPP-WTP Emergency Response Plan* also serves to satisfy a broad range of other requirements (e.g., *Occupational Safety and Health Administration Standards* [29 CFR 1910], *Toxic Substance Control Act of 1976* [40 CFR 761], and United States Department of Energy Orders). Therefore, revisions made to portions of this contingency plan document that are not governed by the requirements of WAC 173-303 will not be considered as a modification subject to WAC 173-303-830 or Hanford Facility Dangerous Waste Permit, Condition I.C.3.

Table 7-1 identifies which portions of the *RPP-WTP Emergency Response Plan* are written to meet WAC 173-303 contingency plan requirements. In addition to the *RPP-WTP Emergency Response Plan* portions identified in Table 7-1, Section 12.0 of the *RPP-WTP Emergency Response Plan* is written to meet WAC 173-303 requirements identifying where copies of the *Hanford Emergency Management Plan* and the *RPP-WTP Emergency Response Plan* are maintained on the Hanford Facility. Therefore, revisions to Section 12.0 and the portions identified in Table 7-1 are considered a modification subject to WAC 173-303-830 or Hanford Facility Dangerous Waste Permit, Condition I.C.3.

This page intentionally left blank.

Table 7-1 Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3)

Requirement	*Hanford Emergency Management Plan* (DOE/RL-94-02): Attachment 4 of the Hanford Facility Dangerous Waste Permit	RPP-WTP Emergency Response Plan[1]
-350(3)(a) – A description of the actions which facility personnel must take to comply with this section and WAC 173-303-360.	X[2] Section 1.3.4	X[2] Sections 7.1, 7.2 through 7.2.5, and 7.3[3] Sections 4.0, 8.2, 8.3, 8.4, 11.0
-350(3)(b) – A description of the actions which shall be taken in the event that a dangerous waste shipment, which is damaged or otherwise presents a hazard to the public health and the environment, arrives at the facility, and is not acceptable to the owner or operator, but cannot be transported pursuant to the requirements of WAC 173-303-370(5), Manifest system, reasons for not accepting dangerous waste shipments.	X[2] Section 1.3.4	X[2,4] Section 7.2.5.1
-350(3)(c) – A description of the arrangements agreed to by local police departments, fire departments, hospitals, contractors, and state and local emergency response teams to coordinate emergency services as required in WAC 173-303-340(4).	X Sections 3.2.3, 3.3.1, 3.3.2, 3.4, 3.4.1.1, 3.4.1.2, 3.4.1.3, 3.7, and Table 3-1	
-350(3)(d) – A current list of names, addresses, and phone numbers (office and home) of all persons qualified to act as the emergency coordinator required under WAC 173-303-360(1). Where more than one person is listed, one must be named as primary emergency coordinator, and others must be listed in the order in which they will assume responsibility as alternates. For new facilities only, this list may be provided to the department at the time of facility certification (as required by WAC 173-303-810 (14)(a)(i)), rather than as part of the permit application.		X[5] Section 3.1, 13.0

Table 7-1 Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3)

Requirement	*Hanford Emergency Management Plan* (DOE/RL-94-02): Attachment 4 of the Hanford Facility Dangerous Waste Permit	RPP-WTP Emergency Response Plan[1]
-350(3)(e) – A list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems, and decontamination equipment), where this equipment is required. This list must be kept up to date. In addition, the plan must include the location and a physical description of each item on the list, and a brief outline of its capabilities.	X Hanford Fire Department: Appendix C	X Section 9.0
-350(3)(f) – An evacuation plan for facility personnel where there is a possibility that evacuation could be necessary. This plan must describe the signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes.	X[6] Figure 7-3 and Table 5-1	X[7] Section 1.5

An "X" indicates requirement applies.

[1]Portions of the *Hanford Emergency Management Plan* not enforceable through Appendix A of that document are not made enforceable by reference in the *RPP-WTP Emergency Response Plan*.

[2]The *Hanford Emergency Management Plan* contains descriptions of actions relating to the Hanford Site Emergency Preparedness System. No additional description of actions are required at the Hanford Site level. If other credible scenarios exist or if emergency procedures at the WTP are different, the description of actions contained in the *RPP-WTP Emergency Response Plan* will be used during an event by a building emergency director.

[3]Sections 7.1, 7.2 through 7.2.5, and 7.3 of the RPP-WTP Emergency Response Plan are those sections subject to the Class 2 "Changes in emergency procedures (i.e., spill or release response procedures)" described in WAC 173-303-830, Appendix I, Section B.6.a.

[4]This requirement only applies to TSD units that receive shipment of dangerous or mixed waste defined as offsite shipments in accordance with WAC 173-303.

[5]Emergency Coordinator names and home telephone numbers are maintained separately from the contingency plan document, on file in accordance with Hanford Facility Dangerous Waste Permit General Condition II.A.3, and is updated, at a minimum, monthly.

[6]The Hanford Facility (site-wide) signals are provided in this document. No unit/building signal information is required unless unique devices are used at the unit/building.

[7]An evacuation route for the WTP is provided. Evacuation routes for occupied buildings surrounding the WTP are provided through information boards posted within buildings.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 7A
EMERGENCY RESPONSE PLAN

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
06/2011	

This page intentionally left blank.

APPENDIX 7A
EMERGENCY RESPONSE PLAN

This page intentionally left blank.

APPENDIX 7A
EMERGENCY RESPONSE PLAN

TABLE OF CONTENTS

1.0 GENERAL INFORMATION 7
1.1 Facility Name 7
1.2 Facility Location 7
1.3 Owner 7
1.4 Description of the WTP Facility and Operations 7
1.5 Building Evacuation Routing 9
2.0 PURPOSE 15
3.0 WTP EMERGENCY RESPONSE ORGANIZATION 15
3.1 Building Emergency Director 15
3.2 Other Members 15
4.0 IMPLEMENTATION OF THE PLAN 16
5.0 FACILITY HAZARDS 17
5.1 Hazardous Materials 17
5.2 Industrial Hazards 17
5.3 Radioactive, Dangerous, and Mixed Waste 17
5.4 Criticality 19
6.0 POTENTIAL EMERGENCY CONDITIONS 19
6.1 Facility Operations Emergencies 19
6.1.1 Loss of Utilities 19
6.1.2 Major Process Disruption/Loss of Plant Control 19
6.1.3 Pressure Release 19
6.1.4 Fire and/or Explosion 20
6.1.5 Hazardous Material Spill 20
6.1.6 Dangerous/Mixed Waste Spill 20
6.1.7 Transportation and /or Packaging Incidents 20
6.1.8 Radiological Waste Release 20
6.1.9 Criticality 20
6.2 Natural Phenomena 20
6.2.1 Seismic Event 21
6.2.2 Volcanic Eruption/Ash fall 21

6.2.3 High Winds/Tornadoes 21
6.2.4 Flood 21
6.2.5 Range Fire 21
6.2.6 Aircraft Crash 21
6.3 Security Contingencies 21
6.3.1 Bomb Threat/Explosive Device 21
6.3.2 Hostage Situation/Armed Intruder 21
6.3.3 Suspicious Object 22
7.0 INCIDENT RESPONSE 22
7.1 Protective Action Responses 22
7.1.1 Evacuation 22
7.1.2 Take Cover 23
7.2 Response to Facility Operations Emergencies 23
7.2.1 Loss of Utilities 24
7.2.2 Major Process Disruption/Loss of Plant Control 25
7.2.3 Pressure Release 25
7.2.4 Fire and/or Explosion 25
7.2.5 Hazardous Material, Dangerous and/or Mixed Waste Spill 26
7.2.6 Radiological Material Release 28
7.2.7 Criticality 28
7.3 Prevention of Recurrence or Spread of Fires, Explosions, or Releases 28
7.4 Response to Natural Phenomena 29
7.4.1 Seismic Event 29
7.4.2 Volcanic Eruption/Ash fall 29
7.4.3 High Winds/Tornadoes 29
7.4.4 Flood 30
7.4.5 Range Fire 30
7.4.6 Aircraft Crash 30
7.5 Security Contingencies 30
7.5.1 Bomb Threat/Explosive Device 30
7.5.2 Hostage Situation/Armed Intruder 30
7.5.3 Suspicious Object 30
8.0 TERMINATION OF EVENT, INCIDENT RECOVERY, AND RESTART OF OPERATIONS 31
8.1 Termination of Event 31

8.2 Incident Recovery and Restart of Operations 31
8.3 Incompatible Waste 31
8.4 Post Emergency Equipment Maintenance And Decontamination 32
9.0 EMERGENCY EQUIPMENT 32
9.1 Fixed Emergency Equipment 32
9.2 Portable Emergency Equipment 32
9.3 Communications Equipment/Warning Systems 33
9.4 Personal Protective Equipment 33
9.5 Spill Control and Containment Supplies 34
9.6 Incident Command Post 35
10.0 COORDINATION AGREEMENTS 35
11.0 REQUIRED REPORTS 35
12.0 PLAN LOCATION AND AMENDMENTS 35
13.0 FACILITY EMERGENCY RESPONSE ORGANIZATION 35
14.0 REFERENCES 36

TABLES

Table 7A-1 Locations of Dangerous Waste Management Units 13
Table 7A-2 Fixed Emergency Equipment 32
Table 7A-3 Portable Emergency Equipment 33
Table 7A-4 Communications Equipment 33
Table 7A-5 Personal Protective Equipment 34
Table 7A-6 Spill Kits and Spill Control Equipment 34
Table 7A-7 WTP BEDs 36

FIGURES

Figure 7A-1 Location of the WTP on the Hanford Site 10
Figure 7A-2 WTP Site Layout 11
Figure 7A-B-1 Hanford Site Evacuation Routes 40

APPENDICES

Appendix 7A-A 37
Appendix 7A-B Evacuation Routes 39

This page intentionally left blank.

1.0 GENERAL INFORMATION

The Waste Treatment and Immobilization Plant (WTP) will be a dedicated treatment plant that will treat mixed waste transferred from the United States Department of Energy, Richland Operations Office (DOE-RL) Double-Shell Tank (DST) System Unit at the Hanford Site. The WTP is located on the Hanford Site, a 560-square-mile (1,450-square kilometer) United States Department of Energy (DOE) site in southeastern Washington State. The WTP is located in the East portion of the 200 Area near the center of the Hanford Site. Figures 7A-1 and 7A-2 show the location of the WTP with respect to the Hanford Site and the 200 East Area of the Hanford Site.

The Hanford Site Emergency Preparedness Program is based on the incident command system that allows a graded approach for response to emergency events. This plan contains a description of WTP facility specific emergency planning and response and is used in conjunction with *Hanford Emergency Management Plan* (DOE/RL-94-02). Response to events is performed using WTP and/or Hanford Site level emergency procedures.

This plan is being issued to meet permitting requirements. This plan will be updated to provide additional necessary information prior to the introduction of bulk quantities of hazardous chemicals into the WTP.

1.1 Facility Name

United States Department of Energy Hanford Site

Waste Treatment and Immobilization Plant

1.2 Facility Location

Benton County, Washington, within the 200 East Area.

Facilities covered by this plan are:

- Pretreatment Facility (PTF)
- Analytical Laboratory (Lab)
- Low-Activity Waste Facility (LAW)
- High-Level Waste Facility (HLW)
- Balance of Facilities (BOF) (e.g., support buildings)

1.3 Owner

United States Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

Facility Manager:

Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

1.4 Description of the WTP Facility and Operations

The WTP will be composed of a pretreatment facility that includes the waste receipt tanks, an analytical laboratory, two vitrification facilities, and an assortment of other support facilities collectively referred to as the Balance of Facility (BOF). Figure 7A-3 shows the layout of the WTP, with the major buildings identified.

The WTP will receive waste from the DST system located in the 200 Area of the Hanford Facility. The waste to be treated meets the regulatory definition of "radioactive high level waste" referred to in the Land Disposal Restriction Treatment Standards (40 CFR 268.40). The WTP will pretreat the tank waste by separating the waste into Low Activity Waste (LAW) feed and High Level Waste (HLW) feed. After separating the waste into two feed streams, the waste will be piped to the vitrification facilities; LAW and HLW to be immobilized in a glass matrix. The vitrification process involves mixing waste feed with glass-forming materials, pouring the mixture into a melter, heating until it is liquefied, pouring it into stainless steel containers (called canisters), and then welding on a lid after each canister finishes cooling.

The canisters of immobilized HLW will remain on the Hanford Site until a permanent repository is available. The immobilized LAW, containing relatively small amounts of radioactive material, will be disposed of on the Hanford Site.

The air emissions (off-gas) from the pretreatment and vitrification processes will be treated to ensure safe levels before being released to the atmosphere. Air emissions are regulated by the Washington State Departments of Ecology and Health, and the United States Environmental Protection Agency, and will be treated to a level protective of human health and the environment. The WTP will discharge air emissions through four primary stacks, one each for pretreatment, LAW facility, HLW facility, and the laboratory.

The WTP will use the following four types of permitted dangerous waste management units:

- Storage in containers
- Treatment and storage in tanks
- Treatment in miscellaneous units (the melters)
- Containment buildings

The locations of these dangerous waste management units are summarized in Table 7A-1 .

The buildings used for treating and storing waste will be constructed of reinforced concrete and structural steelwork. Below-grade portions of buildings will be reinforced concrete construction, and the superstructure will be made of reinforced concrete and structural steelwork with a metal roof. The plant structure will be supported by a reinforced concrete mat foundation.

Except for two outdoor on-ground storage tanks surrounded by a concrete berm for secondary containment, all other tanks and treatment processes managing dangerous waste will be located inside buildings. Container storage areas will be located in buildings or covered storage areas. Where floors and walls provide secondary containment they will either be lined with stainless steel, a protective coating, or a combination of both. The WTP dangerous waste management units will be equipped with leak detection systems and inspected regularly.

The waste and off-gas treatment processes will generate "secondary wastes," such as used equipment, laboratory waste, and other chemically and radiologically contaminated materials. (These "newly generated wastes" also are referred to as "miscellaneous wastes"). Secondary waste will either be transferred elsewhere in the WTP for treatment or transferred to another permitted treatment, storage, or disposal (TSD) facility. Non-radiological dangerous waste may also be generated by laboratory and maintenance activities. Such waste will be managed in containers at the WTP until it can be transferred to a permitted TSD facility.

The three primary processes at the WTP (pretreatment, LAW vitrification, and HLW vitrification) and the LAB are supported by BOF systems and utilities. The BOF will include support systems and utilities required for the waste treatment processes within the main process areas (pretreatment, LAW vitrification, and HLW vitrification). The BOF support systems and utilities will include, but not be limited to, heating and cooling, process steam, process water, chilled water, and compressed air.

1.5 Building Evacuation Routing

Figure 7A-1 shows evacuation routes for the Hanford Site. Identification of the primary and secondary staging areas, a general layout of the evacuation routes and evacuation routes for each of the primary buildings which comprise the WTP will be provided in a revision of this document before the introduction of bulk quantities of hazardous chemicals into the WTP. These evacuation routes will be placed in Appendix 7A-B. Alternate evacuation routes will be used on a case-by-case basis, based on meteorological conditions at the time of an event.

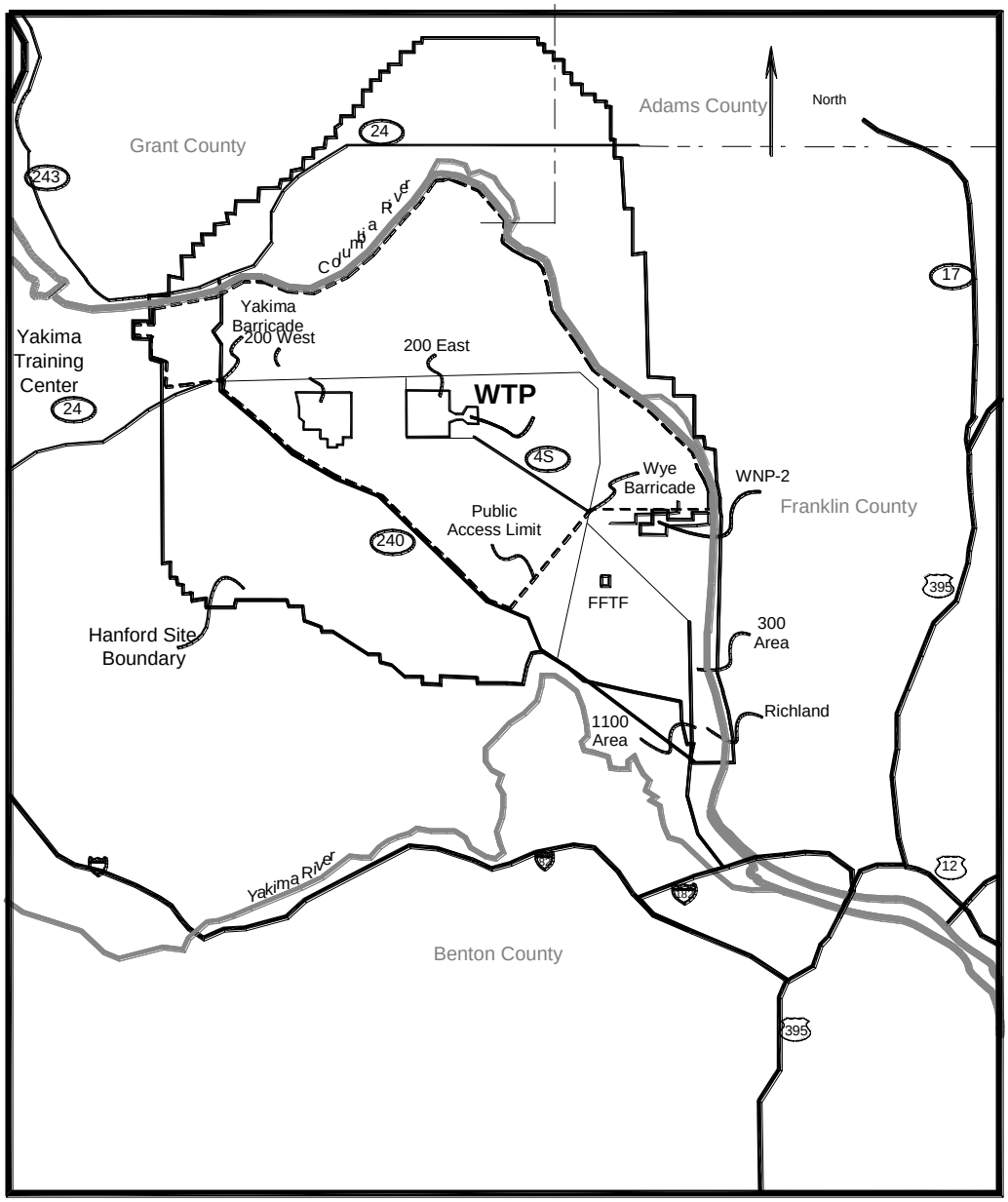
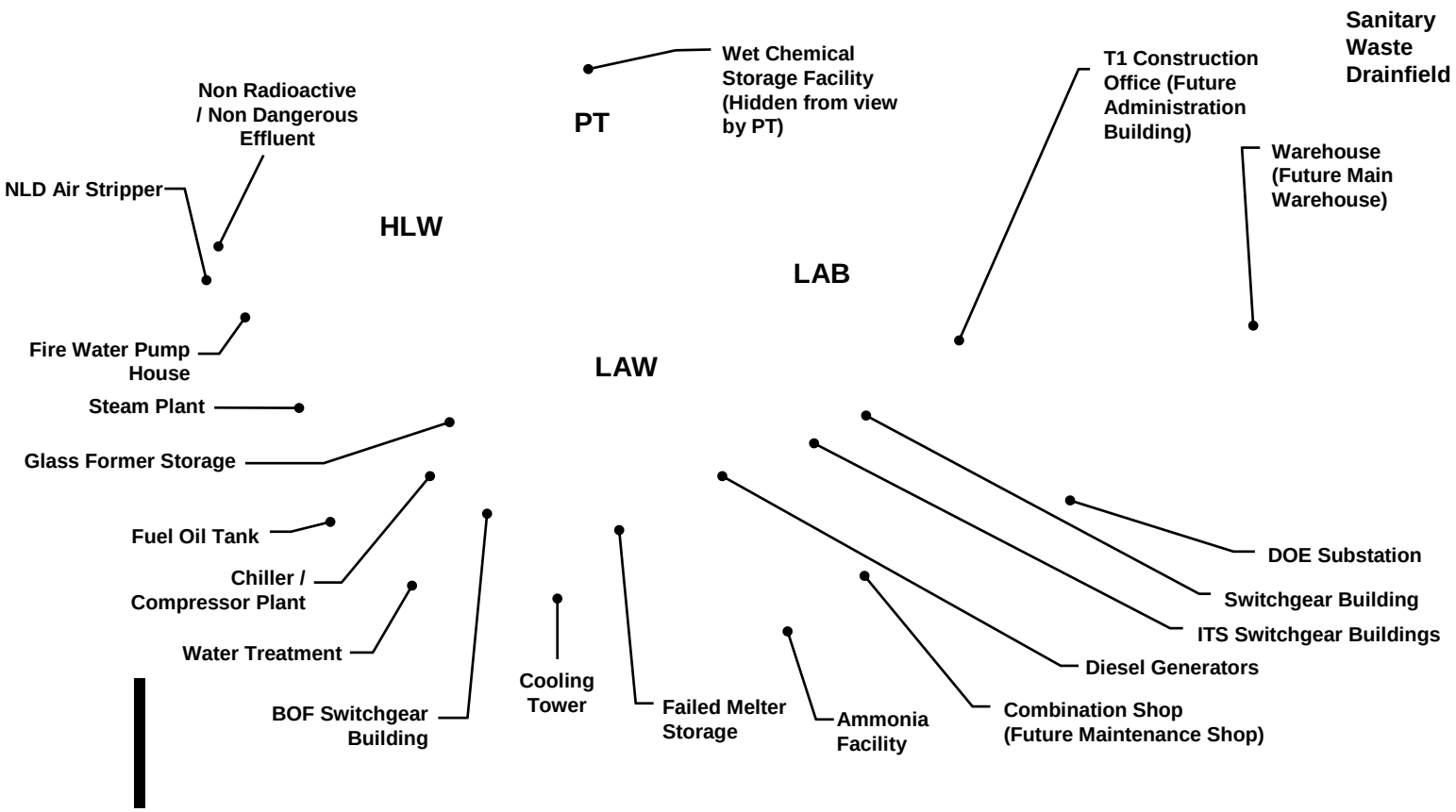


Figure 7A-1 Location of the WTP on the Hanford Site

Waste Treatment Plant Project



October 2008

1

Figure 7A-2 WTP Site Layout

This page intentionally left blank.

Table 7A-1 Locations of Dangerous Waste Management Units

Dangerous Waste Management Unit	General Location
Container Storage Areas (see Chapter 4.0, Tables 4-1 and 4-7)	Immobilized LAW (ILAW) storage in LAW Facility
	Immobilized HLW (IHLW) storage in HLW Facility
	Miscellaneous secondary waste container storage in pretreatment facility, LAW Facility, HLW Facility, and failed melter storage areas
Tank Systems (see Chapter 4.0, Tables 4-1 through 4-5)	Pretreatment Facility tank systems
	• Cesium nitric acid recovery process (CNP)
	• Cesium ion exchange process (CXP)
	• Waste feed receipt process (FRP)
	• Waste feed evaporation process (FEP)
	• HLW Lag Storage and Feed Blending Process (HLP)
	• Treated LAW Concentrate Storage Process (TCP)
	• Treated LAW Evaporation Process (TLP)
	• Spent Resin Collection and Dewatering Process (RDP)
	• Radioactive Liquid Waste Disposal (RLD)
	• Plant Wash and Disposal (PWD)
	• Ultrafiltration Process (UFP)
	• Pretreatment Vessel Vent Process (PVP)
	• Pretreatment In-Cell Handling (PIH)
	• LAW intermediate waste storage in pretreatment facility
	• HLW feed receipt in pretreatment facility
	• HLW ultrafiltration in pretreatment facility
	LAW facility tank systems
	• LAW Concentrate Receipt Process (LCP)
	• LAW Melter Feed Process (LFP)
	• LAW Primary OffgasProcess System (LOP)
	• LAW Secondary Offgas/Vessel Vent Process System (LVP)
	• Radioactive Liquid Waste Disposal System (RLD)
	HLW facility tank system
	• HLW Melter Feed Process System (HFP)
	• HLW Vit Primary Offgas Treatment System /Process Vessel Vent System (HOP/PVV)
	• HLW Canister Decontamination Handling (HDH)
	• Radioactive Liquid Waste Disposal System (RLD)

Table 7A-1 Locations of Dangerous Waste Management Units

Dangerous Waste Management Unit	General Location
	• HLW Melter Cave Support Handling System (HSH)
	LAB tank system:
	• Radioactive Liquid Waste Disposal System (RLD)
Miscellaneous Thermal Treatment Units (melters) (see Chapter 4, Table 4-3)	HLW melter (2 used) in HLW facility
	LAW melters (2 used) in LAW facility
Containment Buildings (see Chapter 4, Table 4-7)	Pretreatment hot cells, maintenance areas, filter cave, and air filters handling areas.
	LAW locally shielded melter gallery, container finishing, consumable import/export, pour cave, ILAW buffer container storage, and C3 workshops.
	HLW melter caves, pour tunnels, canister handling, canister swabbing and monitoring, waste handling area, C3 workshops, drum swabbing and monitoring, and filter cave.

2.0 PURPOSE

This plan describes both the facility hazards and the basic responses to upset and/or emergency conditions within the WTP. These events may include spills or releases caused by equipment failure during processing, fires and explosions, transportation activities, movement of materials, packaging, storage of hazardous materials, and natural and security contingencies. When used in conjunction with *Hanford Emergency Management Plan* (DOE/RL-94-02), this plan meets the requirements for contingency planning as required by WAC 173-303. Sections 1.5, 3.1, 4.0, 7.1, 7.1.1, 7.1.2, 7.2, 7.2.1, 7.2.2, 7.2.3, 7.2.4, 7.2.5, 7.2.5.1, 7.3, 8.2, 8.3, 8.4, 9.0, 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 11.0, 12.0, 13.0 of this plan are enforceable sections meeting Resource Conservation and Recovery Act (RCRA) contingency planning requirements. Enforceable sections cannot be changed without coordinating the change with the Site-wide Permit modification process.

3.0 WTP EMERGENCY RESPONSE ORGANIZATION

The WTP Emergency Response Organization (ERO), as described in this section and in Section 2.2 of the *Hanford Emergency Management Plan* (DOE-RL-94-02, 2006), will be available 24 hours each day to respond to events at the plant. The Building Emergency Director (BED) will be prepared to carry out his or her duties immediately and whenever an imminent or actual emergency exists, as required by *Washington Administrative Code* (WAC) 173-303-360 (2)(a), (b), and (c). The *Hanford Emergency Management Plan* (DOE-RL-94-02, 2006), Section 2.2.1, details the responsibilities of the BED. The on-duty Pretreatment shift operations manager will be the designated primary BED. A designated alternate BED will be available on each shift. Other ERO personnel will be on duty with either primary or alternate responsibilities. A BED, Incident Command Post (ICP) Hazards Communicator, ICP Communicator, and a Hazards Assessor (chemical or radiological, or both, depending on the event) will staff the ERO along with various BED support personnel. In addition, the BED will act as the plant operations specialist for the Hanford Fire Department (HFD) personnel.

3.1 Building Emergency Director

Emergency response will be directed by the BED until the Incident Commander (IC) arrives. The incident command system (ICS) and staff, with supporting on-call personnel, fulfill the responsibilities of the Emergency Coordinator as discussed in WAC 173-303-360. During events, WTP personnel perform response duties under the direction of the BED. The ICP is managed by either the senior Hanford Fire Department member present or senior Hanford Patrol member present on the scene (security events only). These individuals are designated as the IC and as such, have the authority to request and obtain any resources necessary for protecting people and the environment.

The BED becomes a member of the ICP and functions under the direction of the IC. In this role, the BED continues to manage and direct WTP operations.

A listing of primary and alternate BEDs by title, work location, and work telephone number is contained in Section 13.0 of this plan. The BED will be on the premises or will be available through an “on-call” list 24-hours-a-day. Names and home telephone numbers of the BEDs will be available from the Patrol Operations Center (POC), in accordance with Site-wide Permit, General Condition II.A.3.

3.2 Other Members

As a minimum, facility management appoints and ensures training is provided to individuals to perform as Personnel Accountability Aides and Staging Area Managers. The Personnel Accountability Aides are responsible for facilitating the implementation of protective actions (evacuation or take cover) and for facilitating the accountability of personnel after the protective actions have been implemented. Staging Area Managers are responsible for coordinating and conducting activities at the staging area. In addition, the BED can identify additional support personnel (radiological control, maintenance, engineering,

hazardous material coordinators, etc.) to be part of the WTP Emergency Response Organization as necessary.

The complete WTP Emergency Response Organization listing of positions, names, work locations and telephone numbers will be maintained in a separate location in a format determined appropriate by WTP management. Copies will be distributed to appropriate WTP locations and to the Hanford Emergency Operations Center.

4.0 IMPLEMENTATION OF THE PLAN

This plan will be implemented when the BED has determined that a release, fire, or explosion has occurred at the facility or in adjacent site facilities. Actions determined in *Hanford Emergency Management Plan* (DOE/RL-94-02) and the requirements of WAC 173-303 will be implemented as described below.

The BED ensures that trained personnel identify the character, source, amount, and aerial extent of the release, fire, or explosion to the extent possible. Identification of waste can be made by activities that can include, but are not limited to: visual inspection of involved containers, sampling activities in the field, reference to inventory records, or by consulting with facility personnel.

Samples of materials involved in an emergency may be taken by qualified personnel and analyzed as appropriate. These activities will be performed with a sense of immediacy and will include available information.

The BED will use the following guidelines to determine if an event has met the requirements of WAC 173-303-360(2)(d):

1 The event involved an unplanned spill, release, fire, or explosion,

AND

2 a The unplanned spill or release involved a dangerous waste, or the material involved became a dangerous waste as a result of the event (e.g., product that is not recoverable.), or

2 b The unplanned fire or explosion occurred at the WTP or transportation activity subject to RCRA contingency planning requirements,

AND

3 Time-urgent response from an emergency services organization was required to mitigate the event, or a threat to human health or the environment exists.

As soon as possible, after stabilizing event conditions, the BED will determine, in consultation with the WTP environmental single-point-of-contact, if notification to Ecology is needed to meet WAC-173-303-360 (2)(d) reporting requirements. If all of the conditions under 1, 2, and 3 are met, notifications are to be made to Ecology. Additional information is found in *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 4.2.

If review of all available information does not yield a definitive assessment of the danger posed by the incident, a worst-case condition will be presumed and appropriate protective actions and notifications will be initiated. The BED is responsible for initiating any protective actions based on his best judgment of the incident.

The BED will assess each incident to determine the response necessary to protect the personnel, facility, and the environment. If assistance from Hanford Patrol, Hanford Fire Department, or ambulance units is required, the Hanford Emergency Response Number (911) will be used to contact the POC and request the desired assistance. To request other resources or assistance from outside the WTP, the POC business number is used (509-373-3800).

5.0 FACILITY HAZARDS

Chemical and radiological constituent hazards that could occur at the WTP will be identified and evaluated in the hazards assessment required by the *Hanford Emergency Management Plan* (DOE-RL 94-02, 2006), Section 1.3.3.2. The objective of this section is to describe in a general manner the hazards that pose significant risks to human health or to the environment.

Prior to the implementation of this plan, before the introduction of bulk quantities of hazardous chemicals into the WTP, additional information will be provided in this section. Information to be provided will include the following:

- Updates on chemical and radiological hazards upon completion of the hazards assessment.
- Updates based on the Draft Work Plan for Screening Level Risk Assessment for the WTP (BNFL Inc. 1999b)].

5.1 Hazardous Materials

Potentially hazardous materials are used for normal operations, maintenance, and support functions at the WTP. These materials could include acids, caustics, oils, diesel fuel, and solvents.

Material Safety Data Sheets (MSDSs) are provided in the control rooms, storage areas, and operating areas of the WTP.

The following is a representative list of the types of hazardous materials that will be stored and used in the WTP.

Nitric Acid
Sodium Hydroxide
Sodium Nitrate
Sodium Permanganate
Strontium Nitrate
Solvents
Urea

Safe design of the plant, Job Safety Analysis, Job Control System Work Packages, and MSDSs provide the basis for safe use of the materials in the workplace. Plant procedures and training that address these hazardous materials will be in place before the introduction of bulk chemicals into the plant. Employees who work with or handle hazardous wastes will be trained according to requirements identified in the *River Protection Project – Waste Treatment Plant Dangerous Waste Training Plan* (BNI, 2001a).

5.2 Industrial Hazards

Industrial hazards associated with the WTP will include electrical equipment, pressurized equipment and systems, high temperature equipment, rotating equipment, confined spaces, forklifts, cranes, lifting operations, and compressed gas cylinders.

Safe design of the plant, Job Safety Analysis, Job Control System Work Packages, and MSDSs provide the basis for the safe use of this equipment in the workplace. Plant procedures that address these hazards will be in place prior to the implementation of this plan. Employees will be trained in the safe use and handling of compressed gas cylinders, cranes, forklifts etc. as applicable.

5.3 Radioactive, Dangerous, and Mixed Waste

Safe design of the plant, Job Safety Analysis, and Job Control System Work Packages provide the basis for safe handling of radioactive, dangerous, and mixed waste. Plant procedures that address the management of these wastes will be in place prior to operation of the WTP.

Dangerous waste categories treated at the WTP will be identical to the Double-Shell Tank Farms. Categories include characteristic, listed, and state-only wastes, two of which are designated as extremely hazardous waste (WT01 and WP01). The following summarizes the dangerous waste numbers for the WTP.

Characteristic Waste Numbers			
D001	D002	D003	D004
D005	D006	D007	D008
D009	D010	D011	D018
D019	D022	D028	D029
D030	D033	D034	D035
D036	D038	D039	D040
D041	D043		
Listed Waste Numbers			
F001	F002	F003	F004
F005	F039[a]		
State-only Wastes[b]			
WT01	WT02	WP01	WP02

a Multi-source leachate (F039) is included as a waste derived from non-specific wastes F001 through F005.
b Washington State criteria

The WTP will use the following four types of permitted dangerous waste management units:

- Storage in containers
- Treatment and storage in tanks
- Treatment in miscellaneous units (e.g., the melters)
- Containment buildings

Solid Form

Radioactive, dangerous, and mixed wastes will be generated at the WTP during sampling, decontamination, and maintenance activities. This waste will be accumulated in a designated accumulation area(s) and transported to a permitted storage area.

Liquid Form

Highly radioactive mixed waste solutions and slurries will be processed at the WTP and stored in the pretreatment facility, HLW facility, and LAW facility for further treatment. Although these solutions and slurries will contain chemicals that are hazardous, the bounding consequence for spills or releases of this waste is usually based on the radiological components of the waste.

Gaseous Form

Airborne effluent streams will be produced through the following:

- Radiological control area Heating Ventilation Air Conditioning (HVAC) system – exhaust from radiological controlled areas.
- Vessel off-gas systems – vapors and gases from tanks and process equipment including the melters.

The off-gas systems will remove particulate, condensate NO_x and organic vapors from the air stream before discharging them to the radiological controlled area HVAC system. The combined air stream will pass through HEPA filtration and will be monitored for radioactivity and chemicals.

5.4 Criticality

Analyses have shown that there is no credible criticality event that can be postulated to occur at the WTP (BNI 2001b).

6.0 POTENTIAL EMERGENCY CONDITIONS

Potential emergency conditions, under both WAC 173-303 and the DOE, may include one of three basic categories: 1) operations (process upsets, fires and explosions, loss of utilities, spills, and releases), 2) natural phenomena (e.g., earthquakes), and 3) security contingencies (bomb threat, hostage situation, etc.). The following are conditions that may lead to an emergency at the WTP. For a summary of responses to emergency conditions see Section 7.2.

The results of the WTP hazards assessment will be used to update the information presented in this section.

6.1 Facility Operations Emergencies

6.1.1 Loss of Utilities

6.1.1.1 Loss of Electrical Power

A loss of electrical power to the WTP is possible. The power will be provided to the WTP from two power transformers, supplied by two independent 230 kV transmission lines. The transformers will deliver a 13.8 kV secondary voltage for internal distribution at the plant. The plant loads will be divided into two load groups, normal, and alternate (Load Groups A and B).

6.1.1.2 Loss of Water

A loss of water, potable, raw or fire suppressant will not likely result in a plant emergency or evacuation of the WTP. Operations may be limited in order to minimize impact from the loss of water. A loss of water to the fire suppression system could result in a plant emergency, if a fire should develop.

6.1.1.3 Loss of Ventilation

A loss of ventilation could cause a change to plant operation and could require local evacuation of personnel if a loss of contamination control is suspected.

6.1.1.4 Loss of Process Air or Instrument Air

A loss of process air or instrument air could cause a change to plant systems but would not require implementation of personnel-protective actions.

6.1.2 Major Process Disruption/Loss of Plant Control

A major process disruption could be caused by a failure of the Process Control System (PCS). A loss of the PCS could cause plant abnormalities that would lead to increased radiological challenges to the WTP's protection systems.

6.1.3 Pressure Release

The WTP will have high-pressure steam and low-pressure compressed air and steam systems. Loss of the compressed air or steam system or systems could result in loss of plant control or a process disruption. Process disruption or loss of plant control could interrupt the treatment processes. However, it is not likely that this event would be classified as an emergency.

Pressurized gases will be used throughout the WTP. Additionally, compressed gas cylinders will be stored in the compressed gas storage area. The inventory of gases includes flammable and nonflammable gases. These gases pose a hazard in the immediate storage area, or in the immediate area of the location being used. Failure of compressed gas bottles could cause flying debris hazards. This condition is addressed in Section 6.1.4.

A process system pressure release is categorized as a condensate spray release. This condition is addressed in Section 6.1.5.

6.1.4 Fire and/or Explosion

A fire or explosion could generate highly toxic or corrosive fumes, or release of radioactive material. Flying debris might result from explosions or compressed gas cylinder failure. Process system disruption, loss of plant control, and breach of process system boundaries could result from the flying debris. In addition, heavy smoke could disrupt the operation of the ventilation system.

6.1.5 Hazardous Material Spill

Prior to the introduction of bulk quantities of hazardous chemicals into the WTP, this plan will be revised to include the types of hazardous materials that will be present, their locations, quantities, and characteristics. Additionally the potential effects from an accidental release of hazardous materials will be discussed.

6.1.6 Dangerous/Mixed Waste Spill

Dangerous waste or mixed waste could spill, due to equipment failure or operator error. The severity of the event would be dependent on the nature and quantity of the spill.

6.1.7 Transportation and /or Packaging Incidents

A transportation or packaging event involving hazardous chemicals, samples, or radioactive material could result in personnel exposure to hazardous materials. Potential environmental damage could occur due to the release of hazardous or radioactive materials.

6.1.8 Radiological Waste Release

The WTP processes include large quantities of radioactive liquids and slurries. Radioactive waste could accumulate in various treatment systems. The plant has the potential for concentrating radioactive waste; therefore, responses for abnormal radiation levels and radioactive waste releases are included in the scope of emergency planning. The release could come as a result of either failure of the ventilation system or a catastrophic leak of mixed waste.

The ventilation system is designed to provide an air supply from areas of no contamination potential to areas of high contamination potential. Areas within the WTP are classified into one of three zones, C2, C3 and C5, according to their potential for radioactive contamination, with C5 having the highest potential for radioactive contamination. The C3 and C5 exhaust fans maintain a negative pressure in areas where radioactive contamination is most likely to occur. Failure of the C3 or C5 exhaust fans could cause a reverse flow and cause a release of radioactive contamination.

6.1.9 Criticality

Analyses have shown that there is no credible criticality event that can be postulated to occur at the WTP (BNI 2001b).

6.2 Natural Phenomena

The WTP is designed such that it will not fail under a design basis event. Therefore, natural phenomena events are not expected to cause structural damage to the WTP, which would constitute an emergency, or cause a release to the environment. However, the following natural phenomena that have the potential to

cause conditions which are beyond the facility design basis are discussed: a beyond design basis seismic event, high winds, volcanic eruption and ash fall, a flood, a range fire, and an aircraft crash.

6.2.1 Seismic Event

Depending on the magnitude of the beyond design basis event, severe structural damage can occur resulting in serious injuries or fatalities and the release of hazardous materials to the environment. Damaged electrical circuits and wiring could result in the initiation of fires.

6.2.2 Volcanic Eruption/Ash fall

Though not expected to cause structural damage, the ash resulting from a volcanic eruption could cause shorts in electrical equipment and plug ventilation system filters.

6.2.3 High Winds/Tornadoes

High winds that are defined as sustained winds above a threshold that would potentially or actually cause significant structural damage to the facility, are not expected to occur. (Significant structural damage is interpreted to mean a breach of facility containment/confinement systems sufficient to cause an actual or potential release of hazardous material to the environment). However, dirt and dust from windstorms could cause shorts in electrical equipment, or could plug ventilation system filters. Disruption of normal operations is possible.

6.2.4 Flood

The 200 Area is well above projected flood elevations for the Columbia and Yakima Rivers; therefore, a flood is not considered a credible natural event for the WTP. The grading and drainage features that are provided ensures that precipitation, even from a downpour, would infiltrate the ground or drain off toward the Columbia River without significant flooding. The WTP is not sited in a wetlands or coastal high-hazard area.

6.2.5 Range Fire

The hazards associated with a range fire are similar to those associated with a building fire plus potential site access restrictions and travel hazards such as poor visibility. Smoke and ash from a range fire can also cause shorts in electrical equipment, or plug ventilation system filters. Disruption of normal operations is possible.

6.2.6 Aircraft Crash

In addition to the potential for serious injuries or fatalities, an aircraft crash could result in the direct release of hazardous materials to the environment or cause a fire that could lead to the release.

6.3 Security Contingencies

Security contingencies are discussed in the following sections.

6.3.1 Bomb Threat/Explosive Device

A bomb threat may be received by anyone who answers the telephone or receives mail. The major effect on the WTP is that personnel will need to initiate emergency shutdown before evacuation. If an explosive device detonates, the effects are the same as those discussed under fire and explosion.

6.3.2 Hostage Situation/Armed Intruder

A hostage situation or the entry of an armed hostile intruder(s) can pose an emergency if either of these conditions has the potential to adversely affect facility operations. This could result in a loss of facility control or the coercion of an employee to take some malevolent action. The severity of the emergency would be based on actual or potential damage to the WTP or release of hazardous material or radioactive, dangerous, or mixed waste.

6.3.3 Suspicious Object

A suspicious object could result in an explosion. If a suspicious device were to detonate, the effects would be the same as those discussed under fire and explosion. The response to a suspicious device with the potential to contain a bomb would be the same as a bomb threat discussed in Section 6.3.1 above.

7.0 INCIDENT RESPONSE

The initial response to any emergency is to immediately protect the health and safety of persons in the affected area. Identification of released material is essential to determine appropriate protective actions. Containment, treatment, and disposal assessment are secondary responses.

The following sections describe the process for implementing basic protective actions as well as descriptions of response actions for the events listed in Section 6.0 of this plan. *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 1.3, provides concept of operations for emergency response on the Hanford Site. Site specific procedures are detailed in DOE-0223 and will be used as necessary. Facility specific actions will be denoted in WTP emergency response procedures. Procedure titles will be included in Appendix 7A-A when the documentation is revised prior to the introduction of bulk quantities of hazardous chemicals into the WTP.

7.1 Protective Action Responses

Protective action responses are discussed in the following sections. The steps identified in the following description of actions do not have to be performed in sequence because of the unanticipated sequence of incident events.

7.1.1 Evacuation

The WTP may need to be evacuated when conditions warrant (such as fire, explosion, release of hazardous material, etc.). Evacuation will be initiated by automatic alarms or directed by the BED. The evacuation alarm is a steady siren signal. The BED will use WTP emergency response procedures, experience and training to determine when conditions warrant evacuation.

The BED may initiate the evacuation of a building(s) or the entire WTP site with a verbal announcement or by manually initiating an evacuation alarm. The evacuation alarm will be delivered by a combination of the WTP siren system and warning lights. Specific instructions can be provided to personnel via the WTP public address system. As conditions warrant, the 200 Area evacuation alarms will be activated by telephoning the POC, using either 911 (preferred) or 373-3800. The BED will determine if an alternate staging area should be used based on the location of the event, wind direction, and WTP emergency procedures.

The Hanford Site evacuation routes are shown in Figure 7A-B-1, Appendix 7A-B. Evacuation routes out of the buildings will be provided in a revision of this document before the introduction of bulk quantities of hazardous chemicals into the WTP. These routes will be based on providing simple egress. Employees are trained on evacuation routes and procedures. Routes will be clearly marked and maintained clear of all obstructions. The BED will determine the operating configuration of the WTP and identify any additional protective actions needed for limiting exposure of personnel to the hazard.

Staging areas will be designated when the site and building layouts have been finalized. The exterior staging areas will be based on prevailing wind direction (NW), gates, and roadways leading off the site. These locations will be based on historical wind data in the 200 East Area. Alternate staging areas will be available for use if the wind direction or other circumstances necessitate.

For an immediate evacuation, accountability will be performed at the staging area. Personnel Accountability Aides (PAAs) and Staging Area Managers (SAMs) will ensure evacuation actions are taken at all applicable WTP buildings. These positions are standing assignments. Implementing actions executed by the PAAs and SAMs will be directed by site or plant emergency response procedures. When

evacuation actions are complete, the PAAs will report to the SAMs. The Staging Area Managers will report to the BED via radio communications or other means, as necessary. When personnel cannot be accounted for active searches will be conducted. ERO personnel, utilizing personal protective equipment appropriate for the conditions, will conduct these searches.

To evacuate from any WTP building, personnel will proceed to the nearest exit. Stairways, not elevators, will be used to ascend or descend to the main level (0 ft. elevation). From the building, personnel will proceed to the primary staging areas unless otherwise instructed by the BED or other ERO personnel. Personnel in protective clothing when an evacuation alarm sounds will make every effort to follow normal exit procedures when exiting from radiological control areas, unless threatened by the emergency event. Personnel unable to remove protective clothing will remain separated from the others and report to the contaminated personnel staging sign (there will be a sign at each staging area). These personnel will notify staging area personnel that they need a radiation survey.

Personnel will immediately evacuate the building and proceed to the primary staging area (unless directed otherwise by the BED or other ERO personnel), when a fire alarm is heard. The discoverer of the fire will contact the Central Control Room (CCR) via telephone or radio. The BED will make an announcement on the public address system, stating which building has initiated the fire alarm, and inform personnel to stand clear of the area.

The BED may direct personnel to evacuate to an offsite location, if required. Personnel will remove and leave protective clothing in the parking lot and obtain a radiation survey prior to entering a vehicle. Personnel will use their privately owned vehicles. Personnel with their own vehicles will be asked to accommodate other personnel who are without transportation. Government vehicles may be available and may be obtained upon request from the RL Emergency Operations Center (RL-EOC).

7.1.2 Take Cover

The BED will initiate a local take cover notice for the WTP using the facility communications systems. Where area 200 could be affected, the BED will initiate the take cover alarm by telephoning the POC, using either 911 (preferred) or 509-373-3800. The take cover alarm is a wavering siren signal. Actions to complete a take cover order will be directed by WTP emergency response procedure. Determination of additional take cover actions will be based on operating configuration, weather conditions, type and duration of release, and other conditions, as applicable to the event and the associated hazard. The intent of this protective action is to minimize personnel exposure to hazardous materials and move personnel to locations where additional instructions can be provided.

When the take cover alarm is activated, personnel will halt work, place equipment in a safe condition, and take cover in the nearest building capable of providing shelter from an airborne hazard. Exterior doors and windows will be closed; and heating, ventilation, and air conditioning (HVAC) systems will be secured. If possible, personnel will follow normal exit procedures from radiological controlled areas in preparation for evacuation. The PAAs have responsibility to ensure that take cover actions are taken. These positions are standing assignments. When take cover actions are complete, the PAAs will provide the BED with a status report via communications paths identified in WTP procedures.

7.2 Response to Facility Operations Emergencies

Depending on the severity of the event, the BED reviews the site-wide and WTP emergency response procedure(s) and, as required, categorizes and/or classifies the event. If necessary, the BED initiates area protective actions and Hanford Site Emergency Response Organization activation. The steps identified in the following description of actions do not have to be performed in sequence because of the unanticipated sequence of incident events.

The following emergency signals will be used to initiate emergency response:

- Evacuation - steady siren
- Take Cover - wavering siren
- Fire - Gong/Bell

7.2.1 Loss of Utilities

A case-by-case evaluation is required for each event to determine loss of utility impacts. When a BED determines a loss of utility impact, actions are taken to ensure dangerous and/or mixed waste is being properly managed, to the extent possible given event circumstances. As necessary, the BED will stop operations and take appropriate actions until the utility is restored.

7.2.1.1 Loss of Electrical Power

Should there be a partial or total loss of electrical power to the WTP; automatic measures ensure the plant is in a safe operational configuration. (Safe operational configuration is defined as a shutdown to minimal operations that will prevent releases and prevent unnecessary damage to the equipment.)

The emergency power system will consist of two diesel turbine - automatically controlled emergency diesel generators and one diesel engine standby generator. The automatic and standby generators are connected to three separate 4.16kV emergency switchgears. Upon loss of power the emergency diesel turbine generators will automatically start. The emergency diesel turbine generators are capable of starting, accelerating, and being loaded with the design load in a specified time limit. The standby diesel generator is started manually or automatically in the event of a prolonged loss of offsite power. The emergency power system will be connected to essential loads in order to ensure only a short-term power interruption for those loads designated as essential. Critical indications and controls are backed up by uninterruptible power supplies and batteries. The plant will remain in a safe condition during loss of electrical power.

Egress lighting will consist of self-contained fixtures with battery packs and charging systems. These lighting systems will be located in stairways, exit routes, and fire alarm stations and will come on automatically upon loss of normal power to the fixture. A selected part of the normal lighting will operate as essential lighting, and will provide a minimum level of illumination throughout the plant to aid in restoring the plant to normal operation. Essential lighting will be powered by the EPS and will be available after an offsite power loss, following a delay required to start the emergency power supply diesel generators and for the generators to pick up the essential loads.

Selected instrumentation and controls will also be powered by an un-interruptible power supply (UPS) system and therefore will be unaffected by a loss of offsite power. UPS systems will be battery backed, and the battery chargers will be connected to the EPS. Radiation monitors, such as Continuous Air Monitors (CAMs) and area radiation monitors, are also powered by the UPS systems and continue operating during power failure.

7.2.1.2 Loss of Water

Upon loss of the raw water system, operations will be restricted. Upon loss of potable water chemical operations will be terminated until safety showers and eyewash stations are available. Upon loss of the fire suppression system, the plant will be placed in a safe configuration, and corrective actions will be implemented.

7.2.1.3 Loss of Ventilation

A cascade ventilation system is used at the WTP in conjunction with physical building containment features to confine transferable radioactive contamination in the event of an accidental release, spill, or system failure. The ventilation system is designed to maintain building differential pressures so air will flow from areas of lesser contamination potential to areas of greater contamination potential through containment boundary penetrations such as engineered air gaps and air in-bleed ductwork.

The WTP is divided into numbered zones with the higher number indicating the greater hazard potential and therefore the greater degree of control/restriction required. Radiation (R1 to R5) and contamination (C1 to C5) zones are classified independently in order to differentiate between the need for shielding or confinement.

Supply air in C2 areas flows via C3 to the C5 areas, where it will be discharged by the C5 exhaust fans. In some instances, the airflow will flow from the C2 areas to the C3 areas, where it will be discharged by the C3 exhaust fans. Some C2 air flow will be directly exhausted. Upon loss of the ventilation system, restoration of the C3 and C5 exhaust fans will be immediately attempted. If the C3 and C5 exhaust fans cannot be restored immediately, the C2 supply fans are automatically stopped, and personnel may be notified to evacuate C3 areas, as a precautionary measure.

The BED and either the ERO or the IC will take the following actions:

- Locate the source of the problem, and take steps necessary to control the event.
- Ensure appropriate areas have been evacuated.
- Monitor contamination levels in the plant.
- Restore ventilation system.

7.2.1.4 Loss of Process or Instrument Air

The process air system will use redundant air compressors. One will be in operation and the other(s) will be in autostart mode. If the standby compressor fails to start on loss of the operating compressor, a backup compressor will be started locally.

7.2.2 Major Process Disruption/Loss of Plant Control

If there is a major process disruption, the BED will be notified while an attempt is made to return the system to service. The BED will compare the situation to criteria provided in the facility categorization/classification procedure to determine if an Operational Emergency is occurring. If it is determined that an Operational Emergency is in progress, the BED will make the appropriate categorization/classification, initiate protective actions, begin the notification process, and request that the ERO be activated. The system condition will be assessed, and mitigative/corrective actions will be implemented.

7.2.3 Pressure Release

Pressure hazards in plant buildings associated with pressurized gases or compressed gas bottles could require changes to the plant operation and may require local evacuation. A fire or explosion caused by a release of pressurized gas will be responded to in accordance with Section 7.2.4. If a mixed waste release occurs, actions identified in Section 7.2.5 will be performed.

7.2.4 Fire and/or Explosion

In the event of a fire, the discoverer activates a fire alarm (pull box); calls 911 (509-373-3800 if using a cellular phone) or verifies that 911 has been called; and calls the CCR. Automatic initiation of a fire alarm (through the smoke detectors and sprinkler systems) is also possible. Activation of a fire alarm automatically signals the HFD and the Hanford POC and will be audible in the CCR.

As soon as non-essential personnel are notified of a fire (verbally or by fire alarm activation), they will immediately exit the WTP area or building by the nearest safe exit, proceed to the nearest staging area upwind of the area/building, check-in with PAAs, and follow the instructions of responding personnel. If personnel are reported missing, and might be within the WTP area/building, the BED will be notified. A search will be made, if safe to do so. The BED will initiate emergency response procedures and will notify ERO members and the incident command structure.

Initial actions to be taken by non-response personnel will consist of:

- Unless otherwise instructed, personnel will evacuate the area/building by the nearest safe exit and proceed to the designated staging area for accountability.
- On actuation of the fire alarm, ONLY if time permits, personnel should shut down equipment, and secure waste.

Trained and certified operations personnel may initiate a plant shutdown depending on the location and severity of the fire, and the location and type of hazards in the affected area. The BED will interface with the appropriate agencies of the incident command structure and will perform the following:

- Proceed directly to the ICP, obtain all necessary information pertaining to the incident, and send a representative to meet Hanford Fire Department.
- Provide a formal turnover to the IC, when the IC arrives at the ICP.
- Inform the Hanford Site Emergency Response Organization as to the extent of the emergency (including estimates of dangerous waste, mixed waste, or radioactive material quantities released to the environment).
- If operations are stopped in response to the fire, ensure that systems are monitored for leaks, pressure buildup, gas generation, and ruptures.

The following is representative of the type of information that the BED may be called upon to provide to the incident command structure or other response agencies:

- Location and health of personnel, including missing personnel and possible locations for fire fighters to search for them.
- Location and severity of fire, including character, exact source, and the amount, area, and extent of any released materials.
- Known hazardous conditions (such as, radiological, non-radiological, electrical, thermal, flammable materials, pressurized cylinders, toxic gas, pressure systems, batteries, radiation areas).
- Plant operating status.
- Utility systems status.
- Support for WTP radiological control personnel (that is, monitoring, surveys, sampling, and decontamination).
- WTP layout.
- Support for firefighter activities as required.
- Notifications as required in accordance with plant procedures and *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 5.1.1.

Following a fire and/or explosion**,** WAC 173-303-640(7) will be addressed for any WTP tank systems that may have been affected regarding fitness for use.

7.2.5 Hazardous Material, Dangerous and/or Mixed Waste Spill

The WTP has engineering controls to contain or minimize spills. These controls include containment berms, dedicated spill control sumps, remote leak detection systems, remote gauges and level indicators as well as shielding on chemical pipe flanges. WTP procedures provide alarm response and maintenance actions for leak detection equipment, surveillance of possible leak locations, and response actions for detected spills.

Spills can result from many sources including process leaks, container spills or leaks, damaged packages or shipments, or personnel error. Spills of mixed waste are complicated by the need to deal with the extra hazards posed by the presence of radioactive materials.

The following actions will be taken in response to a spill or release of hazardous material, dangerous and/or mixed waste:

- The discoverer notifies the BED and initiates SWIMS response:

  Stops work
  Warns others in the vicinity
  Isolates the area
  Minimizes the spill if possible
  Requests the BED **S**ecure ventilation.

- The BED determines if emergency conditions exist requiring response from the Hanford Fire Department based on classification of the spill and injured personnel, and evaluates need to perform additional protective actions.
- If the Hanford Fire Department resources are not needed, the spill is mitigated with resources identified in Section 9.0 of this plan and proper notifications are made.
- If the Hanford Fire Department resources are needed, the BED calls 911 (509-373-3800 if using a cellular phone).
- The BED sends a representative to meet the Hanford Fire Department.
- The BED provides a formal turnover to the IC when the IC arrives at the ICP.
- The BED informs the Hanford Site Emergency Response Organization as to the extent of the emergency (including estimates of dangerous waste, mixed waste, or radioactive material quantities released to the environment).
- If operations are stopped in response to the spill, the BED ensures that systems are monitored for leaks, pressure buildup, gas generation, and ruptures.
- Hanford Fire Department stabilizes the spill.

As necessary, the BED will also initiate or arrange for the following:

- Notify plant personnel of the spill or release by sounding the appropriate alarm, using the public address system, or other available means.
- Establish a control point at a safe location, and coordinate further spill mitigation activities.
- Obtain all available information pertaining to the event, evaluate the need for event categorization or classification, and begin ERO activation as necessary.
- Initiate use of plant and emergency response procedures.
- Arrange for care of any injured persons.
- Maintain access control at the event site by keeping unauthorized personnel and vehicles away from the area. Security personnel can be used to assist in site control. In determining which areas are to be controlled, the BED will consider environmental factors such as wind velocity and direction.
- Arrange for proper remediation of the event after evaluation, and if required, incident investigation processes have been initiated.
- Remain available for fire, patrol, and other authorities on the scene, and provide all required information.

- Enlist the assistance of alternate BED(s) or ERO personnel, if response activities are projected to be long term.
- Ensure the use of proper protective equipment, remedial techniques, transfer procedures, and decontamination procedures by all involved personnel, if remediation is performed by plant personnel.
- Remain at the scene to oversee activities and provide information, if remediation is performed by the HFD HAZMAT Team or other response teams.
- Ensure proper containerization, packaging, and labeling of recovered spill materials.
- Ensure decontamination (or restocking) and restoration of emergency equipment used in the spill remediation before resuming operations.
- Provide required reports after the event in accordance with plant procedures.

Additional actions to be taken in response to a leaking tank include:

- Removal of the leaking tank from service.
- Conduct an investigation to determine the cause of the event.
- Perform repairs or replacements before the tank is returned to service, with, as required, a final approval from an independent certified professional engineer.
- Following an emergency event involving a tank system, address all requirements of WAC 173-303-640(7) regarding fitness for use.

7.2.5.1 Damaged or Unacceptable Shipments

No wastes will be received at the WTP from outside of the Hanford Site. Therefore, this section of the plan is not applicable to the WTP.

7.2.6 Radiological Material Release

7.2.6.1 C2, C3, or C5 Ventilation System Release

If high radiation alarms indicate the occurrence of a radiological material release from the C2, C3, or C5 ventilation system the operating ventilation system can be immediately switched over to the standby HEPA filtration system. Near-contact radiation surveys and additional assessment making use of on-line instruments will be performed to determine the extent of the radiological material released. The actions described in Section 7.2.1.3 will be performed.

7.2.6.2 Release of Mixed Waste into the Plant

If a catastrophic dumping of mixed waste occurs, affected plants or processes will be immediately shut down. The actions described in Section 7.2.5 will be performed.

If a catastrophic dumping causes a high radiation alarm on the C5 or C3 ventilation systems, the standby systems will be started, and actions described in Section 7.2.1.3 will be performed.

7.2.7 Criticality

Analyses have shown that there is no credible criticality event that can be postulated to occur at the WTP (BNI 2001b).

7.3 Prevention of Recurrence or Spread of Fires, Explosions, or Releases

The BED, as part of the ICS, takes the steps necessary to ensure that a secondary release, fire, or explosion does not occur. The BED will take measures, where applicable, to stop processes and operations; collect and contain released wastes and remove or isolate containers. The BED will also monitor for leaks, pressure buildups, gas generation, or ruptures in valves, pipes, or other equipment, whenever this is appropriate.

7.4 Response to Natural Phenomena

Depending on the severity of the event, the BED reviews site wide and WTP emergency response procedure(s) and, as required, categorizes and/or classifies the event. If necessary, the BED initiates area protective actions and Hanford Site Emergency Response Organization activation. The steps identified in the following description of actions do not have to be performed in sequence because of the unanticipated sequence of incident events.

7.4.1 Seismic Event

The Hanford Site Emergency Response Organization's primary role in a seismic event is coordinating the initial response to injuries, fires, and fire hazards and acting to contain or control radioactive and/or hazardous material releases.

Individuals should remain calm and stay away from windows, steam lines, and hazardous material storage locations. Once the shaking has subsided, individuals should evacuate carefully and assist personnel needing help. The location of any trapped individuals should be reported to the BED or is reported to 911 (509-373-3800 if using a cell phone).

The BED takes whatever actions are necessary to minimize damage and personnel injuries. Responsibilities include the following:

- Coordinating searches for personnel and potential hazardous conditions (fires, spills, etc.)
- Conducting accountability.
- Securing utilities and facility operations.
- Arranging rescue efforts, and notifying 911 for assistance.
- Determining if hazardous materials were released.
- Determining current local meteorological conditions.
- Warning other facilities and implementing protective actions if release of hazardous materials poses an immediate danger.
- Providing personnel and resource assistance to other facilities, if required and possible.

7.4.2 Volcanic Eruption/Ash fall

When notified of an impending ash fall, the BED will implement measures to minimize the impact of the ash fall. BED actions may include the following:

- Installing filter media over building ventilation intakes
- Installing filter media or protective coverings on outdoors equipment that may be adversely affected by the ash (diesel generators, equipment rooms etc.)
- Shutting down some or all operations and processes
- Sealing secondary use exterior doors

If other emergency conditions arise as a result of the ashfall (e.g., fires due to electrical shorts or lightning), response is as described in other sections of this plan.

7.4.3 High Winds/Tornadoes

Upon notification of impending high winds, the BED takes steps necessary to secure all outdoor waste and hazardous material containers and storage locations.

All doors and windows are shut, and personnel are warned to use extreme caution when entering or exiting the building. Ventilation, utilities, and operations will be shut down as appropriate to lessen the severity of the impact.

7.4.4 Flood

Since the 200 Area is well above projected flood elevations for the Columbia and Yakima Rivers, this section is not applicable.

7.4.5 Range Fire

Responses to range fires are handled by preventive measures (i.e., keeping hazardous material and waste accumulation areas free of combustible materials such as weeds and brush). If a range fire breaches the WTP boundary, the response is as described in Section 7.2.4.

7.4.6 Aircraft Crash

The response to an aircraft crash is the same as for a fire and/or explosion (Section 7.2.4).

7.5 Security Contingencies

Depending on the severity of the event, the BED reviews sitewide and WTP emergency response procedure(s) and, as required, categorizes and/or classifies the event. If necessary, the BED initiates area protective actions and Hanford Site Emergency Response Organization activation. The steps identified in the following description of actions do not have to be performed in sequence because of the unanticipated sequence of incident events.

7.5.1 Bomb Threat/Explosive Device

Response to a bomb threat/explosive device is discussed in the following sections.

7.5.1.1 Telephone Threat

Individuals receiving telephoned threats attempt to get as much information as possible from the caller (using the bomb threat checklist if available). Upon conclusion of the call, notify the BED and Hanford Patrol by calling 911 (do not use a cellular phone or hand-held radio for reporting a bomb threat/explosion unless beyond 300 feet from suspected object).

The BED evacuates the WTP and questions personnel at the staging area regarding any suspicious objects. When Hanford Patrol personnel arrive, their instructions will be followed.

7.5.1.2 Written Threat

Receivers of written threats should handle the letter as little as possible. The BED and Hanford Patrol will be notified by calling 911 (do not use a cellular phone or hand-held radio for reporting a bomb threat/explosion unless beyond 300 feet from suspected object). Depending on the content of the letter, the BED might evacuate the affected locations. The letter is turned over to Hanford Patrol and their instructions are followed.

7.5.2 Hostage Situation/Armed Intruder

The discoverer of a hostage situation or armed intruder reports the incident to 911 (509-373-3800 if using a cell phone) and to the BED if possible. The BED, after conferring with Hanford Patrol, might covertly evacuate areas not observable by the hostage taker(s)/intruder. No alarms will be sounded.

Hanford Patrol will determine the remaining response actions and will activate the Hostage Negotiating Team, if necessary.

7.5.3 Suspicious Object

The discoverer of a suspicious object reports this object to the BED and to 911 (do not use a cellular phone or hand-held radio for reporting a bomb threat/explosive device unless beyond 300 feet from suspected object), if possible, and ensures that the object is not disturbed.

The BED will evacuate the WTP and (based on the description provided by the discoverer) attempt to determine the identity or owner of the object. Personnel will be questioned at the staging area to attempt to identify the owner of the object.

If the identity/ownership of the object cannot be determined, then Hanford Patrol will assume command of the incident. The canine unit will be used to determine if the package contains explosives. If there is a positive indication of explosives or it cannot be assured that there are no explosives, then an Explosive Ordnance Disposal Team will be dispatched to properly dispose of the object.

8.0 TERMINATION OF EVENT, INCIDENT RECOVERY, AND RESTART OF OPERATIONS

Hanford Emergency Management Plan (DOE/RL-94-02), Section 9.0, describes actions for event termination, incident recovery, and restart of operations. The extent by which these actions are employed is based on the incident classification of each event. In addition, Hanford *Emergency Management Plan* (DOE/RL-94-02) also contains actions for the management of incompatible wastes that might apply.

8.1 Termination of Event

For events where the Hanford Emergency Operations Center (Hanford-EOC) is activated, the RL/ORP Emergency Manager has the authority to declare event termination. This decision is based on input from the BED, IC, and other emergency response organization members. For events where the Hanford-EOC is not activated, the incident command system and staff will declare event termination.

8.2 Incident Recovery and Restart of Operations

A recovery plan is developed when necessary in accordance with *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 9.2. A recovery plan is needed following an event where further risk could be introduced to personnel, the WTP facilities, or the environment through recovery action and/or to maximize the preservation of evidence.

If the WTP ERP is implemented in accordance with Section 4.0 of this plan, Ecology will be notified before operations can resume. This notification is in addition to the required reports discussed in Section 5.1 of *Hanford Emergency Management Plan* (DOE/RL-94-02) and will include the following statements;

- There are no incompatibility issues with the waste and released materials from the incident.
- All the equipment has been cleaned, fit for its intended use, and placed back into service.

The notification required by WAC 173-303-360(2)(j) may be made via telephone conference. Additional information that Ecology requests regarding these restart conditions will be included in the required 15-day report identified in Section 11.0 of this plan.

For emergencies not involving activation of the Hanford-EOC, the BED ensures that conditions are restored to normal before operations are resumed. If the Hanford Site Emergency Response Organization was activated and the emergency phase is complete, a special recovery organization could be appointed at the discretion of RL to restore conditions to normal. This process is detailed in RL and contractor emergency procedures. The makeup of this organization depends on the extent of the damage and the effects. The onsite recovery organization will be appointed by the appropriate contractor's management.

8.3 Incompatible Waste

After an event, the BED, or the onsite recovery organization ensures that no waste that might be incompatible with the released material is treated, stored, and/or disposed of until cleanup is completed. Clean up actions are taken by WTP personnel or other assigned personnel. *Hanford Emergency Management Plan* (DOE/RL-94-02) Section 9.2.3, describes actions to be taken.

Waste from cleanup activities is designated and managed as newly generated waste. A field check for compatibility is performed before storage, as necessary. Incompatible wastes are not placed in the same container. Containers of waste are placed in approved storage areas appropriate for their compatibility class.

If incompatibility of waste was a factor in the incident, the BED or the onsite recovery organization ensures that the cause is corrected

8.4 Post Emergency Equipment Maintenance And Decontamination

All equipment used during an incident is decontaminated (if practicable) or disposed of as spill debris. Decontaminated equipment is checked for proper operation before storage for subsequent use. Consumable and disposed materials are restocked. Fire extinguishers are replaced.

The BED ensures that all equipment is cleaned and fit for its intended use before operations are resumed. Depleted stocks of neutralizing and absorbing materials are replenished, self-contained breathing apparatus are cleaned and refilled, protective clothing is cleaned or disposed of and restocked, etc.

9.0 EMERGENCY EQUIPMENT

Hanford Site emergency resources and equipment are described and listed in *Hanford Emergency Management Plan* (DOE/RL-94-02), Appendix C. Emergency resources and equipment for the WTP are presented in this section.

9.1 Fixed Emergency Equipment

The following table lists the fixed emergency equipment available at the WTP.

Table 7A-2 Fixed Emergency Equipment

Type	Location	Capability
Safety shower/eye wash station	Throughout the WTP in locations designated by facility procedures.	Assist in flushing chemicals/materials from body or eyes and face.
Automatic sprinkler system	Throughout the WTP.	Assist in the control of fire.
Fire alarm pull boxes	Throughout the WTP.	Activates the building fire alarm and notifies fire department, as developed by Coordination Agreements.
Emergency diesel generators	East of the LAW Facility.	Provide emergency power.
Fire hose connections	Throughout the WTP in locations designated by facility procedures.	Allow for connection of fire hoses to site water system for manual fire suppression.
Personnel decontamination rooms	TBD	Personnel decontamination.

Note: TBD = To be determined

9.2 Portable Emergency Equipment

The following table lists available portable emergency equipment.

Table 7A-3 Portable Emergency Equipment

Type	Location	Capability
General purpose fire extinguishers	Throughout the WTP.	Fire suppression for class A, B, and C fires.
CO_2 or clean-agent fire extinguishers	Throughout the WTP.	Suppress electrical fires.
Miscellaneous emergency equipment	Throughout the facility located in emergency equipment cabinets as designated by facility procedures.	Safety harnesses, blankets, first aid kits, stretchers, emergency lights, and emergency tools.

9.3 Communications Equipment/Warning Systems

The following table lists all communications and warning systems.

Table 7A-4 Communications Equipment

Type	Location	Capability
Siren System Evacuation STEADY SIREN Take Cover WAVERING SIREN Fire GONG/BELL	Throughout the WTP.	Alert facility personnel of emergency conditions.
PA System	Throughout the WTP.	Provides for information dissemination to facility personnel.
Fire alarm pull boxes	Throughout the WTP.	Summon aid in the event of a fire.
Telephone system	WTP CCR, office areas, and other plant locations.	Internal and external communications.
Portable two-way radios	Throughout the WTP.	Communications to the CCR.
Pagers	Assigned to key personnel.	To alert key personnel to respond, either individually or by group alert.

9.4 Personal Protective Equipment

The following table lists types of protective equipment available.

Table 7A-5 Personal Protective Equipment

Type	Location	Capability
Waterproof coveralls, Leather protective wear, Respirators, Filtered masks, Oxygen supplies, Escape Paks, SCBAs.	Throughout the facility in or near emergency equipment cabinets as designated by facility procedure.	Protection from various hazards (e.g., smoke, fumes, oxygen deficient atmosphere, chemicals, high airborne radioactivity concentrations, radiological contamination)

9.5 Spill Control and Containment Supplies

The following table lists the locations of spill kits and includes a basic listing of contents.

Table 7A-6 Spill Kits and Spill Control Equipment

Type	Location	Capability
Absorbent materials 55-gal drums Overpack drums Bags Step-off pads Protective clothing Chemical resistant coveralls Surgical and chemical gloves Acid Goggles/Face shields Sodium-bicarbonate Barrier Tape Rags Scissors Flashlight Batteries pH paper Mop handles Mop heads Mop bucket with wringer Hazardous material labels Non-sparking shovel Hazardous absorbent booms Ear plugs Portable barriers	Throughout the facility in or near spill kit cabinets as designated by facility procedures.	Control and mitigation of radioactive and chemical spills.

9.6 Incident Command Post

The WTP primary ICP is located in the administration building. Alternate locations will be determined at the time of the emergency, if necessary. The location may be inside a building or outside, and may change depending on the weather, wind direction, and location and severity of the event. The IC could also activate the Hanford Fire Department Mobile Command Unit if necessary.

The ICP will contain the following:

- Telephone communications, (including speakerphones and headsets) including the Hanford Site Emergency Alerting System (HSEAS).
- Radio communications.
- Access to the public address system.
- Access to plant operations data.
- Access to plant systems information.
- Access to accountability and building access control information.
- Access to the Hanford Local Area Network (HLAN) as necessary.

10.0 COORDINATION AGREEMENTS

RL has established a number of coordination agreements, or memoranda of understanding (MOU) with various agencies to ensure proper response resource availability for incidents involving the Hanford Site. A description of the agreements is contained in *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 3.0, Table 3-1.

11.0 REQUIRED REPORTS

Post incident written reports are required for certain incidents on the Hanford Site. The reports are described in *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 5.1.

Facility management will note in the WTP operating record, the time, date, and details of any incident that requires implementation of the contingency plan (refer to Section 4.0 of this plan). Within fifteen (15) days after the incident, a written report on the incident will be submitted to Ecology. The report will include all items specified in WAC 173-303-360(2)(k).

If a release from a tank system occurs that requires notification according to WAC 173-303-640(7), notification as described in WTP procedures will be followed.

12.0 PLAN LOCATION AND AMENDMENTS

Copies of this plan are maintained at the following locations:

- WTP CCR
- RL-EOC
- POC
- HFD

Portions of the plan will be reviewed and immediately amended if necessary, when conditions described in *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 14.3.1.1 occur. In addition, the plan will be revised prior to the introduction of bulk quantities of hazardous chemicals into the WTP. This will include information that is not currently available. Subsequently, the plan will be reviewed and updated annually.

13.0 FACILITY EMERGENCY RESPONSE ORGANIZATION

The following table lists the Building Emergency Directors (BED) by job title.

Building Emergency Director

Table 7A-7 WTP BEDs

Title	Location	Phone
Shift Operations Manager (SOM), Pretreatment Facility	Central Control Room, Pretreatment Facility	TBD
SOM, LAW Facility	Control Room, LAW Facility	TBD
SOM, HLW Facility	Control Room, HLW Facility	TBD

Names and home telephone numbers of the BEDs will be available from the POC (509-373-3800) in accordance with Hanford Facility Dangerous Waste Permit, General Condition II.A.3. This list will be available prior to the introduction of bulk quantities of hazardous chemicals into the WTP.

14.0 REFERENCES

BNFL Inc. 1999b. *Draft Work Plan for Screening Level Risk Assessment for the RPP-WTP*, RPT-W375-EN00001, Revision D, 15 November 1999. BNFL Inc., Richland, Washington, USA.

BNI 2001a. *River Protection Project – Waste Treatment Plant Dangerous Waste Training Plan*, Revision 1, August 2001. Bechtel National Incorporated, Richland, Washington, USA.

BNI 2001b. *Criticality Safety Evaluation Report for RPP-WTP*, 24590-WTP-RPT-NS-01-001, Revision 0, Sept 4, 2001. Bechtel National Incorporated, Richland, Washington, USA.

DOE Order 232.1, *Occurrence Reporting and Processing of Operations Information*, United States Department of Energy, Washington D.C.

DOE/RL-94-02, *Hanford Emergency Management Plan*, as amended

WAC 173-303, *Washington State Dangerous Waste Regulations*, *Washington Administrative Code*, Washington State Department of Ecology, Olympia, Washington, as amended

Ecology, 1994, *Dangerous Waste Portion of the Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste, Permit* Number WA7890008967, Washington State Department of Ecology, Olympia, Washington, as amended

APPENDIX 7A-A
LIST OF EMERGENCY RESPONSE PROCEDURES

DOE-0223, *Emergency Plan Implementing Procedures*: RLEP 3.4, "Emergency Termination, Reentry, and Recovery"

DOE-0223, *Emergency Plan Implementing Procedures*: RLEP 1.1, "Hanford Incident Command System and Event Recognition and Classification"

DOE-0223, *Emergency Plan Implementing Procedures*: RLEP 1.0, **"**Recognizing and Classifying Emergencies," Appendix 1-X.X**.**

Facility specific procedures will be available prior to the introduction of bulk quantities of hazardous chemicals into the WTP.

This page intentionally left blank.

APPENDIX 7A-B
EVACUATION ROUTES

This Appendix will contain figures of:

- The site plot plan showing the position of the staging areas.
- Floor plans for each WTP Facility showing evacuation routes.

These figures will be provided prior to the introduction of bulk quantities of hazardous chemicals into the WTP.

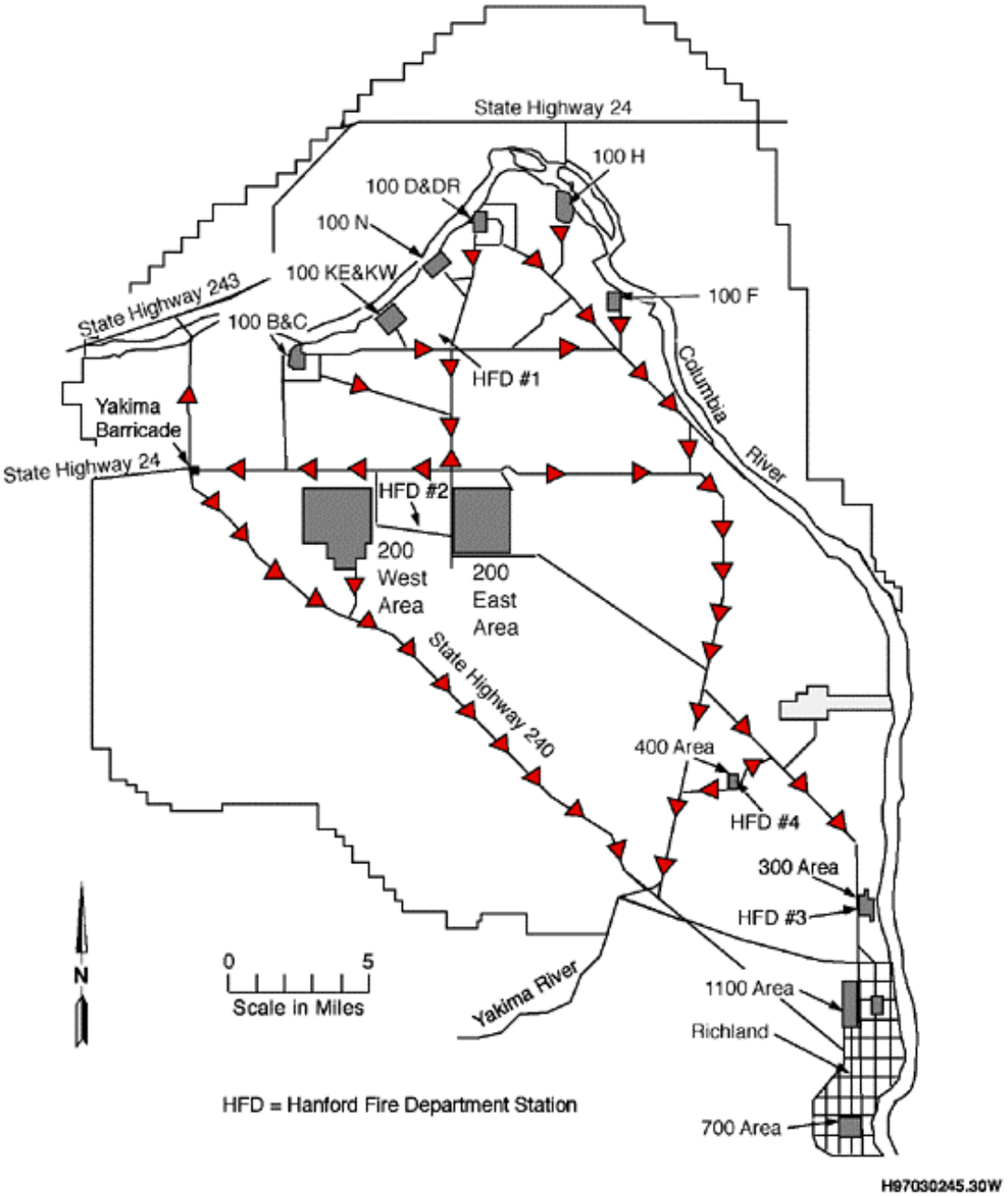


Figure 7A-B-1 Hanford Site Evacuation Routes

WASTE TREATMENT AND IMMOBILIZATION PLANT
CHAPTER 8.0
PERSONNEL TRAINING

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
06/2011	

This page intentionally left blank.

CHAPTER 8.0
PERSONNEL TRAINING

This page intentionally left blank.

CHAPTER 8.0
PERSONNEL TRAINING

TABLE OF CONTENTS

8.0 PERSONNEL TRAINING 5
8.1 Outline of Introductory and Continuing Training Programs 5
8.1.1 Introductory Training 5
8.1.2 Continuing Training 6
8.2 Description of Training Design 6
8.3 Description of Training Plan 7

TABLES

Table 8-1 Example WTP Training Matrix 9

This page intentionally left blank.

8.0 PERSONNEL TRAINING

This chapter discusses personnel training requirements based on Washington Administrative Code (WAC) 173-303 and the *Dangerous Waste Portion of the Resource Conservation and Recovery Act Permit for the Treatment*, Storage, and Disposal of Dangerous Waste (Ecology 1994a), hereafter referred to as "the Permit".

Permit Condition II.C (Personnel Training) contains training requirements applicable to Hanford Facility personnel and non-facility personnel.

Compliance with these requirements at the Waste Treatment and Immobilization Plant (WTP) is demonstrated by information contained in both *Permit Attachment 5* and this chapter. A WTP Dangerous Waste Training Plan will be submitted for incorporation into the Administrative Record prior to initial receipt of waste to meet Compliance Schedule Item 7. This chapter will be updated and resubmitted for agency approval prior to initial receipt of waste, in accordance with Compliance Schedule Item 6.

8.1 Outline of Introductory and Continuing Training Programs

The introductory and continuing training programs are designed to prepare personnel during the operations phase, to manage and maintain the WTP in a safe, effective, and environmentally sound manner. In addition to preparing personnel to manage and maintain the WTP under normal conditions, the training programs ensure that personnel are prepared to respond in a prompt and effective manner should off normal or emergency conditions occur. Emergency response training is consistent with the description of actions contained in Part III, Operating Unit Group 10, Chapter 7.0, *Contingency Plan*. The introductory and continuing training programs are intended to meet the following objectives:

- Teach WTP personnel to perform their duties in a way that ensures the WTP's compliance with WAC 173-303 and this Permit.
- Teach WTP personnel dangerous waste management procedures (including implementation of the contingency plan) relevant to the job titles and positions in which they are employed.
- Ensure that WTP personnel can respond effectively to emergencies.

8.1.1 Introductory Training

Introductory training includes general Hanford Facility training and WTP-specific training. General Hanford Facility training is described in Permit Attachment 5, and provided in accordance with, Permit Condition II.C. WTP-specific training is provided to WTP personnel allowing personnel to work unescorted, and in some cases is required for escorted access. WTP personnel cannot perform a task for which they are not properly trained, except to gain required experience while under the direct supervision of a supervisor or coworker who is properly trained. WTP personnel will be trained within six months after their employment at or assignment to the WTP. If personnel are assigned to a new job title or position at the WTP, any additional position-specific training will be completed within six months.

General Hanford Facility Orientation: Refer to description in Permit Attachment 5, Section 5.1.

Contingency Plan Training: WTP personnel receive training on applicable portions of the *Hanford Emergency Management Plan*, DOE/RL-94-02, as amended (Permit Attachment 4) in General Hanford Facility Orientation. In addition, WTP personnel receive training on the description of actions contained in the Contingency Plan documentation in Part III, Operating Unit Group 10, Chapter 7.0 and Appendix 7A, to be able to effectively respond to emergencies at the WTP.

Emergency Coordinator Training: WTP personnel who perform emergency coordinator duties as specified in WAC 173-303-360 (for example, the Building Emergency Director) in the Hanford Incident Command System receive training on implementation of the Contingency Plan and fulfilling the position within the Hanford Incident Command System. These WTP personnel will also become thoroughly

familiar with applicable Contingency Plan documentation, operations, activities, location, and properties of waste handled, location of records, and the unit and building layout.

Operations Training: Dangerous waste management operations training (for example, waste designation training, shippers training) will be determined on a unit-by-unit basis, and will consider the type of waste management unit and the type of activities performed at the waste management unit. For example, training provided for management of dangerous waste in containers will be different than the training provided for management of dangerous waste in a tank system. Common training required for compliance within similar waste management units can be provided in general training, and supplemented at the WTP. Training provided for WTP-specific operations will be identified in both this chapter and the WTP Dangerous Waste Training Plan. The detailed course curricula descriptions will be contained in the WTP Dangerous Waste Training Plan. WTP-specific training will be based on:

- Whether a general training course exists.
- The training needs to ensure waste management unit compliance with WAC 173-303.
- Training commitments agreed to with the Washington State Department of Ecology.

8.1.2 Continuing Training

Continuing training meets the requirements for WAC 173-303-330(1)(b) and includes general facility training and unit specific training, as specified below.

General Hanford Facility Orientation: Annual refresher training is provided for General Hanford Facility training. Refer to description in Permit Attachment 5, Section 5.1.

Contingency Plan Training: Annual refresher training is provided for contingency plan training. Refer to description above in Section 8.1.1.

Emergency Coordinator Training: Annual refresher training is provided for emergency coordinator training. Refer to description above in Section 8.1.1.

Operations Training: Refresher training occurs on various frequencies for operations training (that is, annual, every other year, every three years). When justified, some training will not contain a refresher course and will be identified as a one-time-only training course. The WTP Dangerous Waste Training Plan and the training matrix in Table 8-1 of this chapter will specify the frequency for each training course. Refer to description above in Section 8.1.1.

8.2 Description of Training Design

A properly designed training program ensures that personnel who perform duties at the WTP related to WAC 173-303-330(1)(d) are trained to perform their duties in compliance with WAC 173-303. Actual job tasks, referred to as duties, are used to determine training requirements.

- The first step taken to ensure that WTP personnel have received the proper training is to determine and document the waste management duties by job title/position.
- In the second step, waste management duties are compared to the general waste management unit training curriculum. If the general waste management unit training curriculum does not address the waste management duties, the training curriculum is supplemented and/or on-the-job training is provided.
- The third step summarizes the content of a training course necessary to ensure that the training addresses the appropriate waste management duties.
- The fourth and last step is to assign training curriculum to WTP personnel based on their job title/position. The WTP Dangerous Waste Training Plan describes this process.

Waste management duties include those specified in Section 8.1, as well as those contained in WAC 173-303-330(1)(d). Training elements of WAC 173-303-330(1)(d) applicable to WTP operations include the following:

- Procedures for using, inspecting, repairing, and replacing emergency equipment and monitoring equipment.
- Key parameters for automatic waste feed cut-off systems.
- Communications or alarm systems.
- Response to fires or explosions.
- Response to groundwater contamination incident.
- Shutdown of operations.

WTP personnel who perform these duties receive training specific to their duties. The WTP Dangerous Waste Training Plan described in Section 8.3 will contain detailed course curricula for the types of training WTP personnel receive based on the outline in Section 8.1.

8.3 Description of Training Plan

The WTP Dangerous Waste Training Plan will consist of one or more documents and a training database. As allowed under Permit Condition II.C.5.b, training records will be maintained in hard copy and/or electronic media.

In accordance with Permit Condition II.C.5.b, the WTP Dangerous Waste Training Plan is maintained outside the Permit, in the WTP Unit-Specific Files of the Hanford Facility Operating Record. Changes to the WTP Dangerous Waste Training Plan are not required to undergo a permit modification. However, any change to this chapter is required to undergo a permit modification, which may affect information contained in the training plan. Upon completion of a permit modification that updates this chapter, the permittee has 6 months to submit an updated WTP Dangerous Waste Training Plan for incorporation into the Operating Record.

In accordance with Permit Condition II.C.1, the unit-specific portion of the Permit will contain a description of the training plan.

A description of how The WTP Dangerous Waste Training Plan meets the requirements in WAC 173-303-330(2) is as follows:

1. -330(2)(a): "The job title, job description, and name of the employee filling each job. The job description will include requisite skills, education, other qualifications, and duties for each position."

   Description: The specific WTP personnel job title and position is correlated to the waste management duties. Waste management duties relating to WAC 173-303 are correlated to training courses to ensure training is properly assigned.

   Only names of WTP personnel who perform duties relating to waste management operations at the WTP are required to be maintained. Names are maintained as described in the WTP Dangerous Waste Training Plan. A list of personnel assigned to the WTP is available upon request.

   Information on requisite skills, education, and other qualifications for job title and positions are addressed by providing a reference where this information is maintained (for example, Human Resources). Specific information concerning job title, requisite skills, education, and other qualifications for personnel can be provided upon request.

2. -330(2)(b): "A written description of the type and amount of both introductory and continuing training required for each position."

   Description: In addition to the outline provided in Section 8.1, training courses developed to comply with the introductory and continuing training programs are identified and described in the WTP Dangerous Waste Training Plan. As discussed above in Section 8.2, the training plan will be updated to include detailed course curricula for the types of training WTP personnel receive based on the outline in Section 8.1. The type and amount of training is specified in the training plan. Table 8-1 is included as an example of a typical training matrix that shows typical job/titles and positions matched to a training category. The WTP Training Plan will be developed and submitted in accordance with Permit Condition III.10.C.7, and will include dangerous waste management related job titles and position descriptions, and the type and amount of initial, refresher, and on-the-job training required for each.

3. -330(2)(c): "Records documenting that personnel have received and completed the training required by this section. The Department may require, on a case-by-case basis, that training records include employee initials or signature to verify that training was received."

   Description: Training records are maintained consistent with Permit Attachment 5, Section 5.5.

Table 8-1 Example WTP Training Matrix

Training Category[a]								
Permit Attachment 5 Training Category	**General Hanford Facility Training**	**Contingency Plan Training**	**Emergency Coordinator Training**	**Operations Training**				
WTP DWTP Implementing Category	**Orientation Program**	**Emergency Management Plan**	**Emergency Coordinator Training**	**General Waste Mgmt**	**Container Mgmt**	**Tank System Mgmt**	**Containment Buildings Mgmt**	**Misc Unit Mgmt**
Example Job Title/Position								
Operators	X	X		X		X	X	X
Shift Operations Manager	X	X	X	X	X	X	X	X
Hazardous Waste Operations (HWO) Manager	X	X		X	X	X	X	X
Operations Manager	X	X	X	X				
Environmental Compliance Officer	X			X				
Waste Service Provider	X			X	X			
Hazardous Waste Operators	X	X		X	X	X	X	X
Laboratory Technician –Hazardous Waste Operations (HWO)	X	X		X	X			
Laboratory Technician	X	X						
Laboratory Manager	X	X	X		X			

[a] Refer to the WTP Dangerous Waste Training Plan for a complete description of coursework in each training category.

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
CHAPTER 11
CLOSURE PLAN

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
03/01/2017	8C.2016.Q4
05/23/2016	8C.2016.Q1

This page intentionally left blank.

CHAPTER 11
CLOSURE PLAN

This page intentionally left blank.

CHAPTER 11
CLOSURE PLAN

TABLE OF CONTENTS

11.0 Introduction 5
11.1 Closure Plan Overview 5
11.1.1 Closure Plan Revisions 6
11.2 Closure Performance Standard 7
11.2.1 Closure Standards for Soils, Groundwater, Surface Water, and Air 10
11.2.2 Closure Standards for Decontamination of Structures and Equipment 11
11.2.3 Closure Standards for Tank Systems 12
11.2.4 Closure Standards for Container Storage Areas 13
11.2.5 Closure Standards for Containment Buildings 14
11.2.6 Closure Standards for Miscellaneous Units 14
11.3 Closure Activities 14
11.3.1 Maximum Extent of Operations 19
11.3.2 Removing Dangerous/Mixed Waste 19
11.3.3 Decontaminating Structures, Equipment, and Soils 20
11.3.4 Sampling and Analysis to Identify Extent of Decontamination/Removal and to Verify Achievement of Closure Performance Standard 23
11.4 Other Activities 24
11.4.1 Certification of Closure 24
11.4.2 Run-on and Runoff Control 25
11.4.3 Equipment Reuse 25
11.5 Maximum Waste Inventory 26
11.6 Closure of Tanks, Container Storage, Containment Buildings, and Miscellaneous Units 26
11.6.1 Closure of Tank Systems 26
11.6.2 Closure of Container Storage Areas 28
11.6.3 Closure of Containment Building Units 29
11.6.4 Closure of Miscellaneous Units 29
11.7 Schedule for Closure 30
11.8 Extension for Closure Time 30

FIGURES

Figure 11-1 Sample Clean Debris Surface Checklist 33
Figure 11-2 Closure Strategy Flowchart for Tank Systems 34
Figure 11-3 Closure Strategy for Container Storage, Containment Building, Miscellaneous Unit, and Tank System Secondary Containment Areas 35
Figure 11-4 Closure Strategy Flowchart for Soils and Groundwater 36
Figure 11-5 Example Closure Certification Statement 38
Figure 11-6 WTP Permitting, Deactivation, and Closure 40
Figure 11-7 Closure Schedule for WTP 42

TABLES

Table 11-1 Maximum Waste Inventory 32
Table 11-2 Clean Closure Performance Standards and Activitiesa 32

CHAPTER 11
CLOSURE PLAN

Note: Where information regarding treatment, management, and disposal of the radioactive source byproduct material and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954 as amended) has been incorporated into this document, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit or chapter 70.105 RCW and its implementing regulations but is provided for information purposes only.

This chapter is the Resource Conservation and Recovery Act (RCRA) closure plan for the River Protection Project Waste Treatment Plant (WTP) permitted mixed waste management units, as required per the *Washington Administrative Code* (WAC) 173-303-806(4)(a)(xiii). This closure plan describes the activities that are necessary to close the WTP permitted mixed waste management units. The procedures and estimated times to complete these activities are discussed in this plan. Submittal of this closure plan completes the requirement of III.10.C.8.b and Compliance Schedule Item 8.

This closure plan is provided in compliance with the applicable requirements of the WAC 173-303-610, -620, and -806. This plan is also intended to demonstrate compliance with Conditions II.J and III.10.C.8 of the Hanford Facility Dangerous Waste Permit (Ecology 2009).

With several exceptions, this plan follows the format of a typical closure plan as outlined in the *Dangerous Waste Permit Application Requirements for Facilities Which Store and/or Treat Dangerous Wastes in Tank Systems and/or Containers* (Ecology 1996). The exceptions are the exclusion of sections that do not apply to the WTP (financial assurance, liability, "already closed disposal unit," and post-closure requirements), and the addition of new sections not addressed in the guidance (closure of tank, miscellaneous unit, container storage, and containment building units).

11.0 INTRODUCTION

This closure plan identifies the steps and procedures necessary to close any WTP permitted mixed waste management unit at any point in its active life. This includes the removal of dangerous and mixed waste and the decontamination of the permitted mixed waste management units, ancillary equipment, and the associated secondary containment systems. The RCRA closure activities will be consistent with the requirements of the WTP deactivation, decontamination, and decommissioning plan to be prepared under separate authorities. They will be revised as necessary to maintain consistency between the plans. Deactivation of the WTP is discussed further in Sections 11.3.2 and 11.7.0.

11.1 Closure Plan Overview

Mixed waste will be handled and stored in the following areas of the WTP, as identified in the Dangerous Waste Permit (DWP) and Chapter 4:

- Pretreatment plant building
- WTP portion of the waste transfer lines from the double-shell tank (DST) system
- Intra-facility transfer lines between WTP buildings
- WTP portion of the effluent transfer lines from the WTP to the Liquid Effluent Retention Facility (LERF)
- Low Activity Waste (LAW) vitrification building
- High-Level Waste (HLW) vitrification building
- Laboratory
- Failed Melter Storage

The permitted mixed waste management units in the WTP are identified in Chapter 4. The WTP mixed waste management units, including ancillary equipment, secondary containment areas, supporting structures and underlying soil, are addressed in this closure plan. Closure of the pipelines connecting the WTP with the DST system unit and the Liquid Effluent Retention Facility/Effluent Treatment Facility (LERF/ETF) will be integrated with those respective facilities. Closure criteria will be developed jointly by United States Department of Energy (DOE), its contractors, and Ecology prior to initiating closure activities. DOE will be responsible for implementing the cleanup standards.

The closure plan indicates several potential Hanford treatment, storage, and disposal (TSD) units that may be used to manage dangerous and mixed wastes generated during closure of the WTP permitted mixed waste management units. These identifications are preliminary and are subject to change as the Hanford facility is developed, and as the Hanford Facility Dangerous Waste Permit (Ecology 2009) is modified in the future.

The remainder of the closure plan provides the following information:

Section 11.2.0 of the closure plan identifies the regulatory standards that apply to closure, and the processes to be used for developing specific cleanup standards that may be achieved during closure.

Section 11.3.0 describes the overall approach for removing the mixed waste inventory, flushing and decontamination operations, removing and disposing of contaminated equipment and residues, and inspections and sampling to verify clean closure.

Section 11.4.0 describes other activities, including certification of completion of closure, control of run-on and runoff during closure, and equipment reuse.

Section 11.5.0 provides the maximum possible mixed waste inventory.

Section 11.6.0 describes the closure procedures for each type of permitted mixed waste management unit.

Section 11.7.0 provides the schedule for closure.

Section 11.8.0 describes the demonstration required to support a request to extend the standard 90- and 180-day mixed waste removal and closure completion time limits, as specified in WAC 173-303-610(4)(a) and (b).

11.1.1 Closure Plan Revisions

Clean closure is the goal for the WTP permitted mixed waste management units. The closure plan will be revised if efforts to achieve the clean closure standards are unsuccessful. The WTP may also be closed as a landfill, as provided in WAC 173-303-610, if the clean closure standards cannot be achieved through the removal of radiological contamination levels and the closure performance standards cannot be achieved. The revised closure plan will be accompanied by a written request for modification of the permit.

The design life of the WTP is 40 years after the initiation of waste treatment operations. The actual operating life of the plant may change depending on expansion in treatment capacity, improvements in treatment technology, or many other factors. The closure plan will be revised and submitted for approval under WAC 173-303-830 (Permit Changes) to incorporate future advances in decontamination technology, changes in plant capacity, newly designated dangerous waste, or other factors that may affect the closure of the WTP permitted mixed waste management units.

The closure plan may also be revised before the start of closure work, based on relevant information from the operational history of the WTP and the permitted mixed waste management units, and when information such as decontamination and access of high rad areas becomes available. The final revised closure plan will provide the necessary final detailed decontamination schedule and procedures, sampling

and analysis plan, health and safety plan, interface with DST system unit and LERF/ETF closure plans, and additional information dependent on future conditions, as indicated in the following pages. Also, if necessary, a post-closure plan presenting details of any post-closure processes and activities will be submitted to Ecology in accordance with WAC 173-303-610(8).

11.2 Closure Performance Standard

The WTP permitted mixed waste management units will be closed in accordance with the requirements of Conditions II.J and III.10.C.8 of the Hanford Facility Dangerous Waste Permit (Ecology 2009).

Clean closure requires decontamination or removal and disposal of dangerous/mixed waste, waste residues, contaminated equipment, soil, or other material, in accordance with the clean closure performance standards of WAC 173-303-610(2). Clean closure as described in this closure plan will accomplish the following:

- Minimize the need for future maintenance.
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated runoff, or dangerous waste decomposition products, to the ground, surface water, groundwater, or the atmosphere.
- Return the land to the appearance and use of the surrounding land areas to the degree possible given the nature of the previous dangerous waste activity.

Activities beyond that point will be decided and documented in the revised plan prior to closure. The WTP buildings will not be used for RCRA-regulated TSD activities following clean closure, unless a new permit is issued.

The appearance of the land where the WTP buildings are located will be consistent with the appearance and future use of the surrounding processing land areas, after completion of clean closure activities. The WTP buildings will remain at the site until final disposition is determined and implemented. The WTP buildings may be demolished, if the buildings will have no future mission. Future land use decisions may be considered during the WTP decommissioning process. The final decision on building disposition and the appearance and use of the plant area will be integrated with the decisions on disposition of the buildings in the adjacent 200 East Area.

The long-term future use of the WTP site and the adjacent 200 Areas was addressed in the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (DOE 1999). The Central Plateau as defined in that document includes the United States Ecology commercial waste disposal facility, the DOE Environmental Restoration and Disposal Facility (ERDF), and the 200 West and 200 East Areas, as well as the WTP site.

Permitted units where mixed or dangerous wastes have been treated or stored will undergo closure activities. Contaminated equipment, debris, and solid decontamination residues generated during the closure of the WTP permitted mixed waste management units will be designated and packaged in accordance with the appropriate regulatory requirements (expected to be the WAC dangerous waste regulations in effect at the time of closure). The dangerous and mixed waste will then be transferred to a permitted TSD unit either on or off the Hanford Site. Equipment and debris that are not adequately decontaminated will be treated to comply with land disposal restriction requirements. Liquid decontamination solutions or agents generated during closure activities will be collected, designated, and disposed of at an appropriate TSD unit.

If a product, residual waste, or decontamination fluid is spilled or released to the environment during closure activities, spill response will be initiated as described in Chapter 7 and Chapter 7A (*River Protection Project – Waste Treatment Plant Emergency Response Plan*), and in accordance with WAC 173-303-145(2) and 173-303-360(2)(d) reporting requirements. The residual waste will be

collected, designated, and managed appropriately. The waste will be managed in accordance with the appropriate regulatory requirements.

Clean Debris Surface

This closure plan proposes use of a "clean debris surface," defined in the following paragraph, as the clean closure performance standard for the WTP metal structures and equipment and concrete structures that will remain after closure, as well as all of the DWP equipment used for waste management; Attainment of a clean debris surface can be verified visually in accordance with the standard in WAC 173-303-610(2)(b)(ii), incorporating 40 CFR 268.45, Table 1, footnote 3, which states:

> "Clean debris surface" means that the surface, when viewed without magnification, will be free of all visible contaminated soil and hazardous (dangerous) waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits will be limited to no more than 5 % of each square inch of surface area."

The clean debris surface standard will be achieved by using the physical and chemical extraction techniques identified in 40 CFR 268.45, Table 1, incorporated by reference WAC 173-303-140. The primary method of decontamination may be water washing, followed by a choice of using chemical decontamination solutions, ultrahigh-pressure water technologies, impact technologies such as sand blasting and CO_2 blasting, or other new technologies that may be developed prior to closure. Physical extraction methods that remove up to 0.6 cm of concrete will be used only after the previous technologies have failed to result in a clean-debris surface, or if there has been a failure of the coated concrete surface. Visual verification may be performed by direct worker observation with written inspection documentation (Figure 11-1, Sample Clean Debris Surface Checklist), or by other means such as remote-operated closed circuit television and videotape.

Concrete surfaces may be protected with a contamination-resistant protective coating. Protective coatings in good condition may be decontaminated using one of the technologies described above, then inspected to determine if a clean debris surface is present in the same manner as steel or other metal surfaces. If there is evidence that a dangerous/mixed waste release has occurred, such as confirmation of contamination behind a stainless-steel lined breach or identification of damaged or deteriorated protective coating on a concrete floor where a dangerous/mixed waste release has occurred, and if the concrete is adjacent to soil, a contamination investigation may be performed.

If the concrete protective coating exhibits more damage than hairline cracks and has lost integrity, the concrete surface under the deteriorated coating will be treated with aggressive physical extraction technologies, such as high pressure water or scabbling, to remove at least 0.6 cm of material below the original surface. This approach also applies to uncoated concrete behind or beneath stainless-steel lined breaches. The exposed concrete will again be inspected to verify that the clean debris surface standard is met. The treatment will be repeated until the clean debris surface standard is met. Closure standards for soil underlying the WTP are addressed in Section 11.2.1.

If the clean debris surface standard as described cannot be performed or cannot not be achieved, an alternative method will be proposed in the revised Closure Plan as required by DWP Conditions III.10.C.8.c and III.10.C.8.d.

Designation Limit

Some waste handling equipment metal surfaces cannot be visually inspected (for example, internal pipe, pump, and tank surfaces). A component or portions of a component may be flushed with decontamination solutions if it cannot be decontaminated to meet the clean debris surface standard, or if it cannot be inspected to verify that it meets the standard. The decontamination solution, or rinsate, will be sampled and analyzed using methods complying with *Test Methods for Evaluating Solid Waste, Physical*

Chemical Methods (EPA 1986) for indicator constituents. Analytical data that meet the criteria defined in WAC 173-303-610(2)(b) will indicate successful decontamination and attainment of the clean closure performance standard. The rinsate analysis criterion is hereafter referred to as the designation limit standard.

Closure Strategy for Tank Systems

The general closure strategy for tank systems is outlined in flowcharts in Figures 11-2 and 11-3. Triple-rinsing followed by visual inspections is an accepted method of decontaminating tanks. However, modification of this technique may be necessary, if determined at a later date.

Figure 11-2 shows that internal flushing and decontamination of tanks and ancillary equipment, inspection of the secondary containment area, and sealing of observed stainless-steel lined breaches will be performed prior to final decontamination efforts. Disposition of solid and liquid treatment residuals is shown only at the initial flushing step (below "flush tanks, piping"), to avoid unnecessary complexity in Figure 11-2. The residuals from the following internal and external decontamination steps are expected to follow the same paths.

The two "more decon?" decision boxes in Figure 11-2 (following determinations that decontamination efforts so far have been inadequate) are the symbols for the key decisions the future closure managers may have to make:

1. Perform additional decontamination to meet the clean closure standard.
2. Stop decontamination and designate that tank or ancillary equipment as mixed waste debris to be removed, reduced in size, encapsulated, packaged, and disposed.

Figure 11-2 does not show that additional decontamination of external tank or other surfaces may be required to continue on the disposal path (after "remove, dispose of as mixed waste") because such additional decontamination, if required, will be due to radiological dose concerns, not dangerous/mixed waste requirements. Figure 11-2 also illustrates the assumption that internal surfaces of tanks and ancillary equipment cannot be adequately or efficiently decontaminated and/or inspected to demonstrate that the clean debris surface standard is met, and that the decontamination solution or rinsate designation limit standard will apply to all internal tank system surfaces.

Closure Strategy for Secondary Containment Areas

Figure 11-3 shows the strategy for closure of secondary containment areas. These steps illustrate the approach for decontaminating stainless steel liners and coated concrete surfaces. Secondary containment area liner breaches may need to be sealed prior to decontamination or removal of equipment. The general procedure for investigating liner breaches or breaks, and decontaminating the concrete behind or below such breaches, is shown in Figure 11-3.

The closure strategy for concrete with intact protective coatings is straightforward. If a release of dangerous or mixed waste in the permitted unit has not been documented in the facility operating record, and no evidence of a release is found during the initial closure inspection, the assumption will be made that the concrete floor surface meets the clean debris surface standard.

If a release has been documented, and the concrete does not meet the clean debris standard, decontamination technologies, as described in Section 11.2.0, will be performed until the clean debris standard can be met and documented.

If evidence is found that a release has occurred on a concrete floor where the protective coating has even minor cracking, physical extraction will be required. Physical extraction of the concrete surface may also be required if sampling of the area determines there is dangerous waste contamination in areas where the protective coating is substantially damaged or deteriorated; for example, if it is broken or peeling.

The extraction will be followed by an inspection and sampling to verify and document the presence of a clean debris surface. If a release is documented at such a location and the concrete at that location is resting on or against soil, a soil investigation may be required. These steps are illustrated in the last two boxes before the final decision box, "Visible Crack or Decomposed Concrete?" in Figure 11-3.

Closure Strategy for Soil

The criteria for determining whether additional soil investigation is required are shown in the final decision box in Figure 11-4. Contaminated soil will be removed to meet risk-based concentration limits, referred to as the soil cleanup limits (see Section 11.2.1). Soil sampling and analyses will be performed after removal to verify compliance with the soil cleanup standard. Figure 11-4 shows the strategy for addressing potential impacts to soil and groundwater.

Compliance with this plan and attainment of the closure standards will be documented by videotape or written inspection records, such as those shown in the sample checklist in Figure 11-1, the example Closure Certification Statement in Figure 11-5, and other supporting records as discussed in Section 11.4.1.

11.2.1 Closure Standards for Soils, Groundwater, Surface Water, and Air

The design of the WTP mixed waste management units is intended to prevent the release of dangerous/mixed waste to the soil, groundwater, surface water, or air. Clean closure of the soil beneath the WTP mixed waste management units will be accomplished by demonstrating that the stainless-steel process cell liners, and the coated concrete walls and floors in the secondary containments, have not lost integrity and have therefore prevented contaminants from reaching the soil. If loss of secondary containment integrity has occurred, the potential for soil contamination will be investigated. The demonstrations will consist of performing and documenting inspections and decontamination work, and soil sampling and removal, if necessary.

The need for sampling of soil will be determined on a unit-specific basis per WAC 173-303-610(2)(b)(i), and will take into consideration the mixed waste management unit operating history.

Where a dangerous/mixed waste release is known or suspected to have occurred, the following conditions indicate probable secondary containment failure and potential soil contamination: the observation of potential through-thickness cracks or crumbling concrete at a liner breach location or in a secondary containment area with deteriorated concrete floor coating. Potential soil contamination will be investigated through coring and sampling of both the concrete and the soil. Biased sampling will be focused in the vicinity of the liner defect or coating defect, concrete cracks, or in the known or suspected release location. Samples will be analyzed for constituents of concern (COCs). The proposed COCs will be submitted to Ecology with the revised closure plan submitted before the start of closure. The COCs to be used will be developed using process knowledge, operating record, and waste characterization analyses, whenever possible.

The appropriate risk-based cleanup standard will be consistent with the future land-use classification. The standard will be reviewed prior to initiating closure to ensure it is still appropriate. Clean closure concentration limits for soils will be established in accordance with WAC 173-303-610(2)(b)(i). Given the long operating life of the WTP and the current state of assumptions for toxicity data, and regulatory guidance, calculation of specific limits is not appropriate at this time.

In establishing soil clean closure concentration limits, consideration will also be given to "area background", as defined in Ecology's *Guidance on Sampling and Data Analysis Methods* (Ecology 1995) and in accordance with WAC 173-303-610(3)(a)(v). The *TWRS Phase 1 Privatization Site Preconstruction Characterization Report* (HNF 1998), the *Hanford Site Background Part 1, Soil Background for Nonradioactive Analytes* (DOE/RL 1995), or other site-specific soil background information will be used to assist in determining background levels in the soil. If the closure soil sample

data are at or below the calculated soil cleanup levels, or the site-specific background concentrations, whichever is greater for each constituent, the soil will be considered clean-closed.

Due to the level of secondary containment provided at the WTP, non-permitted releases of dangerous/mixed wastes to soil, groundwater, surface water, or air are not anticipated.

Areas in which soil could have become contaminated will be mapped during the liner or concrete secondary containment area inspection and decontamination process. Soil sampling is addressed in Appendix A, Sampling and Analysis for Closure of WTP Facility (SAP). As necessary, a more detailed sampling and analysis plan may be included in a future revision to the closure plan in accordance with DWP Conditions III.10.C.8.c and III.10.C.8.d.that is required under permit condition III.10.C.8.d. The revised closure plan will be submitted to Ecology for review and approval prior to closure. The current SAP is consistent with the Guidance for Clean Closure of Dangerous Waste Units and Facilities (Ecology 2005), as incorporated by reference at WAC 173-303-140(2)(a).

11.2.2 Closure Standards for Decontamination of Structures and Equipment

Some of the dangerous/mixed waste-contaminated structures and ancillary equipment that will undergo decontamination during the closure of the WTP consist of equipment with smooth metal surfaces. Concrete and protective coating surfaces in secondary containment areas will also be decontaminated as part of closure. The types of structures and associated equipment that may be decontaminated to meet the clean debris surface standard include, but are not limited to:

- Interior and exterior tank and pipe surfaces
- Secondary containment area stainless steel liners
- Uncoated concrete floors and walls behind stainless-steel liners
- Coated concrete walls and ceilings above stainless-steel lined secondary containment, as necessary
- Coated concrete floors in secondary containment areas

Decontamination of interior surfaces of tanks and pipes and documentation that they meet the clean debris surface standard may or may not be possible, given the current state of decontamination and inspection technologies. At present, the available miniature equipment may not be adequate to remove hardened waste or contaminated corrosion coatings from relatively inaccessible interior tank and pipe surfaces. Similarly, available video equipment may not provide the inspection capability necessary to demonstrate attainment of the clean debris surface standard on interior surfaces. The criteria for whether or not decontamination is possible will be developed and submitted for approval prior to initiating closure activities. In addition, for areas such as the PT and HLW Facility Black Cells and Hot Cells, they are currently provided with spare penetrations that can be used for spray wands if needed during closure activities to facilitate dangerous waste decontamination. If, after decontamination, safe physical access in black cells is not available during the closure period to enable the use of the clean debris surface standard, which requires visual verification, other technologies such as remote operated CCTVs may be used.

Decontamination of equipment and stainless-steel lined secondary containment or liners will be conducted by using water washing and spraying or ultrahigh-pressure water jetting, or other technologies listed in Section 11.3.0. Residues from these extraction operations will be collected, sampled as necessary, designated in accordance with WAC 173-303, and transferred to a TSD facility such as the LERF/ETF or the Central Waste Complex (CWC) for treatment, storage, and/or disposal.

Decontamination of intact secondary containment protective coating surfaces on concrete to meet the clean debris surface standard will also be performed primarily through water washing and spraying. Additional technologies that may be used include chemical decontamination solutions, ultrahigh-pressure water technologies, impact technologies such as sand blasting and CO_2 blasting, or other new technologies that may be developed prior to closure. The secondary containment protective coating on

concrete is designed and applied to provide a durable, non-porous surface. If decontamination of the impermeable protective coating surface in secondary containment areas cannot be completed through chemical extraction, or if the protective coating has broken, cracked, or peeled away from the concrete, then at least 0.6 cm (0.24 inches) of the underlying concrete will be removed using one or more of the physical extraction technologies. The physical extraction performance standard for concrete is removal of 0.6 cm of the surface layer and treatment to a clean debris surface, as noted in the *Guidance for Clean Closure of Dangerous Waste Units and Facilities* (Ecology 2005), Section 5.6, and as noted in 40 CFR 268.45, Table 1, as incorporated by reference at WAC 173-303-140(2)(a).

Metal surface areas of equipment that cannot be documented to meet the clean debris surface standard may be decontaminated using water washing, followed by a choice of chemical decontamination solutions, ultrahigh-pressure water technologies, impact technologies such as sand blasting, or other new technologies that may be developed prior to closure. Rinsate may be sampled and analyzed, using methods complying with *Test Methods for Evaluating Solid Waste, Physical Chemical Methods* (EPA 1986) for Ecology-approved indicator constituents. If other analytical methods are developed and chosen for use, the closure plan will be revised and submitted for approval. Indicators will be determined on the basis of process knowledge, operating record, and waste characterization analyses, whenever possible.

Analytical data less than designation limits will indicate successful decontamination and attainment of the clean closure performance standard for the tank, piping, or other metal structures and equipment. Documentation of the representative character of the sample and laboratory quality control and quality assurance data will be entered into the closure record as specified in Sections 11.3.4 and 11.4.1. Concrete and protective coated concrete surfaces will not be addressed using designation limits.

If the metal structure or equipment cannot be considered decontaminated using the clean debris surface or designation limit criteria, or if further decontamination is determined to be impractical due to high radiation levels, waste minimization, cost considerations, or other reasons, it will be packaged using the debris treatment standard for immobilization by encapsulation. The waste will be designated on the basis of process knowledge and transported to a permitted dangerous or mixed waste disposal facility such as Hanford Low Level Burial Ground (LLBG) mixed waste trenches. Examples of equipment that may undergo encapsulation and disposal include, but are not limited to:

- Tanks and pipes
- Melter off-gas duct work, scrubber, condenser, precipitator, and washout holding vessels
- Pumps, agitators, wash rings, and ejectors

Contaminated items and solid decontamination residues removed from the WTP permitted mixed waste management units will be designated, packaged, and treated as necessary to meet the waste acceptance criteria of the receiving facility. Sampling of items and solid residues known to be contaminated and intended for disposal is not necessary if process knowledge is adequate to accurately designate the wastes with the proper dangerous waste identification codes. The closure plan will be revised prior to start of closure and will address treatment and disposal plans in more detail.

11.2.3 Closure Standards for Tank Systems

At closure of a tank system, the owner or operator is required by WAC 173-303-640(8)(a) to remove or decontaminate dangerous/mixed waste residues, contaminated secondary containment system components (such as liners), contaminated soils, and structures and equipment contaminated with dangerous/mixed waste, and manage them as dangerous/mixed waste, with few exceptions.

For the purposes of the WTP RCRA closure, the standard is interpreted to mean that each tank and associated ancillary equipment, including the secondary containment area, will meet the clean debris surface standard and/or designation limit criteria for rinsate. Indicator constituents or COCs to be used

for rinsate evaluation will be determined using process knowledge, including consideration of the available waste characterization data, and other relevant information in the facility operating record.

Inspectable surfaces may be declared clean if they meet the definition of a clean debris surface, including portions of concrete secondary containment with intact protective coating surfaces, and physically-extracted concrete surfaces behind stainless-steel lined breaches, or under abraded or loose protective coating that have had at least 0.6 cm of material removed from the original surface. Rough or inaccessible metal surfaces such as corroded tank secondary containment area liner surfaces, or tank and pipe interior surfaces, may be declared clean when the decontamination solution sample is analyzed, with appropriate quality control and quality assurance as noted in Section 11.3.4, and the indicator parameter or COC data are determined to be less than or equal to the designation limits.

If decontaminating a tank system in place is not feasible or is ineffective, an alternative method is to remove the tanks, disassemble them, and decontaminate the tank parts using extraction technologies described under alternative treatment standards for hazardous debris (40 CFR 268.45), as incorporated by reference at WAC 173-303-140(2)(a). With Ecology's concurrence, the decontaminated debris can then be disposed of as non-dangerous (but possibly controlled as radioactive) waste, as indicated in Section 5 of *Guidance for Clean Closure of Dangerous Waste Units and Facilities* (Ecology 2005).

Tank systems will be inspected for compliance with the clean debris surface standard by observing the external and internal metal surfaces. Portions of a tank system that cannot be fully inspected (such as interior surfaces of tanks and attached piping, pumps, ejectors, and welded pipe connections or penetrations) or that may pose as low as reasonably achievable (ALARA) compliance problems, may be decontaminated with chemical or physical extraction technologies. The decontamination solutions from these portions of the system will be sampled and analyzed for indicator parameters, and the results will be compared to waste designation limits. Solid residues will be removed, containerized, designated, and disposed of at a permitted disposal facility as required. The tank or ancillary equipment, if not decontaminated to meet clean debris standard, will be removed, treated as necessary, and disposed of in a permitted landfill. Treatment may include macro-encapsulation or micro-encapsulation, or other processes that comply with land disposal restrictions.

Standards for clean closure of tank system secondary containment are identical to standards for decontamination of secondary containment areas for the container storage, containment building, and miscellaneous units; that is, clean debris surface standard and/or designation limits.

The proposed COCs will be submitted to Ecology and finalized in the revised closure plan to be submitted before the start of closure.

11.2.4 Closure Standards for Container Storage Areas

In addition to the requirements of WAC 173-303-610, WAC 173-303-630(10) requires that at closure, dangerous/mixed waste and residues will be removed from the secondary containment system. Remaining containers, liners, bases, and soil contaminated with dangerous/mixed waste or residues will be decontaminated or removed.

Standards for clean closure of clad container storage secondary containment are identical to standards for decontamination of secondary containment areas for the tank system, containment building, and miscellaneous units (that is, clean debris surface standard and/or designation limits). Special requirements for clean closure of several secondary containment areas with coated concrete floors were explained in Section 11.2.2.

11.2.5 Closure Standards for Containment Buildings

At closure of a containment building system, the owner or operator is required by WAC 173-303-695 (incorporating 40 CFR 264.1102(a)) to remove or decontaminate dangerous/mixed waste residues, contaminated secondary containment system components (such as liners), contaminated soils, and structures and equipment contaminated with waste and leachate, and manage them as dangerous waste, unless WAC 173-303-070(2)(a)(ii) applies.

Standards for clean closure of containment building units are identical to standards for decontamination of secondary containment areas for the tank system, container storage, and miscellaneous units (that is, clean debris surface standard and/or designation limits).

11.2.6 Closure Standards for Miscellaneous Units

The owner or operator is required by WAC 173-303-680(2) to close miscellaneous units in a manner that will ensure protection of human health and the environment. Miscellaneous units at WTP include, but are not limited to, melters, scrubbers, condensers, precipitators, reboilers, oxidizers, adsorbers, and filters. The LAW and HLW melters will be removed and replaced several times during the operational life of the WTP. Removal and replacement are not considered closure or partial closure activities. Melters may be replaced according to the schedule based on the design life of the melter components, or replaced when unplanned failure of a component occurs. In either case, ancillary equipment will be removed or disconnected from the melter after molten glass has been removed to the maximum practical extent.

Openings to the LAW locally shielded melter (LSM) will be sealed and the melter will be removed from the LAW vitrification building, after surface decontamination, as a single container.

Spent HLW melters will be placed in a specially designed shield overpack and then removed from the HLW vitrification building to a disposal facility. Failed melters will be placed in the WTP failed melter storage building (container storage area). During closure of the WTP, the failed HLW melters will be dispositioned to meet disposal site waste acceptance criteria.

Spent LAW and HLW melters may also be stored in the WTP failed melter storage building (container storage areas) if necessary to accommodate scheduling of treatment and disposal operations, or for other reasons. The melters will be shipped to permitted treatment and disposal facilities. The WTP miscellaneous units that treat liquid mixed waste will be housed in containment building units, caves, and process/hot cells that provide secondary containment.

Standards for clean closure of the miscellaneous unit secondary containment areas are the standards for decontamination of containment building units (that is, the clean debris surface standard and/or designation limits).

11.3 Closure Activities

This section describes closure activities that will be conducted to meet the clean closure performance standards. Details provided here may change, and if necessary, the plan will be revised to reflect those changes. The facility is scheduled to close at the end of its operating life. If the WTP is shut down prior to this time, an updated closure plan will be submitted prior to start of closure activities. If partial closures of the WTP mixed waste management units are necessary, updates to the closure plan will be submitted prior to initiating closure activities.

Section 11.3.1 describes the maximum extent of operations. Section 11.3.2 describes the process for removing dangerous (mixed) wastes from permitted units. Section 11.3.3 identifies several chemical and physical extraction technologies that may be used to achieve the clean debris surface standard. Section 11.3.4 describes the approach for verification sampling and analysis to confirm that decontamination and/or removal activities have attained the designation limit standard. Section 11.4.0 describes the procedures to be followed in order to comply with closure certification requirements, to control run-on and runoff during closure, and to reuse equipment from the plant. Section 11.5.0 provides the estimated

maximum mixed-waste inventory for each type of dangerous/mixed waste management unit. Section 11.6.0 describes how each of the four types of permitted units will be closed. The goal for closure of the WTP permitted mixed waste management units is clean closure, which is contingent on achievement of the clean debris surface standard or verification that indicator constituents in decontamination solutions from the permitted mixed waste management units are not present in concentrations above designation limits.

Partial closure may be considered for some of the mixed waste management units; that is, one or more treatment processes or tank systems may be closed prior to the start of closure of the entire plant. Closure of a single mixed waste management unit or group of units could be necessary if a process were to be redesigned, eliminating the previous functions of the permitted mixed waste management units. Abnormal occurrences could also force partial closure, such as plugging of a tank or piping. Partial closures of the plant are not planned but could result from unforeseen circumstances. The closure plan will be revised to address the specific details for the permitted mixed waste management units if partial closure is necessary, and the revised plan will be submitted to Ecology for review, approval, and incorporation into the permit prior to start of closure activities.

The following assumptions were made in developing the closure plan:

- The maximum inventory will be present approximately nine months or more before the start of the closure period. This is the case because of the batch nature of the entire WTP treatment scheme. The treatment systems within the WTP will operate normally until the last portions of this final transfer are treated.
- The pretreatment building and the HLW melter will treat mixed waste and may be fully operational at the start of the closure period. These portions of the WTP will continue to operate during the closure period until the tank system flush solutions and residues are removed from each system to the maximum practical extent and treated before final decontamination begins.
- Operating records documenting the constituents and volumes of the mixed wastes in the storage and treatment areas, and of the mixed wastes previously processed through the facility, will be available. The operating record also will include detailed information on historical releases of dangerous/mixed wastes into secondary containment areas, previous decontamination work, and equipment that is present in secondary containment areas. This information will be directly relevant to final detailed planning of decontamination steps and procedures, especially treatment and disposal of the decontamination solutions and residues that will be generated.
- A release of dangerous/mixed wastes outside permitted mixed waste management unit secondary containment areas will not occur.
- Equipment necessary for dangerous/mixed waste removal and equipment decontamination will be functional or will be repaired or replaced.
- Permitted TSD facilities will be available to receive dangerous and mixed wastes that will be generated during closure.

Overall Closure Approach

After the final waste feed shipment or inventory is processed, the LAW LSM units will be closed and removed from the site. Tanks and piping will be flushed. The flush solutions will be treated in the pretreatment building by filtration and evaporation, and concentrated solids will be immobilized in glass produced in the HLW melter. Immobilized waste may or may not be acceptable at the facilities that accepted standard immobilized low-activity waste (ILAW) and immobilized high-level waste (IHLW) during the operating life of the WTP. Specific disposal plans for this type of waste may not be finalized until submittal of the final revised closure plan prior to start of closure.

The next step in the overall closure approach is to decontaminate the WTP mixed waste management units' components to the maximum feasible extent and remove components that cannot be decontaminated to meet the clean debris performance standards. Contaminated components will be disposed of, and the residues and decontamination fluids remaining after treatment operations at the WTP mixed waste management units have ceased will be transferred to the CWC, LERF/ETF or another Hanford Site permitted TSD facility. Other Hanford Site TSD facilities that may be considered for treatment or disposal of closure wastes in addition to the CWC and LERF/ETF include the LLBG, the Waste Receiving and Processing (WRAP) facility, and the Integrated Disposal Facility (IDF).

Vitrification treatment will not be available after the last melter is shut down, near the completion of WTP deactivation work. Small quantities of feed waste or flushing residues may remain in tanks after the last melter is shut down, in addition to insoluble adhered coatings in piping and tanks. The remaining aqueous residues may have to be transferred to the LERF/ETF or the CWC for evaporation, precipitation, filtration, solidification, or other treatment.

General Sequence of Closure Activities

The general sequence of activities necessary to close permitted mixed waste management units within the WTP, and the basis for establishing the order of performing these activities, is summarized in the following discussion:

Dangerous/Mixed Waste Inventory Removal

- Dangerous/mixed waste removal: The nonradioactive dangerous waste, if present, will be removed from the WTP to minimize the possibility of release. Note: dangerous wastes may be generated at the WTP throughout the closure period from maintenance activities.
- Inventory removal: The mixed waste inventory present in the WTP mixed waste management units at the beginning of the closure (primarily heels in the bottoms of tanks) will be removed and processed (pretreated and vitrified) to the maximum practical extent. This removal will minimize the possibility for release and allow decontamination of the equipment to proceed. Tank systems, miscellaneous units, and ancillary equipment will undergo flushing as part of closure activities.

Decontamination

- Liner inspection: After removal of mixed wastes (flushing), but before final decontamination of tanks and other permitted mixed waste management units begins, each secondary containment area will be inspected to identify potential or apparent breaks, cracks, or separation of the liner or protective coating from the concrete floors and walls. These locations (if any) will be mapped and documented, and sealed by welding or by application of patching or protective coating material, to prevent entry of contaminants during decontamination activities.
- Decontamination: Tank systems and other equipment in the permitted mixed waste management units will be decontaminated. Additional chemical or physical extraction may be performed before tank systems, piping, or the equipment and equipment support structures in the permitted mixed waste management units are removed. Extraction will be performed not only to meet clean debris standards detailed in Section 11.2.0, but also to minimize the amount of mixed waste constituents that could be readily available for migration or release during equipment removal.
- Equipment may be left in place as clean-closed if it can be successfully decontaminated.

Inspection

- Equipment inspection: Tank/miscellaneous units systems and ancillary equipment will be inspected to ensure that the clean debris surface standard and/or rinsate analyses designation limits are met. If necessary, the equipment will be identified as requiring removal, encapsulation, and disposal.

Removal

- Equipment removal: If the permitted equipment cannot be decontaminated to meet the closure performance standard, it will be removed, treated by encapsulation, and disposed at a permitted facility. Size reduction treatment may also be performed.
- Permitted equipment decontamination: After the last batch of waste feed has been fully processed through the WTP, the LAW LSMs will be shut down and removed. Pretreatment process vessels and lines will be flushed with water or other solutions. Flushing liquids will be determined prior to initiation of closure activities, and if a liquid other than water is identified for use, the closure plan will be revised and submitted for approval prior to initiating closure activities. Flushing wastes will be treated in the pretreatment evaporation, cesium removal, and ultrafiltration processes. The concentrates will be transferred to a HLW melter. Water condensate will be routed to the LERF/ETF. One HLW melter may be operated after shutdown of the LAW LSMs to provide treatment for the solid flushing residues and evaporator concentrates. At the completion of treatment operations, the HLW melter will be shutdown by procedure for melter change out. The HLW failed melters will be disposed of in accordance with LDR requirements and to the degree necessary to meet disposal facility waste acceptance criteria (Section 11.3.3). LAW LSMs are not expected to require decontamination or size reduction treatment, other than surface decontamination after the operating equipment openings are closed. Spent HLW melters will be overpacked, and shipped to a permitted disposal facility.

Structure Decontamination

- Building structure decontamination, stainless steel-lined secondary containment areas: Liners in the permitted mixed waste management unit secondary containment areas will be decontaminated using chemical or physical extraction technologies, or both. Most of the secondary containment areas in the mixed waste management units will be lined with stainless steel. Coated concrete floors in secondary containment areas will be decontaminated using only chemical extraction technologies, unless the protective coating is damaged or deteriorated. Damaged protective coating in secondary containment areas, and contaminated concrete under or behind liner breaches, will be decontaminated using physical extraction technologies. Decontamination solutions may be sampled to determine treatment requirements and transferred via existing pipelines to the LERF/ETF if they meet the LERF/ETF acceptance criteria or to another permitted Hanford TSD unit. Structure decontamination activities are described in Section 11.3.3.
- Building structure decontamination, concrete secondary containment areas: Examples of mixed waste management units that have coated concrete secondary containment without stainless steel include the condensate tank system, the LAW LSM gallery containment building, ILAW container finishing containment building, and several secondary waste container storage areas. At the time of closure, the facility operating record will be reviewed and each mixed waste management unit will be inspected to determine if releases of dangerous/mixed wastes have occurred in these areas. If a release of dangerous/mixed waste has occurred on a secondary containment concrete floor where the protective coating is even slightly damaged or deteriorated, the concrete in that secondary containment area will be physically extracted to remove at least 0.6 cm of concrete from the original surface. This effort will demonstrate compliance with the clean debris surface standard. If a release is not documented or suspected, minor or hairline cracks may still be accepted in determining that the clean debris surface standard is met. If the secondary containment protective coating is intact, the surface may be decontaminated by chemical extraction. If chemical extraction is unsuccessful, or if the coating is damaged by the chemical extraction, physical extraction will be performed.

- Building examination to verify decontamination: After each mixed waste management unit in each building has been decontaminated, the mixed waste management units will be inspected and closure documentation will be examined to verify that the clean closure standards have been met.

Soil Investigation, Removal, and Verification

- Potentially contaminated soil identification: Areas in which soil could have become contaminated will be mapped during the liner or concrete secondary containment area inspection and decontamination process. Soil sampling protocols will be established and implemented if potentially contaminated areas are identified.
- Soil decontamination: Soil removal will be performed if necessary. A revised closure plan and a post-closure plan per WAC 173-303-610(3) and WAC 173-303-610(7) will be submitted if removal to the established risk-based standards is not feasible.
- Soil sampling to verify decontamination for indicator constituents: The soil will be sampled and analyzed for indicator constituents after the contaminated soil has been removed.

NOTE: Sampling of soil to verify decontamination will be addressed per the SAP and is included as Appendix A of the Closure Plan.

Disposition of Decontamination Wastes

- Disposition of decontamination fluids: Wastewater or chemical extraction solutions from decontamination activities will enter an existing collection system for waste characterization and verification against LERF/ETF waste acceptance criteria. At the final stage of closure, when the transfer pipeline to the LERF/ETF is taken out of service, decontamination solutions may be containerized and transported to the LERF/ETF by truck. Characterization of the closure residues in the permitted mixed waste management units will be documented based on process knowledge or analysis of the mixed waste treated in the units. If the wastewater cannot be accepted by LERF/ETF, it may be solidified and transferred to the CWC or another available permitted unit.
- Disposition of the building air emission control equipment (i.e., HVAC): Building air emission control equipment will remain in place until decontamination of other WTP components meets the clean closure performance standards. The HVAC equipment will be decontaminated to meet the clean closure performance standard, or will be removed, designated, and packaged to meet the waste acceptance criteria of a permitted disposal facility.
- Disposition of decontamination equipment: Equipment or materials used in performing closure activities will be decontaminated or disposed of at a permitted disposal facility. Personal protective equipment will be disposed of as appropriate.

The general order of closure activities was selected to minimize the potential for release of mixed waste constituents by removing the bulk of the mixed waste constituents early in the closure process. This order of closure also minimizes waste generation by reducing the possibility that decontaminated areas will become contaminated again by ongoing closure efforts.

Detailed scheduling of closure activities depends on the necessary facility functions required to be maintained during the closure period and the degree of contamination in each permitted mixed waste management unit, especially after the mixed waste inventory is removed and decontamination activities start. The large number of tank systems increases the potential for a highly complex schedule. Similar tank systems and other types of permitted mixed waste management units may be grouped for the purpose of minimizing the bulk and complexity of plans for closure activities. The detailed decontamination operations schedule will be included in the revised closure plan to be submitted before the start of closure activities (see Section 11.7.0).

Work will be performed in a manner that minimizes worker exposure to dangerous and/or mixed waste or other workplace hazards and will meet the ALARA principles.

Additional detail will be provided describing waste removal, equipment decontamination, and closure-generated dangerous/mixed waste disposal activities in the revised closure plans to be submitted prior to start of closure.

11.3.1 Maximum Extent of Operations

The maximum extent of operations during the active life of the WTP corresponds to the maximum mixed waste inventory with full feed tanks, the melters operating at design capacity, and full storage areas.

The general arrangement drawings in Chapter 4 show the locations of tanks, melters, miscellaneous units, containment buildings, and container storage areas. The dimensions of the permitted dangerous/mixed waste management units are included in Chapter 4 tables.

11.3.2 Removing Dangerous/Mixed Waste

The mixed waste feed inventory present in the WTP after the final receipt of waste feed from the DST system unit will be processed before the start of the first phase of closure. The mixed waste will be removed from tank systems to the maximum practical extent. Removal will be continued by processing the last bulk volumes of waste feed through the applicable pretreatment and vitrification systems, and transferring treated ILAW and IHLW to other TSD units or facilities from the container and canister shipping docks. These activities will follow normal operating procedures.

The following description of mixed waste removal is intended to provide a brief overview of the WTP permitted mixed waste management units closure activities.

At the completion of mixed waste treatment operations, DOE and its contractor will close the permitted mixed waste management units and deactivate the WTP facilities. Deactivation, when completed, will leave the facilities in a safe, stable, and passive state that can be monitored with minimal cost and minimal requirements for service support from either personnel or active equipment.

The WTP deactivation operations will comprise a large portion of the RCRA closure activities of the permitted mixed waste management units that will occur between the start of the closure period, as defined in WAC 173-303-610(3)(c)(ii), and the final shutdown of the HLW vitrification system. Closure operations for some permitted mixed waste management units may begin before the completion of treatment of the final batch of waste feed from the DST system unit.

Overlaps between dangerous/mixed waste management unit closure and the WTP facilities' deactivation activities, and the overall TSD facility permitting process, as defined in the *Hanford Federal Facility Agreement and Consent Order* (Ecology, EPA and DOE 2011) and the implementing attachment known as the *Tri-Party Agreement Action Plan*, Section 6.3, are illustrated in Figure 11-6. The full extent of necessary interfaces, and detailed definition of the intermediate points in this timeline, will not be determined until deactivation and closure planning are finalized before the start of closure.

Vitrified waste in storage at the WTP at the start of the closure period will be shipped to disposal units on the Hanford Site or to other appropriate facilities. If the inventory of untreated waste feed cannot be treated at the WTP, it will be transferred to a permitted TSD facility. Circumstances under which the waste feed inventory would not be treated through vitrification are not accounted for in this closure plan and would require revision of the plan. Properly completed shipping papers and certifications, as applicable, will accompany waste shipments.

Once the final batch of waste feed has been processed, residual heels will be flushed from the tank systems in accordance with deactivation procedures. Wastewater from flushing and decontamination solutions will be filtered, evaporated, and further treated as necessary in the WTP pretreatment building. The removed solids will be sent to the HLW melter. Wastewater will be sent to the LERF/ETF for treatment if acceptance criteria is met, or it will be transported to the CWC or another permitted TSD unit for storage, treatment, and disposal. Treatment in containers could be performed at the WTP if necessary or preferable, and if the resulting waste will meet the CWC or another TSD unit's waste acceptance

criteria. The treatment in containers alternative is not likely to be used, due to the relatively large volumes of flush solutions that will be generated.

If non-radioactive is present as inventory at the start of the closure period at the dangerous/mixed waste container storage unit, it will be transferred to a permitted off-site facility for treatment or disposal. Non-radioactive dangerous waste generated during the closure or deactivation work will be managed similarly.

The TSD units available at the time of closure, and their waste acceptance criteria, may include additional units that are not available today.

Complete records will be kept as to the date of shipment, waste characterization, waste quantity, destination facility, land disposal restriction certifications and notifications, and other appropriate information for removed dangerous/mixed waste. Specific documentation requirements are discussed in Chapter 3A. This information will be included in the closure documentation supporting certification, which is described in Section 11.4.1.

The specific types of off-site treatment and disposal units for dangerous wastes generated during closure will be determined and provided in the revised closure plan to be submitted before closure begins. Interfaces with the DST system unit and LERF/ETF will be specified in the revised plan to be submitted before the start of closure.

11.3.3 Decontaminating Structures, Equipment, and Soils

The only structures and equipment that may be contaminated at the start of the closure period are within the permitted mixed waste management unit secondary containment areas. Some of the types of waste handling equipment that may be located in each permitted mixed waste management unit can be determined by review of the design drawings and operating plans. Examples include, but are not limited to, cranes, power manipulators, and welding machines. Many other types of hand tools, instruments, lights and cameras, radiation monitors, buckets, and other equipment may be present in one or more permitted mixed waste management unit secondary containment areas. If contaminated with dangerous/mixed waste, these structures, tools, and equipment will be decontaminated, if feasible, using one or more of the following technologies to achieve the clean closure performance standard:

- Ultrahigh-pressure water jet
- Rotating cavitation water jet
- Soap scrubbing and wet vacuuming
- Steam vacuuming
- Vacuum abrasive blasting
- Soda blasting
- Shot blasting
- Ice blasting
- Hydroblasting
- Grit blasting
- Cryogenic CO_2 pellet blasting
- Sponge blasting
- Etching
- Rotating brushes/honing

More aggressive decontamination methods may be used on concrete if it becomes necessary to remove mixed waste accumulations that extend into the concrete:

- Needle scaler
- Paving breaker or chipping hammer
- Piston scabbler

These decontamination technologies were chosen based upon demonstrated effectiveness in a radioactive environment and the ability to successfully achieve the RCRA closure performance standard. These technologies are covered under the generic physical or chemical extraction technology categories listed in 40 CFR 268.45, Table 1. This approach is consistent with Ecology guidance (Ecology 2005) to achieve clean closure.

Specific methods of decontamination (and removal and disposal if required) of the permitted mixed waste management unit components and equipment will be determined at the time of closure. These methods will be based on information in the operating record, including historical mixed waste releases, and DOE plans for future use of the buildings. The feasibility, or practicality, of decontamination depends on many factors that cannot be fully defined until the closure plan is finalized. Decision criteria may include, but are not limited to, radiation hazards, secondary mixed waste volumes, schedule and budget restrictions, and availability of TSD facilities to receive secondary mixed wastes. Equipment and debris that are not decontaminated will be disposed of as mixed waste.

Decontamination solutions from interiors of tanks, attached piping, and other equipment will be collected in tank drain piping and collection tanks. Decontamination solutions from tank and pipe exterior surfaces, and from decontamination of other free-standing ancillary equipment and secondary containment walls and floors in the four types of permitted mixed waste management units will be collected in secondary containment area sumps, then transferred by pumping or gravity drainage to plant wash collection tanks. Exceptions to this process may include decontamination of small surface areas where drainage may be captured in portable collection basins or buckets. Transfers of decontamination solutions to the LERF/ETF, CWC or another on-site TSD unit, or if the waste is non-mixed, to an off-site TSD facility, are addressed in Section 11.3.2.

The decontamination solutions and residues will be designated on the basis of process knowledge, or sampling and analysis if necessary, and transferred by existing hard piping to the LERF/ETF. The pipe connection to the LERF/ETF will be one of the last WTP components to be taken out of service, after decontamination activities are complete. The last few decontamination activities may require the collection of wastewater in a temporary sump and container, and will be transported by truck to the LERF/ETF.

Solid residues will be collected into containers by vacuuming or mechanical means (such as sweeping or shoveling), treated, if necessary, at the WTP, CWC, or WRAP to stabilize or solidify the residues, and disposed in the LLBG or a permitted disposal unit on the Hanford Site. Off-site mixed-waste landfill disposal facilities may be considered if an appropriate Hanford Site unit is not available.

Contaminated debris and solid decontamination residues removed from the WTP will be designated and packaged to meet the waste acceptance criteria of the receiving facility. Sampling of equipment and solid residues that are known to be contaminated and are intended for disposal is not necessary, if process knowledge is adequate to accurately designate the waste with the proper dangerous waste identification codes. Process knowledge includes the operating record, which should provide adequate waste analyses and waste processing histories for each permitted mixed waste management unit in the WTP.

Information to support disposal of melters and other debris will be provided in a revised closure plan to be submitted before the start of closure.

11.3.3.1 Secondary Containment Structures and Associated Equipment

Within most of the process areas, stainless steel liners supported by steel reinforced concrete structures provide secondary containment for the process tanks, miscellaneous units, HLW melters, LAW melters,

and ancillary equipment. Coated concrete surfaces (the walls and ceilings above the liners) in lined mixed waste management areas are not part of the required dangerous waste secondary containment structure, although additional controls may be provided for splashes and airborne contamination. Concrete in stainless-steel lined permitted secondary containment areas, where control of splashes, washdown sprays, or airborne contamination is necessary, will be coated during construction with a durable chemical-resistant impermeable protective coating. Top edges of the liner plates in these secondary containment areas will be sealed to the concrete surface.

Steel liners and coated concrete surfaces will be inspected visually. The visual inspection may be conducted remotely using CCTV. The purpose of the inspections will be twofold: to identify and map cracks that might provide a migration pathway for contaminants and to identify areas that are potentially contaminated with mixed waste or waste residues.

Identified cracks in secondary containment areas will be sealed to prevent infiltration of decontamination solutions between the stainless steel liner and the concrete, or migration into cracks in concrete. Coated concrete and liner surfaces will be decontaminated to achieve the clean debris surface standard using chemical extraction, or if necessary, through physical extraction as described in Section 11.2.0.

Secondary containment areas with concrete surfaces are eligible for decontamination by chemical extraction only if the protective coating is intact. Minor cracking in the protective coating will not disqualify the concrete surface from being eligible for classification as a clean debris surface, if that surface has not been directly exposed to dangerous waste as a result of a container leak or some other release mechanism. The facility operating record will be consulted before decontamination work begins to identify those permitted mixed waste management units where leaks or other dangerous/mixed waste releases have occurred. These permitted secondary containment areas will also be physically inspected to determine whether the protective coating is intact, and whether undocumented evidence of a mixed waste release is present.

Secondary containment areas with intact protective coatings may be decontaminated with water washing if necessary. If additional decontamination is necessary, other technologies will be used, such as chemical decontamination solutions, ultrahigh-pressure water technologies, impact technologies such as sand blasting and CO_2 blasting, or other new technologies that may be developed prior to closure. Physical extraction methods that remove up to 0.6 cm of concrete will be necessary on concrete surfaces where the protective coating has peeled, bubbled, or is broken (before or after decontamination), exposing bare concrete. Stainless-steel liners may also require physical extraction treatment to remove mixed waste residues or corrosion. Inspections of the concrete and liner surfaces for a clean debris surface will be documented in an inspection record. Details of the decontamination methods to be used will be developed and submitted for approval prior to initiating closure activities.

Concrete and steel grinding, scaling, or scabbling residues will be collected, placed in containers, and sampled and analyzed for indicator constituents.. The parameters, or the residues, will be designated based on knowledge of the process or the waste that contaminated the concrete or steel.

The operating record will be reviewed prior to closure to determine if decontamination procedures should be performed in any areas outside the permitted unit secondary containment areas. These areas may include equipment decontamination bays or secondary containment sumps in transfer tunnels, or other locations where mixed wastes may have been generated or transferred during the operating life of the WTP and accidentally released. A final revised closure plan that includes areas identified as a result of the operating record review will be submitted to Ecology for review and approval before closure starts. Floors and walls in non-permitted areas of the building (such as offices, lunch rooms, or bulk storage areas for non-hazardous materials) that do not have documented releases of dangerous or mixed waste are not included in this closure plan.

11.3.3.2 Building Air Emission Control Equipment

Building air emission control (i.e., heating, ventilation, and air conditioning, HVAC) equipment will remain in place and in operation as necessary to facilitate deactivation and decontamination of the WTP. HVAC equipment will be taken out of service in stages as radiological contamination is progressively removed or reduced. Compliance with applicable air emission standards and permits will be maintained. Air permits for operations will be evaluated to determine if they will support closure activities. The permits will be modified if necessary.

After completion of decontamination operations that may generate fumes, vapors, or dust that will be controlled by the building ventilation system, the HVAC equipment will be decontaminated, then dismantled, and reduced in size to the extent necessary to facilitate preparation for disposal. DOE may determine that the HVAC equipment will remain in place after closure.

Modifications to air emission standards or other appropriate standards to prevent or minimize the release of dangerous waste or dangerous waste constituents to the air or surrounding environment during closure will be specified in the revised closure plan to be submitted before the start of closure.

11.3.3.3 Soil

Discovery of an apparent or potential breach in a cell liner or in the protective coating in unlined permitted secondary containment areas, on an exterior wall, or bottom floor adjacent to soil will require further investigation. The presence of soil contamination will be a unit-specific determination based on WTP records and direct visual or CCTV inspection of the stainless-steel liners and concrete surfaces as described in Section 11.2.0. The liner will be removed to allow access for additional investigation and decontamination if this inspection reveals areas of poor liner integrity such as severe corrosion, weld breaks, or other damage to the steel. Coring and soil sampling will be performed if a liner breach or damaged protective coating is found on a wall or floor adjacent to external soil and if the concrete has lost integrity at that location. If the concrete is not cracked, deteriorated, or porous, and a clean debris surface can be obtained by physical extraction treatment, no further investigation or soil removal may be necessary. If soil is sampled, it will be analyzed for indicator constituents of concern identified on the basis of the mixed wastes contained in that permitted mixed waste management unit during the operating life of the plant.

If soil having levels of contamination that exceed the risk-based soil cleanup levels is found, it will be removed and managed as media containing dangerous waste, and will be designated and disposed of accordingly at a permitted disposal facility. Soil at the limits of excavation will be sampled and analyzed after removals are completed to confirm that the concentrations of dangerous waste constituents are below the risk-based exposure limits. The appropriate risk-based cleanup standard will be consistent with the future land-use classification from the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (DOE 1999). Risk assessment principles will be used to establish clean closure concentration limits for soils in accordance with WAC 173-303-610(2)(b)(i).

11.3.4 Sampling and Analysis to Identify Extent of Decontamination/Removal and to Verify Achievement of Closure Performance Standard

If there are stainless-steel lined secondary containment breaches or concrete that has lost integrity, efforts to define the extent of contamination will use a graded approach using field screening and survey followed by verification sampling if needed. This section is an outline for a SAP that describes the approach that will be followed for verification sampling. The SAP will also assist in confirming that decontamination and/or removal activities have attained the closure performance standard. Sampling may be employed where the clean debris surface standard cannot be met, such as interior tank and pipe surfaces, or where evidence is found indicating apparent failure of permitted mixed waste management unit secondary containment such as liner cracks.

However, the SAP cannot be finalized at this time because the dangerous waste COCs at each permitted dangerous/mixed waste management unit and restrictions on sampling and analysis activities due to high radiation levels are not adequately defined. Prior to closure, this closure plan will be revised to specify sampling and analysis techniques in a site-specific SAP that may include: sampling to determine the extent of dangerous/mixed waste contamination, sampling objectives, analytical parameters, sampling methods and locations, identification of sampling preservation, sampling and data quality control, the evaluation and reporting of data, and the chain-of-custody record.

Additional information, as follows, may be provided in the revised closure plan to be submitted prior to closure:

- Health and safety plan
- Details on sampling equipment
- COC indicator parameters for decontamination solution analyses
- Analytical methods that deviate from *Test Methods for Evaluating Solid Waste, Physical Chemical Methods* (EPA 1986), if any

11.3.4.1 Sampling to Confirm Decontamination of Structures and Soil

Sampling of decontamination solutions may be conducted for equipment, structures, and debris that do not meet the clean debris surface standard following the decontamination process. This sampling will serve to define the extent of remaining contamination or confirm adequate decontamination of equipment, structures, or debris. The sampling process will be repeated after each subsequent round of decontamination effort until the decontamination effort is either determined to be successful, or is terminated, and the contaminated component is removed and disposed of as dangerous or mixed waste.

Soil found to be contaminated will be removed as part of the closure activities, and sampling will be performed to confirm that levels of contamination in the remaining soil do not exceed Ecology-approved risk-based soil cleanup levels. The Sampling and Analysis Plan for WTP is referenced in Appendix A.

11.4 Other Activities

This section describes the procedures to be followed in order to comply with closure certification requirements, to control run-on and runoff during closure, and to reuse equipment from the plant.

11.4.1 Certification of Closure

WAC 173-303-610(6) requires that within 60 days of completion of closure activities of the permitted dangerous/mixed waste management units, a closure certification will be submitted to Ecology. Following completion of closure, DOE (or the DOE-selected contractor) and an Independent Qualified Registered Professional Engineer will submit certifications that the permitted mixed waste management units have been closed in accordance with the approved closure plan. The certifications will be submitted in accordance with the Hanford Facility Dangerous Waste Permit (Ecology 2009) Condition I.I.1 to the following address:

Program Manager, Nuclear Waste Program
Washington State Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

The following documentation will be prepared to support the closure certification, and will be provided or accessible to Ecology on request:

- Field notes related to closure activities
- A description of deviations from the approved closure plan and justifications for these deviations

- Documentation of the final disposition of dangerous wastes and dangerous waste residues, including contaminated media, debris, and treatment residuals
- Laboratory and field data (including quality assurance and quality control data) for samples and measurements, including those taken to determine background conditions or to determine or confirm clean closure
- A summary report that itemizes the data reviewed by the independent registered professional engineer and tabulates the analytical results of samples taken to determine or confirm clean closure

A draft decontamination documentation checklist and an example of RCRA closure certification statement are provided in Figure 11-1 and Figure 11-5, respectively.

Ecology will verify that the requirements for closure certification are properly completed per WAC 173-303-610(6). If the closure certification is accepted, Ecology will inform DOE of the acceptance in writing.

11.4.2 Run-on and Runoff Control

No runoff or run-on resulting from precipitation or surface water flows is anticipated in the areas undergoing closure. The WTP permitted dangerous/mixed waste management units are enclosed within highly secure reinforced concrete and steel frame buildings, with the exceptions noted below. Wash water or other liquids resulting from decontamination activities will be contained by WTP containment structures - floors, walls, ceilings, sumps, and catch tanks.

The only permitted mixed waste management units that may be exposed to direct precipitation are the two process condensate vessels outside the pretreatment building. The failed melter storage building will be a separate freestanding unit, and run-on or runoff control will be assured for this unit before and during operation of the WTP, as well as during the closure period. There will be no changes in the secondary containment capacities or runoff control design for this unit during closure activities.

Activities such as groundwater monitoring and run-on and runoff control will be described in a revision to the closure plan prior to closure.

11.4.3 Equipment Reuse

Equipment may be decontaminated and reused during or after closure, if practicable. For example, contaminated (radiological) material and handling equipment such as shield doors, cranes, and power manipulators may be decontaminated in order to reduce radiation dose rates. This will allow initial or repeated personnel entry to areas where additional decontamination, debris size reduction, or packaging and encapsulation activities will be conducted. Equipment described in Sections 11.3.0 and 11.6.0 will be decontaminated using methods selected from those specified under 40 CFR 268.45, or equivalent technologies.

Criteria for determining whether equipment will be reused or disposed of include the following:

- Degree of contamination (radiological)
- The need to minimize potential worker radiation and dangerous/mixed waste exposures during decontamination; the amount of decontamination residues that would be generated
- The value of the equipment
- Compliance with the approved schedule and budget

Equipment that could be used by DOE in future operations at the WTP site, in other Hanford projects, or at different DOE facilities, may be decontaminated first.

11.5 Maximum Waste Inventory

The estimated maximum mixed waste inventory for each type of permitted mixed waste management unit is listed in Table 11-1. These are total storage capacity volumes from the WTP Part A form in Chapter 11.

The actual volumes present at the start of the closure period will be much less than values shown in the table. For example, the containment buildings and container storage areas may be empty or nearly empty on the date of completion of treatment of the final volume of waste feed, and the tank systems are not likely to contain more than a few percent of the maximum capacity.

11.6 Closure of Tanks, Container Storage, Containment Buildings, and Miscellaneous Units

This section of the closure plan identifies specific closure requirements for each type of permitted mixed waste management unit at the WTP, and describes the removal of wastes and equipment, decontamination of the unit, and disposition of decontamination residues. A summary of the closure standards and activities for each type of permitted mixed waste management unit is provided in Table 11-2.

The performance standards and closure activities for many of the mixed waste management unit components are similar or identical for the four types of units, as indicated in the table. Differences in the detailed closure procedures will be due in part to variations in permitted mixed waste management unit design, and different ancillary equipment present in various units, even in units of the same type. In the process cells/caves secondary containment areas for tanks or miscellaneous units, initial decontamination activities will be performed remotely, while the same types of activities may be performed by personnel in most of the other mixed waste management units, such as container storage units.

An overall estimate of the volume of closure wastes to be generated has not been prepared, due to the uncertainties regarding final disposition of the WTP equipment and structures. The estimate of the volume of closure wastes will be provided in an amended closure plan and submitted for approval prior to initiating closure activities. The volume of decontamination wastes that will be generated may be relatively large if most of the tanks, piping and related equipment, and major portions of the concrete and steel structures are removed and disposed of as waste. Volume of wastes may also be large if the same equipment and structures are completely decontaminated, resulting in large amounts of secondary residues, personnel protective equipment, and decontamination solutions. The volume of immobilized waste that will be generated during the closure period depends in part on the composition of the final batch of waste feed, which cannot be predicted at this time.

11.6.1 Closure of Tank Systems

Tank systems will be decontaminated using chemical and/or physical extraction technologies. Types of tank systems that will be decontaminated include, but are not limited to, the following:

- LAW and HLW feed and storage tank systems
- Evaporators and condensers
- Waste filtration tanks
- Ion exchange tanks
- PTF condensate tanks

Types of ancillary equipment that may be decontaminated include, but are not limited to, the following:

- Waste transport, rinse, and washdown piping
- Pumps, agitators, wash rings, and ejectors
- Air, steam, and water lines in secondary containment areas

- Intra-facility pipelines

Decontamination of tank systems including tanks, piping, and other ancillary equipment will be conducted using chemical extraction technology and water washing and spraying. High-pressure steam or other physical extraction technologies identified in Section 11.3.3 will also be used to remove contamination if necessary. The decontamination procedures for closure of tanks will include, but may not be limited to, the following:

- Tank systems will be flushed after the final batch of bulk waste has been processed through that tank system. Large-volume flush solutions will remove as much waste as possible before smaller scale decontamination work begins. Flush water will be transferred to the pretreatment evaporation and ultrafiltration systems, and the concentrates will be sent to the HLW melter for vitrification, if the HLW vitrification system is operating. (If either or both vitrification systems will not be operating during the first phase of the closure period, this closure plan will be revised to account for changes in treatment and disposal of waste feed and flushing wastes, as necessary.) Water condensate from the evaporator will be routed to the LERF/ETF. The HLW melter will be shut down after flushing wastes are treated. Tank decontamination activities to be performed after completion of flushing may involve any of the chemical or physical extraction technologies identified in Section 11.3.3. Used decontamination solutions will be transferred to the LERF/ETF or another permitted TSD facility.
- Physical evidence of mixed waste contamination in the secondary containment systems may be used, in addition to the operating record, to determine whether decontamination of the exterior of a tank system is needed. Before using decontamination solutions on the outside of a tank, the floor and wall liners will be inspected for cracks or other breaches. The cracks will be sealed before beginning decontamination treatment, or other engineered containment devices (such as collection basins) will be used to collect and contain solutions. The outer tank surface then will be cleaned with water or detergents, or other technologies as necessary, and rinsed. Decontamination of secondary containment for permitted mixed waste management units will be similar or identical to the procedures used for mixed waste container storage and containment building units.
- After the tanks are decontaminated, the tank interiors may be inspected using CCTV cameras to determine compliance with the clean debris surface standard. Because of possible radiation exposure, visual inspection of the process cells may be performed remotely using a camera with a zoom lens, or using another device that allows verification that the standard is met. Inspections will be documented in an inspection record.
- The outside of the tanks also will be inspected for compliance with the clean debris surface standard, and inspections will be documented in an inspection record.
- If tanks or ancillary equipment cannot be determined by visual inspection to meet the clean debris surface standard, the tanks may undergo further decontamination, or rinsate samples may be obtained to determine if the decontaminated tank meets the designation limit performance standard for clean closure. Before or after decontamination efforts, a tank system may be designated as mixed waste debris, removed, reduced in size, packaged, treated by encapsulation, and sent to a permitted disposal facility.
- Decontamination residues will be collected, designated, and transferred to a permitted disposal facility.

The decontamination procedures for piping and ancillary equipment will include, but will not be limited to, the following activities:

- The facility design and process information, in combination with operating records, will be used to identify the equipment associated with treatment of mixed waste. Piping that may have carried

mixed waste or may have become externally contaminated with mixed or dangerous waste will undergo decontamination. Contaminated piping may include waste transfer piping, sump contents transfer piping, nitric acid transfer piping, and other piping associated with waste treatment and secondary waste transfer.

- The piping will undergo bulk flushing at the same time the tanks are flushed. Flushing of the pipes and other ancillary equipment will remove the waste in order to meet the clean debris surface standard. Chemical and/or physical extraction technologies may be used to attempt to remove the remaining waste from piping and other ancillary equipment. Where it is not possible to visually verify that the clean debris surface standard has been met, verification may be attempted by rinsate sampling, analysis, and comparison of analyses with designation limits.
- If it is not possible to meet the clean debris surface standard or designation limits, contaminated portions of the piping and ancillary equipment will be removed, designated as dangerous/mixed waste, packaged in waste containers, transferred to the CWC or another permitted unit, encapsulated, and disposed of at a permitted landfill disposal unit on the Hanford Site. Encapsulation may be performed at the CWC or elsewhere.

11.6.2 Closure of Container Storage Areas

Each permitted mixed waste container storage unit will be evaluated for historical spills or other releases of dangerous or mixed wastes by review of the facility operating records and by visual inspection. The visual inspections will determine if the container storage unit can be declared clean using the clean debris surface standard by checking for signs of any spills and/or releases of waste and loss of integrity, breaks, cracks, gaps, and other signs of deterioration of container storage area floors. If the record review and inspection support the conclusion that no releases of dangerous/mixed waste to the floor occurred, no further decontamination or sampling work will be required for that permitted mixed waste container storage unit. If either the inspection or record review indicate that dangerous/mixed waste releases to the floor of a mixed waste container storage occurred, decontamination will be required. If the protective coating is intact, physical extraction treatment will not be performed. If the coating is cracked or more severely damaged, physical extraction treatment will be required to remove at least 0.6 cm from the original surface. If the extent of the historical releases (the actual location on the floor) cannot be determined, the entire floor surface of the container storage area will be treated. If the resulting surface cannot be documented as a clean debris surface, the treatment may be repeated or the full thickness of the floor may be removed. The solid residues or rubble produced by treatment or removal will be disposed of as dangerous/mixed waste, unless sampling and analyses are performed to support a request for an Ecology determination that the rubble is not dangerous/mixed waste.

The presence of through-thickness cracks or other loss of integrity, if found in concrete floors that rest directly on soil, in secondary containment areas where dangerous/mixed waste releases are documented or suspected, may require a soil contamination investigation. Examples of adequate evidence that a release may have occurred include discoloration or staining of the concrete, odor, or elevated radiation readings observed during the initial closure inspection. Soil and possibly concrete samples will be obtained by coring in the vicinity of known or suspected mixed waste releases. Soil contaminated at concentrations above the risk-based soil cleanup levels will be removed, and confirmation samples will be taken at the limits of the excavation to confirm adequate removal. If analytical results are less than the Hanford soil background levels but greater than the risk-based soil cleanup concentrations, a request for approval of a clean closure-determination will be submitted to Ecology. The request will be supported with the analytical and other pertinent data for that mixed waste container storage unit.

If soil contamination is so extensive that the zone of contamination cannot be practically removed, or if groundwater contamination could result, the closure plan will be revised to provide for additional investigation and measures to address corrective action requirements.

Decontamination documentation will be prepared as described in Sections 11.3.4 and 11.4.1.

11.6.3 Closure of Containment Building Units

One containment building unit, the pretreatment plant hot cell maintenance area containment building unit, will be used for secondary waste (mostly debris) decontamination, size reduction, and packaging operations throughout the operating life of the WTP. It may be used for these same functions during the closure period. The HLW melter (cave) containment building may be used for similar operations during closure, after the normal melter operations have been completed. In particular, the HLW melter containment building may be used to partially decontaminate and overpack failed HLW melters that were stored in the failed melter storage building (container storage area) during the operating life of the plant.

After completion of operations to facilitate closure of other permitted mixed waste management units, the melters and associated spent parts, feed apparatus, and off-gas control equipment will be removed. The containment buildings will be closed in the same manner, following the same inspection, decontamination, and documentation requirements identified in Sections 11.6.1 and 11.6.2 for tank system secondary containment areas and mixed waste container storage units. Several significant differences in design and mixed waste types may result in substantially longer time requirements for closure of the permitted containment building units, as compared to mixed waste container storage units. For example, most operations in the HLW melter cave will be conducted with remotely operated equipment until the final decontamination stages are reached. Complex remote operations are necessarily slow, and the full extent of necessary decontamination, size reduction, and packaging work will not be known until the final stages of closure. The ILAW container finishing line and container fixative containment building units are also larger and contain more equipment than most of the mixed waste container storage units.

Other containment building units are more similar to mixed waste container storage units, including coated concrete rather than cladded floors and walls. These containment buildings will be closed in the same manner as the mixed waste container storage units (Section 11.6.2), with the added complications of various types of waste handling equipment such as power manipulators, cranes, and the LAW LSMs.

11.6.4 Closure of Miscellaneous Units

The HLW and LAW melters are miscellaneous units. Several times during the life of the WTP, spent melters will be removed from the HLW melter cave and LAW LSM gallery containment buildings. Removal and replacement of spent melters is not considered closure. One or more of the LAW melters may actually be removed and not replaced before the start of the closure period. The HLW melter is planned to be operating during the deactivation period (the first part of the closure period). If necessary, the HLW melter may be removed and replaced during the closure period to provide treatment for the residues from tank system flushing operations. Such removal and replacement would not be considered closure, although it may occur during the closure period.

LAW melter operating equipment openings will be closed and the exterior surfaces decontaminated. The melters will be removed from the LAW melter gallery as intact assemblies, encapsulated, if required, and shipped to the LLBG or another permitted treatment/disposal unit. Failed HLW melters may be stored during the closure period, while treatment, transport, and disposal operations are arranged. HLW melters may be partially decontaminated and packaged in an overpack in the HLW melter cave during the final phases of closure activities. HLW melters in the failed melter storage building (container storage area) may be returned to the HLW melter cave for partial decontamination and packaging. Both types of melters will be treated in accordance with the immobilization treatment standard and disposed of at permitted mixed waste disposal facilities.

Removal of melter components will be accomplished according to standard procedures for the operational period of the plant. Special HLW melter closure activities, such as size reduction, decontamination of components, or packaging of components and decontamination residues, may require the development of new procedures or the installation of new equipment.

Other miscellaneous units such as offgas scrubbers, condensers, precipitators, reboilers, oxidizers, and adsorbers will be closed in the same manner, following the same inspection, decontamination, and documentation requirements identified in Sections 11.6.1 and 11.6.2 for tank systems and container storage areas.

11.7 Schedule for Closure

For the purposes of this closure plan, the design life of the WTP is estimated at 40 years of operations. The estimated three-year schedule for closure is provided in Figure 11-7.

As required by WAC 173-303-610(3)(c), WTP will notify Ecology at least 45 days before the date on which the closure period is expected to start. In addition, WAC 173-303-610(3)(c) requires that the closure period begin no later than 30 days after the date on which WTP receives the final volume of dangerous waste. Due to the complexity of the WTP operations, the 30-day requirement to start closure activities will likely be unable to be met. Processing of the final batch of waste feed may require approximately nine months after receiving the final waste feed transfer from the DST system unit. Additional evaluation of the schedule will be conducted prior to closure.

The date of receipt of the final volume of bulk waste feed in the melters and various other specific individual permitted mixed waste management units within the WTP will be at the end of the processing of that final batch of waste feed. This date will roughly correspond to the date of the start of deactivation operations. The pretreatment and HLW feed preparation and melter systems may continue to operate for several months after the start of the closure period. These systems will be processing the tank system flush solutions and producing immobilized waste glass containing most of the residual waste constituents left in the tanks at the start of the closure period.

The year the WTP permitted mixed waste management units close will depend on the time required for the initial portion of the tank waste inventory to be processed, the degree of success in this mission, and whether the WTP will be used to continue to process the remaining Hanford tank waste inventory. Other factors that could affect the year of closure include changes in operational requirements, lifetime extension upgrades, a different operating contractor, and other unforeseen factors.

This estimated three-year closure schedule is necessarily general and is not meant to be definitive. For example, completion of decontamination of the pretreatment building and residue removal is shown at approximately 21 months after the start of the closure period. However, decontamination of the LAW and HLW vitrification plant tanks and other permitted mixed waste management units is expected to require use of pipelines through the pretreatment building to transfer decontamination solutions and rinsates to the LERF/ETF. Therefore, the final decontamination of piping and collection tanks in the pretreatment building may not be completed until after the LAW and HLW vitrification plant tanks and other permitted mixed waste management units are decontaminated.

A more specific schedule will be provided in the revision of this closure plan prior to the start of closure activities. The revised schedule will take advantage of final design and operating procedure information that is not available at this time. The schedule for closure will include a breakdown of activities to be performed after the date of completion of vitrification processing of the last batch of waste feed from the DST system.

11.8 Extension for Closure Time

The following discussion addresses the extension of the dangerous/mixed waste removal and closure time periods as specified in WAC 173-303-610(4)(a) and (b), respectively. The first citation requires that within 90 days after receiving the final volume of dangerous waste (the DST waste), the owner or operator will treat, remove from the dangerous/mixed waste management unit, or dispose of all dangerous wastes in accordance with the approved closure plan. The second requirement is that all closure activities will be completed within 180 days after receiving the final volume of dangerous waste.

The need for more than 90 days to remove dangerous/mixed wastes and more than 180 days to complete closure activities is anticipated. This need is due in part to the high radiation fields in many of the mixed waste management units, even after the entire bulk waste inventory has been processed and the residues (the inventory present at the start of the closure period) are removed by flushing. Processing of the final batch of waste feed may require approximately nine months of operation at or near design capacity of the plant, prior to the start of deactivation and closure work. As explained in Section 11.7.0, these processing operations will be completed, or nearly completed, at the start of the closure period.

The large number of mixed waste management units and extensive integrated ancillary equipment such as piping, valves, filters (mostly welded together), and the need to coordinate closure activities with other TSD units both at Hanford and offsite, means that more time will be required for closure than would be necessary for a typical dangerous waste management facility.

The decontamination operations described in this closure plan are intended to avoid excessive secondary waste generation and to provide for the recycling of some pieces of equipment. The decontamination operations will include extensive use of chemical and physical decontamination treatment technologies. Incineration is not considered as an option for dangerous/mixed wastes to be generated during closure. Solidification, encapsulation, and landfilling of dangerous and mixed wastes will be deliberately minimized. The volumes of wastes that will be disposed of will also be minimized to the extent practical by physical size reduction. Size reduction will allow packaging of large tanks, pipe, and support structures in relatively small, densely packed drums or waste boxes. These waste management priorities are emphasized to support this request for extension of the waste removal and closure periods, as suggested in Section 8.3 of the Ecology *Guidance for Clean Closure of Dangerous Waste Units and Facilities* (Ecology 2005).

The WTP operator will take the actions necessary to prevent threats to human health and the environment from the unclosed but not operating WTP, including compliance with applicable permit requirements. During the first several months of the closure period, a large portion of the plant will be operating to remove waste residues from the tank systems to the maximum practical extent. Flushing, vitrification, and other deactivation activities will require continued security and monitoring of the other non-operating portions of the plant, and no part of the plant will be unsecured or abandoned during the closure period.

If necessary, an extension of the three-year closure schedule will be requested and the need for the extension demonstrated in accordance with WAC 173-303-610(4)(a) and (b). The request would be determined prior to initiating closure activities, or during closure activities should closure conditions necessitate. A revised closure plan will be submitted for approval if an extension is necessary.

Condition II.R.1 Hanford Facility Dangerous Waste Permit (Ecology 2009) requires the Permittees to notify Ecology in writing, as soon as possible, of deviations or expected deviations from the schedules of the permit. The Permittees will include with the notification information supporting their claim that they have used best efforts to meet the required schedules. If Ecology determines that the Permittees have made best efforts to meet the schedules of the permit, Ecology will notify the Permittees in writing by certified mail that the Permittees have been granted an extension. Such an extension will not require a permit modification under Condition I.C.3. Should Ecology determine that the Permittees have not made best efforts to meet the schedules of the permit, Ecology may take such action as is deemed necessary. Copies of correspondence regarding schedule extensions will be kept in the operating record.

Condition II.R.1 Hanford Facility Dangerous Waste Permit (Ecology 2009) provides that any schedule extension granted through the approved change control process identified in the *Hanford Federal Facility Agreement and Consent Order* (Ecology, EPA, and DOE 1998) will be incorporated into the permit. Such a revision will not require a permit modification under Condition I.C.3.

Table 11-1 Maximum Waste Inventory

Mixed Waste Management Unit	Maximum Inventory [a]
Total container storage	1,089,000 gal
Total tank storage	5,276,000 gal

[a] Miscellaneous (e.g., melter and offgas equipment) and containment building units are not counted, as they will be processing the volumes previously stored in tanks, and producing treated and secondary wastes that are included in the container storage total.

Table 11-2 Clean Closure Performance Standards and Activitiesa

Mixed Waste Management Unit Type	Components	Performance Standards	Closure Activities
Tank system	Exterior surfaces Interior surfaces Ancillary equipment Secondary containment	Clean debris surface, designation limits, or removal	Extraction technologies or removal of tanks Liner and concrete decontamination and/or removal
Container storage area	Floor, walls, and ancillary equipment	Clean debris surface, designation limits, or removal	Extraction technologies Liner and concrete decontamination and/or removal
Containment building	Floor, walls, and ancillary equipment	Clean debris surface, designation limits, or removal	Extraction technologies Liner and concrete decontamination and/or removal
Miscellaneous units (melter)	Melters and ancillary equipment	Removal	Removal
Miscellaneous units (others)	Exterior surfaces Interior surfaces Ancillary equipment Secondary containment, as applicable	Clean debris surface, designation limits, or removal	Extraction technologies or removal of miscellaneous units Liner and concrete decontamination and/or removal

[a] Refers to WAC 173-303-610 and 40 CFR 268.45, Table 1, as incorporated by reference at WAC 173-303-140 (2)(a).

DECONTAMINATION CHECKLIST

This checklist is intended to document decontamination work and the attainment of a clean debris surface for the following components, structures, and materials.

1 Building or location:
2 Component or Area:
3 Material (such as concrete, metal):
4 Decontamination treatment method[1]:
5 Decontamination treatment parameters:
– Temperature
– Propellant
– Solid media (such as shot, grit, beads)
– Pressure
– Residence time
– Surfactants
– Detergents
– Grinding or striking media (such as wheels, piston heads)
– Depth of surface layer removal in cm (in concrete, for example)
– Other

The decontamination of the building, component, or material identified in steps 1 through 3 was completed as specified at steps 4 and 5.

_____	_____ /	_____
Title	Signature	Date

6 Performance Standard:

I have visually inspected the above-identified material before / after (circle one) decontamination or treatment in accordance with the closure plan. Dangerous waste residues have / have not (circle one) been removed to attain a clean debris surface[2].

_____	_____ /	_____
Authorized Representative	Signature	Date

Notes:

1 Decontamination treatment will use a chemical or physical extraction method as listed in Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45).
2 Clean debris surface as defined in Table 1, Alternative Treatment Standards for Hazardous Debris (40 CFR 268.45): "'Clean debris surface' means the surface, when viewed without magnification, will be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits will be limited to no more than 5 % of each square inch of surface area."

Figure 11-1 Sample Clean Debris Surface Checklist

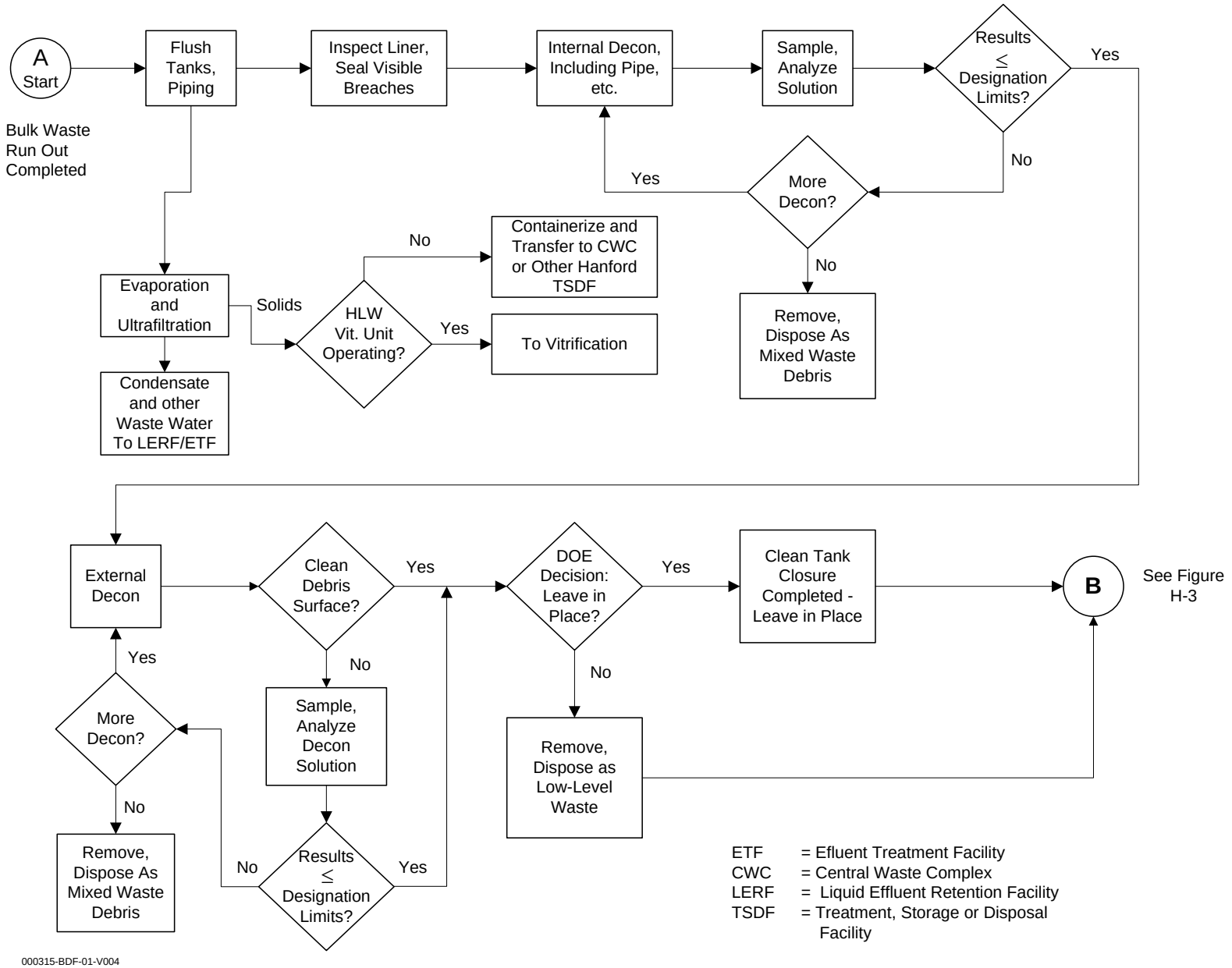


Figure 11-2 Closure Strategy Flowchart for Tank Systems

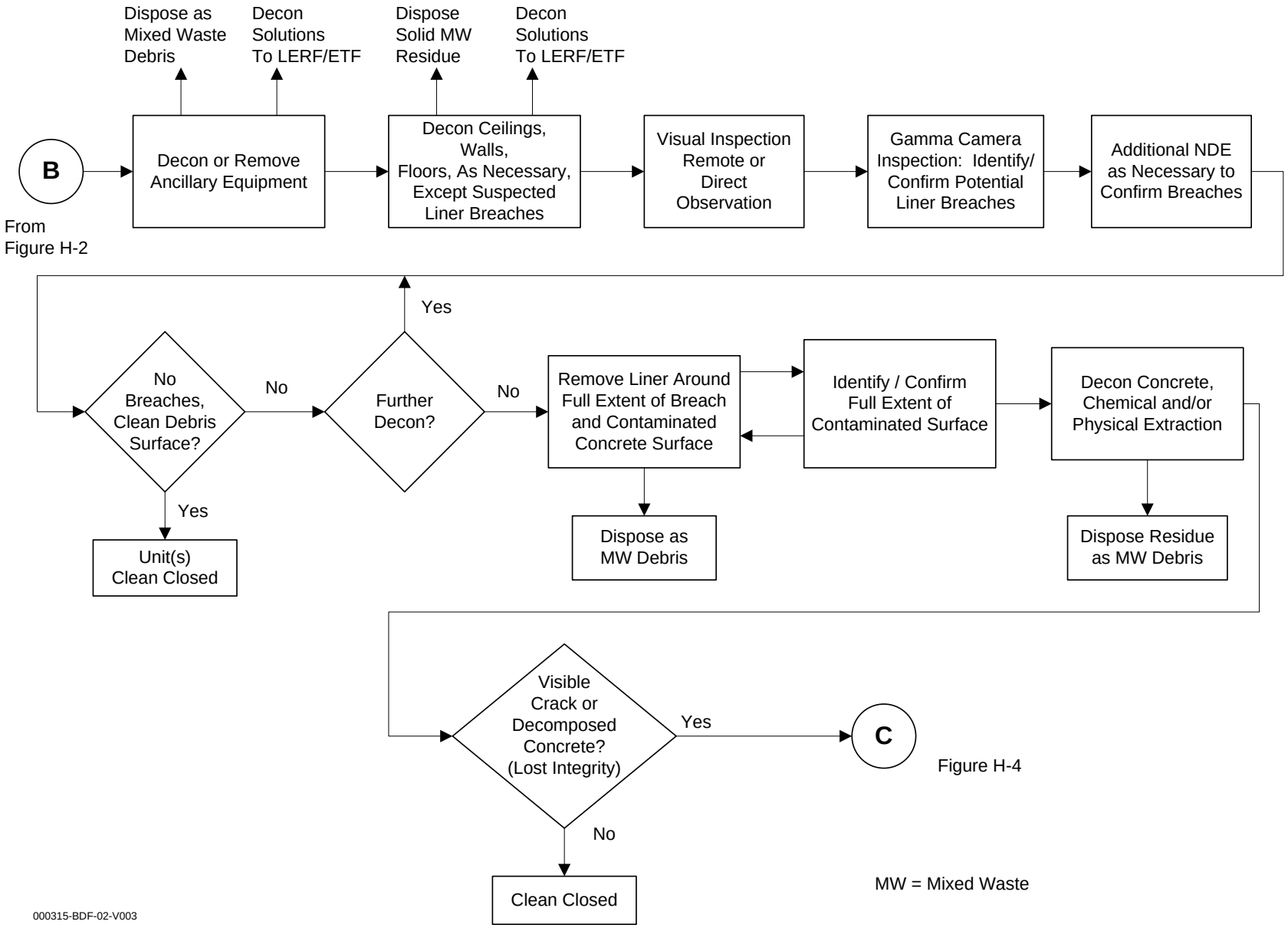


Figure 11-3 Closure Strategy for Container Storage, Containment Building, Miscellaneous Unit, and Tank System Secondary Containment Areas

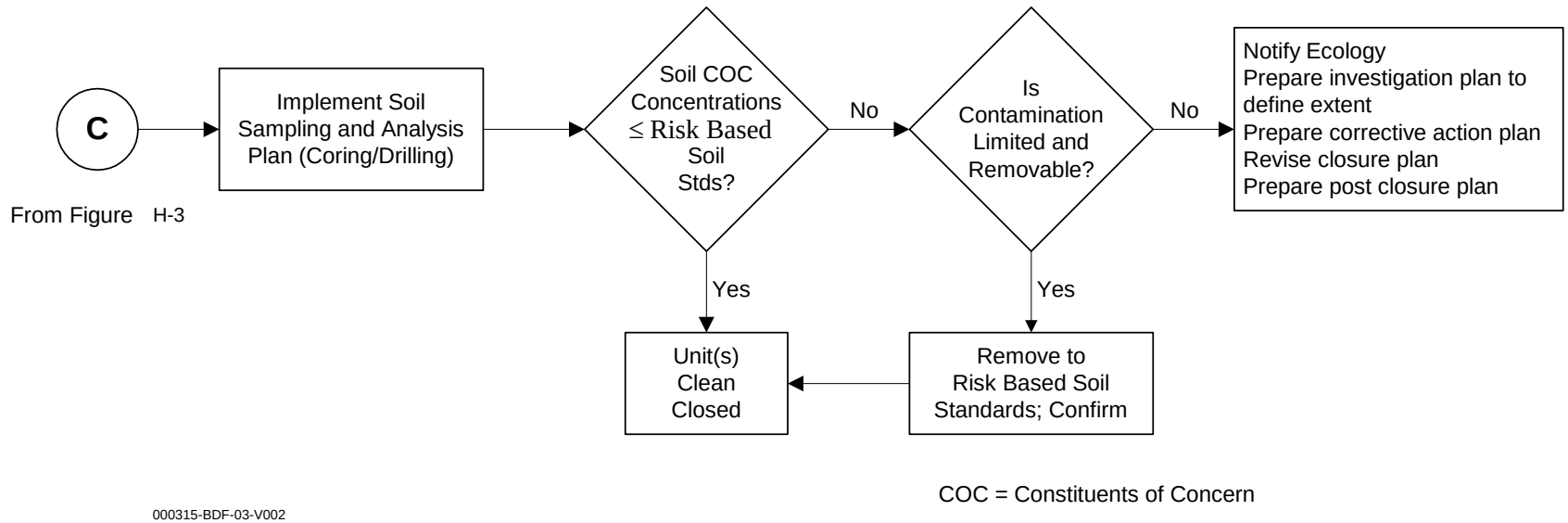


Figure 11-4 Closure Strategy Flowchart for Soils and Groundwater

This page intentionally left blank.

RCRA CLOSURE CERTIFICATION
FOR

River Protection Project – Waste Treatment Plant
Hanford Site
US Department of Energy, Richland Operations Office

We, the undersigned, hereby certify that _____ closure activities were performed in accordance with the specifications in the approved closure plan.

_____	_____ /	_____
Owner/Operator	Signature	Date
_____	_____ /	_____
Contractor Representative	Signature	Date
_____	_____ /	_____
Independent Registered Professional Engineer	Signature	Date

Washington State PE # _____

Figure 11-5 Example Closure Certification Statement

This page intentionally left blank.

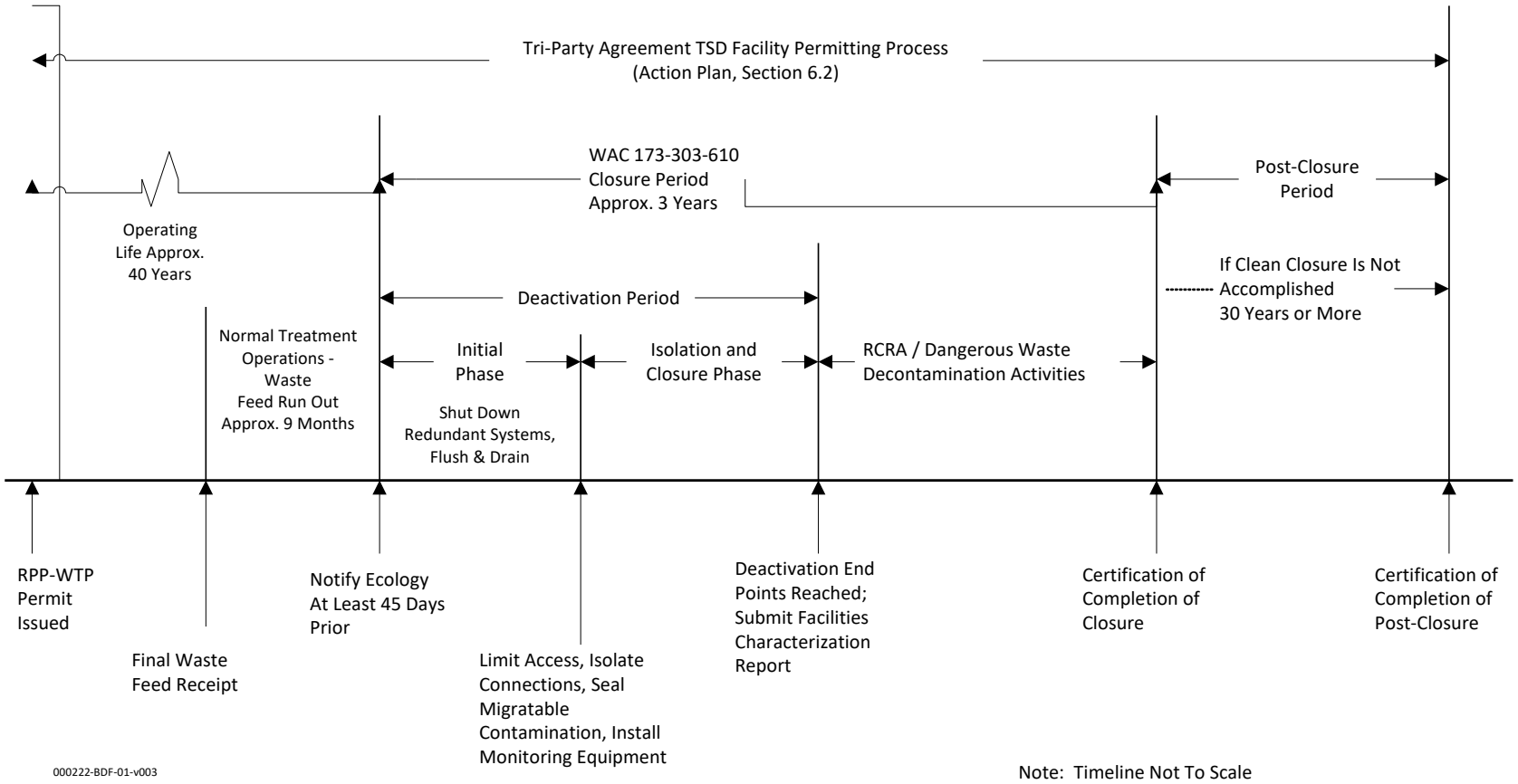


Figure 11-6 WTP Permitting, Deactivation, and Closure

This page intentionally left blank.

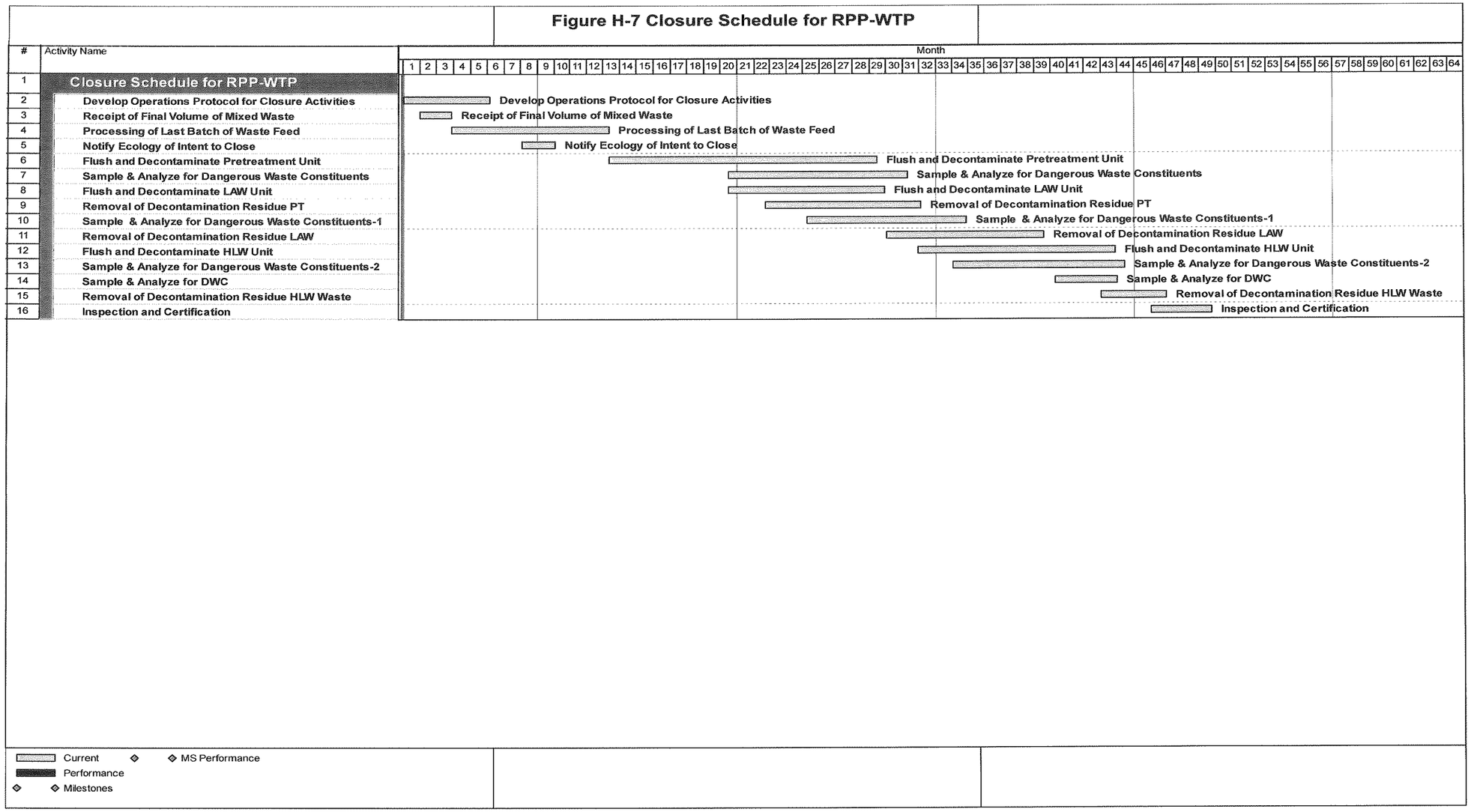


Figure 11-7 Closure Schedule for WTP

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX A
SAMPLING AND ANALYSIS PLAN FOR CLOSURE OF WTP FACILITY
CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
05/23/2016	8C.2016.Q1

This page intentionally left blank.

APPENDIX A
SAMPLING AND ANALYSIS PLAN FOR CLOSURE OF WTP FACILITY

1 **Crosswalk Table of the QAPP Elements to the SAP Sections**

QAPP Element in *EPA Guidance for Quality Assurance Project Plans*, EPA/240/R-02/009, EPA QA/G-5, Table 1	SAP Section Number and Title	
Group A Project Management		
A1 Title and Approval Sheet	--	Approval Cover Page
A2 Table of Contents	--	Table of Contents
A3 Distribution List	--	Distribution List
A4 Project/Task Organization	A.3.1	Project/Task Organization
A5 Problem Definition and Background	A.1 A.4.1	Purpose of Sampling for Closure at WTP Step 1: State the Problem
A6 Project/Task Description	A.2	Sampling Objectives
A7 Quality Objectives and Criteria	A.4	Data Quality Objectives
A8 Special Training/Certifications	A.3.2	Special Training and Certification Requirements
A9 Documentation and Records	A.8	Documentation and Data Management
Group B Data Generation and Acquisition		
B1 Sampling Process Design (Experimental Design)	A.5.1	Sampling Process Design
B2 Sampling Methods	A.5.3	Sampling Methods, Containers and Preservation
B3 Sample Handling and Custody	A.5.4	Sample Handling and Custody
B4 Analytical Methods	A.5.3 A.6.3	Sampling Methods, Containers and Preservation Analytical Methods
B5 Quality Control	A.5.5 A.6.4	Field Quality Control Laboratory Quality Control
B6 Instrument/Equipment Testing, Inspection, and Maintenance	A.5.7 A.6.6	Field Instrument/Equipment Testing, Inspection and Preventative Maintenance Procedures and Frequency Laboratory Instrument/Equipment Testing, Inspection and Preventative Maintenance Procedures and Frequency
B7 Instrument/Equipment Calibration and Frequency	A.5.6 A.6.5	Field Instrument Calibration and Frequency Laboratory Instrument Calibration and Frequency
B8 Inspection/Acceptance of Supplies and Consumables	A.5.8 A.6.7	Inspection/Acceptance of Field Supplies and Consumables Inspection/Acceptance of Laboratory Supplies and Consumables
B9 Non-Direct Measurements	A.7.4	Non-Direct Measurements
B10 Data Management	A.8	Documentation and Data Management
Group C Assessment and Oversight		
C1 Assessments and Response Actions	A.10	Assessments and Corrective Actions
C2 Reports to Management	A.11	Reports to Management
Group D Data Validation and Usability		
D1 Data Review, Verification, and Validation	A.7.1	Data Review and Reduction
D2 Verification and Validation Methods	A.7.2	Data Verification and Validation
D3 Reconciliation with User Requirements	A.7.3	Data Quality Assessment

APPENDIX A
SAMPLING AND ANALYSIS PLAN FOR CLOSURE OF WTP FACILITY

TABLE OF CONTENTS

A.1 Purpose of Sampling and Analysis for Closure of WTP 7
A.2 Sampling Objectives 8
A.3 Project Management 9
A.3.1 Project/Task Organization 9
A.3.2 Special Training and Certification Requirements 9
A.4 Data Quality Objectives 9
A.4.1 Step 1: State the Problem 9
A.4.2 Step 2: Identify the Goals of the Study 10
A.4.3 Step 3: Identify Information Inputs 10
A.4.4 Step 4: Define the Boundaries of the Study 10
A.4.5 Step 5: Develop a Decision Rule 13
A.4.6 Step 6: Specify Performance or Acceptance Criteria 13
A.4.6.1 Impact of Decision Errors on Sample Size 14
A.4.6.2 Derivation of Sampling Size Requirements 14
A.4.7 Step 7: Develop and Optimize the Design for Obtaining Data 14
A.5 Sampling Management 15
A.5.1 Sampling Process Design 15
A.5.2 Sampling Locations 15
A.5.3 Sampling Methods, Containers and Preservation 16
A.5.4 Sample Handling and Custody 18
A.5.5 Field Quality Control 20
A.5.6 Field Instrument Calibration and Frequency 21
A.5.7 Field Instrument/Equipment Testing, Inspection and Preventative Maintenance Procedures and Frequency 21
A.5.8 Inspection/Acceptance of Field Supplies and Consumables 21
A.6 Laboratory Analysis Management 22
A.6.1 Analytical Laboratory 22
A.6.2 Analytical Parameters 22
A.6.3 Analytical Methods 22
A.6.4 Laboratory Quality Control 22

A.6.5 Laboratory Instrument Calibration and Frequency 24
A.6.6 Laboratory Instrument/Equipment Testing, Inspection and Preventative Maintenance Procedures and Frequency 24
A.6.7 Inspection/Acceptance of Laboratory Supplies and Consumables 25
A.6.8 Laboratory Data Reporting Requirements 25
A.6.9 Laboratory Data Review Requirements 26
A.6.10 Laboratory Data Deliverable Requirements 26
A.7 Data Validation and Reporting 26
A.7.1 Data Review and Reduction 26
A.7.2 Data Verification and Validation 27
A.7.3 Data Quality Assessment 28
A.7.4 Non-Direct Measurements 28
A.8 Documentation and Data Management 28
A.8.1 Field Operations Records 28
A.8.1.1 Sample Container Labels 28
A.8.1.2 Field Sampling Logbooks 29
A.8.1.3 Chain-of-Custody Forms 29
A.8.2 Laboratory Records 29
A.8.2.1 Sample Data Records 29
A.8.2.2 Sample Management Records 30
A.8.2.3 Test Methods 30
A.8.2.4 Quality Assurance/Quality Control Reports 30
A.8.3 Document Control 30
A.8.4 Project Data Flow and Transfer 30
A.9 Assessments and Corrective Actions 30
A.10 Reports to Management 31
A.11 References 31

FIGURES

Figure A–1 Generalized WTP Closure Organizational Chart 11

TABLES

Table A–1 Summary of Potential Decision Errors 14
Table A–2 Sample Containers, Preservation and Holding Times 17
Table A–3 Analytical and Preparation Methods 23

ACRONYMS

BNI	Bechtel National, Inc.
CFR	Code of Federal Regulations
°C	degree Celsius
CL	control limit
COC	constituent of concern
CVAA	cold vapor atomic absorption
DOE	US Department of Energy
DQO	data quality objective
DRO	diesel range organics
DWMU	dangerous waste management unit
Ecology	State of Washington, Department of Ecology
EPA	US Environmental Protection Agency
GC	gas chromatography
GC/MS	GC/mass spectrometry
GC-ECD	GC-electron capture detector
GFAA	graphite furnace atomic absorption spectrometry
GRO	gasoline range organics
HCl	hydrochloric acid
HLW	high-level waste
HPLC	high-performance liquid chromatography
HRGC/HRMS	high-resolution GC/high-resolution MS
ICP-AES	inductively coupled plasma-atomic emission spectrometry
ICP-MS	inductively coupled plasma-mass spectrometry
L	liter
LAW	low-activity waste
LOQ	level of quantitation
mL	milliliter
MS	mass spectrometry
MS/MSD	matrix spike/matrix spike duplicate
MTCA	Model Toxics Control Act
ORP	Office of River Protection
oz	ounce
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PTFE	polytetrafluoroethylene

QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
SAP	sampling and analysis plan
SIM	selective ion monitoring
SOP	standard operating procedure
SVOC	semi-volatile organic compound
TPH	total petroleum hydrocarbons
TPH-DRO	total petroleum hydrocarbons-diesel range organics
TPH-GRO	total petroleum hydrocarbons-gasoline range organics
US	United States
VOA	volatile organic analyte
VOC	volatile organic compound
WAC	Washington Administrative Code
WTP	Hanford Tank Waste Treatment and Immobilization Plant

A.1 PURPOSE OF SAMPLING AND ANALYSIS FOR CLOSURE OF WTP

This sampling and analysis plan (SAP) describes the sampling, analysis, and quality assurance (QA) and quality control (QC) procedures to be used during closure of the Hanford Tank Waste Treatment and Immobilization Plant (WTP) permitted dangerous waste management units (DWMUs). The DWMUs include container storage areas, containment buildings, tanks, and miscellaneous unit systems with the associated ancillary equipment and secondary containment. The DWMUs may include areas of suspected releases of dangerous wastes, such as concrete floors and underlying soil, when evidence is found indicating apparent failure of secondary containment systems.

This SAP presents closure activities in accordance with US Environmental Protection Agency (EPA) guides *EPA Requirements for Quality Assurance Project Plans*, EPA/240/B-01/003, EPA QA/R-5 (EPA 2001), *EPA Guidance for Quality Assurance Project Plans*, EPA/240/R-02/009, EPA QA/G-5 (EPA 2002a) and Washington Administrative Code (WAC)173-303, *Dangerous Waste Regulations*, closure regulations. The elements of this SAP present the activities, organization, and QA/QC protocols to achieve the data quality objectives (DQOs) of the sampling and analysis effort.

This SAP will be updated as necessary in accordance with WAC 173-303-610 and the *Hanford Facility Resource Conservation and Recovery Act (RCRA) Permit, Dangerous Waste Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste, Part III, Operating Unit Group 10 (Waste Treatment and Immobilization Plant), WA7890008967* (Ecology 2007), Permit Condition III.10.C.8, and will serve as the governing document for all activities conducted in support of closure, decontamination, and post-decontamination sampling of WTP.

Clean closure is the goal for the DWMUs. Clean closure requires decontamination or removal and disposal of dangerous/mixed waste, waste residues, and contaminated equipment, soil, or other material, in accordance with the clean closure performance standards of WAC 173-303-610. As presented in Section H.2.0 of the closure plan, the use of a "clean debris surface" standard is proposed as the clean closure performance standard for the WTP metal structures and equipment and concrete structures that will remain after closure, as well as DWP equipment used for waste management. If the clean debris surface standard cannot be achieved or verified visually (e.g., interior surfaces of a pipe, pump, or tank), the equipment, structure, or portions thereof, may be washed and flushed with decontamination solutions. The post-decontamination solution or rinsate will be sampled and analyzed to determine whether the criteria defined in WAC 173-303-610(2)(b) have been achieved, which indicates successful decontamination and attainment of the clean closure performance standard (referred to as the rinsate "designation limit standard" in Section H.2.0 of the closure plan).

Due to the level of secondary containment provided at the WTP, releases of dangerous wastes to the environment are not anticipated. However, when evidence is found indicating apparent failure of secondary containment systems (e.g., stainless steel liners and coated concrete surfaces), potential soil contamination will be investigated. When contaminated soil is removed, soil samples will be collected and analyzed to verify compliance with risk-based concentration limits (referred to as the "soil cleanup standard" in Section H.2.0 of the closure plan).

The overall purposes of the sampling and analysis activities during closure of the DWMUs are to:

- Confirm that dangerous wastes (i.e., either characterized by toxicity or by corrosivity as defined in WAC 173-303-070 and 40 Code of Federal Regulations [CFR] 261, *Identification and Listing of Hazardous Waste*) are not left in any of the DWMUs.
- For a DWMU where the clean debris surface standard cannot be achieved or verified visually, confirm that the DWMU was successfully decontaminated and can be declared to have achieved clean closure by collecting post-decontamination rinsate samples and demonstrating that the analytical data are below the rinsate designation limit standard.

- For releases of dangerous wastes to soil, confirm that contaminated soil have been successfully removed and the DWMU can be declared to have achieved clean closure by collecting samples of the remaining soil and demonstrating that the analytical data are below the soil cleanup standard.

A.2 SAMPLING OBJECTIVES

Sampling will be conducted to verify the decontamination of equipment and structures and removal of contaminated soil at the DWMUs. Media anticipated to be sampled during closure of the DWMUs include decontamination rinsates and soil at suspected release locations.

Investigation of potential soil contamination may involve coring and sampling of the concrete floor when evidence indicates apparent failure of secondary containment systems. Concrete, if it is left in place, may also be sampled by collecting wipe or chip samples to determine if it is a clean and acceptable risk to remain. Sampling may be conducted following decontamination of the interior surfaces of the permitted secondary containment areas. If there is required sampling under the secondary containment structures, it will be conducted in a manner that minimizes disturbance of underlying soil.

Sampling and analysis tasks in which clean closure demonstrations may be needed are as follows:

- Collect samples from select biased, or *focused*, sample locations, based on reviews of the DWMU operating record; stainless steel liner breach investigations and underlying concrete decontamination work and evaluations; or based on interior inspection data (e.g., from video, closed circuit television, or radiation surveys) for container storage areas, containment buildings, tanks, piping, or other ancillary equipment.
- Collect rinsate, soil, concrete wipe or chip samples from select biased sample locations, focusing on the locations of apparent highest concentrations. For tanks, piping, or other permitted equipment, the locations to be sampled will include apparent or likely waste accumulations in crevices, connections, or other rough or restricted flow locations such as inlets or outlets. The rinsate sample will be taken from the first rinse, obtained within a reasonably short time after the completion of decontamination efforts. For concrete, wipe or chip samples will be collected from locations immediately adjacent to or below stainless steel liner breaches. For soil, samples will be collected from locations immediately adjacent to or below cladding breaches or cracked or deteriorated concrete. The sample locations may expand extensively, as necessary, to determine the areal and vertical boundaries of contaminated soil at concentrations above the soil cleanup standard.
- Conduct analyses of samples.

A list of indicator constituents will be developed based on the media, potential constituents of concern (COCs) and clean closure performance standard (rinsate designation limit standard or soil cleanup standard) for the DWMUs. Collected samples (rinsate, soil, concrete wipe, or chip) will be analyzed for these indicator constituents. In addition, the analytical results will be compiled, evaluated, and summarized in the following manner:

- Review the QC data of the sample handling and analyses to assess the reliability of the analytical data. Examine sample results for comparison with clean closure performance standard on an indicator constituent by indicator constituent basis.
- Conduct the statistical evaluation of the analytical data reported for the indicator constituents.
- Prepare summary statistics of the analytical data reported for indicator constituents.
- For each indicator constituent, compare the statistical results with the selected clean closure performance standard (rinsate designation limit standard or soil cleanup standard) and, for soil, with the established background levels. Sample concentrations below the background level, but above the clean closure performance standard, may be proposed as adequate demonstrations of clean closure, pending State of Washington, Department of Ecology (Ecology) approval.

- Prepare a report that includes data analysis and assessments that evaluate whether the levels of various indicator constituents present a health or environmental concern, and whether they meet the clean closure performance standards. The report will include sample locations, number of samples, specific methods used for sample collection and analyses, data quality assessment, and differences in procedures or sample locations from those provided in the revised closure plan and the SAP, as applicable. The report will provide clean closure evaluations.
- A DWMU may require several sampling campaigns and therefore iterative reports, while other units may require no sampling and single short letter reports.

A.3 PROJECT MANAGEMENT

A.3.1 Project/Task Organization

A generalized organizational chart for the implementation of this SAP during closure is included as Figure A-1.

The WTP Closure Manager will be responsible for the activities associated with the closure, and will report directly to the WTP Project Director. His staff will be responsible for the collection and analyses of sampling data of known quality, representative of actual site conditions, and are adequate and appropriate for making informed environmental decisions regarding closure of DWMUs at WTP.

The WTP Environmental Protection Manager and WTP Safety and Health Manager will report directly to the WTP Project Director. Their staff will provide environmental permitting, regulatory compliance, waste management, and safety support to the WTP Closure Manager's staff. The WTP Environmental Protection Manager (or his designee) is responsible for revising and updating this SAP.

The WTP QA Manager will report directly to the WTP Project Director, and his staff will provide independent QA oversight to ensure that onsite and subcontracted sampling and analytical laboratory activities are performed in accordance with this SAP, WTP QA Manual and other applicable project QA procedures. The WTP QA Manager (or his designee) is responsible for reviewing revisions and updates to this SAP.

A.3.2 Special Training and Certification Requirements

Individuals involved in sampling, analysis, or data review will be trained and qualified to safely implement the activities addressed in this SAP. Training will conform to the training requirements specified in the WAC 173-303-330 (Personnel Training), WTP QA Manual, and Chapter 8.0 of the *Hanford Facility Resource Conservation and Recovery Act (RCRA) Permit, Dangerous Waste Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste, Part III, Operating Unit Group 10 (Waste Treatment and Immobilization Plant), WA7890008967*. Training records will be maintained in accordance with Section A.8 of this document.

A.4 DATA QUALITY OBJECTIVES

The DQOs are qualitative and quantitative statements that define data quality requirements based on identified end uses. The DQOs define the performance criteria that limit the probability of making decision errors by considering the purpose of collecting data, defining the appropriate types of data needed, and specifying acceptable probabilities of making decision errors. The EPA's seven-step process for DQO development is presented below to communicate the quality objectives for closure sampling at WTP (*EPA Guidance on Systematic Planning Using the Data Quality Objectives Process*, EPA/240/B-06/001, QA/G-4 [EPA 2006]). These steps may be reviewed and refined for each DWMU before its closure commences.

A.4.1 Step 1: State the Problem

The problem is sampling data are needed to confirm that the clean closure performance standards (discussed in Section A.1 of this SAP and Section H.2.0 of the closure clan) have been met to demonstrate clean

closure of the DWMUs. To accomplish this, five primary activities have to be conducted during Step 1. These are:

- Identify DWMUs to be closed at WTP.
- Identify potential sample locations at each DWMU based on review of operating records (e.g., spills and releases to the environment).
- Identify the list of COCs for each DWMU based on review of operating records (e.g., types and quantities of wastes received and stored in vessels, tanks, miscellaneous equipment, and ancillary equipment during operations).
- Identify the list of indicator constituents to be analyzed based on the media to be sampled and COCs for each DWMU.
- Identify the key decision-makers involved in the closure of the DWMU.

Identify the resources and organization/management issues needing resolution to successfully implement the sampling and analysis activities

A.4.2 Step 2: Identify the Goals of the Study

The primary goal is to verify that the clean closure performance standards have been met. Possible logic decisions are as follows:

- DWMU will be administratively closed with no sampling, decontamination or remediation needed based on review of operating records and consideration of the future use of the DWMU.
- DWMU will be sampled to confirm that clean closure performance standards have already been met without the need of decontamination or remediation.
- DWMU will be decontaminated or remediated and sampled until clean closure performance standards have been achieved.

A.4.3 Step 3: Identify Information Inputs

The inputs to the decision include dangerous waste generation and disposal practices, hazardous substances associated with the DWMU operating records, physical attributes of the unit, anticipated variability of the COCs, and critical sample locations that can be identified prior to sampling design consideration. The WTP Closure Plan identifies the COCs and clean closure performance standards.

A.4.4 Step 4: Define the Boundaries of the Study

The boundaries include the physical characteristics of the DWMU planned for closure, spatial boundaries (the specific locations, depths, and media to be sampled), temporal boundaries (the operations to be assessed and the sampling and analysis time frame), and project constraints (the items that may impede or prevent the sampling and analysis activities from being implemented successfully).

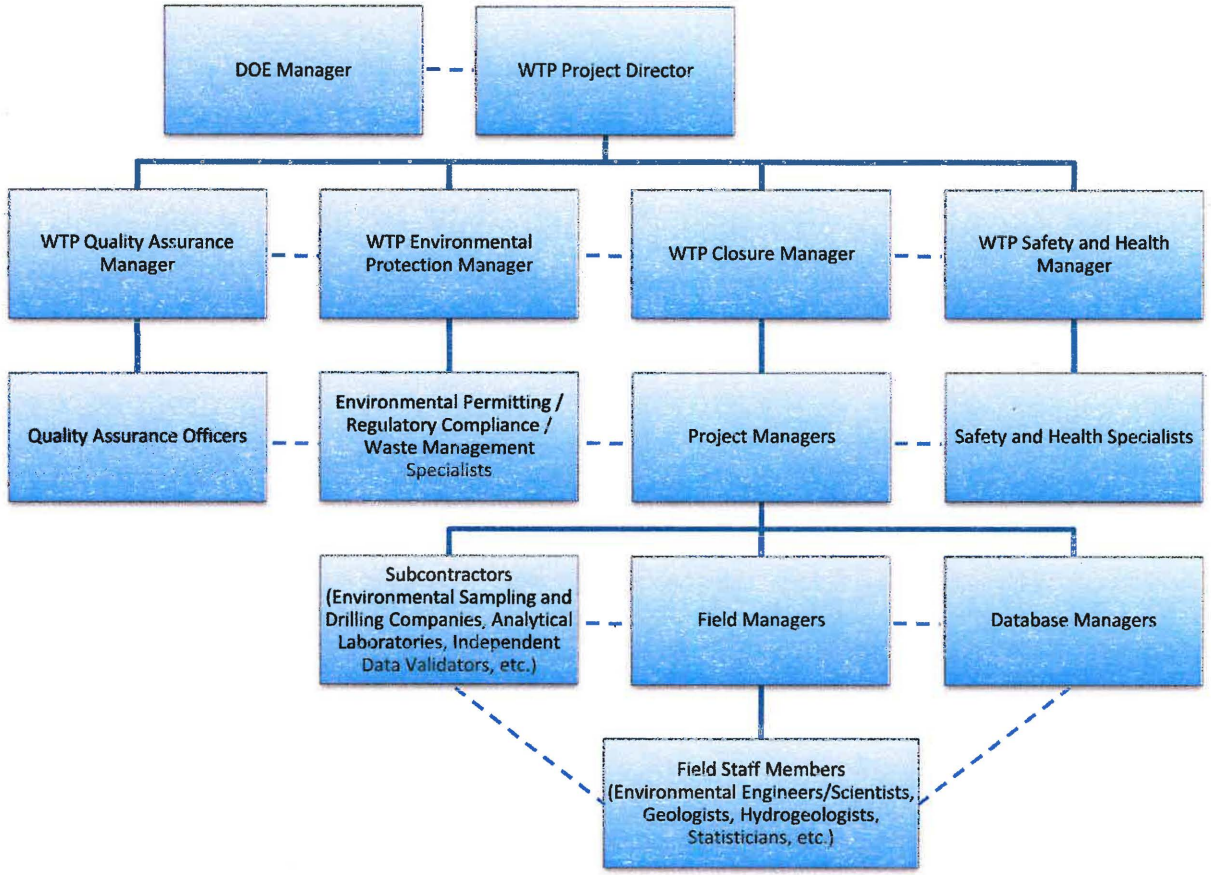


Figure Error! No text of specified style in document.**–1Generalized WTP Closure Organizational Chart**[1]

Notes:
Solid line = line of authority
Dashed line = line of communication

[1] As stated in the closure plan, the design life of the WTP is 40 years after the initiation of waste treatment operations. The actual operating life of the plant may change depending on expansion in treatment capacity, improvements in treatment technology, or many other factors. Consequently, implementation of this SAP may not occur for at least 40 years. The organizational chart will be completed and finalized with specific names and titles in the revised closure plan SAP to be submitted 180 days before closure at WTP commences (Permit Condition III.10.C.8, *Hanford Facility Resource Conservation and Recovery Act [RCRA] Permit, Dangerous Waste Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste, Part III, Operating Unit Group 10 [Waste Treatment and Immobilization Plant], WA7890008967*).

This page intentionally left blank.

A.4.5 Step 5: Develop a Decision Rule

The general decision-making is the comparison of the sampling dataset for the indicator constituents to the clean closure performance standards, which will be negotiated with Ecology before closure of the DWMU commences. After achieving agreements on the closure performance standards, specific decision rules for the DWMU will be developed. In general, if the sampling dataset for an indicator constituent is less than or equal to the closure performance standard, the closure performance standard is achieved. If the sampling dataset is greater than the closure performance standard, Ecology will be notified and interim measures will be discussed which may include resampling, decontamination activities, interim corrective action measures, and/or performance of an incremental human-health risk assessment.

A.4.6 Step 6: Specify Performance or Acceptance Criteria

Before closure of the DWMU, the project will decide whether statistical hypothesis tests will be applied to the collected sampling dataset to determine if the clean closure performance standards have been achieved. For example, for a DWMU planned for closure, statistical tests of the analytical results reported for concrete wipe samples or soil samples collected from multiple locations may be performed to determine if the closure performance standards have been met. However, a sample taken from the first rinse of a decontaminated tank may only require a direct comparison of the analytical results to the closure performance standards without performing statistical tests.

Due to the inherent uncertainty associated with all sample datasets (EPA 2002a), the result of any statistical hypothesis test performed on a dataset carries some uncertainty and risk whether the correct decision will be made. Quantification of the probabilities of making decision errors will be performed based on the DWMU to be closed, media sampled, and closure performance standards. For statistical hypothesis tests applied to the sampling dataset for each indicator constituent of a DWMU, there are two types of decision errors associated with the determination whether the closure performance standards have been met: Type I (false rejection of the null hypothesis) and Type II (false acceptance of the null hypothesis) (Myers 1997).

- Type I, False Rejection – This error is the belief that the sample result is less than or equal to the closure performance standard, when in reality it is not. The consequence of this type of error is that an unacceptable concentration of a COC is still present at the DWMU (i.e., the unit was concluded to be clean, when in reality it remains contaminated).
- Type II, False Acceptance – This error is the belief that the sample result exceeds the closure performance standard, when in reality it meets the closure performance standard. The consequence of this type of error is that resources will be spent unnecessarily to decontaminate or perform removals/remediations at the DWMU (i.e., the unit was concluded to be contaminated, when in reality it is clean).

The consequences of such errors depend upon the null hypothesis used when assessing the DWMU in question. The primary purpose for sampling (i.e., the working hypothesis) is to determine if the sampling dataset exceed the closure performance standards. Table A-1 shows how these errors relate to unbiased level of confidence and power related to the sample dataset.

Table Error! No text of specified style in document.**–1Summary of Potential Decision Errors**

Reality	Decision/Conclusion		Result of Decision Error
	Site Is Contaminated	Site Is Not Contaminated	
Site Is Contaminated	Correct Decision Probability ≥ 1 - α = Level of Confidence	Type I Error False Rejection Probability < α	Failure to decontaminate or perform removals/remediations and unacceptable contamination remains at the DWMU
Site Is Clean	Type II Error False Acceptance Probability < β	Correct Decision Probability ≥ 1 - β = Power	Unnecessary allocations of resources to decontaminate or perform removals/remediations at the DWMU

There are no prescriptive limits on decision errors; the EPA has no set policy that encourages the use of any particular decision error limit (EPA 2006). However, some EPA programs (e.g., Superfund) may provide alternative guidance on starting points for setting decision error limits. For example, the EPA guidance document, *Soil Screening Guidance: User's Guide*, EPA/540/R-96/018 (EPA 1996), recommends starting values of 5% for the Type I error rate (α) and 20% for the Type II error rate (β). For WTP, the specific Type I error and Type II error for each DWMU will be defined based on the specific characteristics of the problem being investigated.

A.4.6.1 Impact of Decision Errors on Sample Size

Statistical methods generally are used to calculate the minimum number of samples needed to estimate the population parameters based on predefined values for the Type I and Type II decision errors and other factors. The null hypothesis is set up so that the consequences of a Type I error are more serious than a Type II error because the consequences of the Type I error are that actions are not taken when they should (i.e., the DWMU is concluded to be clean, when in reality it remains contaminated). Therefore, more stringent limits are placed on the Type I error rate (α), while less stringent limits are placed on the Type II error rate (β). The probabilistic targeting approach establishes the grid size according to the Type I/Type II error constraints. The number of samples then becomes a function of the size of the unit. In general, the more stringent the limits (i.e., the lower the limits) placed on the probability of making a Type I error, the larger the number of samples required to be collected.

A.4.6.2 Derivation of Sampling Size Requirements

The number of samples to be collected per unit is computed in accordance with the DQO process using either statistical methods or professional judgment. In general, statistical methods will be used to determine the appropriate number of samples. However, a number of DWMUs are quite small or are associated with tanks or miscellaneous units. For these DWMUs, statistical methods provide impractical large estimates for the number of samples, especially when the limits of decision errors are stringent. In these cases, professional judgment after reviewing operating records will be used to identify sample locations (e.g., where leaks/spills may have occurred and/or previous decontamination work may have been performed), thereby determining the number of samples needed.

A.4.7 Step 7: Develop and Optimize the Design for Obtaining Data

The first six steps of the DQO process presented above will be revisited for each DWMU to develop and optimize an appropriate sample collection and analysis design before its closure commences. Groupings of units with similar characteristics and operational histories may implement the same design based on the DQO process. Section A.5 provides a general overview of the design for collecting and analyzing samples.

A.5 SAMPLING MANAGEMENT

A.5.1 Sampling Process Design

This section describes the general approach that will be followed for sampling and analysis during closure of the DWMUs. The sampling and analysis processes will assist in confirming that decontamination or removal/remediation activities, when implemented, have been successful and the DWMU has attained the clean closure performance standard. Sampling may be employed where the clean debris surface standard cannot be met or verified visually, such as interior pipe, pump, or tank surfaces, or where evidence is found indicating apparent failure of the DWMU secondary containment systems.

Sampling of decontamination solutions (rinsate) may be conducted for DWMUs that do not meet or could not be inspected to verify attainment of the clean debris surface standard following the decontamination process. This sampling process will serve to define the extent of remaining contamination or confirm adequate decontamination. The sampling process will be repeated after each subsequent round of decontamination effort until the decontamination effort is either determined to be successful, or is terminated, and the contaminated component is removed and disposed of as dangerous or mixed waste.

Concrete found to be contaminated may be decontaminated or removed as part of the closure activities, and concrete wipe or chip sampling will be performed to confirm that levels of dangerous wastes in the remaining concrete do not exceed the clean closure performance standards. Soil found to be contaminated above background levels and clean closure performance standards will be removed as part of the closure activities, and sampling will be performed to confirm that levels of dangerous wastes in the remaining soil do not exceed the clean closure performance standards.

This sampling and analysis protocol will also be prepared to evaluate the extent of soil contamination and the effectiveness of decontamination at specific permitted mixed waste management units in the WTP, if needed because of breach in the secondary containment structures. This section discusses the design and outline of the sampling program. Subjects addressed in this section will be detailed in the revised closure plan and the SAP prior to commencement of closure. Additional information concerning investigation tools (e.g., the gamma camera, closed circuit television, and other analytical or survey equipment) will also be included in the final closure plan. The subjects addressed in this section include analytical parameters, sampling activities, and data quality.

A.5.2 Sampling Locations

Surfaces of the DWMUs will be visually inspected, if feasible, to determine if the clean debris surface standard has been attained. When sampling of a DWMU is needed, sample locations will be selected based on reviews of the operating record; stainless steel liner breach investigations and underlying concrete decontamination work and evaluations; or based on interior inspection data (e.g., from video, closed circuit television, or radiation surveys). For areas that do not meet or could not be inspected to verify attainment of the clean debris surface standard, decontamination activities may be performed. Post-decontamination solution or rinsate samples will be collected from select biased sample locations, focusing on the locations of apparent highest concentrations. For pipes, pumps, tanks, or other permitted equipment, the locations to be sampled will include apparent or likely waste accumulations in crevices, connections, or other rough or restricted flow locations such as inlets or outlets. The rinsate sample will be taken from the first rinse, obtained within a reasonably short time after the completion of decontamination efforts. When the analytical data are below the closure performance standards, the DWMU was successfully decontaminated and can be declared to have achieved clean closure.

Surfaces of the secondary containment systems (e.g., stainless steel liners, coated concrete floors) will be visually inspected, if feasible, to determine if the clean debris surface standard has been attained. If evidence is found indicating apparent failure of the secondary containment systems, the extent of concrete or soil contamination will be determined by collecting concrete wipe or chip samples or soil samples from locations of apparent highest concentrations. Biased sample locations will be selected by reviews of the

operating record; stainless steel liner breach investigations and underlying concrete decontamination work and evaluations; or based on results of previous inspections of cracks or areas where concrete has lost its integrity. After decontamination or removal, the remaining concrete or soil will be sampled to confirm that levels of dangerous wastes in the remaining concrete or soil are below the closure performance standards.

In lieu of biased or focused sampling, area-wide sampling may be conducted in larger areas of suspected contamination. The area-wide sampling will be performed in accordance with *Guidance for Clean Closure of Dangerous Waste Units and Facilities* (Ecology 2005).

Proposed sample locations, and the number of samples collected at each location, will be chosen ahead of time and described in the revised closure plan and SAP prior to commencement of closure of the DWMU. Since the sample locations may be moved or number of samples may be revised based on actual field conditions during the time of sample collection, final sample locations, and numbers will be documented in the final report as part of the closure record.

A.5.3 Sampling Methods, Containers and Preservation

The appropriate sampling methods, containers, supplies, and preservation will be used, depending on the type of media to be sampled and analytical method to be used by the laboratory. The list of criteria used for determining appropriate sampling methods will be developed using federal and state guidance (e.g., WAC 173-303-110) and industry codes, standards, practices (e.g., ASTM International), and submitted to Ecology for approval prior to initiating sampling activities during closure. Sampling and analysis of samples will be performed in a manner consistent with EPA and Ecology guidelines (EPA 1986 and Ecology 1995).

Rinsate samples may be collected from the outlet of a pipe, pump, or tank and transferred directly into laboratory-supplied sample containers. Concrete samples may be collected by breaking small chips using a rock hammer and placed into laboratory-supplied sample containers. Alternatively, a small cylindrical section of the concrete can be removed using a concrete corer and sent to the analytical laboratory, where chip samples can be collected. Wipe samples may be collected using a uniform sample template and wipes pre-wetted with preservatives supplied by the analytical laboratory. Soil samples may be collected using soil probes, augers, or core samplers. Since closure activities and implementation of this SAP may not occur for at least 40 years, sample collection methods and equipment will be specified in the revised closure plan and SAP prior to the start of closure activities to incorporate future advances in sampling technology.

The analytical laboratory will furnish new sample containers with required preservatives. Sample containers will be selected based on their compatibility with the waste sampled, types of analyses to be performed, resistance to leaking or breakage, ability to seal tightly, and the required volume for an optimum sample, in accordance with protocols described in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA SW-846)* (EPA 1986). Sample containers and preservations are listed in Table A-2.

Any deviations will be proposed in cases where compliance is impractical or would conflict with other requirements (e.g., *As Low as Reasonably Achievable* requirements). Deviations from this SAP will be proposed in the revised closure plan and SAP to be submitted to Ecology prior to the start of closure activities. Deviations made in the field during sampling and analysis activities will be recorded in a field logbook and discussed in the final report.

1

Table Error! No text of specified style in document.**–2Sample Containers, Preservation and Holding Times**

Analyte	Method[1]	Sample Containers[2]	Preservation	Holding Time
Solid Samples[3]				
Glycols	SW8015	4 oz amber glass jar with PTFE-lined lid	Cool, ≤6°C	14 days
VOCs	SW8260	EnCore™ or equivalent	Cool ≤6°C, freeze at lab within 48 hours	14 days
		1x 5-25[1,2] grams collected using coring device and extruded into 40 milliliter (mL) VOA vial with PTFE-lined septum cap	Cool ≤6°C, methanol preserved within 48 hours	14 days
TPH-GRO	NWTPH-Gx	EnCore™ or equivalent	Cool, ≤6°C, freeze at lab within 48 hours	14 days
		1 x 5-25[4] grams collected using coring device and extruded into 40 mL VOA vial with PTFE-lined septum cap	Cool, ≤6°C, methanol preserved within 48 hours	14 days
		40 mL VOA vial with PTFE-lined septum cap	Cool, ≤6°C	14 days
TPH-DRO	NWTPH-Dx	8 oz amber glass jar with PTFE-lined lid	Cool, ≤6°C	14 days until extraction; 40 days after extraction
SVOCs	SW8270, SW8270 SIM	8 oz amber glass jar with PTFE-lined lid	Cool, ≤6°C	14 days until extraction; 40 days after extraction
Dioxins/Furans	SW8290	8 oz amber glass jar with PTFE-lined lid	Cool, ≤6°C	30 days until extraction; 45 days after extraction
PCBs	SW8082	8 oz amber glass jar with PTFE-lined lid	Cool, ≤6°C	14 days until extraction; 40 days after extraction
PCB Congeners	EPA1668	8 oz amber glass jar with PTFE-lined lid	Cool, ≤6°C	1 year until extraction; 1 year after extraction[5]
Explosives	SW8095, SW8330, SW8332	8 oz amber glass jar with PTFE-lined lid	Cool, ≤6°C	14 days until extraction; 40 days after extraction
Metals	SW6010, SW6020	8 oz glass or plastic (high density polyethylene) jar[6]	Cool, ≤6°C	180 days
	SW7471		Cool, ≤6°C	28 days
Wipe Samples				
VOCs	SW8260	4 oz amber glass jar with PTFE-lined lid containing pre-wetted wipe	Cool, ≤6°C	14 days
Glycols	SW8015	4 oz amber glass jar with PTFE-lined lid containing pre-wetted wipe	Cool, ≤6°C	14 days
SVOCs	SW8270, SW8270 SIM	4 oz amber glass jar with PTFE-lined lid containing pre-wetted wipe	Cool, ≤6°C	14 days until extraction; 40 days after extraction
Dioxins/Furans	SW8290	1 L amber glass bottle with PTFE-lined lid	Cool, ≤6°C	30 days until extraction; 45 days after extraction
PCBs	SW8082	2 x 1 L amber glass bottle with PTFE-lined lid	Cool, ≤6°C	7 days until extraction; 40 days after extraction
PCB Congeners	EPA1668	1 L amber glass bottle with PTFE-lined lid	Cool, ≤6°C	1 year until extraction; 1 year after extraction[5]
Explosives	SW8095, SW8330, SW8332	4 oz amber glass jar with PTFE-lined lid containing pre-wetted wipe	Cool, ≤6°C	14 days until extraction; 40 days after extraction

Table Error! No text of specified style in document.**–2Sample Containers, Preservation and Holding Times**

Analyte	Method[1]	Sample Containers[2]	Preservation	Holding Time
Metals	SW6010, SW6020	4 oz amber glass jar with PTFE-lined lid containing pre-wetted wipe	Cool, ≤6°C	180 days
	SW7471	4 oz amber glass jar with PTFE-lined lid containing pre-wetted wipe	Cool, ≤6°C	28 days
Aqueous Samples				
VOCs	SW8260	3 x 40 mL VOA vial with PTFE-lined septum cap	HCl to pH<2, Cool, ≤6°C, no headspace	14 days
Glycols	SW8015	1 L amber glass bottle with PTFE-lined lid	Cool, ≤6°C	7 days until extraction; 40 days after extraction
TPH-GRO	NWTPH-Gx	3 x 40 mL VOA vial with PTFE-lined septum cap	HCl to pH<2, Cool, ≤6°C, no headspace	14 days
TPH-DRO	NWTPH-Dx	1 L amber glass bottle with PTFE-lined lid	HCl to pH<2, Cool, ≤6°C	14 days; 7 days for unpreserved water
SVOCs	SW8270, SW8270 SIM	2 x 1 L amber glass bottle with PTFE-lined lid	Cool, ≤6°C	7 days until extraction; 40 days after extraction
Dioxins/Furans	SW8290	1 L amber glass bottle with PTFE-lined lid	Cool, ≤6°C	30 days until extraction; 45 days after extraction
PCBs	SW8082	2 x 1 L amber glass bottle with PTFE-lined lid	Cool, ≤6°C	7 days until extraction; 40 days after extraction
PCB Congeners	EPA1668	1 L amber glass bottle with PTFE-lined lid	Cool, ≤6°C	1 year until extraction; 1 year after extraction[5]
Explosives	SW8095, SW8330, SW8332	1 L amber glass bottle with PTFE-lined lid	Cool, ≤6°C	7 days until extraction; 40 days after extraction
Metals	SW6010, SW6020	1 L plastic (high density polyethylene) bottle	HNO_3 to pH<2, Cool, ≤6°C	180 days
	SW7470		HNO_3 to pH<2, Cool, ≤6°C	28 days

Acronyms:

°C	degree Celsius
HCl	hydrochloric acid
L	liter
mL	milliliter
oz	ounce
PCB	polychlorinated biphenyl
PTFE	polytetrafluoroethylene
SIM	selective ion monitoring
SVOC	semi-volatile organic compound
TPH-DRO	total petroleum hydrocarbons-diesel range organics
TPH-GRO	total petroleum hydrocarbons-gasoline range organics
VOA	volatile organic analyte
VOC	volatile organic compound

Notes:
1 Alternate analytical methods may be acceptable. The laboratory must submit any changes to the analytical methods listed, along with proposed QC acceptance criteria, prior to substitution.
2 Alternate numbers and sizes of containers may be used to provide adequate sample volume required by the laboratory.
3 Solid samples may include soil, concrete chip or other solid material.
4 If 25 grams of sample are collected, additional methanol will be required.
5 Extended holding times only apply when samples and extracts are stored in the dark at less than -10 C at the laboratory.
6 High density polyethylene containers are preferred where boron is a COC.

A.5.4 Sample Handling and Custody

All samples will be uniquely identified, labeled, and documented in the field at the time of collection. A sample label will be completed and securely affixed to each container. Sample labels convey information unique to each sample and thus serve to prevent misidentification of samples. Labels may be adhesive or tags, made of weatherproof paper or plastic with gummed backs. Labels will be completed with indelible ink before or at the time of collection and protected from water with clear tape. Information will be completed as close as possible to the time of collection. Each label will contain at least the following information:

- Project identification and sample location

- Unique sample identification number
- Sample collection date and time, using a 24-hour clock notation
- Site contractor
- Name or initials of field sampler (not preprinted)
- Analysis to be performed and required sample preservation (if applicable)

In accordance with the chain-of-custody protocols, signed and dated custody seals will be affixed on the sample containers and on the sample shipment coolers to prevent or detect tampering with the samples between the time of collection and the beginning of analysis. Seals will be applied to the sample containers and coolers before leaving the sample location. The seals will be attached in such a manner that the seal will be broken to open the container or cooler.

Samples collected in the field will be transported to the laboratory as expeditiously as possible. When cooling to a temperature of less than or equal to 6 degrees Celsius (°C) immediately after sample collection is required, the samples will be packed in ice to keep them cool during collection and transportation. A temperature blank will be included in every cooler and used to determine the internal temperature of the cooler upon receipt of the cooler at the laboratory. If the temperature of the samples upon receipt exceeds the temperature requirements, the exceedance will be recorded on laboratory records. The decision regarding the potentially affected samples will also be documented in laboratory records.

Chain-of-custody forms will be used to document the integrity of all samples and to physically trace sample possession from the time of collection to ultimate disposition. To maintain a record of sample collection, transfer of samples between personnel, shipment of samples and receipt of samples at the laboratory, chain-of-custody forms will be completed. At a minimum, information recorded on the form will include:

- Project identification and sample location
- Unique sample identification number for each container
- Sample collection date and time, using a 24-hour clock notation
- Site contractor
- Name or initials of field sampler
- Type of sample (e.g., solid, wipe, aqueous)
- Designation of matrix spike / matrix spike duplicate (if predetermined)
- Analysis to be performed and required sample preservation (if applicable)
- Serial numbers of custody seals and shipment coolers (if any)
- Custody transfer signatures as well as dates and times of sample transfers from the field to transporters and to the laboratory
- Bill of lading or transporter tracking number (if applicable)

The chain-of-custody forms will be signed as relinquished or received each time the sample changes possession. A sample is in the custody of a field sampler, shipping agent, or analytical laboratory employee/sample custodian if:

- In a person's physical possession.
- In view, after having been in a person's physical possession.
- Secured and locked so that it cannot be tampered with, after having been in a person's physical custody.
- Placed in a designated secure area restricted to authorized personnel.

Samples will be shipped to the laboratory via overnight air courier. Bills of lading will be used as custody documentation during this time and will be retained as part of the permanent sample custody documentation. In some cases, samples may be hand delivered to the laboratory; hand delivery will be noted on the chain-of-custody form. The laboratory is responsible for sample custody once samples are received.

In the event that multiple analytical laboratories are used, a separate chain-of-custody form will be completed for each laboratory. Each form will indicate the number of sample containers and coolers transmitted to that particular laboratory. A copy of the form shall be placed in the cooler and accompany the sample containers to the laboratory.

Once the samples are accepted by the laboratory, they will be checked against information on the chain-of-custody form for anomalies. The condition, temperature, and appropriate preservation of samples will be checked and documented. Checking an aliquot of the sample using pH paper or meter is an acceptable procedure except for volatile organic compounds where an additional sample is required to check preservation. The occurrence of any anomalies in the received samples and their resolutions will be documented in laboratory records. All sample information will then be entered into a laboratory information management tracking system and unique analytical sample identifiers will be assigned by the laboratory.

Samples will be stored in limited- or controlled-access, temperature-controlled areas while in the laboratory. Refrigerators, coolers, and freezers will be monitored for temperature seven days a week. Acceptance criterion for the temperatures of the refrigerators and coolers for all samples will be 6°C. Acceptance criterion for the temperatures of the freezers will be less than or equal to 7°C. All of the cold storage areas will be monitored by thermometers calibrated with a National Institute of Standards and Technology traceable thermometer. Records of refrigerator, cooler and freezer temperatures will be maintained. These records will include acceptance criteria. Samples for volatile organic analysis will be stored separately from other samples, standards, and sample extracts.

Sample holding time tracking begins with the collection of samples and continues until the analysis is completed. Samples will not be held in excess of specified analytical holding times listed in Table A-2. Procedures ensuring internal laboratory sample control and custody will be implemented and documented by the laboratory. Specific instructions concerning the analysis specified for each sample on the chain-of-custody form will be communicated to the analysts. Preparation batches will be created and laboratory QC samples will be introduced into each batch. Samples will be stored after analysis until disposed of in accordance with applicable local, state, and federal regulations. Disposal records will be maintained by the laboratory.

A.5.5 Field Quality Control

Sample QC procedures will be followed, including proper implementation of the sample collection, labeling, handling, and chain-of-custody form completion described in the preceding sections. Field QC sampling described in this section will also be followed.

Field QC will be accomplished through the collection and analysis of trip blanks, field duplicates, equipment rinsate blanks, and field blanks. Definitions of each type of field QC samples are listed below.

Trip blanks. These samples are used to verify that no contamination has occurred during sampling and shipping of VOC samples due to environmental conditions. They consist of a series of cleaned sample containers filled with analyte-free water and precertified by analysis at the laboratory as clean. The trip blanks are prepared by the laboratory in sample containers identical to those used in the actual sampling activities. Trip blanks will be included for each sample cooler containing samples for VOC analysis. The trip blanks will be analyzed for VOCs only.

Field duplicates. These samples are used to evaluate sampling quality and to check the precision and accuracy of the sampling technique for collecting samples. A field duplicate sample is one of two samples collected at a single sample location in the field during a single act of sampling. Field duplicate samples are collected in a manner identical to that of routine samples, transferred to separate sample containers, and analyzed for the same parameters. One field duplicate will be collected for every 10 aqueous samples or each sampling event when less than 10 samples were collected. Due to soil heterogeneity, soil duplicates will not be collected. The variability between soil samples nullifies the ability of duplicate samples to confirm analytical results.

Equipment rinsate blanks. These samples are used to verify that samples collected in the field were not contaminated by the equipment. They will be prepared by passing deionized or distilled water through decontaminated, non-dedicated sampling equipment. The water is collected, transferred to a sample container, and handled in the same manner as other samples. Equipment rinsate blanks will be collected daily and analyzed for the same analytes as the samples collected that day.

Field blanks. These samples are used to verify that the water used for decontamination of the equipment was not contaminated. They will be prepared by collecting the deionized or distilled water used for decontamination of sampling equipment into a sample container and handled in the same manner as other samples. Field blanks will be collected daily and analyzed for the same analytes as the samples collected that day.

A.5.6 Field Instrument Calibration and Frequency

Any field instrumentation or monitoring equipment used to support sampling will be calibrated at prescribed intervals and/or as part of daily use in accordance with the manufacturer's specifications to ensure sampling activities obtain the most accurate and precise information possible. Equipment will be calibrated, whenever possible, using reference standards having known relationships to nationally recognized standards or accepted values of physical constants. If national standards do not exist, the basis for calibration will be documented. Calibrations of equipment will be recorded in a field logbook and records will be included in the final report.

A.5.7 Field Instrument/Equipment Testing, Inspection and Preventative Maintenance Procedures and Frequency

All new sample equipment, consumable materials, parts, and supplies of current manufacture that are free from defects affecting performance will be used as required to perform necessary sampling. These items will be inspected for quality by the appropriate sampling personnel before use and stored in a clean, uncontaminated condition throughout the course of the sampling activities. When feasible, disposable and/or dedicated sampling equipment, materials, parts, and supplies will be used to collect samples to avoid the need to decontaminate them after use. Non-disposable and non-dedicated items will be decontaminated and inspected between uses and sample locations in accordance with the manufacturer's specifications and approved project procedures. Inspection and preventive maintenance of field equipment will be conducted in accordance with the manufacturer's specifications. Maintenance of equipment will be recorded in a field logbook and records will be included in the final report.

A.5.8 Inspection/Acceptance of Field Supplies and Consumables

Consumable materials, parts, and supplies will be inspected by the appropriate sampling personnel before use to ensure it is clean, free from defects, and made of materials appropriate for the media being sampled and analytes being analyzed. Inspection and acceptance of these items will be documented or, when certifications are provided by the manufacturer, maintained in project files to ensure availability of these records for review when needed.

A.6 LABORATORY ANALYSIS MANAGEMENT

A.6.1 Analytical Laboratory

The laboratory chosen for conducting the analyses will have the appropriate level of qualified personnel, appropriate instrumentation, approved QA plans and standard operating procedures (SOPs), approved analytical methods, and appropriate internal procedures and requirements to perform the required analyses. Laboratory accreditations (e.g., National Environmental Laboratory Accreditation Program) will be used for selection of the commercial laboratory that may be retained for sample analyses. When requested, the QA plans and SOPs will be made available for review by WTP project personnel.

A.6.2 Analytical Parameters

Analytical parameters will be based on knowledge of the operations and wastes processed (process knowledge) in the DWMUs. A list of indicator constituents will be developed based on potential COCs and the clean closure performance standard (rinsate designation limit standard or soil cleanup standard) selected for the DWMU. These indicator constituents and their associated analytical methods will be provided in the revised closure plan and SAP prior to the start of closure activities.

A.6.3 Analytical Methods

A listing of analytical and preparation methods that may be used by a future contract laboratory for organic and inorganic analyses can be found in Tables A-2 and A-3. To ensure that data of acceptable quality are obtained, standard EPA laboratory methods described in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, (EPA SW-846)* (EPA 1986) or technically appropriate methods for radioanalytical determinations will be used to obtain laboratory data. Sample analysis and laboratory results will be requested only for the indicator constituents specified in the approved closure plan and SAP. Method detection limits, estimated quantitation limits and reporting limits will be established based on the media to be analyzed, selected indicator constituents and analytical methods in conformance with *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, (EPA SW-846)* (EPA 1986) or other guidance. Since closure activities and implementation of this SAP may not occur for at least 40 years, analytical methods will be specified in the revised closure plan and SAP prior to the start of closure activities to incorporate future advances in analytical testing technology.

A.6.4 Laboratory Quality Control

Laboratory QC is addressed through the analysis of laboratory QC samples, documented internal and external laboratory QC practices, and laboratory audits. Three types of laboratory QC samples will be used: laboratory blank samples, matrix spike/matrix spike duplicate (MS/MSD) samples, and laboratory control samples. Definitions of each type of laboratory QC samples are listed below.

Laboratory blank samples. These samples are designed to detect contamination of routine samples that occurs in the laboratory. Laboratory blanks verify that method interference caused by contaminants in solvents, reagents, glassware, and other sample processing hardware are known and minimized. Laboratory blanks are deionized water for water samples or a purified solid matrix for soil samples. A minimum of one laboratory blank will be analyzed each day that routine samples are analyzed. The concentration of the target compounds in the laboratory blank sample must be less than or equal to the reporting limit. If the blank is not under the specified limit, the source contamination is to be identified and corrective actions taken.

Table Error! No text of specified style in document.**–3Analytical and Preparation Methods**

Analytical Method[1]	Parameter	Preparation Methods	
		Water/Aqueous	Solid[2]/Wipe
GC			
SW8015	Glycols	—	See analytical method
SW8081	Chlorinated Pesticides	SW3510, SW3520, SW3535	SW3540, SW3541, SW3545, SW3550
SW8082	PCBs	SW3510, SW3520, SW3535	SW3540, SW3541, SW3545, SW3550
NWTPH-Gx	TPH-GRO	NWTPH-Gx	NWTPH-Gx
NWTPH-Dx	TPH-DRO	NWTPH-Dx	NWTPH-Dx
GC/MS			
SW8260	VOCs	SW5030	SW5035, SW5035A
SW8270	SVOCs	SW3510, SW3520, SW3535	SW3540, SW3541, SW3545, SW3550
SW8270 SIM	SVOCs/PAHs	SW3510, SW3520, SW3535	SW3540, SW3541, SW3545, SW3550
NWTPH-Gx	TPH-GRO	NWTPH-Gx	NWTPH-Gx
GC/ECD			
SW8095	Explosives	SW3535	See analytical method
HRGC/HRMS			
SW8290	Dioxins/Furans	See analytical method	See analytical method
EPA1668	PCB Congeners	See analytical method	See analytical method
HPLC			
SW8330	Explosives	See analytical method	See analytical method
SW8332	Explosives	See analytical method	See analytical method
ICP-AES/ICP-MS/GFAA/CVAA			
SW6010	Trace metals by ICP-AES	SW3005, SW3010, SW3015, SW3020	SW3050, SW3051
SW6020	Trace metals by ICP-MS	SW3005, SW3010, SW3015, SW3020	SW3050, SW3051
SW7470	Mercury (water)	See analytical method	—
SW7471	Mercury (solid)	—	See analytical method

Acronyms:

—	not applicable
CVAA	cold vapor atomic absorption
GC	gas chromatography
GC/MS	GC/mass spectrometry
GC-ECD	GC-electron capture detector
GFAA	graphite furnace atomic absorption spectrometry
HPLC	high-performance liquid chromatography
HRGC/HRMS	high-resolution GC/ high resolution MS
ICP-AES	inductively coupled plasma-atomic emission spectrometry
ICP-MS	inductively coupled plasma-mass spectrometry
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
SIM	selective ion monitoring
SVOC	semi-volatile organic compound
TPH-DRO	total petroleum hydrocarbons-diesel range organics
TPH-GRO	total petroleum hydrocarbons-gasoline range organics
VOC	volatile organic compound

Notes:

[1] Alternate analytical methods may be acceptable. The laboratory must submit any changes to the analytical methods listed, along with proposed QC acceptance criteria, prior to substitution.

[2] Solid samples may include soil, concrete chip or other solid material.

MS/MSD samples. These samples are designed to check the precision and accuracy of the analytical methods through the analysis of a normal sample with a known amount of analyte added. Soil samples to be used for MS/MSD samples will be collected and identified in the field; water MS/MSD samples will be collected in the same manner as field duplicate samples. In the lab, two portions of the sample are spiked with a standard solution. MS/MSD samples are to be analyzed for the same parameters as the routine samples, and analytical results compared to evaluate the precision and accuracy of the analytical method and effects of the sample matrix. The MS/MSD samples will be collected at one for every 20 routine samples for each sample matrix.

Laboratory control samples. These samples include blank spikes and blank spike duplicates. Blank spike samples are designed to check the accuracy of the analytical method by measuring a known concentration of an analyte in the blank spike samples. Blank spike duplicate samples are designed to check the accuracy and precision of the analytical method by measuring a known concentration of an analyte in the blank spike duplicate sample. Blank spike and blank spike duplicate samples are prepared by the laboratory using clean laboratory matrices spiked with the same spiking compounds used for matrix spikes at levels no greater than 10 times the method detection limit.

A.6.5 Laboratory Instrument Calibration and Frequency

Laboratory equipment and instrumentation will be operated and calibrated according to both the manufacturer's specifications and the analytical method specifications as appropriate to ensure laboratory analysis activities obtain the most accurate and precise information possible. The laboratory QA plan will include requirements for calibrations when specifications are not listed in analytical methods. Calibrations that are typically not called out in analytical methods include ancillary laboratory equipment (e.g., analytical balances, pipettes, and pH meters) and verification of reference standards used for calibration and standard preparation.

Analytical methods prescribed must have specifications for equipment checks and instrument calibrations. The laboratory will comply with method-specific calibration requirements for requested parameters. If an instrument calibration or equipment fails, the instrument will be recalibrated and all affected samples will be analyzed using an acceptable calibration.

Laboratory equipment and instrumentation will be calibrated at prescribed intervals and/or as part of daily use. Frequency will be based upon the type of equipment, inherent stability, and manufacturer's recommendations. Calibration will be conducted, whenever possible, using reference standards having known relationships to nationally recognized standards or accepted values of physical constants. If national standards do not exist, the basis for calibration will be documented. Laboratory documentation will include calibration techniques and sequential calibration actions, performance tolerances provided by the specific analytical method, and calibration dates and frequency.

In addition, records for laboratory-prepared standards will be maintained and provided at an agreed upon time or as requested with each data deliverable. Instrument responses for gas chromatography (GC) / mass spectrometry (MS), GC retention time window definitions, and documentation of calibration check precision for GC and GC/MS systems will be reported in each deliverable. Standard reference materials used to perform calibration checks associated with both inorganic target analytes and radiochemical parameters will be prepared using an independent source for the standard materials from that used to prepare the calibration standards. The results of these calibration checks will be reported with each data deliverable.

A.6.6 Laboratory Instrument/Equipment Testing, Inspection and Preventative Maintenance Procedures and Frequency

Laboratory equipment and instrumentation will be tested, inspected, and maintained to a level such that each piece of equipment and instrumentation can meet method-specific QA/QC tolerances and are in proper working order. Testing, inspection, and maintenance will be performed under the supervision of

qualified personnel in accordance with the manufacturer's specifications, laboratory QA plan, and procedures and requirements.

EPA Requirements for Quality Assurance Project Plans, EPA/240/B-01/003, EPA QA/R-5 (EPA 2001) requires that all activities not governed by specific analytical procedures be completed under approved procedures and requirements. If procedures and requirements governing the inspection and maintenance of equipment and instrumentation do not presently exist, they will be developed to ensure that activities are conducted using equipment and instrumentation that are performing within the manufacturer's or design specifications.

A.6.7 Inspection/Acceptance of Laboratory Supplies and Consumables

Laboratory consumable materials, parts, and supplies will be inspected for quality by the appropriate personnel before use to ensure it is clean, free from defects, and made of materials appropriate for the media and analytes being analyzed. Inspection and acceptance of these items will be documented or, when certifications are provided by the manufacturer, maintained in laboratory files to ensure availability of these records for review when needed.

A.6.8 Laboratory Data Reporting Requirements

An important part of the laboratory documentation is the case narrative. The case narrative contains essential information that allows an informed evaluation of data usability. The case narrative will include, but not be limited to, the following:

- A table summarizing samples received, correlating field sample identification numbers, laboratory sample identification numbers, and laboratory analyses completed.
- Discussion of sample appearance and integrity issues that may affect data usability (e.g., temperature, preservation, pH, sample containers, air bubbles, and multi-phases).
- Samples received but not analyzed and the reason for it.
- Discussion of holding time excursions for sample preparation and analyses.
- Discussion on all out-of-control analyses or discrepancies of calibrations, continuing calibrations or QC sample results (e.g., surrogates, laboratory blank samples, laboratory control samples, MS/MSD samples, and post-digestion spikes) and corrective actions taken.
- Discussion of all qualified data and definition of qualifying flags.
- Discussion of and recommendations for potential data usability of qualified data.

Reporting of analytical results will follow the guidelines listed below:

- Reported data will identify the concentration units (e.g., milligrams per kilogram, milligrams per liter) and appropriate laboratory qualifiers.
- Data reported as non-detected will be referenced against a stated method detection limit or instrument detection limit value.
- Method detection limits and sample results will be reported to one decimal place more than the corresponding level of quantitation (LOQ), unless the appropriate number of significant figures for the measurement dictates otherwise.
- Soil samples will have results reported on a dry-weight basis.
- If possible, samples will be analyzed undiluted and non-detects reported to the specified LOQs; LOQs for minority constituents in highly contaminated samples may have to be adjusted for dilutions.

A.6.9 Laboratory Data Review Requirements

All analytical data generated will be verified for completeness and technical accuracy by the laboratory performing the work prior to submittal to WTP. This internal data review process, which is multi-tiered, will include all aspects of data generation, reduction, and QC assessment. In each laboratory analytical section, the analyst performing the tests will review 100% of the definitive data. After the review by the analyst has been completed, 100% of the data will be reviewed independently by a senior analyst or by the supervisor of the respective analytical section using the same criteria.

The elements of the laboratory data review at each level will include, but are not limited to:

- Sample receipt procedures and conditions
- Sample preparation
- Accuracy and completeness of analytical results
- Correct interpretation of all raw data, including all manual integrations
- Appropriate application of QC samples and compliance with established CLs
- Verification of data transfers
- Documentation completeness (e.g., all anomalies in the preparation and analysis have been identified; appropriate corrective actions have been taken and have been documented in the case narratives; associated data have been appropriately qualified; and anomaly forms have been completed)
- Accuracy and completeness of data deliverables (hardcopy and electronic)

A.6.10 Laboratory Data Deliverable Requirements

The laboratory data package will be prepared after completion of analyses and submitted to WTP. It will contain adequate information for data review and validation. A complete data deliverable will consist of a complete analytical report, chain-of-custody documentation, and electronic deliverable. The following information may be part of the laboratory data package:

- Cover letter that identifies the project
- Table of contents
- Case narrative that summarizes samples and analyses and discusses any issues that may affect data usability
- Analytical results to include the field sample identification numbers, laboratory sample identification numbers, date sampled, date extracted, date analyzed, dilution factors, extraction and analytical methods, units and sample quantitation limits
- Laboratory method detection limits, estimated detection limits, and LOQs
- Laboratory qualifiers
- Sample management records including original signed chain-of-custody and cooler receipt forms
- Internal laboratory QA/QC information

A.7 DATA VALIDATION AND REPORTING

The data collection in the field and by the laboratory is the first of several steps in evaluating conditions at a DWMU. After the data are collected, a series of evaluations and data reduction steps must be conducted to ensure that the data are acceptable and that the information is in a form practical for the data users.

A.7.1 Data Review and Reduction

Data review is the in-house examination to ensure that the collected data have been recorded, transmitted, and processed correctly. Data review includes checking for data entry, transcription, calculation,

reduction, and transformation errors. It is also a completeness check to determine whether there are any deficiencies such as data missing or integrity lost (e.g., due to corruption or loss in storage or processing). Data reduction is the process of converting raw data or instrument data into a usable form for evaluation by data users. Review and reduction of environmental data will take place at the laboratory and project offices. The data review and reduction activities convert the data into a form more usable for interpretive purposes of environmental risk and verification of clean closure.

Field data reduction involves tabulating data obtained in the field and calculating summary statistics (e.g., average, maximum, minimum) on the data. Laboratory data reduction involves converting the outputs of the analytical instruments into sample and QC results. Laboratory data reduction will be performed as defined in the analytical method. Laboratory deliverables will include raw data and reduced data. This form of laboratory reporting will: (a) ensure complete documentation of all aspects of laboratory analysis, (b) permit independent verification of reported results, (c) provide a form of data that is technically and legally defensible, and (d) ensure that data users can be completely confident in the results they deem usable.

Scientists, engineers, and regulators within EPA, Office of River Protection (ORP), and Ecology may review the data to ensure compliance with applicable WACs and DOE closure requirements. Individual regulators will submit their requests to the WTP Closure Manager for any datasets required to evaluate the post-decontamination sampling effort and declaration of clean closure. The WTP Closure Manager will provide requested information to regulators in an agreed upon form.

A.7.2 Data Verification and Validation

The *EPA Guidance on Environmental Data Verification and Data Validation*, EPA/240/R-02/004, EPA QA/G 8 (EPA 2002b) will be used as a guide to perform data verification and validation. Data verification is the process of evaluating the completeness, correctness, and conformance/compliance of a specific dataset against the method, procedural, or contractual requirements. Data verification is performed on analytical results to ensure that they are complete and in order. It involves ensuring that deficiencies are identified, documented, and corrected. Data verification is generally done by the laboratory generating the data or by others independent of the laboratory.

Data validation is the comparison of analytical results versus the requirements established by the analytical method. Validation involves evaluation of all sample-specific information generated from sample collection in the field to sample analysis in the laboratory. It involves ensuring that the holding times, precision, accuracy, laboratory blanks, and detection limits are within the acceptance criteria. Data validation is used to determine whether the analytical data are technically and legally defensible and reliable. The applicable analytical method QC guidelines will be used to validate the data with the exception of radioanalytical data. Data validation is one step of the data quality assessment (DQA) process that will be used to determine whether the data meet the DQOs.

Data validation is generally performed by others independent of the laboratory performing sample analysis. The analytical data generated by the laboratory will be sent to an independent, third-party company for data validation. The data validation strategy may be 90% Level III and 10% Level IV. The Level III data validation assumes that reported data values are correct as reported by the laboratory. Data quality is assessed by verifying that the requirements have been achieved for each compound class. The Level IV data validation is based on the assessment of laboratory raw data packages, which include all data required for a full review of compound selection, integration, interference assessment, and requantification (e.g., spectra and chromatograms). Supporting records are also included in this package (e.g., calibration standards, instrument sequence files, and dilution factors). If necessary, Level IV data validation includes requantification of reported QC and field sample values using the raw data files. In addition, instrument performance, calibration methods, and calibration standards are reviewed to ensure that the detection limits and data values are accurate and appropriate.

The final product of the validation process is the validation report. The validation report communicates the quality and usability of the data to the data users and decision-makers. The validation report will contain an itemized discussion of the validation process and results. The validation report, along with the other data obtained during the sampling and analysis activities, will be reviewed to make a determination whether the overall dataset met the DQOs and the closure performance standards have been attained.

A.7.3 Data Quality Assessment

The sampling and analytical data will be evaluated to determine whether they are of the appropriate type, quality, and quantity to support their intended use. A data quality assessment will be performed on data obtained in the field and by the laboratory in accordance with *EPA Guidance for Data Quality Assessment: Practical Methods for Data Analysis*, EPA/600/R-96/084, EPA QA/G-9 (EPA 2000).

A.7.4 Non-Direct Measurements

In addition to the data obtained during sampling and analysis activities, decision-makers will use data obtained from other existing sources such as operating records from project files and databases, photographs taken during operations, information on background soil levels from published scientific literature and environmental investigation reports from other facilities, and cleanup standards from local, state, and federal regulations. These data will be used to assist in designing the sampling and analysis program. For example, operating records will be used to identify potential sample locations and COCs while soil background levels and regulatory cleanup standards will be used to establish clean closure performance standards for the DWMU. In addition, operating records will be reviewed to determine whether the DWMU may be administratively closed with no sampling, decontamination, or remediation.

A.8 DOCUMENTATION AND DATA MANAGEMENT

To ensure all sampling, analysis, and data reporting activities are conducted in accordance with this SAP, WTP QA Manual and all appropriate project procedures, adequate documentation of each event must be completed. Therefore, all field activities related to sample collection and sample custody must be recorded. A designated professional engineer will observe sampling activities and will be given the documentation generated during closure activities that is required to certify closures.

The laboratory will perform all functions required for analyses of the samples and reporting of analytical results in accordance with an approved laboratory QA plan. Laboratory activities relating to sample custody, sample preparation, sample analysis, and data reporting must be recorded to ensure that laboratory data can be confidently used by the data users. As designated by the WTP Closure Manager, key project staff may contact the laboratory personnel and obtain a copy of the laboratory QA plan for review and/or visit the facility to ensure laboratory procedures meet the project-specific goals.

Records generated to support activities described in this SAP will be legible, identifiable, and retrievable, and will be protected against damage, deterioration, or loss. Requirements and responsibilities for record transmission, distribution, retention, maintenance, and disposal will be established and documented. Personnel that generate or use data in an electronic format are responsible for complying with applicable software quality requirements to ensure that data input (and changes to data input) is complete and accurate, and that security and integrity of the data are maintained.

A.8.1 Field Operations Records

The following subsections provide a summary of requirements for adequate field documentation. All field documentation will be the responsibility of the designated sampling personnel.

A.8.1.1 Sample Container Labels

At the point of sample collection, samples will be collected in pre-labeled containers to obtain sufficient volumes for the required analyses. Each sample may require multiple containers and each sample set of

containers from a specific sample location and depth will be assigned a unique identification number to prevent misidentification of samples.

At a minimum, the sample location, identification number, collection date and time will be recorded on the sample label, in the field logbook and/or on the chain-of-custody form. Samples will be labeled, recorded, and tracked according to the requirements of this SAP.

A.8.1.2 Field Sampling Logbooks

Field logbooks are legal documents; they are the written record for all field data gathered, field observations, field equipment calibrations, samples collected for laboratory analysis, and sample custody. The logbooks are maintained to ensure that field activities are properly documented. Field logbooks will be bound and will contain consecutively numbered pages. All entries in field logbooks will be made using permanent ink pens or markers. All mistakes made as entries will be amended by drawing a single line through the entry. The person making the correction will initial and date it. At a minimum, the following entries will be made to the field logbook:

- Identification of project
- Name of site contractor
- Identification of all sampling team members
- References to field methods used to obtain samples, field data, etc.
- Location, depth and description of each sample location
- Matrix of samples (e.g., rinsate, soil, concrete wipe, concrete chip)
- Types, numbers, and volumes of sample containers
- Unique sample identification numbers
- Dates and times of sample collection, using a 24-hour clock notation
- Dates and times of sample shipping or transfer of sample custody
- Observed weather conditions
- All field equipment, instruments and measurements
- Any deviations from this SAP
- The chain-of-custody form numbers

A.8.1.3 Chain-of-Custody Forms

The ability to demonstrate that samples were collected from the designated sample locations and that they reached the laboratory without alteration is important for the accuracy and integrity of the data resulting from laboratory analysis. Evidence of sample collection, transfers between personnel, shipment, and laboratory receipt will be documented using chain-of-custody forms. The chain-of-custody form will, as a minimum, provide the sample location, identification number, type, collection date and time, preservation, and analyses to be performed.

A.8.2 Laboratory Records

Laboratory records are required to document all activities involved in sample receipt, processing, analysis, and data reporting. The following subsections describe the laboratory records that will be generated for WTP closure activities.

A.8.2.1 Sample Data Records

These records contain the times samples were analyzed to verify the holding times were the same as those prescribed by the analytical methods. Sample data records will include information on the total number of samples analyzed in a given day, location of sample analysis (i.e., instrument identification number),

any deviations from analytical procedures and requirements and/or methods, and time and date of analysis. Corrective action steps taken to rectify situations that did not conform to laboratory procedures and requirements and/or analytical methods (including steps taken to seek additional sample material, if required) will also be noted in these records.

A.8.2.2 Sample Management Records

Sample management records document sample receipt, handling and storage, and date of analyses. The records verify that the chain-of-custody was maintained and the sample was properly preserved. The record will reflect any anomalies in the samples (such as receipt of damaged samples), note proper log in of samples into the laboratory, and address procedures used to prioritize received samples to ensure holding time requirements will be met.

A.8.2.3 Test Methods

This documentation describes any deviation from the analytical methods or laboratory procedures and requirements. Items to be documented include sample preparation and analysis, instrument standardization, detection and reporting limits, and test-specific QC criteria. Documentation demonstrating laboratory proficiency with each method used will also be included in this category.

A.8.2.4 Quality Assurance/Quality Control Reports

The QA/QC reports will include general QC records, such as initial demonstration of the capability of individual analysts to conduct specific analyses, instrument calibration, routine monitoring of analytical performance (e.g., control charts), and calibration verification. Project-specific information from the QA/QC checks, such as blanks (e.g., field, reagent, and method), spikes (e.g., MS/MSD and surrogate), calibration check samples (e.g., zero check, span check, and mid-range check), replicates, and splits will be included in the QA/QC reports to facilitate data quality analysis. Specific requirements for the quantity and types of QA/QC monitoring and associated reporting formats will be specified in the analytical SOPs to the laboratory.

A.8.3 Document Control

Document control consists of the clear identification of all project-specific documents in an orderly form, secure storage of all project information, and controlled distribution of all project information. Document control ensures controlled documents of all types related to the project will receive appropriate levels of review, comment, and revision as necessary.

Hardcopy and/or electronic data of records generated to support activities described in this SAP will be stored in project files. The laboratory will maintain electronic and hardcopy records sufficient to recreate each analytical event. Records will be stored by the laboratory for the duration of the WTP Project or once closure certification has been completed, whichever is longer, or as dictated by project requirements. Data will be made available for retrieval by authorized WTP personnel upon request. In the event of laboratory closure, all applicable documents and electronic media must be immediately transferred to the WTP facility operator at the time of closure and/or ORP.

A.8.4 Project Data Flow and Transfer

The data flow from the laboratory and field to the project staff/data users will be sufficiently documented to ensure that the data are properly tracked, reviewed, validated for use and retrievable.

A.9 ASSESSMENTS AND CORRECTIVE ACTIONS

Periodic assessments to verify that field sampling and laboratory analytical activities meet the requirements of this SAP, WTP QA Manual, and laboratory QA plan will be conducted. If necessary, corrective action procedures will be implemented whenever field sampling or laboratory analysis results do not meet the required QA/QC standards. Implemented corrective actions will be documented according to approved procedures.

A.10 REPORTS TO MANAGEMENT

Conditions identified as having an adverse effect on quality, the significance of such conditions, and corrective actions will be documented, reported to the appropriate level of management, and resolved according to approved procedures.

The assessment reports may include the following items, as appropriate:

- Deviations from the requirements specified in this SAP, WTP QA Manual, or laboratory QA plan
- Limitations or constraints on the applicability of the resulting field and analytical data
- Results of assessments
- Corrective actions taken

A.11 REFERENCES

40 CFR 261. *Identification and Listing of Hazardous Waste*. Code of Federal Regulations.

Ecology. 1995. *Guidance on Sampling and Data Analysis Methods*. Publication No. 94-49. Washington State Department of Ecology, Olympia, WA.

Ecology. 2005. *Guidance for Clean Closure of Dangerous Waste Units and Facilities*. Publication No. 94-111. Washington State Department of Ecology, Olympia, WA.

Ecology. 2007. *Hanford Facility Resource Conservation and Recovery Act (RCRA) Permit, Dangerous Waste Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste, Part III, Operating Unit Group 10 (Waste Treatment and Immobilization Plant), WA7890008967*. Washington State Department of Ecology, Richland, WA.

Ecology. 2013. *Model Toxics Control Act Regulation and Statute*. Publication No. 94-06. Washington State Department of Ecology, Olympia, WA.

EPA 1983. Environmental Monitoring and Support Laboratory. Methods for Chemical Analysis of Water and Wastes (Revised). 600/4-79/020. Cincinnati, OH. U.S. Environmental Protection Agency, 1983.

EPA. 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (EPA SW-846), 3rd Edition, including Final Updates I, II, IIA, IIB, III, IIIA, and IIIB, and Draft Updates IVA and IVB. US Environmental Protection Agency, Washington, DC.

EPA. 1996. *EPA Soil Screening Guidance: User's Guide*, EPA/540/R-96/018. US Environmental Protection Agency, Washington, DC.

EPA. 2000. *EPA Guidance for Data Quality Assessment: Practical Methods for Data Analysis*, EPA/600/R-96/084, EPA QA/G-9. US Environmental Protection Agency, Washington, DC.

EPA. 2001. *EPA Requirements for Quality Assurance Project Plans*, EPA/240/B-01/003, EPA QA/R-5. US Environmental Protection Agency, Washington, DC.

EPA. 2002a. *EPA Guidance for Quality Assurance Project Plans*, EPA/240/R-02/009, EPA QA/G-5. US Environmental Protection Agency, Washington, DC.

EPA. 2002b. *EPA Guidance on Environmental Data Verification and Data Validation*, EPA/240/R-02/004, EPA QA/G-8. US Environmental Protection Agency, Washington, DC.

EPA. 2006. *EPA Guidance on Systematic Planning Using the Data Quality Objectives Process*, EPA/240/B-06/001, QA/G-4. US Environmental Protection Agency, Washington, DC.

EPA 2012. Methods and Guidance for the Analysis of Water. EPA/540/R-11/016, U.S. Environmental Protection Agency, 2012.

DOE O 435.1. 1999. *Radioactive Waste Management*. US Department of Energy, Washington, DC.

Myers, JC. 1997. *Geostatistical Error Management: Quantifying Uncertainty for Environmental Sampling and Mapping*. John Wiley & Sons, New York, NY.

WAC 173-303. *Dangerous Waste Regulations*. Washington Administrative Code.

WASTE TREATMENT AND IMMOBILIZATION PLANT
CHAPTER 12
REPORTING AND RECORDKEEPING

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
08/2011	

This page intentionally left blank.

CHAPTER 12.0
REPORTING AND RECORDKEEPING

This page intentionally left blank.

CHAPTER 12.0
REPORTING AND RECORDKEEPING

TABLE OF CONTENTS

12.0 REPORTING AND RECORDKEEPING 5

This page intentionally left blank.

12.0 REPORTING AND RECORDKEEPING

The River Protection Project - Waste Treatment Plant (WTP) is subject to the reporting and recordkeeping requirements of *Dangerous Waste Regulations* (WAC 173-303), *Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities* (40 CFR 264), and *Land Disposal Restrictions* (40 CFR 268).

Descriptions of specific reporting and recordkeeping requirements applicable to treatment, storage, and disposal units are located in the *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE-RL 1998). Not all of the requirements and associated reports and records identified in Chapter 12 of the General Information Portion apply to the WTP. Those that apply are as follows:

Reports and Records	Reports and Records
Quarterly notification of Class 1 modification notification	Closure and postclosure cost estimates
Monitoring and records	Onsite transportation documentation
Certification of construction or modifications	Annual noncompliance report
Anticipated noncompliance	Annual dangerous waste report
Reporting planned changes	Annual LDR report
Immediate reporting	Permit condition compliance evaluation
Release or noncompliance not requiring immediate reporting	Deed notification (reference only)
Written reporting	Inspection records
Waste transfer documentation discrepancy report (equivalent to “Manifest Discrepancy Report”)	Closure certification
Other Information	Notification of, or request for, permit modification
Permit-related documentation	Closure plan deviation
Notification of permit-related documentation	Engineering change notices and nonconformance reports
Waste location	As-built drawings
Waste analysis	Equivalent materials
Contingency Plan and incident reports	LDR records
Personnel training records	Schedule extensions
Occurrence reports	Waste minimization and pollution prevention
Emergency Response Plan	Other permit compliance documentation

The WTP facility operating record (Hanford Facility Operating Record) will be kept onsite or at the permittee’s offices located in Richland, Washington.

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 1.0
WTP INTERIM COMPLIANCE SCHEDULE

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
09/30/2015	8C.2015.Q3

This page intentionally left blank.

APPENDIX 1.0
WTP INTERIM COMPLIANCE SCHEDULE

Interim Compliance Schedule - WTP Facility		
	Compliance Schedule Submittal	**Interim Compliance Date**
	III.10.C.2	
1.	Submit documentation stating the WTP has been constructed in compliance with the Permit.	12/31/2018
2.	Submit updated Site Transportation Report for incorporation into the Administrative Record.	Complete
33.	Update and resubmit the Part A, Form 3 Permit Application.	Complete
34.	DELETED	DELETED
	III.10.C.3	
3.	Revise and Submit Waste Analysis Plan and associated Quality Assurance Project Plan to Ecology for review and approval.	12/30/2017
	III.10.C.5.	
4.	Update and submit for approval "Procedures to Prevent Hazards", Chapter 6.0 Sections 6.3, 6.4, 6.5 and the Inspection Schedule.	12/30/2017
	III.10.C.6	
5.	Update and submit the Contingency Plan.	12/30/2017
	III.10.C.7	
6.	Update and resubmit for review and approval Training Program description in Chapter 8 of the Permit.	12/30/2017
7.	Submit under separate cover the actual WTP Dangerous Waste Training Plan for incorporation into Administrative Record.	12/30/2017
	III.10.C.8	
8.	Update and resubmit the Closure Plan for approval.	12/30/2017
	III.10.C.11	
9.	Submit Risk Assessment Workplan, revised in consultation with Ecology.	Complete
	III.10.C.15	
36.	Submit System Descriptions for Mechanical Handling Systems identified in Permit Table III.10.C.A, for incorporation into the Administrative Record.	Complete
37.	Submit Mechanical Handling Diagrams and Mechanical Handling Data Sheets for the following pieces of equipment: a. HDH-CRN-00005 b. HEH-CRN-00003 c. HPH-CRN-00001 d. HPH-CRN-00002 e. HSH-CRN-00001 f. HSH-CRN-00014 g. LEH-CRN-00003	Complete Complete

Interim Compliance Schedule - WTP Facility		
	Compliance Schedule Submittal	**Interim Compliance Date**
	h. LPH-CRN-00002 i. HEH-CRN-00001	
38.	Submit equipment instrument logic narrative description for mechanical handling equipment, as specified in Permit Condition III.10.C.15.a.ii.A.	Complete
39.	Submit descriptions of operational procedures for mechanical handling systems, as specified in Permit Condition III.10.C.15.a.ii.B.	Complete
	CONTAINERS III.10.D.10	
10.	Submit detailed information associated with containers and container management areas.	Complete
11.	Submit descriptions of container management practices.	12/30/2017
46.	Submit the updated BOF-001 permit package associated with the Failed Melter Storage Building (Building 32).	6/30/2018
	TANK SYSTEMS III.10.E.9	
12.	Submit engineering information for each secondary containment and leak detection system for the WTP Tank System to be included in the Permit.	Complete
13.	Submit engineering information for each dangerous waste tank and primary sump to be included in the Permit.	12/31/2017
14.	Submit engineering information for each tank system ancillary equipment to be included in the Permit.	12/31/2017
15.	Submit descriptions of tank management practices.	12/30/2017
40.	Submit WTP document *Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria,"* 24590-WTP-DC-PS-01-001.	Complete
	CONTAINMENT BUILDINGS III.10.F.7	
16.	Submit engineering information for each containment building to be included in the Permit.	Complete
17.	Submit descriptions of containment building management practices.	12/30/2017
	PRETREATMENT PLANT MISC. UNITS SYSTEMS III.10.G.9	
18.	Submit engineering information for secondary containment and leak detection system for the Pretreatment Plant Miscellaneous Unit Systems.	Complete
19.	Submit engineering information for Pretreatment Plant Miscellaneous Unit Systems.	12/31/2017
20.	Submit engineering information for Pretreatment Plant Miscellaneous Unit Systems equipment.	12/31/2017
21.	Submit descriptions of management practices for the Pretreatment Miscellaneous Treatment System.	06/30/2018
	LAW SHORT TERM MELTER UNIT III.10.H.5	

Interim Compliance Schedule - WTP Facility		
	Compliance Schedule Submittal	**Interim Compliance Date**
22.	Submit engineering information for LAW Vitrification Miscellaneous Treatment Unit secondary containment.	Complete
23.	Submit engineering information for LAW Vitrification Miscellaneous Treatment Unit sub-system.	12/31/2015
24.	Submit engineering information for equipment for each LAW Vitrification Miscellaneous Treatment Unit sub-system.	Complete
25.	Submit descriptions of management practices for the LAW Vitrification Miscellaneous Treatment System.	06/30/2018
26.	Submit LAW Vitrification Environmental Performance Demonstration Test Plan for Ecology review and approval.	01/01/2018
	HLW SHORT TERM MELTER UNIT III.10.J.5	
27.	Submit engineering information for HLW Vitrification Miscellaneous Treatment Unit secondary containment.	Complete
28.	Submit engineering information for HLW Vitrification Miscellaneous Treatment Unit sub-system.	Complete
29.	Submit engineering information for equipment for each HLW Vitrification Miscellaneous Treatment Unit sub-system.	Complete
41.	Submit the following source drawings to complete HLW melter permit packages HLW-018 and HLW-019: ▪ P&ID *HLW Melter 1 System Film Cooler Utilities*, 24590-HLW-M6-HMP-00012 ▪ P&ID *HLW Melter 2 System Film Cooler Utilities*, 24590-HLW-M6-HMP-20012 ▪ HLW Melter Mechanical Drawings showing the melter physical attributes and overall dimensions.	Complete Complete
30.	Submit descriptions of management practices for the HLW Vitrification Miscellaneous Treatment System.	12/30/2017
31.	Submit HLW Vitrification Environmental Performance Demonstration Test Plan for Ecology review and approval.	01/01/2018
	REPORT OF PROGRESS	
35.	Submit 2005 Report of Progress.	Complete

Interim Compliance Schedule - WTP Facility		
	Compliance Schedule Submittal	**Interim Compliance Date**
42.	Submit 2007 Report of Progress.	Complete
43.	Submit 2010 Report of Progress.	Complete
44.	Submit 2011 Report of Progress.	Complete
45.	Update and resubmit Chapter 4, Process Information.	12/30/2017
	FINAL COMPLIANCE DATE	
32.	Final Compliance Date.	12/30/2018

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 2.0
CRITICAL SYSTEMS FOR THE WTP

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
03/2014	

This page intentionally left blank.

OPERATING UNIT GROUP 10 – APPENDIX 2.0
CRITICAL SYSTEMS FOR THE WTP

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd. Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Mnemonic System Locator	System Name
Pretreatment Systems	
CNP	Cesium Nitric Acid Recovery Process System
CXP	Cesium Ion Exchange Process System
FEP	Waste Feed Evaporation Process System
FRP	Waste Feed Receipt Process System
HLP	HLW Lag Storage and Feed Blending Process System
PFH	Pretreatment Filter Cave Handling System
PIH	Pretreatment In-Cell Handling System
PJV	Pulse Jet Ventilation System
PVP	Pretreatment Vessel Vent Process System
PVV	Process Vessel Vent System
PWD	Plant Wash and Disposal System
RDP	Spent Resin and Dewatering Process System
RLD	Radioactive Liquid Waste Disposal System
TCP	Treated LAW Concentrate Storage Process System
TLP	Treated LAW Evaporation Process System
UFP	Ultrafiltration Process System
Low-Activity Waste Systems	
LCP	LAW Concentrate Receipt Process System
LEH	LAW Canister Export Handling System
LFH	LAW Container Finishing Handling System
LFP	LAW Melter Feed Process System
LMH	LAW Melter Handling System
LMP	LAW Melter Process System
LOP	LAW Primary Offgas Process System
LPH	LAW Container Pour Handling System
LSH	LAW Melter Equipment Support Handling System
LVP	LAW Secondary Offgas/Vessel Vent Process System
RLD	Radioactive Liquid Waste Disposal System

Mnemonic System Locator	System Name
High-Level Waste Systems	
HCP	HLW Concentrate Receipt Process System
HDH	HLW Canister Decontamination Handling System
HEH	HLW Canister Export Handling System
HFH	HLW Filter Cave Handling System
HFP	HLW Melter Feed Process System
HMH	HLW Melter Handling System
HMP	HLW Melter Process System
HOP	Melter Offgas Treatment Process System
HPH	HLW Canister Pour Handling System
HSH	HLW Melter Cave Support Handling System
PJV	Pulse-Jet Ventilation System
PVV	Process Vessel Vent System
RLD	Radioactive Liquid Waste Disposal System
Analytical Laboratory Systems	
RLD	Radioactive Liquid Waste Disposal System
Balance of Facilities Systems	
CPE	Cathodic Protection Electrical System

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 6.0

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Appendices	Modification Date	Modification Number
Appendix 6.0	01/28/2016	8C.2016.1F
Appendix 6.1		
Appendix 6.2		

This page intentionally left blank.

OPERATING UNIT GROUP 10
APPENDIX 6.0

This page intentionally left blank.

OPERATING UNIT GROUP 10
APPENDIX 6.0

Where information regarding treatment, management, and disposal of the radioactive source, byproduct material, and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954, as amended) has been incorporated into this permit, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit and chapter 70.105 Revised Code of Washington (RCW). In the event of any conflict between Permit Condition III.10.A and any statement relating to the regulation of source, special nuclear, and byproduct material contained in portions of the permit application that are incorporated into this permit, Permit Condition III.10.A will prevail.

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 7.0

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Appendices	Modification Date	Modification Number
Appendix 7.0	06/20/2016	8C.2015.4F
Appendix 7.1		
Appendix 7.2		
Appendix 7.5		
Appendix 7.7		
Appendix 7.9		
Appendix 7.11		
Appendix 7.12		
Appendix 7.13		
Appendix 7.15		

This page intentionally left blank.

OPERATING UNIT GROUP 10
APPENDIX 7.0

This page intentionally left blank.

OPERATING UNIT GROUP 10
APPENDIX 7.0

Where information regarding treatment, management, and disposal of the radioactive source, byproduct material, and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954, as amended) has been incorporated into this permit, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit and chapter 70.105 Revised Code of Washington (RCW). In the event of any conflict between Permit Condition III.10.A and any statement relating to the regulation of source, special nuclear, and byproduct material contained in portions of the permit application that are incorporated into this permit, Permit Condition III.10.A will prevail.

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 8.0

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Appendices	Modification Date	Modification Number
Appendix 8.0	09/30/2015	8C.2015.Q3
Appendix 8.1		
Appendix 8.2		
Appendix 8.4		
Appendix 8.5		
Appendix 8.6		
Appendix 8.7		
Appendix 8.8		
Appendix 8.9		
Appendix 8.10		
Appendix 8.11		
Appendix 8.13		
Appendix 8.18		

This page intentionally left blank.

OPERATING UNIT GROUP 10
APPENDIX 8.0

This page intentionally left blank.

OPERATING UNIT GROUP 10
APPENDIX 8.0

Where information regarding treatment, management, and disposal of the radioactive source, byproduct material, and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954, as amended) has been incorporated into this permit, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit and chapter 70.105 Revised Code of Washington (RCW). In the event of any conflict between Permit Condition III.10.A and any statement relating to the regulation of source, special nuclear, and byproduct material contained in portions of the permit application that are incorporated into this permit, Permit Condition III.10.A will prevail.

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 9.0

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Appendices	Modification Date	Modification Number
Appendix 9.0		
Appendix 9.1		
Appendix 9.2	03/01/2017	8C.2016.Q4
Appendix 9.4		
Appendix 9.5		
Appendix 9.6	03/01/2017	8C.2016.Q4
Appendix 9.7	12/1/2016	8C.2016.7F
Appendix 9.8		
Appendix 9.9	12/1/2016	8C.2016.7F
Appendix 9.10		
Appendix 9.11	12/1/2016	8C.2016.7F
Appendix 9.13		
Appendix 9.18		

This page intentionally left blank.

OPERATING UNIT GROUP 10
APPENDIX 9.0

This page intentionally left blank.

OPERATING UNIT GROUP 10
APPENDIX 9.0

Where information regarding treatment, management, and disposal of the radioactive source, byproduct material, and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954, as amended) has been incorporated into this permit, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit and chapter 70.105 Revised Code of Washington (RCW). In the event of any conflict between Permit Condition III.10.A and any statement relating to the regulation of source, special nuclear, and byproduct material contained in portions of the permit application that are incorporated into this permit, Permit Condition III.10.A will prevail.

This page intentionally left blank.

DRAWINGS AND DOCUMENTS
OPERATING UNIT GROUP 10 – APPENDIX 9.2
LOW ACTIVITY WASTE BUILDING
PIPING AND INSTRUMENTATION DIAGRAMS

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document Number	Description
24590-LAW-M6-LCP-00001001, Rev 0	P&ID - LAW Concentrate Receipt Process System LCP-BULGE-00001
24590-LAW-M6-LCP-00001002, Rev 0	P&ID - LAW Concentrate Receipt Process System Concentrate Receipt Vessel LCP-VSL-00001
24590-LAW-M6-LCP-00001003, Rev 0	P&ID - LAW Concentrate Receipt Process System Concentrate Receipt Vessel LCP-VSL-00001
24590-LAW-M6-LCP-00001004, Rev 0	P&ID - LAW Concentrate Receipt Process System LCP-BULGE-00002 (Sheet 1 of 2)
24590-LAW-M6-LCP-00001005, Rev 0	P&ID - LAW Concentrate Receipt Process System LCP-BULGE-00002 (Sheet 2 of 2)
24590-LAW-M6-LCP-00001006, Rev 0	P&ID - LAW Concentrate Receipt Process System Expansion Vessel LCP-VSL-00005
24590-LAW-M6-LCP-00002001, Rev 0	P&ID – LAW Concentrate Receipt Process System LCP-BULGE-00003 (Sheet 1 of 2)
24590-LAW-M6-LCP-00002002, Rev 0	P&ID – LAW Concentrate Receipt Process System LCP-BULGE-00003 (Sheet 2 of 2)
24590-LAW-M6-LCP-00002003, Rev 0	P&ID – LAW Concentrate Receipt Process System Concentrate Receipt Vessel LCP-VSL-00002
24590-LAW-M6-LCP-00002004, Rev 0	P&ID – LAW Concentrate Receipt Process System Concentrate Receipt Vessel LCP-VSL-00002
24590-LAW-M6-LFP-00001001, Rev 0	P&ID – LAW Melter Feed Process System Melter 1 Feed Preparation LFP-VSL-00001
24590-LAW-M6-LFP-00001002, Rev 0	P&ID – LAW Melter Feed Process System Melter 1 Feed Preparation LFP-VSL-00001
24590-LAW-M6-LFP-00001003, Rev 0	P&ID – LAW Melter Feed Process System Melter 1 Feed Vessel LFP-VSL-00002
24590-LAW-M6-LFP-00001004, Rev 0	P&ID – LAW Melter Feed Process System Melter 1 Feed Vessel LFP-VSL-00002
24590-LAW-M6-LFP-00001005, Rev 0	P&ID – LAW Melter Feed Process System Melter 1 Feed Preparation and Feed LFP-BULGE-00001
24590-LAW-M6-LFP-00001006, Rev 0	P&ID – LAW Melter Feed Process System Melter 1 Feed Preparation and Feed LFP-BULGE-00001

24590-LAW-M6-LFP-00003001, Rev 0	P&ID – LAW Melter Feed Process System Melter 2 Feed Preparation LFP-VSL-00003
24590-LAW-M6-LFP-00003002, Rev 0	P&ID – LAW Melter Feed Process System Melter 2 Feed Preparation LFP-VSL-00003
24590-LAW-M6-LFP-00003003, Rev 0	P&ID – LAW Melter Feed Process System Melter 2 Feed Vessel LFP-VSL-00004
24590-LAW-M6-LFP-00003004, Rev 0	P&ID – LAW Melter Feed Process System Melter 2 Feed Vessel LFP-VSL-00004
24590-LAW-M6-LFP-00003005, Rev 0	P&ID – LAW Melter Feed Process System Melter 2 Feed Preparation and Feed LFP-BULGE-00002
24590-LAW-M6-LFP-00003006, Rev 0	P&ID – LAW Melter Feed Process System Melter 2 Feed Preparation and Feed LFP-BULGE-00002
24590-LAW-M6-LMP-00001001, Rev 0	P&ID – LAW Melter Process System Melter 1 Agitation Zone 1 & Zone 2 and LMP-RK-00040A/B *Confidential Business Information*
24590-LAW-M6-LMP-00002001, Rev 0	P&ID –LAW Melter Process System Melter 1 Agitation Zone 3 & Level Detection LMP-RK-00040B and PPJ-RK-00001 *Confidential Business Information*
24590-LAW-M6-LMP-00002002, Rev 0	P&ID –LAW Melter Process System Melter 1 Agitation Zone 3 & Level Detection and LMP-RK-00040C *Confidential Business Information*
24590-LAW-M6-LMP-00003001, Rev 0	P&ID –LAW Melter Process System Melter 1 Walls and Floor Panels Cooling System
24590-LAW-M6-LMP-00005001, Rev 0	P&ID –LAW Melter Process System Melter 1 Electrode Extension Cooling & Glass/Plenum Temperatures *Confidential Business Information*
24590-LAW-M6-LMP-00007001, Rev 0	P&ID –LAW Melter Process System Melter 1 Glass Pouring and Monitoring Instrumentation
24590-LAW-M6-LMP-00007002, Rev 0	P&ID –LAW Melter Process System Melter 1 Glass Pouring and Monitoring Instrumentation
24590-LAW-M6-LMP-00008001, Rev 0	P&ID –LAW Melter Process System Melter 1 Discharge Heaters, Power Controls (1-4) & Air Left - Eastside
24590-LAW-M6-LMP-00010001, Rev 0	P&ID –LAW Melter Process System Melter 1 Discharge Heaters, Power Controls (1-4) & Air Lift - Westside
24590-LAW-M6-LMP-00012001, Rev 0	P&ID –LAW Melter Process System Melter 1 Feed Nozzles Cooling System and Feed Nozzles
24590-LAW-M6-LMP-00013001, Rev 0	P&ID –LAW Melter Process System Melter 1 Lid, Plenum and Offgas Ports Cooling System
24590-LAW-M6-LMP-00013002, Rev 0	P&ID –LAW Melter Process System Melter 1 Melter Lid Cooling Loop

24590-LAW-M6-LMP-00031001, Rev 0	P&ID –LAW Melter Process System Melter 2 Agitation Zone 1 & Zone 2 *Confidential Business Information*
24590-LAW-M6-LMP-00032001, Rev 0	P&ID –LAW Melter Process System Melter 2 Agitation Zone 3 & Level Detection LMP-RK-00041B and PPJ-RK-00002 *Confidential Business Information*
24590-LAW-M6-LMP-00032002, Rev 0	P&ID –LAW Melter Process System Melter 2 Agitation Zone 3 & Level Detection LMP-RK-00041C *Confidential Business Information*
24590-LAW-M6-LMP-00033001, Rev 0	P&ID –LAW Melter Process System Melter 2 Walls and Floor Panels Cooling System
24590-LAW-M6-LMP-00035001, Rev 0	P&ID –LAW Melter Process System Melter 2 Electrode Extension Cooling & Glass/Plenum Temperatures *Confidential Business Information*
24590-LAW-M6-LMP-00037001, Rev 0	P&ID –LAW Melter Process System Melter 2 Glass Pouring and Monitoring Instrumentation
24590-LAW-M6-LMP-00037002, Rev 0	P&ID –LAW Melter Process System Melter 2 Glass Pouring and Monitoring Instrumentation
24590-LAW-M6-LMP-00038001, Rev 0	P&ID –LAW Melter Process System Melter 2 Discharge Heaters, Power Controls (1-4) & Air Lift - Eastside
24590-LAW-M6-LMP-00040001, Rev 0	P&ID –LAW Melter Process System Melter 2 Discharge Heaters, Power Controls (1-4) & Air Lift - Westside
24590-LAW-M6-LMP-00042001, Rev 0	P&ID –LAW Melter Process System Melter 2 Feed Nozzles Cooling System and Feed Nozzles
24590-LAW-M6-LMP-00043001, Rev 0	P&ID –LAW Melter Process System Melter 2 Lid, Plenum and Offgas Ports Cooling System
24590-LAW-M6-LMP-00043002, Rev 0	P&ID –LAW Melter Process System Melter 2 Melter Lid Cooling Loop
24590-LAW-M6-LOP-00001001, Rev. 0	P&ID –LAW Primary Offgas Process System Melter 1 LOP-SCB-00001
24590-LAW-M6-LOP-00001002, Rev. 0	P&ID – LAW Primary Offgas Process System Melter 1 LOP-VSL-00001
24590-LAW-M6-LOP-00001003, Rev. 0	P&ID – LAW Primary Offgas Process System Melter 1 LOP-BULGE-00001
24590-LAW-M6-LOP-00001004, Rev. 1	P&ID – LAW Primary Offgas Process System Melter 1 LOP-WESP-00001
24590-LAW-M6-LOP-00001005, Rev. 0	P&ID – LAW Primary Offgas Process System Melter 1 Film Cooler Offgas
24590-LAW-M6-LOP-00001006, Rev. 0	P&ID – LAW Primary Offgas Process System Melter 1 LOP-PMP-00003A/B

24590-LAW-M6-LOP-00002001, Rev 0	P&ID – LAW Primary Offgas Process System Melter 2 LOP-SCB-00002
24590-LAW-M6-LOP-00002002, Rev 0	P&ID – LAW Primary Offgas Process System Melter 2 LOP-VSL-00002
24590-LAW-M6-LOP-00002003, Rev 0	P&ID – LAW Primary Offgas Process System Melter 1 LOP-BULGE-00001
24590-LAW-M6-LOP-00002004, Rev 1	P&ID – LAW Primary Offgas Process System Melter 2 LOP-WESP-00002
24590-LAW-M6-LOP-00002005, Rev 0	P&ID – LAW Primary Offgas Process System Melter 2 Film Cooler Offgas
24590-LAW-M6-LOP-00002006, Rev 0	P&ID – LAW Primary Offgas Process System Melter 2 LOP-PMP-00006A/B
24590-LAW-M6-LOP-00004001, Rev 0	P&ID – LAW Primary Offgas Process System Melter 1 LOP-FCLR-00002
24590-LAW-M6-LOP-00004002, Rev 0	P&ID – LAW Primary Offgas Process System Melter 1 LOP-FCLR-00001
24590-LAW-M6-LOP-00005001, Rev 0	P&ID – LAW Primary Offgas Process System Melter 2 LOP-FCLR-00004
24590-LAW-M6-LOP-00005002, Rev 0	P&ID – LAW Primary Offgas Process System Melter 2 LOP-FCLR-00003
24590-LAW-M6-LVP-00001001, Rev 0	P&ID – LAW Secondary Offgas/Vessel Vent Process System Combined Header
24590-LAW-M6-LVP-00001002, Rev 0	P&ID – LAW Secondary Offgas/Vessel Vent Process System HEPA Preheaters
24590-LAW-M6-LVP-00001003, Rev 0	P&ID – LAW Secondary Offgas/Vessel Vent Process System HEPA Filters
24590-LAW-M6-LVP-00001004, Rev 0	P&ID – LAW Secondary Offgas/Vessel Vent Process System Offgas Exhausters LVP-EXHR-00001A
24590-LAW-M6-LVP-00001005, Rev 0	P&ID – LAW Secondary Offgas/Vessel Vent Process System Offgas Exhausters LVP-EXHR-00001B
24590-LAW-M6-LVP-00001006, Rev 0	P&ID – LAW Secondary Offgas/Vessel Vent Process System Offgas Exhausters LVP-EXHR-00001C
24590-LAW-M6-LVP-00002001, Rev 0	P&ID – LAW Secondary Offgas/Vessel Vent Process System Caustic Scrubber Bypass
24590-LAW-M6-LVP-00002002, Rev 0	P&ID – LAW Secondary Offgas/Vessel Vent Process System Caustic Scrubber LVP-SCB-00001
24590-LAW-M6-LVP-00002003, Rev 0	P&ID– LAW Secondary Offgas/Vessel Vent Process System Caustic Collection Tank LVP-TK-00001
24590-LAW-M6-LVP-00002004, Rev 0	P&ID – LAW Secondary Offgas/Vessel Vent Process System Scrubber Recirculation Loop LVP-PMP-00003A/3B

24590-LAW-M6-LVP-00002005, Rev 0	P&ID – LAW Secondary Offgas/Vessel Vent Process System Transfer Pumps LVP-PMP-00002A/B
24590-LAW-M6-LVP-00002006, Rev 1	P&ID – LAW Secondary Offgas/Vessel Vent Process System Stack Discharge Monitoring System
24590-LAW-M6-LVP-00002007, Rev 0	P&ID – LAW Secondary Offgas/Vessel Vent Process System Stack Discharge Monitoring System
24590-LAW-M6-LVP-00003001, Rev 0	P&ID – LAW Secondary Offgas/Vessel Vent Process System Equipment Vents
24590-LAW-M6-LVP-00004001, Rev 1	P&ID – LAW Secondary Offgas/Vessel Vent Process System Mercury Mitigation Equipment Bypass
24590-LAW-M6-LVP-00004002, Rev 1	P&ID – LAW Secondary Offgas/Vessel Vent Process System Mercury Mitigation Equipment LVP-SKID-00001
24590-LAW-M6-LVP-00004003, Rev 1	P&ID – LAW Secondary Offgas/Vessel Vent Process System Mercury Mitigation Equipment LVP-ADBR-00001A/B
24590-LAW-M6-LVP-00005002, Rev 1	P&ID – LAW Secondary Offgas/Vessel Vent Process System SCO/SCR Skid
24590-LAW-M6-RLD-00001001, Rev 0	P&ID - LAW Radioactive Liquid Waste Disposal System Plant Wash Vessel RLD-VSL-00003
24590-LAW-M6-RLD-00001002, Rev 0	P&ID - LAW Radioactive Liquid Waste Disposal System Plant Wash Vessel RLD-VSL-00003
24590-LAW-M6-RLD-00001003, Rev 0	P&ID - LAW Radioactive Liquid Waste Disposal System SBS Condensate Collection RLD-VSL-00005
24590-LAW-M6-RLD-00001004, Rev 0	P&ID - LAW Radioactive Liquid Waste Disposal System SBS Condensate Collection RLD-VSL-00005
24590-LAW-M6-RLD-00001005, Rev 0	P&ID - LAW Radioactive Liquid Waste Disposal System Plant Wash & SBS Condensate Collection RLD-BULGE-00004
24590-LAW-M6-RLD-00001006, Rev 0	P&ID - LAW Radioactive Liquid Waste Disposal System Plant Wash & SBS Condensate Collection RLD-BULGE-00004
24590-LAW-M6-RLD-00002001, Rev 0	P&ID - LAW Radioactive Liquid Waste Disposal System C3/C5 Drains/Sump Collection RLD-VSL-00004
24590-LAW-M6-RLD-00002002, Rev 0	P&ID - LAW Radioactive Liquid Waste Disposal System C3/C5 Drains/Sump Collection RLD-VSL-00004
24590-LAW-M6-RLD-00002003, Rev 0	P&ID - LAW Radioactive Liquid Waste Disposal System C3/C5 Drains/Sump Collection RLD-BULGE-00001

24590-LAW-M6-RLD-00002004, Rev 0	P&ID - LAW Radioactive Liquid Waste Disposal System C3/C5 Drains/Sump Collection RLD-BULGE-00001
24590-LAW-M6-RLD-00002005, Rev 0	P&ID - LAW Radioactive Liquid Waste Disposal System C3/C5 Sumps RLD-SUMP-00010/11/28
24590-LAW-M6-RLD-00003001, Rev 0	P&ID - LAW Radioactive Liquid Waste Disposal System C3/C5 Floor Drains Collection
24590-LAW-M6-RLD-00003002, Rev 2	P&ID - LAW Radioactive Liquid Waste Disposal System Process Cell Sumps at EL 2 FT
24590-LAW-M6-RLD-00003003, Rev 2	P&ID - LAW Radioactive Liquid Waste Disposal System Process and Effluent Cell Sumps at EL 2 FT
RESERVED	RESERVED

Source documents (which do not include a "P" in the last set of numbers, e.g. "-P0001," or "-TP001") should be used in conjunction with any document change notices issued against them.

We are currently transitioning from permit documents (which include a "P" in the last set of numbers) to source documents. At the end of the transition period, permit submittals will contain source documents and will be incorporated into the permit as described in Ecology Publication #07-05-006 (http://www.ecy.wa.gov/biblio/0705006.html).

DRAWINGS AND DOCUMENTS
OPERATING UNIT GROUP 10 – APPENDIX 9.6
LOW ACTIVITY WASTE BUILDING
MECHANICAL DRAWINGS

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document Number	Description
24590-LAW-M0D-LEH-00014, Rev 7	Mechanical Handling Data Sheet for LEH-CRN-00003
24590-LAW-M0D-LPH-00003, Rev 5	Mechanical Handling Data Sheet for LPH-CRN-00002
24590-LAW-M7-LEH-00002002, Rev 1	LAW Vitrification System LEH Mechanical Handling Diagram Container Export Handling System
24590-LAW-M7-LPH-00001004, Rev 2	LAW Vitrification System LPH Mechanical Handling Diagram Container Pour Handling System
24590-LAW-MAD-LVP-00006, Rev 9	Mechanical Data Sheet for LAW LVP Exhausters LVP-EXHR-00001A/B/C
24590-LAW-MKD-LOP-P0008, Rev 0	Mechanical Data Sheet for LOP-SCB-00001/2
24590-LAW-MKD-LVP-00013, Rev 2	Mechanical Data Sheet for the Safe Change HEPA Filter Housing
24590-QL-MRA-MKH0-00001-T0003	Technical Change Notice for LVP Filter Housing Design and Operating Pressure Change
24590-WTP-SDDR-HV-10-00001	Supplier Deviation Disposition Request for LVP Filter Housing Data Sheet
24590-LAW-MK-LOP-P0001001, Rev 0	Equipment Assembly LAW Submerged Bed Scrubber LOP-SCB-00001/2, Sheet 1 of 3
24590-LAW-MK-LOP-P0001002, Rev 0	Equipment Assembly LAW Submerged Bed Scrubber LOP-SCB-00001/2, Sheet 2 of 3
24590-LAW-MK-LOP-P0001003, Rev 0	Equipment Assembly LAW Submerged Bed Scrubber LOP-SCB-00001/2, Sheet 3 of 3
24590-LAW-MTD-LVP-00001, Rev 1	Mechanical Data Sheet for LVP-TK-00001
24590-LAW-VDCN-M-13-00001	Update Nozzles on LVP-TK-00001
24590-LAW-MVD-LCP-P0004, Rev 1	Mechanical Data Sheet for LCP-VSL-00001
24590-LAW-MVD-LCP-P0005, Rev 1	Mechanical Data Sheet for LCP-VSL-00002
24590-LAW-MVD-LFP-P0007, Rev 1	Mechanical Data Sheet for LFP-VSL-00002
24590-LAW-MVD-LFP-P0008, Rev 1	Mechanical Data Sheet for LFP-VSL-00004
24590-LAW-MVD-LFP-P0010, Rev 1	Mechanical Data Sheet for LFP-VSL-00001

24590-LAW-MVD-LFP-P0011, Rev 1	Mechanical Data Sheet for LFP-VSL-00003
24590-LAW-MVD-LOP-00004, Rev 6	Mechanical Data Sheet for LOP-VSL-00001
24590-LAW-MVD-LOP-00005, Rev 6	Mechanical Data Sheet for LOP-VSL-00002
24590-LAW-MVD-LVP-00003, Rev 6	Mechanical Data Sheet for Activated Carbon Adsorber, LVP-ADBR-00001A/B
24590-LAW-MVD-RLD-P0001, Rev 1	Mechanical Data Sheet for RLD-VSL-00004
24590-LAW-MVD-RLD-P0006, Rev 2	Mechanical Data Sheet for RLD-VSL-00005
24590-LAW-MVD-RLD-P0007, Rev 2	Mechanical Data Sheet for RLD-VSL-00003
24590-LAW-MV-LCP-P0001, Rev 0	Equipment Assembly Concentrate Receipt Vessel LCP-VSL-00001
24590-LAW-MV-LCP-P0002, Rev 0	Equipment Assembly Concentrate Receipt Vessel LCP-VSL-00002
24590-LAW-MV-LFP-P0001, Rev 0	Equipment Assembly Melter 1 Feed Vessel LFP-VSL-00002
24590-LAW-MV-LFP-P0002, Rev 0	Equipment Assembly Melter 2 Feed Vessel LFP-VSL-00004
24590-LAW-MV-LFP-P0004, Rev 0	Equipment Assembly Melter 1 Feed Preparation Vessel LFP-VSL-00001
24590-LAW-MV-LFP-P0005, Rev 0	Equipment Assembly Melter 2 Feed Preparation Vessel LFP-VSL-00003
24590-LAW-MV-LOP-P0001, Rev 0	Equipment Assembly LAW Melter 1 SBS Condensate Vessel LOP-VSL-00001
24590-LAW-MV-LOP-P0002, Rev 0	Equipment Assembly LAW Melter 2 SBS Condensate Vessel LOP-VSL-00002
24590-LAW-MV-RLD-P0001, Rev 2	Equipment Assembly C3/C5 Drains/Sump Collection Vessel RLD-VSL-00004
24590-LAW-MV-RLD-P0002, Rev 1	Equipment Assembly Plant Wash Vessel RLD-VSL-00003
24590-LAW-MV-RLD-P0003, Rev 1	Equipment Assembly SBS Condensate Collection Vessel RLD-VSL-00005
RESERVED	RESERVED

Source documents (which do not include a "P" in the last set of numbers, e.g. "-P0001," or "-TP001") should be used in conjunction with any document change notices issued against them.

We are currently transitioning from permit documents (which include a "P" in the last set of numbers) to source documents. At the end of the transition period, permit submittals will contain source documents and will be incorporated into the permit as described in Ecology Publication #07-05-006 (http://www.ecy.wa.gov/biblio/0705006.html).

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 10.0

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Appendices	Modification Date	Modification Number
Appendix 10.0	09/30/2015	8C.2015.Q3
Appendix 10.0		
Appendix 10.2		
Appendix 10.4		
Appendix 10.5		
Appendix 10.6		
Appendix 10.7		
Appendix 10.8		
Appendix 10.9		
Appendix 10.10		
Appendix 10.11		
Appendix 10.13		
Appendix 10.18		

This page intentionally left blank.

OPERATING UNIT GROUP 10
APPENDIX 10.0

This page intentionally left blank.

OPERATING UNIT GROUP 10
APPENDIX 10.0

Where information regarding treatment, management, and disposal of the radioactive source, byproduct material, and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954, as amended) has been incorporated into this permit, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit and chapter 70.105 of the Revised Code of Washington (RCW). In the event of any conflict between Permit Condition III.10.A and any statement relating to the regulation of source, special nuclear, and byproduct material contained in portions of the permit application that are incorporated into this permit, Permit Condition III.10.A will prevail.

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 11.0

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Appendices	Modification Date	Modification Number
Appendix 11.0	05/15/2014	
Appendix 11.1		
Appendix 11.2		
Appendix 11.4		
Appendix 11.5		
Appendix 11.6		
Appendix 11.8		
Appendix 11.9		
Appendix 11.10		
Appendix 11.11	03/01/2017	8C.2016.Q4
Appendix 11.13		
Appendix 11.18		

This page intentionally left blank.

OPERATING UNIT GROUP 10
APPENDIX 11.0

This page intentionally left blank.

OPERATING UNIT GROUP 10
APPENDIX 11.0

Where information regarding treatment, management, and disposal of the radioactive source, byproduct material, and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954, as amended) has been incorporated into this permit, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit and chapter 70.105 of the Revised code of Washington (RCW). In the event of any conflict between Permit Condition III.10.A and any statement relating to the regulation of source, special nuclear, and byproduct material contained in portions of the permit application that are incorporated into this permit, Permit Condition III.10.A will prevail.

This page intentionally left blank.

DRAWINGS AND DOCUMENTS
OPERATING UNIT GROUP 10 – APPENDIX 11.11
LABORATORY BUILDING
IQRPE REPORTS

The documents listed in the following table are incorporated by reference into this permit and are subject to the requirements set forth in Part I Standard Conditions, Part II General Facility Conditions, and Part III Operating Unit Group 10 Conditions. Upon request, copies of the documents can be viewed at the Nuclear Waste Program Resource Center located at 3100 Port of Benton Blvd., Richland, WA. Appointments for viewing can be scheduled by calling (509) 372-7950.

Drawing/Document	Description
AREVA IA-3001891-002	IQRPE Structural Integrity Assessment Report for LAB RLD Ancillary Equipment
24590-CM-HC4-HXYG-00240-02-00004, Rev. 00A (IA-3007244-000)	IQRPE Structural Integrity Assessment Report for LAB RLD LAB Area Sink Drain Collection Vessel (RLD-VSL-00164) and Hot Cell Drain Collection Vessel (RLD-VSL-00165)
24590-CM-HC4-HXYG-00240-02-00005, Rev. 00A (IA-3007238-000)	IQRPE Structural Integrity Assessment Report for LAB Below Grade Level Secondary Containment
RESERVED	RESERVED

Source documents (which do not include a "P" in the last set of numbers, e.g. "-P0001," or "-TP001") should be used in conjunction with any document change notices issued against them.

We are currently transitioning from permit documents (which include a "P" in the last set of numbers) to source documents. At the end of the transition period, permit submittals will contain source documents and will be incorporated into the permit as described in Ecology Publication #07-05-006 (http://www.ecy.wa.gov/biblio/0705006.html).

This page intentionally left blank.

WASTE TREATMENT AND IMMOBILIZATION PLANT
APPENDIX 12.0

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Appendices	Modification Date	Modification Number
Appendix 12.0	09/30/2015	8C.2015.Q3
Appendix 12.2		
Appendix 12.4		
Appendix 12.5		
Appendix 12.18		

This page intentionally left blank.

OPERATING UNIT GROUP 10
APPENDIX 12.0

This page intentionally left blank.

OPERATING UNIT GROUP 10
APPENDIX 12.0

Where information regarding treatment, management, and disposal of the radioactive source, byproduct material, and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954, as amended) has been incorporated into this permit, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit and chapter 70.105 Revised Code of Washington (RCW). In the event of any conflict between Permit Condition III.10.A and any statement relating to the regulation of source, special nuclear, and byproduct material contained in portions of the permit application that are incorporated into this permit, Permit Condition III.10.A will prevail.

This page intentionally left blank.