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[0072842H]

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

17-AMRP-0072

JAN 06 2017

Ms. Alexandra K. Smith, Program Manager
Nuclear Waste Program
Washington State Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

RECEIVED
JAN 16 2016
EDMC

Dear Ms. Smith:

CLASS 1 MODIFICATIONS TO THE HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY ACT PERMIT, QUARTER ENDING DECEMBER 31, 2016

In accordance with the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion for the Treatment, Storage, and Disposal of Dangerous Waste (Permit) Condition I.C.3, attached are Class 1 permit modification documents for the quarter ending December 31, 2016.

The modifications update information in Parts I, II, III, V, and Attachment 9 of the Permit Revision 8C. The changes address the Waste Treatment and Immobilization Plant, the FS-1 Outdoor Container Storage Area, the 207-A South Retention Basins, and historical contractor information. The modifications are being made to ensure activities are conducted in compliance with the Permit. A record of the modifications is maintained in the Hanford Facility Operating Record.

The U.S Department of Energy Richland Operations Office and the Washington State Department of Ecology use Permit Change Notices (PCNs) to help track Class 1 Permit Modifications. This modification package addresses the following PCNs:

PCN Identifier:	Affected Permit Section:
PCN-HFSW-2016-10	Parts I & II
24590-LAW-PCN-ENV-14-001	OUG-10 (Appendix 9.2 and Appendix 9.6)
24590-LAW-PCN-ENV-14-007	OUG-10 (Appendix 9.2)
24590-LAB-PCN-ENV-16-001	OUG-10 (Appendix 11.11)
24590-WTP-PCN-ENV-16-003	OUG-10 (Chapter 11)
PCN-FS1-2016-01	Parts I & II, Attachment 9, V. 4 Conditions, V. 4 Addendum H1, V.4 Addendum HA

If you have any questions, please contact me, or your staff may contact Ray Corey, Assistant Manager for the River and Plateau on (509) 373-9971.

Sincerely,

Doug S. Shoop
Manager

AMRP:DBC

Attachment

cc w/attach:
J. L. Cantu, Ecology (CD)
Administrative Record, TSD: H-0-1, S-2-7, D-2-9, H-0-8 (Hard Copy & CD)
Ecology NWP Library (Hardcopy & CD)
Environmental Portal (CD)
Gonzaga University, Foley Center Library (CD)
HF Operating Record (J. K. Perry, MSA, A3-01) (CD)
Portland State University, Government Information (CD)
University of Washington, Suzzallo Library, Govt. Publications Department (CD)
U.S. Department of Energy, Public Reading Room, Washington State University, Tri Cities, Consolidated Information Center, (CD)

cc w/o attach: See page 3

cc w/o attach:
D. J. Alexander, Ecology
L. E. Borneman, WRPS
A. S. Carlson, Ecology
B. L. Curn, URS
L. J. Cusack, CHPRC
S. L. Dahl-Crumpler, Ecology
S. R. Horn, CHPRC
S. K. Johansen, CHPRC
M. E. Jones, Ecology
P. W. Martin, CHPRC
S. Murdock, BNI
B. Peck, BNI
E. R. Skinnarland, Ecology
S. A. Thompson, WRPS
H. T. Tilden, PNNL
M. G. Vesely, CHPRC
M. B. Wilson, MSA
D. M. Yasek, BNI

ENCLOSURE

CLASS 1 MODIFICATIONS FOR QUARTER ENDING December 31, 2016
Ms. S. L. Dahl-Crumpler, Ecology

Consisting of 114 pages,
including this cover page

Hanford Facility RCRA Permit Modification Notification Forms

Parts I & II, Standard & General Conditions

Index

Page 2 of 5 Parts I & II, Standard & General Conditions, Unit status Table, Page 13

Page 3 of 5 Parts I & II, Standard & General Conditions, Unit status Table, Page 15

Page 4 of 5 Parts I & II, Standard & General Conditions, Pages iii, 10, 17, 18, 20, 22

Page 5 of 5 Revision Instructions

Reviewed by RL Program Office: M. [illegible] 12/8/2016

Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
N/A	**Parts I & II, Standard & General Conditions (Unit status Table)**

Description of Modification:

Change needed to the Unit Status Table. The change correspond to an inaccurate date associated with the 8c.2016.6F modification package (10/6/16, 16-NWP-163).

The "Revision Date" on Page 13 for the 207-A South Retention Basins needs to be corrected.

WAC 173-303-830 Modification Class	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:	X			

Enter relevant WAC 173-303-830, Appendix I Modification citation number: A.1 (Administrative and informational changes)

Modification Concurrence: ☑ Yes ☐ No (state reason)

Reason for Non-concurrence:

Reviewed by Ecology:

S. L. Dahl-Crumpler 12-14-16 Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **N/A**	Permit Part **Parts I & II, Standard & General Conditions (Unit status Table)**

Description of Modification:

Changes are needed to the Unit Status Table. The changes correspond to a typographical error inadvertently introduced in the 8c.2016.6F modification package (10/6/16, 16-NWP-163).

The blank row on Page 15 under the "TO BE INCORPORATED" subsection that needs to be deleted.

WAC 173-303-830 Modification Class	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:	X			

Enter relevant WAC 173-303-830, Appendix I Modification citation number: A.2 (Correction of typographical errors)

Modification Concurrence: [✓] Yes [ ] No (state reason)

Reason for Non-concurrence:

Reviewed by Ecology:

S. L. Dahl-Crumpler 12-14-16 Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **N/A**	Permit Part **Parts I & II, Standard & General Conditions (Multiple pages)**

Description of Modification:

Pages: iii, 10, 17, 18, 20, 22

Changes are needed to remove references to Washington Closure Hanford (WCH). The WCH contract ended 9/30/16. With regard to the treatment, storage, disposal unit groups previously managed by WCH, a Class 1-prime permit modification was processed in the quarter ending 9/30/16 to transfer WCH co-operator responsibilities to CHPRC (8C.2016.Q3).

WAC 173-303-830 Modification Class	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Per WAC 173-303-830(4)(d), the Permittee requests that this modification be reviewed and approved as a Class 1-prime.

For modifications not explicitly listed in WAC 173-303-830, Appendix I, the permittee may request the modification to be reviewed and approved as a Class 1. When requesting approval to categorize a modification as a Class 1, the permittee must provide Ecology with the necessary information to support the request

Basis for categorizing the modification as a Class 1-prime: The proposed modifications does not do not alter permit conditions or reduce the capacity of the facility to protect human health or the environment.

Modification Approved: ☑ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology: S. L. Dahl-Crumpler — 12-14-16 Date

Revision Instructions:

Revise the Parts I & II (Standard & General Conditions) as shown herein

1

UNIT STATUS TABLE

Permit Revision	Revision Date	Units Incorporated
Permit Revision 0	8/29/94	616 NDWSF, 305-B Storage Facility, 183-H SEB, 300 ASE, 2727-S, NRDWSF
Permit Revision 1	4/28/95	Simulated High-Level Waste Slurry, 218-E-9 Borrow Pit Demo Site, 200 W Area Ash Pit Demo Site, 2101-M Pond, 216-B-3 Expansion Ponds
Permit Revision 2	8/29/95	Hanford Patrol Academy Demolition Site, 105-DR Large Sodium Fire Facility, 304 Concretion Facility
Permit Revision 3	11/25/96	PUREX Storage Tunnels, 4843 Alkali Metal Storage Facility, 3718-F Alkali Metal Treatment & Storage Facility, 303-K Storage Facility, 300 APT
Permit Revision 4	1/28/98	LERF & 200 Area ETF, 242-A Evaporator, 325 HWTUs
Permit Revision 5	5/18/99	100 D Ponds, 1301-N & 1325-Liquid Waste Disposal Facility, 1324-N Surface Impoundment, 1324-NA Percolation Pond
Permit Revision 6	3/28/00	Permit Condition II.Y, Corrective Action
Permit Revision 7	2/27/01	Waste Treatment & Immobilization Plant, 300 Area WATS
Permit Revision 8	9/23/04	No new units, modification updates
Permit Revision 8A	3/6/06	Integrated Disposal Facility
Permit Revision 8B	1/2007	331-C Storage Unit, PFP Treatment Unit, 241-Z Treatment & Storage Tanks, 303-M Oxide Facility
Permit Revision 8C	8/2007	400 Area Waste Management Unit, 224-T TRUSAF
Permit Revision 8C (8c.2016.2F)	01/21/2016	FS-1 Outdoor Container Storage Area Closure
Permit Revision 8C (8c.2016.6F)	~~9/29/~~10/6/2016	207-A South Retention Basins

2

UNIT	Permit Revision		Comments/History
	Incorporated	Retired	
PART III, OPERATING UNITS			
616 Non-Radioactive Dangerous Waste Storage Facility	Rev. 6	Rev. 7	Closed, 9/5/01
242-A Evaporator	Rev. 4		
305-B Storage Facility	Rev. 0		Closed, 7/2/07
325 Hazardous Waste Treatment Units	Rev. 4		RLWT procedural closure, 9/04
LERF & 200 Area ETF	Rev. 4		
PUREX Storage Tunnels	Rev. 3		
Waste Treatment and Immobilization Plant	Rev. 7		Permitted unit under construction
Integrated Disposal Facility	Rev. 8A		

UNIT	Permit Revision		Comments/History
	Incorporated	Retired	
FS-1 Outdoor Container Storage Area Closure	Rev. 8C		
Waste Encapsulation and Storage Facility Hot Cells A through F	Rev. 8C		
207-A South Retention Basins	Rev. 8C		
PART VI, POSTCLOSURE UNITS			
183-H Solar Evaporation Basin	Rev. 4		
300 Area Process Trenches	Rev. 3		
PROCEDURALLY CLOSED			
216-U-12 Crib	N/A	N/A	Closed, 7/19/07
221-T Test Facility	N/A	N/A	Closed, 2/22/99
2727-WA SRE Sodium Storage Bldg	N/A	N/A	Closed, 2/22/99
324 Pilot Plant	N/A	N/A	Closed, 6/9/97
332 Storage Facility	N/A	N/A	Closed, 4/21/97
437 Maintenance and Storage Facility	N/A	N/A	Closed, 9/11/03
Biological Treatment Test Facilities	N/A	N/A	Closed, 12/10/96
Physical/Chemical Treatment Test Facilities	N/A	N/A	Closed, 5/13/96
Sodium Storage/Sodium Reaction	N/A	N/A	Closed, 9/17/03
Thermal Treatment Test Facilities	N/A	N/A	Closed, 5/13/96
TO BE INCORPORATED			
1706-KE Waste Treatment System			
216-A-29 Ditch			
216-A-36B Crib			
216-A-37-1 Crib			
216-B-3 Main Pond			
216-B-63 Trench			
216-S-10 Pond & Ditch			
222-S Dangerous & Mixed Waste TSD Unit			
241-CX Tank System			

Commented [PJK1]: Delete this row

DANGEROUS WASTE PORTION OF THE RESOURCE CONSERVATION AND RECOVERY ACT PERMIT FOR THE TREATMENT, STORAGE, AND DISPOSAL OF DANGEROUS WASTE

Washington State Department of Ecology
Nuclear Waste Program
3100 Port of Benton Boulevard
Richland, Washington 99354
Telephone: 509-372-7950

Issued in accordance with the applicable provisions of the Hazardous Waste Management Act, Chapter 70.105 Revised Code of Washington (RCW), and the regulations promulgated there under in Chapter 173-303 Washington Administrative Code (WAC).

ISSUED TO:

United States Department of Energy
Richland Operations Office
(Owner/Operator)
P.O. Box 550, MSIN A7-50
Richland, Washington 99352
Telephone: (509) 376-7395

United States Department of Energy
Office of River Protection
(Owner/Operator)
P.O. Box 450, MSIN H6-60
Richland, Washington 99352
Telephone: (509) 372-3062

Mission Support Alliance
2490 Garlick, MSIN H1-30
Richland, Washington 99354
Telephone: (509) 376-1310

Bechtel National, Inc.
(Co-Operator)
2435 Stevens Center Place MSIN H4-02
Richland, Washington 99354
Telephone: (509) 371-2335

~~Washington Closure Hanford, LLC~~
~~(Co-operator)~~
~~2620 Fermi Avenue, MSIN H4-24~~
~~Richland, Washington 99354~~
~~Telephone: (509) 372-9951~~

Washington River Protection Solutions, LLC
(Co-operator)
P.O. Box 1500, MSIN H6-63
Richland, Washington 99352
Telephone: (509) 372-9138

Pacific Northwest National Laboratory
(Co-operator)
P.O. Box 999, MSIN K1-46
Richland, Washington 99352
Telephone: (509) 375-5911

CH2MHILL Plateau Remediation Company
(Co-operator)
P.O. Box 1600, MSIN H7-30
Richland, Washington 99352
Telephone: (509) 376-0556

INTRODUCTION

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 or Chapter 70.105 RCW.

Pursuant to Chapter 70.105 RCW, the Hazardous Waste Management Act (HWMA) of 1976, as amended, Chapter 70.105D RCW, the Model Toxics Control Act (MTCA), and regulations promulgated there under by the Washington State Department of Ecology (hereafter called Ecology), codified in Chapter 173-303 Washington Administrative Code (WAC), Dangerous Waste Regulations, a Dangerous Waste Permit is issued to the United States Department of Energy (USDOE) - Richland Operations Office (RL) and Office of River Protection (ORP) [owner/operator], and its contractors [co-operators], Bechtel National, Incorporated (BNI), CH2MHILL Plateau Remediation Company (CHPRC), Mission Support Alliance, LLC (MSA)], Pacific Northwest National Laboratory (PNNL), ~~Washington Closure Hanford, LLC (WCH)~~, and Washington River Protection Solutions, LLC (WRPS) and hereafter called the Permittees, for the treatment, storage, and disposal of dangerous waste at the Hanford Facility.

This Dangerous Waste Permit, issued in conjunction with the United States Environmental Protection Agency's (hereafter called EPA) Hazardous and Solid Waste Amendments Portion of the Resource Conservation and Recovery Act (RCRA) Permit for the Treatment, Storage, and Disposal (TSD) of Hazardous Waste (HSWA Permit), constitutes the RCRA Permit for the Hanford Facility. Use of the term "Permit" within the Dangerous Waste Permit will refer to the Dangerous Waste Permit, while use of the term "Permit" within the HSWA Permit, will refer to the HSWA Permit. Use of the same term in both the Dangerous Waste Permit and the HSWA Permit, will have the standard meaning associated with the activities addressed by the permit in which the term is used. Such meanings will prevail, except where specifically stated otherwise.

The Permittees will comply with all terms and conditions set forth in this Permit and those portions of the Attachments that have been specifically incorporated into this Permit. When the Permit and the Attachments (except Permit Attachment 1) conflict, the wording of the Permit will prevail. The Permit is intended to be consistent with the terms and conditions of the Hanford Federal Facility Agreement and Consent Order (HFFACO, Permit Attachment 1). The Permittees will also comply with all applicable state regulations, including Chapter 173-303 WAC.

Applicable state regulations are those which are in effect on the date of issuance, or as specified in subsequent modifications of this Permit. In addition, applicable state regulations include any self-implementing statutory provisions and related regulations which, according to the requirements of the HWMA, as amended, or other law(s), are automatically applicable to the Permittees' dangerous waste management activities, notwithstanding the conditions of this Permit.

This Permit is based upon the Administrative Record, as required by WAC 173-303-840. The Permittees' failure in the application, or during the Permit issuance process, to fully disclose all relevant facts, or the Permittees' misrepresentation of any relevant facts at any time, will be grounds for the termination or modification of this Permit and/or initiation of an enforcement action, including criminal proceedings. The Permittees will inform Ecology of any deviation from the Permit conditions, or changes in the information on which the application is based, which would affect either the Permittees' ability to comply, or actual compliance with the applicable regulations or the Permit conditions, or which alters any condition of this Permit in any way.

DEFINITIONS

Except with respect to those terms specifically defined below, all definitions contained in the HFFACO, May 1989, as amended, and in WAC 173-303-040 and other portions of Chapter 173-303 WAC are hereby incorporated, in their entirety, by reference into this Permit. For terms defined in both Chapter 173-303 WAC and the HFFACO, the definitions contained in Chapter 173-303 WAC will control within this Permit. Nonetheless, this Permit is intended to be consistent with the HFFACO.

Where terms are not defined in the regulations, the Permit, or the HFFACO, a standard dictionary reference, or the generally accepted scientific or industrial meaning of the terms will define the meaning associated with such terms.

As used in this Permit, words in the masculine gender also include the feminine and neuter genders, words in the singular include the plural, and words in the plural include the singular.

The following definitions apply throughout this Permit:

The term "**Area of Concern**" means any area of the Facility where a release of dangerous waste or dangerous constituents has occurred, is occurring, is suspected to have occurred, or threatens to occur.

The term "**Contractor(s)**" means, unless specifically identified otherwise in this Permit, or Attachments, Bechtel National, Inc. (BNI), CH2M HILL Plateau Remediation Company, Inc. (CHPRC), Mission Support Alliance, LLC (MSA), Pacific Northwest National Laboratory (PNNL), ~~Washington Closure Hanford, LLC (WCH),~~ and Washington River Protection Solutions, LLC (WRPS).

The term "**Critical Systems**" as applied to determining whether a Permit modification is required, means those specific portions of a 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 of a specific TSD unit may be developed and included in Part III, V, and/or VI of this Permit. In developing a critical system list, or in the absence of a critical system list, WAC 173-303-830 Modifications will be considered.

The term "**Dangerous Constituent**" means any constituent identified in WAC 173-303-9905 or 40 CFR Part 264 Appendix IX , any constituent which caused a waste to be listed or designated as dangerous under Chapter 173-303 WAC, and any constituents within the meaning of hazardous substance at RCW 70.105D.020(7).

The term "**Dangerous Waste**" means those solid wastes designated under Chapter 173-303 WAC as dangerous or extremely hazardous waste. As used in the Permit, the phrase "dangerous waste" will refer to the full universe of wastes regulated by Chapter 70.105 RCW and Chapter 173-303 WAC (including dangerous waste, hazardous waste, extremely hazardous waste, mixed waste, and acutely hazardous waste).

The term "**Days**" means calendar days, unless specifically identified otherwise. Any submittal, notification, or recordkeeping requirement that would be due, under the Conditions of this Permit, on a Saturday, Sunday, or federal, or state holiday, will be due on the following business day, unless specifically stated otherwise in the Permit.

The term "**Director**" means the Director of the Washington State Department of Ecology, or a designated representative. The Program Manager of the Nuclear Waste Program (with the address as specified on page one [1] of this Permit) is a duly authorized and designated representative of the Director for purposes of this Permit.

The term "**Ecology**" means the Washington State Department of Ecology (with the address as specified on page one [1] of this Permit).

The term "**Facility**" means all contiguous land, structures, other appurtenances, and improvements on the land used for recycling, reusing, reclaiming, transferring, storing, treating, or disposing of dangerous waste. The legal and physical description of the Facility is set forth in Permit Attachment 2.

The term "**Facility**" for the purposes of corrective action under Permit Condition II.Y, means all contiguous property under the control of the Permittees and all property within the meaning of "facility" at RCW 70.105D.020(3) as set forth in Permit Attachment 2.

The term "**HFFACO**" means the Hanford Federal Facility Agreement and Consent Order, as amended (Commonly referred to as Tri-Party Agreement [TPA]).

The term "**Permittees**" means the United States Department of Energy (owner/operator), Bechtel National, Inc. (Co-operator), CH2M HILL Plateau Remediation Company (Co-operator), Mission Support Alliance, LLC (MSA), Pacific Northwest National Laboratory (Co-operator), ~~Washington Closure Hanford, LLC (Co-operator),~~ Washington River Protection Solutions, LLC.

The term "**Permittees**" for purposes of corrective action under Permit Condition II.Y means only the United States Department of Energy (owner/operator).

The term "**Raw Data**" means the initial value of analog or digital instrument output, and/or manually recorded values obtained from measurement tools or personal observation. These values are converted into reportable data (e.g., concentration, percent moisture) via automated procedures and/or manual calculations.

The term "**RCRA Permit**" means the Dangerous Waste Portion of the RCRA Permit for the Treatment, Storage, and Disposal of Dangerous Waste (Dangerous Waste Permit) issued by the Washington State Department of Ecology, pursuant to Chapter 70.105 RCW and Chapter 173-303 WAC, coupled with the HSWA Portion of the RCRA Permit for the Treatment, Storage, and Disposal of Hazardous Waste (HSWA Permit) issued by EPA, Region 10, pursuant to 42 U.S.C. 6901 et seq. and 40 CFR Parts 124 and 270.

The term "**Reasonable Times**" means normal business hours; hours during which production, treatment, storage, construction, disposal, or discharge occurs, or times when Ecology suspects a violation requiring immediate inspection.

The term "**Release**" means any intentional or unintentional spilling, leaking, pouring, emitting, emptying, discharging, injecting, pumping, escaping, leaching, dumping, or disposing of dangerous constituents into the environment and includes the abandonment or discarding of barrels, containers, and other receptacles containing dangerous waste or dangerous constituents, and includes any releases within the meaning of release at RCW 70.105D.020(20).

The term "**Significant Discrepancy**" in regard to a manifest or shipping paper, means a discrepancy between the quantity or type of dangerous waste designated on the manifest, or shipping paper, and the quantity or type of dangerous waste a TSD unit actually receives. A significant discrepancy in quantity is a variation greater than ten (10) percent in weight for bulk quantities (e.g., tanker trucks, railroad tank cars, etc.), or any variation in piece count for nonbulk quantities (i.e., any missing container or package would be a significant discrepancy). A significant discrepancy in type is an obvious physical or chemical difference which can be discovered by inspection or waste analysis (e.g., waste solvent substituted for waste acid).

The term "**Solid Waste Management Unit (SWMU)**" means any discernible location at the Facility where solid wastes have been placed at any time, irrespective of whether the location was intended for the management of solid or dangerous waste, and includes any area at the Facility at which solid wastes have been routinely and systematically released (for example through spills), and includes dangerous waste treatment, storage, and disposal units.

The term "**Unit" or "TSD unit**", as used in Parts I through VI of this Permit, means the contiguous area of land on or in which dangerous waste is placed, or the largest area in which there is a significant likelihood of mixing dangerous waste constituents in the same area. A TSD unit, for purposes of this Permit, is a subgroup of the Facility which has been identified in a Hanford Facility Dangerous Waste Part A Form.

1	ID	Identification
2	IRM	Interim Remedial Measure
3	LDR	Land Disposal Restrictions
4	LERF	Liquid Effluent Retention Facility
5	LSFF	105-DR Large Sodium Fire Facility
6	MSA	Mission Support Alliance, LLC
7	MTCA	Model Toxics Control Act
8	OSWER	Office of Solid Waste and Emergency Response
9	PNNL	Pacific Northwest National Laboratory
10	QA	Quality Assurance
11	QAPP	Quality Assurance Project Plan
12	QC	Quality Control
13	RCRA	Resource Conservation and Recovery Act of 1976
14	RCW	Revised Code of Washington
15	ROD	Record of Decision
16	RPD	Relative Percent Difference
17	RPP	RCRA Past Practice
18	SAP	Sampling and Analysis Plan
19	SARA	Superfund Amendments and Reauthorization Act of 1986
20	SCD	Security Control Devices
21	SHLWS	Simulated High Level Waste Slurry
22	SOP	Standard Operating Procedure
23	SWMU	Solid Waste Management Unit
24	TCLP	Toxicity Characteristic Leaching Procedure
25	TSD	Treatment, Storage, and/or Disposal
26	USDOE	United States Department of Energy
27	U.S.C.	United States Code
28	WAC	Washington Administrative Code
29	WAP	Waste Analysis Plan
30	~~WCH~~	~~Washington Closure Hanford, LLC~~
31	WRPS	Washington River Protection Solutions, LLC
32	WTP	Waste Treatment and Immobilization Plant
33	183-H	183-H Solar Evaporation Basins

PART I STANDARD CONDITIONS

I.A Effect of Permit

The Permittees are authorized to treat, store, and dispose of dangerous waste in accordance with the Conditions of this Permit and in accordance with the applicable provisions of Chapter 173-303 WAC (including provisions of the Chapter as they have been applied in the HFFACO). Any treatment, storage, or disposal of dangerous waste by the Permittees at the Facility that is not authorized by this Permit, or by WAC 173-303-400 (including provisions of this regulation as they have been applied in the HFFACO), for those TSD units not subject to this Permit, and for which a Permit is required by Chapter 173-303 WAC, is prohibited.

TSD units operating or closing under interim status will maintain interim status until that TSD unit is incorporated into Part III, V, and/or VI of this Permit, or until interim status is terminated under WAC 173-303-805(8). Interim status units will be incorporated into this Permit through the Permit modification process.

The Conditions of this Permit will be applied to the Facility as defined by the Permit Applicability Matrix (Permit Attachment 9).

I.A.1 USDOE is responsible for activities which include, but are not limited to, the overall management and operation of the Facility.

BNI is identified as a Permittee for activities subject to the Conditions of this Permit where its agents, employees, or subcontractors have operational and/or management responsibilities and control.

CHPRC is identified as a Permittee for activities subject to the Conditions of this Permit where its agents, employees, or subcontractors have operational and/or management responsibilities and control.

MSA is identified as a Permittee for activities subject to the Conditions of this Permit where its agents, employees, or subcontractors have operational and/or management responsibilities and control.

PNNL is identified as a Permittee for activities subject to the Conditions of this Permit where its agents, employees, or subcontractors have operational and/or management responsibilities and control.

~~WCH is identified as a Permittee for activities subject to the Conditions of this Permit where its agents, employees, or subcontractors have operational and/or management responsibilities and control.~~

WRPS is identified as a Permittee for activities subject to the Conditions of this Permit where its agents, employees, or subcontractors have operational and/or management responsibilities and control.

I.A.2 Coordination with the HFFACO

Each TSD unit will have an application for a final status Permit or closure/post-closure plan submitted to Ecology in accordance with the schedules identified in the HFFACO Milestone M-20-00 or in accordance with WAC 173-303-830. After completion of the Permit application or closure/post-closure plan review, a final Permit decision will be made pursuant to WAC 173-303-840. Specific Conditions for each TSD unit will be incorporated into this Permit in accordance with the Class 3 Permit modification procedure identified in Permit Condition I.C.3.

Quarter Ending Sept 30, 2016 24590-LAW-PCN-ENV-14-001

Hanford Facility RCRA Permit Modification Notification Form
Part III, Operating Unit 10
Waste Treatment and Immobilization Plant

Index

Page 2 of 3: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant

Replace Piping and Instrumentation Diagrams (P&IDs) for the LAW Primary Offgas Process System (LOP) in Appendix 9.2 of the Dangerous Waste Permit (DWP).

Replace Mechanical Data Sheets for SBS Condensate Vessels in Appendix 9.6 of the DWP.

Submitted by Co-Operator:

Roger J. Landon 7/6/16
Roger J. Landon Date

Reviewed by ORP Program Office:

Joanne Grindstaff 8/1/16
J. F. Grindstaff Date

Quarter Ending Sept 30, 2016 24590-LAW-PCN-ENV-14-001

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **Waste Treatment and Immobilization Plant**	Permit Part: **Part III, Operating Unit 10**

Description of Modification:

The purpose of this Class 1 prime modification is to update and replace the following P&IDs and mechanical data sheets in Appendices 9.2 and 9.6 of the DWP:

Appendix 9.2			
Replace:	24590-LAW-M6-LOP-00001004, Rev. 0	With:	24590-LAW-M6-LOP-00001004, Rev. 1
	24590-LAW-M6-LOP-00002004, Rev. 0		24590-LAW-M6-LOP-00002004, Rev. 1
Appendix 9.6			
Replace:	24590-LAW-MVD-LOP-P0004, Rev. 1	With:	24590-LAW-MVD-LOP-00004, Rev. 6
	24590-LAW-MVD-LOP-P0005, Rev. 1		24590-LAW-MVD-LOP-00005, Rev. 6

This modification requests Ecology approval and incorporation into the permit the specific changes to the P&IDs and mechanical data sheets indicated by revision notes, clouds and bars. These documents include changes provided in applicable document change forms (e.g., DCN, SCN, SDDR, FCN, FCR, etc.). In addition, the P&IDs and mechanical data sheets include changes associated with the resolution to comments on change documents since the issuance of the last revision of the permitted documents.

Significant changes to the P&IDs are summarized below:

- Modified and added notes.
- Incorporated changes from change documentation identified in the Notes section on each drawing.
- Removed call-outs of pipe diameters under flow valves FV-1050 and FV-2050 in Grid E6.
- Revised flow valves FV-1050 and FV-2050 in Grid E6 to close on loss of power or melter plenum high pressure to isolate air flow to the wet electrostatic precipitators. Designation of failure position for these flow valves was changed from fail-open (FO) to fail-closed (FC).
- Modified and added valve position switches to flow valves FV-1140 and FV-2140 in Grid F3.
- Added high-high alarms to liquid level indicators LI-1060 and LI-2060 in Grid E3.
- Revised instrumentation to indicate density correction for flow control loops in Grid E6.
- Updated symbols for radar level transmitters LT-1060 and LT-2060 in Grid E3 to show that these are foundation fieldbus devices.
- Provided safety interlock signals PDSHH-1410A and PDSHH-1528/1529 to FC-1050 and PDSHH-2410A and PDSHH-2528/2529 to FC-2050 in Grids F6, F7 and F8.
- Revised manual valves LOP-V-10052 and LOP-V-10068 to a position of normally opened (NO) / locked opened (LO) in Grid F4.
- Changed isolation valves from a gate valve to a ball valve for ISA-V-40187 and ISA-V-69659 in Grid E6; ISA-V-68968 and ISA-V-69438 in Grid G6; ISA-V-68969 and ISA-V-69439 in Grid E5; ISA-V-68970 and ISA-V-69437 in Grid D7.
- Revised the line number for nozzle N31 in Grids E4 and E5.
- Updated references to off-sheet P&IDs.

Significant changes to the mechanical data sheets are summarized below:

- Updated reference document numbers for the P&IDs.
- Revised the tag numbers of the eductors (mixers).
- Updated Design Data such as quality levels, volumes (maximum operating and total), internal pressures (vessel operating), external pressures (vessel operating, vessel design, and coil/jacket design), and temperatures (vessel operating). Added Design Data for the average dose rates, actual weights (empty, operating, and test), seismic base moments, hydrostatic test pressures and fabrication specs.

Quarter Ending Sept 30, 2016 24590-LAW-PCN-ENV-14-001

- Updated Materials of Construction Data for the pipes and forgings. Added data for the eductors.
- Revised Remarks section.
- It should be noted that mechanical data sheets currently included in the DWP are 24590-LAW-MVD-LOP-P0004 and -P0005, Rev. 1 (dated 3/14/05). These "P" permit version of the data sheets were the most current version at the time when these sheets were submitted for incorporation into the DWP. The source documents for these data sheets were 24590-LAW-MVD-LOP-00004 and -00005, Rev. 5 (dated 2/06/05). The version of the mechanical data sheets being submitted in this PCN is Rev. 6 (dated 10/20/14). See approval page (last page) of the data sheets for the history of versions and dates.

This PCN updates information in Appendices 9.2 and 9.6 to reflect current design. This DWP component may be re-evaluated to confirm design adequacy. If the re-evaluation results in future design changes, the changes will be reviewed by Ecology in subsequent permit modifications.

The following outstanding change documents have been submitted to Ecology pursuant to Permit Condition III.10.C.9.h and are maintained in the WTP Operating Record:
24590-LAW-M6-LOP-00001004, Rev. 1 and 24590-LAW-M6-LOP-00002004, Rev. 1

- 24590-LAW-M6N-LOP-00099 – provided to Ecology in milk run (CCN 275855)
- 24590-LAW-M6N-M80T-00033 – provided to Ecology in milk run (CCN 275837)
- 24590-LAW-M6N-LOP-00102 – provided to Ecology in milk run (CCN 287548)
- 24590-LAW-M6N-LOP-00104 – provided to Ecology in milk run (CCN 287545)

In accordance with Permit Condition III.10.C.2.e, this permit modification sent to Ecology may include page changes to the Permit, attachments, and permit application supporting documentation.

WAC 173-303-830 Modification Class:	Class 1	Class 11	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: N/A
Enter wording of WAC 173-303-830, Appendix I Modification citation:

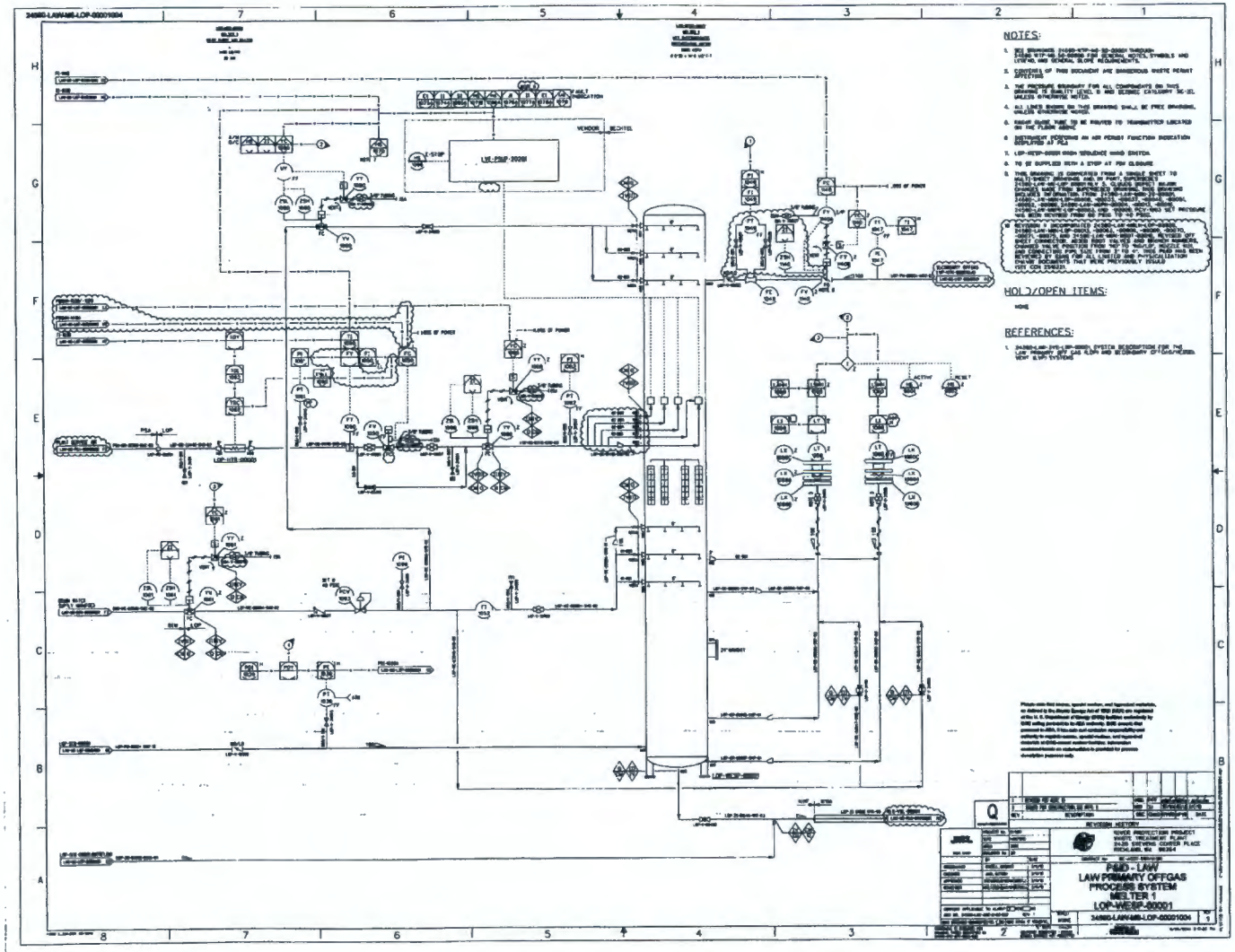
In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class 11 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

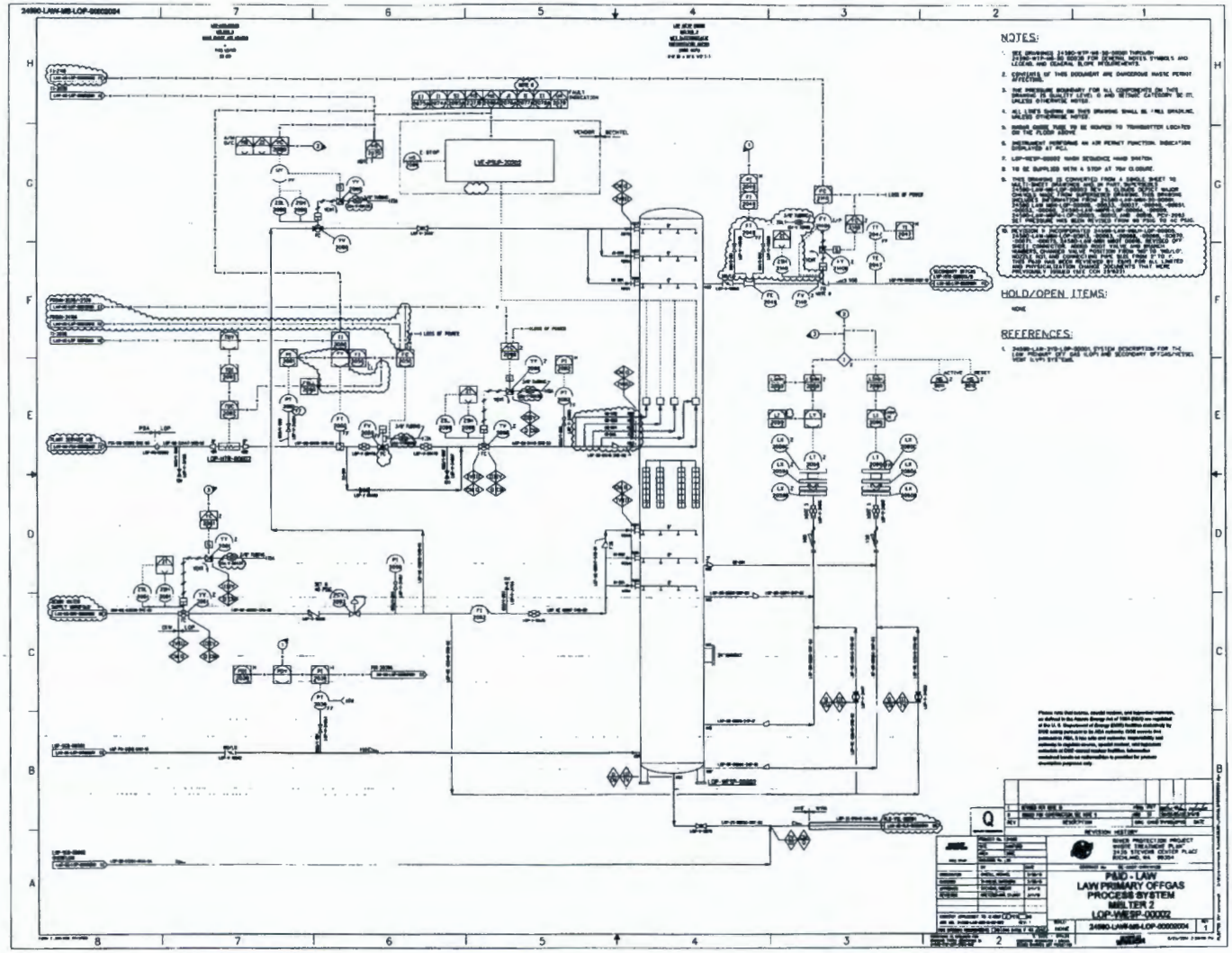
Modification Approved/Concur: ☑ Yes ☐ Denied (state reason below)

Reason for denial:

Reviewed by Ecology:

S. Dahl 11/4/16
S. Dahl Date


NOTES:
HOLD/OPEN ITEMS:
NONE
REFERENCES:
REVISION HISTORY
PBAR - LAW
LAW PRIMARY OFFGAS
PROCESS SYSTEM
MELTER 1
LOP-MELTER-00001


NOTES:
HOLD/OPEN ITEMS:
NONE
REFERENCES:
PID - LAW
LAW PRIMARY OFFGAS
PROCESS SYSTEM
MELTER 2
LOP-WESP-00002
24590-LAW-M8-LOP-00002004

ISSUED BY
RPP-WTP PDC

R11683140

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-LAW-MV-LOP-VSL-00001

Project:	*RPP-WTP*	P&ID:	*24590-LAW-M6-LOP-00001002* 6
Project No:	*24590*	Process Data Sheet:	
Project Site:	*Hanford*	Vessel Drawing	*24590-LAW-MV-LOP-00001*
Description:	*LAW Melter 1 SBS Condensate Vessel*		

Reference Data

Charge Vessels (Tag Numbers)	*Not Applicable*
Pulsejet Mixers / Agitators (Tag Numbers)	*24590-LAW-MY-LOP-EDUC-00001* 6
RFDs/Pumps (Tag Numbers)	*Not Applicable*

Design Data

Quality Level		*Q* 6		Fabrication Specs	*24590-WTP-3PS-MV00-T0001 (PVDF)*		
Seismic Category		*SC-III*		Design Code	*ASME VIII Div 1*		
Service/Contents		*LAW Condensate*		Code Stamp	*Yes*		
Design Specific Gravity		*1.03*		NB Registration	*Yes*		
Maximum Operating Volume	gal	*7,325* 6		Weights (lbs)	Empty	Operating	Test
Total Volume	gal	*6,944* 6		Estimated	*25,500*	*91,700*	*100,800*
				Actual *	*23,000 (Note 8)* 6	*102,000 (Note 8)* 6	*98,000 (Note 8)* 6
Average Dose Rate		*2.10 x 10¹ Rad/hr (Note 14)* 6					

Inside Diameter	inch	*144*			Wind Design	*Not Required*	
Length/Height (TL-TL)	inch	*98*			Snow Design	*Not Required*	
		Vessel Operating (Note 11)	Vessel Design	Coil/Jacket Design	Seismic Design	*24590-WTP-3PS-MV00-T0002* *24590-WTP-3PS-FB01-T0001*	
Internal Pressure	psig	*-1.7*	*15*	*125*	Seismic Base Moment *	ft*lb	*Note 9* 6
External Pressure	psig	*1.7* 6	*15* 6	*15* 6	Postweld Heat Treat	*Not Required*	
Temperature	°F	*122*	*237*	*237*	Corrosion Allowance	inch	*0.08 vessel (Note 5), 0.04 Jacket*
Min. Design Metal Temp.	°F	*40*			Hydrostatic Test Pressure *	psig	*20 vessel* *163 cooling coils* 6

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	*SB-575 N06022*	*Note 10*	*Auxiliary*
Shell	*SB-575 N06022*	*Note 10*	*Primary*
Bottom Head	*SB-575 N06022*	*Note 10*	*Primary*
Support	*SA-240 304 (Note 1 & 6)*	*Note 10*	*N/A*
Jacket/Coils/Half-Pipe Jacket	*SA-312 304 (Note 1)*	*Note 10*	*N/A*
Internals	*SB-575 N06022 / SB-622 N06022 (Note 7)*	*Note 10* 6	*Thermowells Primary*
Pipe (Seamless)	*SB-622 N06022 / SA-312 TP304* 6	*Note 10*	*Note 2*
Forgings/ Bar stock	*SB-564 N06022* 6	*Note 10*	*N/A*
Gaskets	*EPDM*	*Note 13*	*N/A*
Bolting	*SA-193 Gr. B8M / SA-194 Gr. 8M*	*N/A*	*N/A*
Eductor	*A351-CF8M* 6	*N/A* 6	*N/A* 6

Miscellaneous Data

Orientation	*Vertical*	Support Type	*Skirt*
Insulation Function	*Not Applicable*	Insulation Material	*Not Applicable*
Insulation Thickness (inch)	*Not Applicable*	Internal Finish	*Descaled as laid*
		External Finish	*Note 3*

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-LAW-MV-LOP-VSL-00001***

Remarks

** To be determined by the vendor.*

Note 1: *Material shall have Carbon Content of 0.030% Max. Non-welded specialty items are excluded from this requirement.*

Note 2: *Nozzle necks below normal operating level are Primary, others Auxiliary. See PVDF and vessel drawing for NDT.*

Note 3: *Shell welds under half pipe coils to be ground smooth. Others descaled as laid.*

Note 4: *Contents of this document are Dangerous Waste Permit affecting.*

Note 5: *Corrosion allowance of 0.01" is also to be added to the external surface of shell under the jacket.*

Note 6: *Use SA-240 316 material for skirt and base chair gussets as design change by SDDR No. 24590-WTP-SDDR-PROC-04-00936.*

Note 7: *Use Hastelloy C-276 in lieu of Hastelloy C-22 material for removable eductor guide cone as reference by SDDR No. 24590-WTP-SDDR-PROC-04-01080.*

Note 8: *Reference 24590-QL-POB-MVA0-00002-01-01. Operating and Test weights do not include pumps.*

Note 9: *See 24590-QL-POB-MVA0-00002-03-11.*

Note 10: *See 24590-QL-POB-MVA0-00002-01-01 and 24590-QL-POB-MVA0-00002-01-02.*

Note 11: *For vessel operating pressure and temperature see 24590-LAW-MEC-LOP-00006, Section 6, Lines 1 and 3.*

Note 12: *Nozzle loads shall not exceed that shown in 24590-QL-POB-MVA0-00002-03-09.*

Note 13: *Gasket material and dimensions are per 24590-QL-POB-MVA0-00002-01-02 and 24590-QL-POB-MVA0-00002-01-08.*

Note 14: *Average Contact Dose Rate for 21+ years per 24590-WTP-Z0C-W13T-00010, Rev. F, Table 8.1, Streams LOP01, LOP04, LOP04a, LOP05_1, and LOP05_2.*

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Approval

Rev	Description	System Engr	Vessel Engr	Checked	Reviewed	Approved	Date
0	Issue for Purchase	J. Rewari	S.L. Lee	E. Isern/ C. Slater	N/A	S. Kirk	10/21/02
1	Revised to incorporate the SDDR-PROC-03-0215 & SDDR-PROC-03-0216	J. Rewari	S.L. Lee	E. Isern/ C. Slater	N/A	M. Hoffmann	10/16/03
2	Revised the External Pressure and Delete the Process Data Sheet	J. Rewari	S.L. Lee	M.Sanvictors /C. Slater	E. Isern	M. Hoffmann	12/22/03
3.	Revised as noted & issued for Purchase	S. Sourani	S.L. Lee	M.Sanvictors /C. Slater	Ed.Donoso /D. Adler	M. Hoffmann	05/09/04
4.	Revised as noted & issued for Purchase	S. Sourani	S.L. Lee	M.Sanvictors /C. Slater	Ed.Donoso /D. Adler	M. Hoffmann	10/19/04
5.	Revised as noted & incorporated SDDR no. 24590-WTP-SDDR-PROC-04-00936 & 24590-WTP-SDDR-PROC-04-01080	S. Sourani	S.L. Lee	M.Sanvictors /C. Slater	Ed.Donoso /D. Adler	M. Hoffmann	02/06/05
6.	Revised eductor tag number, P&ID number, quality level, vessel volumes, and vessel operating pressures and temperature. Added vessel actual weights and test pressures. Removed cyclic data sheet (previously deleted under Revision 5). Added Notes. Incorporated and revised data from 24590-LAW-M6N-M80T-00008.	M. O'Neill	N/A	R. Tometczak	S.S. Austen MET D. Adler	S. Kretzschmar	10/20/14

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated at the U. S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts that pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

ISSUED BY
RPP-WTP PDC

R11683139

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No. 24590-LAW-MV-LOP-VSL-00002

Project:	RPP-WTP	P&ID:	24590-LAW-M6-LOP-00002002 6
Project No:	24590	Process Data Sheet:	
Project Site:	Hanford	Vessel Drawing	24590-LAW-MV-LOP-00002
Description:	LAW Melter 2 SBS Condensate Vessel		

Reference Data

Charge Vessels (Tag Numbers)	Not Applicable
Pulsejet Mixers / Agitators (Tag Numbers)	24590-LAW-MY-LOP-EDUC-00002 6
RFDs/Pumps (Tag Numbers)	Not Applicable

Design Data

Quality Level		Q 6	Fabrication Specs	24590-WTP-3PS-MV00-T0001 (PVDF)		
Seismic Category		SC-III	Design Code	ASME VIII Div 1		
Service/Contents		LAW Condensate	Code Stamp	Yes		
Design Specific Gravity		1.03	NB Registration	Yes		
Maximum Operating Volume	gal	7,325 6	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	8,944 6	Estimated	25,500	91,700	100,800
			Actual *	23,000 (Note 8) 6	102,000 (Note 8) 6	98,000 (Note 8) 6
Average Dose Rate		2.10 x 10⁻¹ Rad/hr (Note 14) 6				

Inside Diameter	inch	144			Wind Design	Not Required
Length/Height (TL-TL)	inch	98			Snow Design	Not Required
		Vessel Operating (Note 11)	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-T0002 24590-WTP-3PS-FB01-T0001
Internal Pressure	psig	-1.7	15	125	Seismic Base Moment *	ft*lb Note 9 6
External Pressure	psig	1.7 6	15 6	15 6	Postweld Heat Treat	Not Required
Temperature	°F	122	237	237	Corrosion Allowance	inch 0.08 vessel (Note 5), 0.04 Jacket
Min. Design Metal Temp.	°F	40			Hydrostatic Test Pressure *	psig 20 vessel 163 cooling coils 6

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	SB-575 N06022	Note 10	Auxiliary
Shell	SB-575 N06022	Note 10	Primary
Bottom Head	SB-575 N06022	Note 10	Primary
Support	SA-240 304 (Note 1 & 6)	Note 10	N/A
Jacket/Coils/Half-Pipe Jacket	SA-312 304 (Note 1)	Note 10	N/A
Internals	SB-575 N06022 / SB-622 N06022 (Note 7)	Note 10 6	Thermowells Primary
Pipe (Seamless)	SB-622 N06022 / SA-312 TP304 6	Note 10	Note 2
Forgings/ Bar stock	SB-564 N06022 6	Note 10	N/A
Gaskets	EPDM	Note 13	N/A
Bolting	SA-193 Gr. B8M / SA-194 Gr. 8M	N/A	N/A
Eductor	A351-CF8M 6	N/A 6	N/A 6

Miscellaneous Data

Orientation	Vertical	Support Type	Skirt
Insulation Function	Not Applicable	Insulation Material	Not Applicable
Insulation Thickness (inch)	Not Applicable	Internal Finish	Descaled as laid
		External Finish.	Note 3

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-LAW-MV-LOP-VSL-00002***

Remarks

** To be determined by the vendor.*

Note 1: *Material shall have Carbon Content of 0.030% Max. Non-welded specialty items are excluded from this requirement.*

Note 2: *Nozzle necks below normal operating level are Primary, others Auxiliary. See PVDF and vessel drawing for NDT.*

Note 3: *Shell welds under half pipe coils to be ground smooth. Others descaled as laid.*

Note 4: *Contents of this document are Dangerous Waste Permit affecting.*

Note 5: *Corrosion allowance of 0.01" is also to be added to the external surface of shell under the jacket.*

Note 6: *Use SA-240 316 material for skirt and base chair gussets as design change by SDDR No. 24590-WTP-SDDR-PROC-04-00936.*

Note 7: *Use Hastelloy C-276 in lieu of Hastelloy C-22 material for removable eductor guide cone as reference by SDDR No. 24590-WTP-SDDR-PROC-04-01080.*

Note 8: *Reference 24590-QL-POB-MVA0-00002-01-03. Operating and Test weights do not include pumps.*

Note 9: *See 24590-QL-POB-MVA0-00002-03-12.*

Note 10: *See 24590-QL-POB-MVA0-00002-01-03 adn 24590-QL-POB-MVA0-00002-01-04.*

Note 11: *For vessel operating pressure and temperature see 24590-LAW-MEC-LOP-00006, Section 8, Lines 1 and 3.*

Note 12: *Nozzle loads shall not exceed that shown in 24590-QL-POB-MVA0-00002-03-10.*

Note 13: *Gasket material and dimensions are per 24590-QL-POB-MVA0-00002-01-04 and 24590-QL-POB-MVA0-00002-01-10.*

Note 14: *Average Contact Dose Rate for 21+ years per 24590-WTP-ZDC-W13T-00010, Rev. F, Table 8.1, Streams LOP01, LOP04, LOP04a, LOP05_1, and LOP05_2.*

6

Approval

Rev	Description	System Engr	Vessel Engr	Checked	Reviewed	Approved	Date
0	Issue for Purchase	J. Rewari	S.L. Lee	E. Isern/ C. Slater	N/A	S. Kirk	10/21/02
1	Revised to incorporate the SDDR-PROC-03-0215 & SDDR-PROC-03-0216	J. Rewari	S.L. Lee	E. Isern/ C. Slater	N/A	M. Hoffmann	10/16/03
2	Revised the External Pressure and Delete the Process Data Sheet	J. Rewari	S.L. Lee	M.Sanvictors /C. Slater	E. Isern	M. Hoffmann	12/22/03
3.	Revised as noted & issued for Purchase	S. Sourani	S.L. Lee	M.Sanvictors /C. Slater	Ed.Donoso /D. Adler	M. Hoffmann	05/09/04
4.	Revised as noted & issued for Purchase	S. Sourani	S.L. Lee	M.Sanvictors /C. Slater	Ed.Donoso /D. Adler	M. Hoffmann	10/19/04
5.	Revised as noted & incorporated SDDR no. 24590-WTP-SDDR-PROC-04-00936 & 24590-WTP-SDDR-PROC-04-01080	S. Sourani	S.L. Lee	M.Sanvictors /C. Slater	Ed.Donoso /D. Adler	M. Hoffmann	02/06/05
6.	Revised eductor tag number, P&ID number, quality level, vessel volumes, and vessel operating pressures and temperature. Added vessel actual weights and test pressures. Removed cyclic data sheet (previously deleted under Revision 5). Added Notes. Incorporated and revised data from 24590-LAW-M6N-M80T-00008.	M. O'Neill	N/A	R. Tometczak R Tometczak	B.S. Austen MET D. Adler	S. Kretzschmar	10/20/14

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated at the U. S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts that pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

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 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 4.1.3.3; 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-VSL-00001 (LAW Melter 1 SBS Condensate Vessel) LOP-VSL-00002 (LAW Melter 2 SBS Condensate Vessel)	LOP	**24590-LAW** -M5-V17T-P0007, Rev 0 -M5-V17T-P0008, Rev 0 -M6-LOP-P0001, Rev 2 -M6-LOP-P0002, Rev2 -MV-LOP-P0001, Rev 0 -MV-LOP-P0002, Rev 0 -MVD-LOP-~~P~~00004, Rev ~~1~~6 -MVD-LOP-~~P~~00005, Rev ~~1~~6 -N1D-LOP-00002, Rev 3 -P1-P01T-00002, Rev 7	Section 4.1.3.3; 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
LAW Vitrification Plant Radioactive Liquid Waste Disposal System	RLD	**24590-LAW** -M5-V17T-P0014, Rev 2	Section 4.1.3.4; Tables 4-3 and 4-6; and Figures C1-1 and C1-3 of	RLD-VSL-00003 = 25,780

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-SCB-00002 (Melter 2 Submergered Bed Scrubber)		-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	
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 ~~0~~1 -M6-LOP-00002004, Rev ~~0~~1 -NID-LOP-00003, Rev 3 -P1-P01T-00002, Rev 7 **24590-WTP** -3PS-MKE0-T0001, Rev 5	Section 4.1.3.3, 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-HEPA-00001B (Melter Offgas HEPA Filter) LVP-HEPA-00002A (Melter Offgas HEPA Filter)	LVP	**24590-LAW** -M5-V17T-00010, Rev 4 -M6-LVP-00001003, Rev 0 -P1-P01T-00005, Rev 4	Section 4.1.3.3, Table C-8, Figures C1-1 and C1-3 in Operating Unit Group 10, Addendum C of this Permit.

Quarter Ending Sept. 30, 2016 24590-LAW-PCN-ENV-14-007

Hanford Facility RCRA Permit Modification Notification Form
Part III, Operating Unit 10
Waste Treatment and Immobilization Plant

Index

Page 2 of 3: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant
Replace Piping and Instrumentation Diagrams (P&IDs) for the LAW Radioactive Liquid Waste Disposal System (RLD) in Appendix 9.2 of the Dangerous Waste Permit (DWP).

Submitted by Co-Operator:

Roger J. Landon 7/6/16
Roger J. Landon Date

Reviewed by ORP Program Office:

8/23/16
J. F. Grindstaff Date

Quarter Ending Sept. 30, 2016 24590-LAW-PCN-ENV-14-007

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **Waste Treatment and Immobilization Plant**	Permit Part: **Part III, Operating Unit 10**

Description of Modification:

The purpose of this Class 1 prime modification is to update and replace the following P&IDs in Appendix 9.2 of the DWP:

Appendix 9.2			
Replace:	24590-LAW-M6-RLD-00003002, Rev. 1	With:	24590-LAW-M6-RLD-00003002, Rev. 2
	24590-LAW-M6-RLD-00003003, Rev. 1		24590-LAW-M6-RLD-00003003, Rev. 2

This modification requests Ecology approval and incorporation into the permit the specific changes to the P&IDs indicated by revision notes and clouds. These documents include changes provided in applicable document change forms (e.g., DCN, SCN, SDDR, FCN, FCR, etc.). In addition, the P&IDs include changes associated with the resolution to comments on change documents since the issuance of the last revision of the permitted documents.

Significant changes common to all P&IDs are summarized below:

- Modified and added notes and references.
- Incorporated changes from change documentation identified in the Notes section on each drawing.
- Incorporated changes from Drawing Change Notices 24590-LAW-M6N-RLD-00077, 24590-LAW-M6N-M80T-00042 and 24590-LAW-M6N-M80T-00043.

Significant changes specific to:

24590-LAW-M6-RLD-00003002, Rev. 2

- Changed safety radar level transmitters to thermal level switches/probes LE 2322 and LE 2323 for RLD-SUMP-00030 and LE 2324 and LE 2325 for RLD-SUMP-00032 (Grids C4 through F4 and C7 through F7). This change affects only the safety instruments for the detection of flooding in the process cell and does not affect the DWP leak detection radar level transmitters.
- Deleted lines RLD-GR-01352-S11P-011/2 and RLD-GR-01353-S11P-011/2 and valves RLD-V-35590 and RLD-V-35591 (Grids C4, C7, D4 and D7).
- Added a function to the sump level indicators for conversion of inches to gallons (Grids E3, E5, E6 and E8).
- Re-routed the discharge of sumps RLD-SUMP-00029 through RLD-SUMP-00032 to vessel RLD-VSL-00004 (Grid B2).
- Updated references to off-sheet connectors and P&IDs (multiple grids).

24590-LAW-M6-RLD-00003003, Rev. 2

- Changed safety radar level transmitters to thermal level switches/probes LE 2326 and LE 2327 for RLD-SUMP-00034 and LE 2328 and LE 2329 for RLD-SUMP-00036 (Grids C4 through F4 and C7 through F7). This change affects only the safety instruments for the detection of flooding in the process cell and does not affect the DWP leak detection radar level transmitters.
- Deleted lines RLD-GR-01349-S11P-011/2 and RLD-GR-01350-S11P-011/2 and valves RLD-V-35587 and RLD-V-35588 (Grids D4, D6, E4 and E6).
- Added a function to the sump level indicators for conversion of inches to gallons (Grids E4 and E5).
- Re-routed the discharge of sumps RLD-SUMP-00035 and RLD-SUMP-00036 to vessel RLD-VSL-00004 (Grid F2).
- Updated references to off-sheet connectors and P&IDs (Grid G2).

Quarter Ending Sept. 30, 2016 24590-LAW-PCN-ENV-14-007

This PCN updates information in Appendix 9.2 to reflect current design. This DWP component may be re-evaluated to confirm design adequacy. If the re-evaluation results in future design changes, the changes will be reviewed by Ecology in subsequent permit modifications.

The following outstanding change documents have been submitted to Ecology pursuant to Permit Condition III.10.C.9.h and are maintained in the WTP Operating Record:
None

In accordance with Permit Condition III.10.C.2.e, this permit modification sent to Ecology may include page changes to the Permit, attachments, and permit application supporting documentation.

WAC 173-303-830 Modification Class:	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: N/A
Enter wording of WAC 173-303-830, Appendix I Modification citation:

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class [1]1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

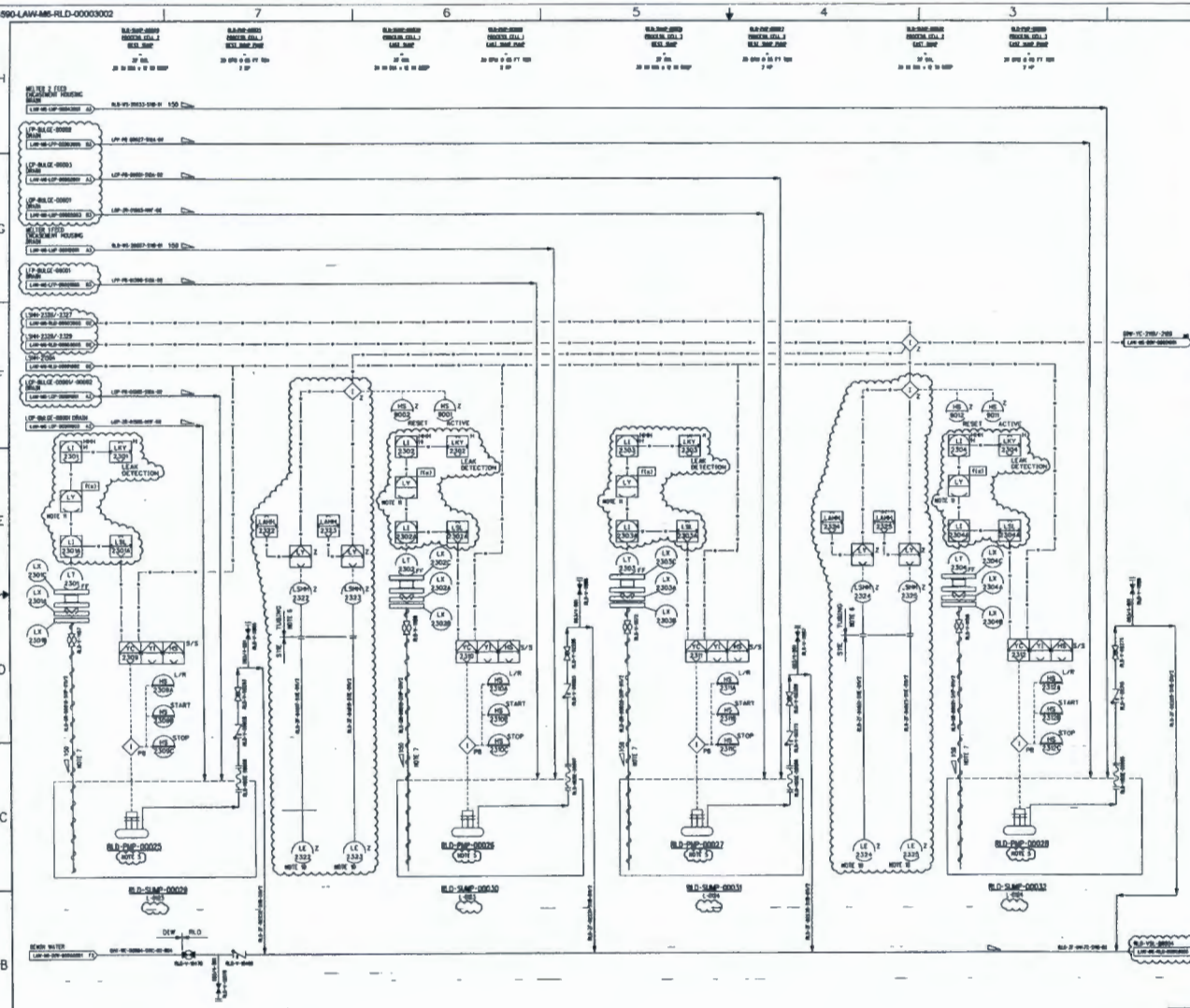
Modification Approved/Concur: [X] Yes [ ] Denied (state reason below)

Reason for denial:

Reviewed by Ecology:

S. Dahl 11/30/16
Date

24590-LAW-M6-RLD-00003002



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-SO-00001 THROUGH 24590-WTP-M6-SO-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. THESE PUMPS ARE PERMANENTLY INSTALLED IN THE SUMPS.
6. PIPING EXTENDS APPROXIMATELY 3 FEET PAST THE CELL PENETRATION (I.E. INCELL/OUTCELL PENETRATION)
7. LEVEL METER WAVE GUIDE PIPE TS TO SIT ON THE BOTTOM OF THE SUMP. SLOTTED PORTION OF THE WAVE GUIDE PIPE IS TO CONTACT THE SUMP.
8. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES, 24590-LAW-M6-RLD-00003, REV 6. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-20-00001, 24590-LAW-M6N-RLD-00034, AND -00045.
9. REVISION 1 INCORPORATED 24590-LAW-M6N-RLD-00053. ADDED NOTE 7, AND REVISED SUMP BOTTOM CONFIGURATION FROM CONICAL TO FLAT.
10. SAFETY SIGNIFICANT THERMAL LEVEL PROBES LE-2322/-2323 AND LE-2324/-2325 FOR PROCESS CELL 71 ODD DETECTION ARE MOUNTED NEAR THE SUMPS RLD-SUMP-00030 AND RLD-SUMP-00032 RESPECTIVELY. LEAK DETECTION INSTRUMENTATION IS QUALITY LEVEL D AND SEISMIC CATEGORY SC-III.
11. FUNCTION CONVERTS TANK LEVEL IN INCHES TO GALLONS.
12. REVISION 2: INCORPORATED AND FURTHER REVISED 24590-LAW-M6N-RLD-00035, AND 24590-LAW-M6LN-20-00006. ROUTED DISCHARGE OF PUMPS FROM RLD-VSL-00053 TO RLJ-VL5-00004. REVISED/ADDED/DELETED NOTES, HOLD, INSTRUMENTATION, AND OFF SHEET CONNECTORS. THIS P&ID HAS BEEN REVISED BY EMS FOR ALL LIMITED AND PHYSICALIZATION CHANGE DOCUMENTS THAT WERE PREVIOUSLY ISSUED.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE LAW RADIOACTIVE LIQUID WASTE DISPOSAL (RLD) SYSTEM.
2. 24590-LAW-ADR-N-01-001, REV. 2, DESIGN REVIEW OF P&IDS INCLUDING ALARA CONSIDERATIONS FOR RLD SYSTEM
3. 24590-WTP-ADR-J-08-0001, REV. 2, RADAR LEVEL INSTRUMENTATION
4. 24590-WTP-ADR-J-M -0001, REV 0, THERMAL CONNECTIVITY LEVEL INSTRUMENTATION

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated at the U. S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE assumes that, pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radioactivity is provided for process description purposes only.

REV	DESCRIPTION	DRC	CHKD	RVWD	APVD	DATE
2	REVISED PER NOTE 8					
1	REVISED PER NOTE 1	PR	MD	MS/RS	DB	08/3/15
0	ISSUED FOR CONSTRUCTION SEE NOTE 8	RF	RJ	RS/JS	RS/DB	09/05/08

REVISION HISTORY

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No: DE-AC27-01RV14136

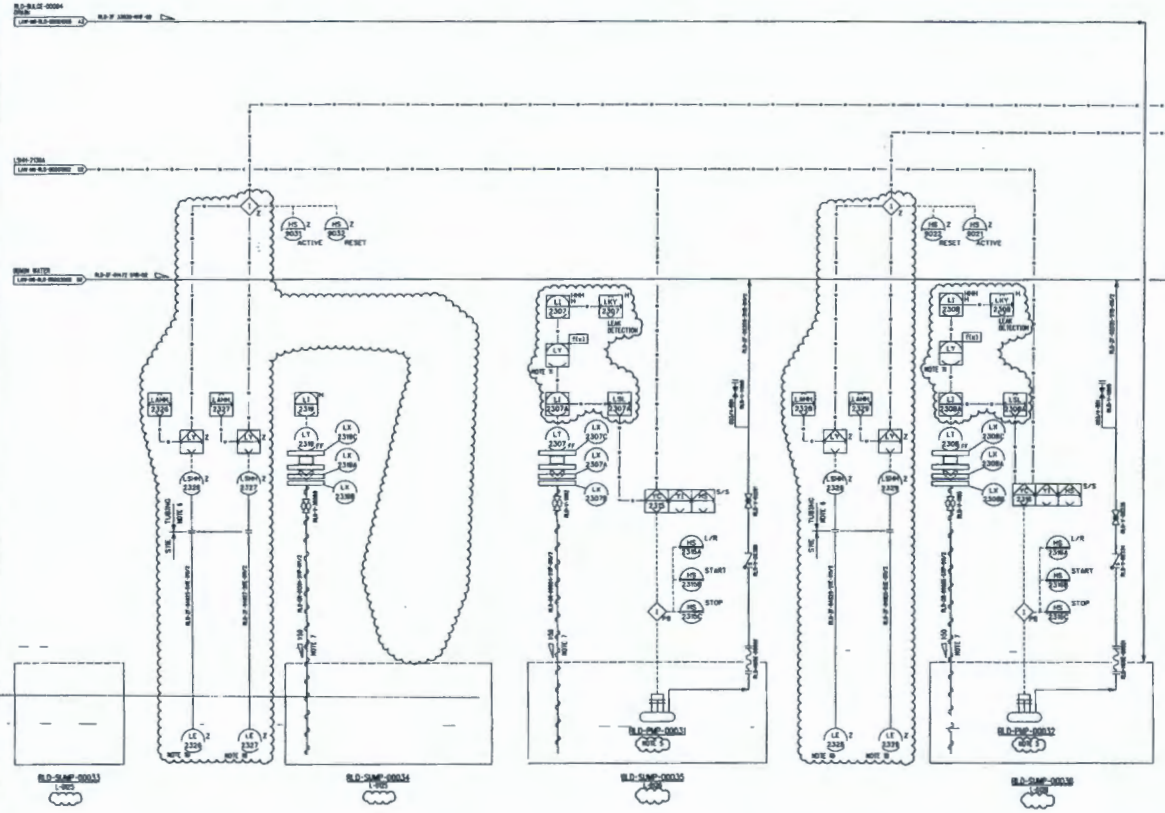
P&ID - LAW RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM PROCESS CELL SUMPS AT EL 2 FT

SCALE: NONE

24590-LAW-M6-RLD-00003002

REV 2

24590-LAW-M6-RLD-00003003



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL QN AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. THESE PUMPS ARE PERMANENTLY INSTALLED IN THE SUMPS.
6. PIPING EXTENDS APPROXIMATELY 3 FEET PAST THE CELL PENETRATION (I.E. INCELL/OUTCELL PENETRATION).
7. LEVEL METER WAVE GUIDE PIPE IS TO SIT ON THE BOTTOM OF THE SUMP. SLOTTED PORTION OF WAVE GUIDE PIPE IS TO CONTACT THE SUMP.
8. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-RLD-00003, REV 8. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-20-00001, 24590-LAW-M6N-RLD-00034, AND -00045.
9. REVISION 1: INCORPORATED 24590-LAW-M6N-RLD-00053, ADDED NOTE 7, AND REVISED SUMP BOTTOM CONFIGURATION FROM CONICAL TO FLAT.
10. SAFETY SIGNIFICANT THERMAL LEVEL PROBES LE-2326/-2327 AND LE-2328/-2329 FOR PROCESS CELL FLOOD DETECTION, ARE MOUNTED NEAR THE SUMPS RLD-SUMP-00034 AND RLD-SUMP-00036 RESPECTIVELY. LEAK DETECTION INSTRUMENTATION IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III.
11. FUNCTION CONVERTS TANK LEVEL IN INCHES TO GALLONS.
12. REVISION 2: INCORPORATED AND FURTHER REVISED 24590-LAW-M6N-RLD-00003, AND 24590-LAW-M6N-20-00006. REVISED DESCRIPTION OF PUMPS FROM RLD-VS1-00003 TO RLD-VLS-00004. REVISED/ADDED/DELETED NOTES, HOLDS, INSTRUMENTATION, AND OFF SHEET CONNECTORS. THIS PAID HAS BEEN REVISED BY CMOS FOR ALL LIMITED AND PHYSICALIZATION CHANGE DOCUMENTS THAT WERE PREVIOUSLY ISSUED.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3YD-RLD-00001, SYSTEM DESCRIPTION FOR THE LAW RADIOACTIVE LIQUID WASTE DISPOSAL (RLD) SYSTEM.
2. 24590-LAW-ADR-M-01-001, REV. 3, DESIGN REVIEW OF P&IDS INCLUDING ALARM CONSIDERATIONS FOR RLD SYSTEM
3. 24590-WTP-ADR-J-08-0001, REV. 2, RADAR LEVEL INSTRUMENTATION
4. 24590-WTP-ADR-J-M-0001, REV 0, THERMAL CONNECTIVITY LEVEL INSTRUMENTATION

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated at the U. S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE assumes this pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE central nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

REV	DESCRIPTION	DRN	CHKD	APVD	APVD	DATE
2	REVISED PER NOTE 12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	REVISED PER NOTE 9	PE	MD	[illegible]	[illegible]	[illegible]
0	ISSUED FOR CONSTRUCTION, SEE NOTE 8	JF	RJ	[illegible]	[illegible]	[illegible]

Q

REVISION HISTORY

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No. DE-AC27-01RV14136

P&ID - LAW
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM PROCESS AND EFFLUENT CELL SUMPS AT EL 2 FT

SCALE: NONE

24590-LAW-M6-RLD-00003003

REV 2

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)
RLD-VSL-00003 (Plant Wash Vessel) RLD-VSL-00004 (C3/C5 Drains/Sump Collection Vessel) RLD-VSL-00005 (SBS Condensate Collection Vessel)		-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 ~~1~~2 -M6-RLD-00003003, Rev ~~1~~2 -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		RLD-VSL-00004 = 7696 RLD-VSL-00005 = 25,780

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-0124 Process Cell Sump, El. +3')			(6% Mo)	-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 ~~1~~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 ~~1~~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 ~~1~~2 -P1-P01T-00002, Rev 7
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

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

Quarter Ending Sept 30, 2016 24590-LAB-PCN-ENV-16-001

Hanford Facility RCRA Permit Modification Notification Form
Part III, Operating Unit 10
Waste Treatment and Immobilization Plant

Index

Page 2 of 3: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant

Update the integrity assessment for the ancillary equipment associated with the Lab RLD system components to be located in various rooms within the Analytical Laboratory at below grade elevation.

Ancillary equipment assessed is associated with the following plant items and/or components:

- Ancillary equipment associated with the Hot Cell Drain Collection Vessel (RLD-VSL-00165)
- Ancillary equipment associated with the Lab Area Sink Drain Collection Vessel (RLD-VSL-00164)
- Ancillary equipment that comprises the Lab RLD Disposal System C3 Rad Lab Collection
- Ancillary equipment associated with the Lab RLD Disposal System C3/C5 Collection and Leak Detection Boxes
- Ancillary equipment associated with the Lab RLD Disposal System C5 Drain Collection Headers

Submitted by Co-Operator:

Roger J. Landon 9/13/16
Roger J. Landon Date

Reviewed by ORP Program Office:

Joanne Grindstaff 10/14/16
J. F. Grindstaff Date

Quarter Ending Sept 30, 2016 24590-LAB-PCN-ENV-16-001

Hanford Facility RCRA Permit Modification Notification Form	
Unit:	Permit Part:
Waste Treatment and Immobilization Plant	**Part III, Operating Unit 10**

Description of Modification:

The purpose of this Class 1 prime modification is to update the Integrity Assessment of the LAB RLD System. The following document is submitted to replace the document currently in Appendix 11.11

Appendix 11.11			
Replace	CCN 200253/IA-3001891-001	With	AREVA IA-3001891-002

This modification requests Ecology approval and incorporation into the permit the above referenced integrity assessment report. The report has been updated by the Independent Qualified Registered Professional Engineer (IQRPE). The report reflects the IQRPE's review of the following final design documents:

- Mechanical System Data Sheet, Facility and Vendor Fabrication Drawings, Specifications, Material Requisition, and System Description produced in accordance with the following references:
  - ASME B31.3 Code, *Process Piping*, American Society of Mechanical Engineers, 1996
  - ASME Boiler and Pressure Vessel (B&PV) Code, Section III, Division 1, Rules for Construction of Nuclear Facility Components, Subsection NC, and Appendix F, American Society of Mechanical Engineers, 1995
  - ASME Boiler and Pressure Vessel Code, Section III, Division 1, Subsection NF, Appendix N and F, Rules for Construction of Nuclear Power Plant Components (20010
  - ASME Boiler and Pressure Vessel (B&PV) Code, Section IX, Welding and Brazing Qualifications
  - ASME B16.5 Code, *Piping Flanges and Flanged Fittings* (1988)
  - Uniform Building Code (UBC), 1997 Edition, International Conference of Building Officials
- 24590-LAB-PHC-RLD-00101, Rev 0, *RPP-WTP Engineered Support Calculation for LAB-RLD-H00394*
- 24590-LAB-PHC-P33T-00001, Rev 0, *Pipe Support Calculation*
- 24590-LAB-SSC-S15T-00013, Rev 0, *Leak Detection Box Support Design Calculation*
- 24590-WTP-PHC-P50-00001, Rev 1, *RPP/WTP Support Standards Calculations*

Updates to the integrity assessment report for the Analytical Laboratory (Lab) Radioactive Liquid Waste Disposal (RLD) ancillary equipment are summarized below:

The documents listed in the "References" row and under the "Source of Information" column were updated. These documents were reviewed to assess the design of the Lab RLD ancillary equipment.

For each item of "Information Assessed" in the integrity assessment report, the items listed under the "Source of Information" column were reviewed and found to furnish adequate design controls and requirements to ensure that the design fully satisfies the requirements of Washington Administrative Code, WAC-173-303-640, *Dangerous Waste Regulations*.

This PCN updates information in Appendix 11.11 to reflect current design. This DWP component may be re-evaluated to confirm design adequacy. If the re-evaluation results in future design changes, the changes will be reviewed by Ecology in subsequent permit modifications.

In accordance with Permit Condition III.10.C.2.e, this permit modification sent to Ecology may include page changes to the Permit, attachments, and permit application supporting documentation.

Quarter Ending Sept 30, 2016 24590-LAB-PCN-ENV-16-001

WAC 173-303-830 Modification Class:	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter relevant WAC 173-303-830, Appendix I Modification citation number: NA
Enter wording of WAC 173-303-830, Appendix I Modification citation:

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class [1]1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved/Concur: ☒ Yes ☐ Denied (state reason below)

Reason for denial:

Reviewed by Ecology:

S. Dahl 11/30/16 Date

24590-CM-HC4-HXYG-00240-02-00015 Rev. 00A

R11785858

AREVA

ISSUED BY
RPP-WTP PDC

AFS-16-0183

July 20, 2016

Ms. Tess Klatt
Subcontract Administrator
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Dear Ms. Klatt:

BECHTEL NATIONAL, INC. CONTRACT NO. 24590-CM-HC4-HXYG-00240 IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAB RLD ANCILLARY EQUIPMENT (IA-3001891-002)

The structural integrity assessment of the subject ancillary equipment has been completed per the contract requirements and is enclosed for your use. The assessment found that the design is sufficient to ensure that the ancillary equipment is adequately designed and has sufficient structural strength, compatibility with the waste(s) to be processed/stored/treated, and corrosion protection to ensure that it will not collapse, rupture, or fail.

If you have any questions, please contact Tarlok Hundal at (509) 371-1975, or via email at tarlok.hundal@areva.com.

Sincerely,

Elizabeth W. Smith, C.P.M
Contract Manager
AREVA Federal Services LLC
Cleanup & Closure

lap

Enclosure (1)

cc: D. C. Pfluger, MS 12-2A w/enclosure (2)

AREVA Federal Services LLC

2101 Horn Rapids Road · Richland, WA 99354
Tel: (509) 371-1893 · Fax: (509) 375-8495 · www.us.areva.com

IA-3001891-002

IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT
FOR
LAB RLD ANCILLARY EQUIPMENT

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

IA-3001891-002

IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAB RLD ANCILLARY EQUIPMENT

"I, Tarlok Hundal have reviewed, and certified a portion of the design of a new tank system or component located at the Hanford Waste Treatment Plant, owned/operated by Department of Energy, Office of River Protection, Richland, Washington. My duties were independent review of the current design for the LAB RLD Ancillary Equipment, as required by the Washington Administrative Code, *Dangerous Waste Regulations*, Section WAC-173-303-640(3) (a) through (g) applicable components."

"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."

The documentation reviewed indicates that the design fully satisfies the requirements of the WAC.

The attached review is fifteen (15) pages numbered one (1) through fifteen (15).

TARLOK SINGH HUNDAL
STATE OF WASHINGTON
26213
REGISTERED
PROFESSIONAL ENGINEER

T S Hundal
Signature

7/20/2016
Date

Scope	Scope of this Integrity Assessment	This report consists of the Integrity Assessment for the Dangerous Waste Permit (DWP) effecting ancillary equipment associated with the LAB RLD system components to be located in various LAB facility rooms at below grade elevation, as shown in the General Arrangement drawing 24590-LAB-P1-60-00007. The DWP affecting ancillary equipment for the RLD system is shown in the P&ID drawings listed here and under References below. The ancillary equipment assessed is associated with the following plant items and/or components: 1. Ancillary equipment associated with the Hot Cell Drain Collection Vessel (RLD-VSL-00165) as shown on Drawing No. 24590-LAB-M6-RLD-00001001; 2. Ancillary equipment associated with the LAB Area Sink Drain Collection Vessel (RLD-VSL-00164) as shown on Drawing No. 24590-LAB-M6-RLD-00002001; 3. Ancillary equipment that comprises the LAB RLD Disposal System C3 Rad Lab Collection Drawing Nos. 24590-LAB-M6-RLD-00006001, -00006002, and -00006003; 4. Ancillary equipment associated with the LAB RLD Disposal System – C3 Collection & Leak Detection Boxes as shown on Drawing No. 24590-LAB-M6-RLD-00007001; 5. Ancillary equipment associated with the LAB RLD Disposal System – C3 Collection & Leak Detection Boxes as shown on Drawing No. 24590-LAB-M6-RLD-00007002; 6. Ancillary equipment associated with the LAB RLD Disposal System – C5 Collection & Leak Detection Boxes as shown on Drawing No. 24590-LAB-M6-RLD-00008001; 7. Ancillary equipment associated with the LAB RLD Disposal System – C5 Drain Collection Headers as shown on Drawing No. 24590-LAB-M6-RLD-00008002. **Note: This report is the revision of AFS document # IA-3001891-001 and supersedes BNI document # CCN 200253.**
Summary of Assessment		For each item of "Information Assessed" (i.e., Criteria) on the following pages, the items listed under "Source of Information" were reviewed and found to furnish adequate design requirements and controls to ensure that the design fully satisfies the requirements of Washington Administrative Code (WAC), Chapter 173-303 WAC, *Dangerous Waste Regulations*, WAC-173-303-640, *Tank Systems*.

References	Material Requisition, Specifications, Mechanical System Data Sheet, System Design Description, and Drawings	<u>Material Requisition (MR)</u>: 24590-CM-MRA-MPC0-00005, Rev. 2, Pumps, Centrifugal Sealless (MS072) (N012), including Supplement #S0005. <u>Specifications</u>: The following Specifications with their respective revision and Specification Change Notices (SCNs) are identified in the above listed Material Requisition document: 24590-WTP-3PS-MPC0-T0002, Engineering Specification for General Centrifugal Pumps to Meet Requirements of ASME B37.1M-2001 and ASME B73.2M-2003 for Commercial (CM) Components; 24590-WTP-3PS-MUMI-T0002, Engineering Specification for Low Voltage Induction Motors; 24590-WTP-3PS-FB01-T0001, Engineering Specification for Structural Design Loads for Seismic Category III/IV Equipment and Tanks; 24590-WTP-3PS-G000-T0002, Engineering Specification for Positive Material Identification (PMI) for Shop Fabrication; 24590-WTP-3PS-P000-T0001, Rev. 6, Engineering Specification for Piping Material Classes General Description and Summary. <u>Mechanical System Data Sheet</u>: 24590-LAB-MPD-RLD-00001, Rev. 1, ASME/ANSI General Centrifugal Pump (Hotcell Drain Collection Vessel Pump, LAB-RLD-PMP-00183A/B). <u>System Design Description</u>: 24590-LAB-3ZD-RLD-00001, Rev. 0, Lab Radioactive Liquid Waste Disposal (RLD) System Design Description. <u>Vendor Drawing (Bechtel Status Code 1 Drawing*)</u>: 24590-CM-POA-MPC0-00005-03-00002, Rev. 00B, SPGS Pump Range. * Bechtel Status Code 1 Drawing means vendor drawing approved/accepted by Bechtel. <u>Plant Drawings</u>: 24590-LAB-P1-60-00007, Rev. 3, Analytical Laboratory General Arrangement Plan at El. (-) 19'-2" Sections E-E, F-F & G-G; 24590-LAB-P1-60-00010, Rev. 3, Analytical Laboratory General Arrangement Sections A-A, B-B, C-C, and D-D; 24590-LAB-M5-V17T-00029, Rev. 4, WTP Analytical Laboratory Process Flow Diagram Radioactive Liquid Disposal; 24590-LAB-M6-RLD-00001001, Rev. 1, P&ID – LAB Radioactive Liquid Waste Disposal System C5 Collection and Transfer RLD-VSL-00165; 24590-LAB-M6-RLD-00002001, Rev. 1, P&ID – LAB Radioactive Liquid Waste Disposal System C3 Collection and Transfer RLD-VSL-00164; 24590-LAB-M6-RLD-00006001, Rev. 0, P&ID – LAB Radioactive Liquid Waste Disposal System C3 Rad Lab Collection; 24590-LAB-M6-RLD-00006002, Rev. 0, P&ID – LAB Radioactive Liquid Waste Disposal System C3 Rad Lab Collection; 24590-LAB-M6-RLD-00006003, Rev. 0, P&ID – LAB Radioactive Liquid Waste Disposal System C3 Rad Lab Collection; 24590-LAB-M6-RLD-00007001, Rev. 0, P&ID – LAB Radioactive Liquid Waste Disposal System C3 Leak Detection Boxes; 24590-LAB-M6-RLD-00007002, Rev. 0, P&ID – LAB Radioactive Liquid Waste Disposal System C3 Collection Drain Header; 24590-LAB-M6-RLD-00008001, Rev. 0, P&ID – LAB Radioactive Liquid Waste Disposal System C5 Leak Detection Boxes; 24590-LAB-M6-RLD-00008002, Rev. 0, P&ID – LAB Radioactive Liquid Waste Disposal System C5 Drain Collection Headers;

Reference (cont'd)	Drawings	24590-LAB-P3-RLD-ZN00001011, Rev. 1, LAB Facility Isometric (Line No. RLD-ZN-00001-W11B-4); 24590-LAB-P3-RLD-ZN00001012, Rev. 4, LAB Facility Isometric (Line No. RLD-ZN-00001-W11B-4); 24590-LAB-P3-RLD-ZN02205001, Rev. 6, LAB Facility Isometric (Line No. RLD-ZN-02205-S11E-3); 24590-LAB-P3-RLD-ZN03393001, Rev. 0, LAB Facility Isometric (Line No. RLD-ZN-03393-S11E-4); 24590-LAB-P3-RLD-ZN03413001, Rev. 1, LAB Facility Isometric (Line No. RLD-ZN-03413-N11E-4); 24590-LAB-P3-RLD-WU22122001, Rev. 1, LAB Facility Isometric (Line No. RLD-WU-22122-S11E-6); 24590-LAB-P3-RLD-WU02198001, Rev. 3, LAB Facility Isometric (Line No. RLD-WU-02198-W11B-3); 24590-LAB-P3-RLD-WU02198002, Rev. 1, LAB Facility Isometric (Line No. RLD-WU-02198-W11B-3); 24590-LAB-P3-RLD-WU02198051, Rev. 1, LAB Facility Isometric (Line No. RLD-WU-02198-W11B-6); 24590-LAB-P3-RLD-WU02198052, Rev. 1, LAB Facility Isometric (Line No. RLD-WU-02198-W11B-6); 24590-LAB-P3-RLD-WU02198053, Rev. 1, LAB Facility Isometric (Line No. RLD-WU-02198-W11B-6); 24590-LAB-P3-RLD-WU02213001, Rev. 0, LAB Facility Isometric (Line No. RLD-WU-02213-S11E-8); 24590-LAB-P3-RLD-WU02224051, Rev. 0, LAB Facility Isometric (Line No. RLD-WU-02224-S32B-6); 24590-LAB-P3-RLD-WU02249001, Rev. 1, LAB Facility Isometric (Line No. RLD-WU-02229-S11E-1); 24590-LAB-P3-RLD-WU02269001, Rev. 2, LAB Facility Isometric (Line No. RLD-WU-02269-W11B-2); 24590-LAB-P3-RLD-WU02269051, Rev. 1, LAB Facility Isometric (Line No. RLD-WU-02269-W11B-4); 24590-LAB-P3-RLD-WU02270001, Rev. 2, LAB Facility Isometric (Line No. RLD-WU-02270-W11B-3); 24590-LAB-P3-RLD-WU02270051, Rev. 0, LAB Facility Isometric (Line No. RLD-WU-02270-W11B-6); 24590-LAB-P3-RLD-WU02279051, Rev. 0, LAB Facility Isometric (Line No. RLD-WU-02279-W11B-6); 24590-LAB-P3-RLD-ZN03433001, Rev. 1, LAB Facility Isometric (Line No. RLD-ZN-03433-S32B-3); 24590-LAB-P3-RLD-ZN03433002, Rev. 2, LAB Facility Isometric (Line No. RLD-ZN-03433-S32B-3); 24590-LAB-P3-RLD-ZN03433005, Rev. 1, LAB Facility Isometric (Line No. RLD-ZN-03433-S32B-3); 24590-LAB-P3-RLD-ZN03433051, Rev. 1, LAB Facility Isometric (Line No. RLD-ZN-03433-S32B-6); 24590-LAB-P3-RLD-ZN03433056, Rev. 3, LAB Facility Isometric (Line No. RLD-ZN-03433-S32B-8); 24590-LAB-P3-RLD-ZN03433059, Rev. 1, LAB Facility Isometric (Line No. RLD-ZN-03433-S32B-4); 24590-LAB-P3-RLD-ZN03445001, Rev. 2, LAB Facility Isometric (Line No. RLD-ZN-03445-S11E-3); 24590-LAB-P3-RLD-ZN03449002, Rev. 0, LAB Facility Isometric (Line No. RLD-ZN-03449-S32B-2); 24590-LAB-P3-RLD-ZN03449052, Rev. 0, LAB Facility Isometric (Line No. RLD-ZN-03449-S32B-4); 24590-LAB-PH-P33T-00001, Rev. 2, Pipe Support and Fabrication Details; 24590-LAB-PH-P33T-00002, Rev. 2, Pipe Support and Fabrication Details; 24590-LAB-PH-P33T-00003, Rev. 1, Pipe Support and Fabrication Details; 24590-WTP-PH-50-00003001, Rev. 4, Standard Pipe Support Details, Cantilever-Cantilever CC; 24590-WTP-PH-50-00012001, Rev. 7, Standard Pipe Support Details, Guide-U Bolts GU; 24590-WTP-PH-50-00012002, Rev. 6, Standard Pipe Support Details, Guide-U Strap GU; 24590-WTP-PH-50-00024001, Rev. 2, Standard Pipe Support Details, Strut-Sway WS; 24590-LAB-RLD-H00098, Rev. 3, Pipe Support Drawing; 24590-LAB-RLD-H00394, Rev. 1, Pipe Support Drawing.

	Information Assessed	Source of Information	Assessment
Design	Ancillary equipment design standards are appropriate and adequate for the equipment's intended use.	Drawings and System Design Description listed above under References; 24590-WTP-DC-PS-01-001, Rev. 8, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria"; ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers, 1996; 24590-WTP-3DP-G04T-00905, Rev. 14, Determination of Quality Levels.	The Pipe Stress Design Criteria document identifies ASME B31.3 Code as the design code for piping systems of the WTP. The P&ID drawings and the System Design Description document indicate that ancillary equipment associated with the C3/C5 collection, transfer and leak detection functions is Quality Level CM (Commercial Grade) and Seismic Category (SC-III/IV), for personnel protection from hazardous materials. These seismic categories are discussed in detail in the Pipe Stress Design Criteria document. Determination of Quality Levels document and Pipe Stress Design Criteria document provide detailed discussion of quality grades and seismic categories, respectively. The codes, standards, and documents identified and used above are acceptable and adequate for the design of the LAB RLD system ancillary equipment's intended service.

	Information Assessed	Source of Information	Assessment
Design (cont'd)	If the ancillary equipment to be used is not built to a design standard, the design calculations demonstrate sound engineering principles of construction.	Drawings listed above under References; 24590-WTP-DC-PS-01-001, Rev. 8, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria"; ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers, 1996; 24590-WTP-VV-PS-01-001, Rev. 6, Verification and Validation Test Plan/Test Report for ME101, Linear Elastic Analysis of Piping; 24590-LAB-M6C-RLD-00001, Rev. 0, Overflow Sizing for LAB RLD Vessels; 24590-LAB-P6C-RLD-00051, Rev. 0, Richland RPP-WTP LAB Plant RLD System, including ECCN # 00002 (Pipe Stress Analysis); 24590-LAB-P6C-RLD-00006, Rev. 0, Pipe Stress Analysis for LAB RLD System, including ECCN # 00002; 24590-LAB-P6C-RLD-00041, Rev. 0, Richland RPP-WTP LAB Plant RLD System (Pipe Stress Analysis); 24590-LAB-P6C-RLD-00045, Rev. 0, RPP-WTP LAB Plant RLD System, including ECCN #s 00002 & 00003 (Pipe Stress Analysis); 24590-LAB-P6C-RLD-00046, Rev. 0, RPP-WTP LAB Plant RLD System, including ECCN # 00002 (Pipe Stress Analysis); 24590-WTP-PHC-P50-00001, Rev. 1, RPP/WTP Support Standards, including ECCN # 00001 (Calculations); 24590-WTP-3DP-G04T-00906, Rev. 10, Isometric Drawings and Associated Calculations; 24590-WTP-3DP-G04B-00037, Rev. 30, Engineering Calculations; 24590-WTP-3PS-PH01-T0002, Rev. 6, Installation of Pipe Supports.	The ancillary equipment is to be built to the design standards. The Pipe Stress Design Criteria specifies that piping is to be designed in accordance with ASME B31.3 Code. The review of the sample isometric and pipe support drawings listed in the References, Pipe Stress Analysis, Pipe Support Calculations, Engineering Specification, Pump and Line Sizing calculations, and of the design process and controls described in Isometric Drawings and Associated Calculations, Engineering Calculations, and Installation of Pipe Supports documents provides adequate assurance that RLD ancillary equipment are properly designed and will be installed and verified to meet the requirements of the applicable design criteria established for the project. The review of the aforementioned documents also demonstrates that sound design engineering principles are used for the design and construction of the ancillary equipment.

	Information Assessed	Source of Information	Assessment
Design (cont'd)	Ancillary equipment has adequate strength at the end of its design life to withstand the operating pressure, operating temperature, thermal expansion, and seismic loads. Equipment is protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction.	Drawings listed above under References; 24590-WTP-DC-PS-01-001, Rev. 8, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria"; ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers, 1996; ASME Boiler and Pressure Vessel (B&PV) Code, Section III, Division 1, Rules for Construction of Nuclear Facility Components, Subsection NC, and Appendix F, American Society of Mechanical Engineers, 1995; Uniform Building Code (UBC), 1997 Edition, International Conference of Building Officials; 24590-WTP-PER-M-02-002, Rev. 3, Materials for Ancillary Equipment; 24590-WTP-GPG-ENG-004, Rev. 3, Design Guide Pipe Stress, Pipe Layout, and Support Spacing; 24590-WTP-SE-ENS-03-704, Rev. 0, Safety Evaluation for Design (Seismic Design of Piping and Pipe Supports); 24590-WTP-PHC-P50-00001, Rev. 1, RPP/WTP Support Standards, including ECCN # 00001 (Calculations); 24590-LAB-M6C-RLD-00022, Rev. 1, LAB RLD System Line Pressure and Temperature Conditions (Calculations); 24590-LAB-P6C-RLD-00006, Rev. 0, Pipe Stress Analysis for LAB RLD System, including ECCN # 00002; 24590-LAB-P6C-RLD-00041, Rev. 0, Richland RPP-WTP LAB Plant RLD System (Pipe Stress Analysis); 24590-LAB-P6C-RLD-00045, Rev. 0, RPP-WTP LAB Plant RLD System, including ECCN #s 00002 & 00003 (Pipe Stress Analysis); 24590-WTP-DB-ENG-01-001, Rev. 3, Basis of Design; DOE-STD-1020-94, Natural Phenomenon Hazards Design Evaluation Criteria for Department of Energy Facilities (including Change Notice #1, January 1996).	The Pipe Stress Design Criteria document requires the use of the ASME B31.3 Code and DOE-STD-1020-94 standard document for piping design. ASME B31.3 Code requires explicit consideration of operating pressure, operating temperature, thermal expansion/contraction, settlement, vibration, and corrosion allowance in the design of piping. Elements of the ASME B&PV Code, Section III, Division 1, Subsection NC and Appendix F, and the Uniform Building Code (UBC) are used to supplement the requirements of ASME B31.3 Code and DOE-STD-1020-94 for the design of Seismic Category (SC-III/SC-IV) piping. Details of the seismic design methods are discussed in the Pipe Stress Design Criteria and Safety Evaluation documents. The Basis of Design document specifies that mechanical equipment is to be designed for a nominal plant life of 40 years. Components in non-maintainable areas are to be designed to last the entire design life of the plant. The Materials for Ancillary Equipment document specifies that ancillary equipment downstream of a waste source vessel is to be constructed of the same or better material and with the same corrosion allowance as the source vessel, unless the service seen in the downstream line warrants a different material, corrosion allowance, or other modification. Using the same or better materials and corrosion allowance for downstream ancillary equipment ensures that the equipment will be able to withstand all anticipated loadings for the entire design service life. The above mentioned codes and standards including the Design Guide document ensure that the ancillary equipment has adequate strength at the end of its design life to withstand all anticipated loads. Review of sample ancillary equipment calculations and drawings indicates that they are adequately designed meeting the requirements of the aforementioned applicable code and standards.

	Information Assessed	Source of Information	Assessment
Supports	Ancillary equipment supports are adequately designed.	Drawings listed above under References; 24590-WTP-DC-PS-01-002, Rev. 7, Pipe Support Design Criteria; 24590-WTP-PER-PS-02-001, Rev. 5, Ancillary Equipment Pipe Support Design; ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers (1996); ASME Boiler and Pressure Vessel Code, Section III, Division I, Subsection NF, Appendix N and F, Rules for Construction of Nuclear Power Plant Components (2001); 24590-WTP-PL-PS-01-001, Rev. 2, Verification and Validation Test Plan for Bechtel's ME150 Pipe Support Family of Programs (PCFAPPS); 24590-LAB-PHC-RLD-00104, Rev. 0, RPP-WTP Engineered Support Calculation for LAB-RLD-H00098 & LAB-RLD-H00170; 24590-WTP-3DP-G04T-00906, Rev. 10, Isometric Drawings and Associated Calculations; 24590-WTP-3DP-G04B-00037, Rev. 30, Engineering Calculations; 24590-LAB-PHC-RLD-00101, Rev. 0, RPP-WTP Engineered Support Calculation for LAB-RLD-H00394; 24590-LAB-PHC-P33T-00001, Rev. 0, RPP-WTP Pipe Support and Fabrication Details: Dwgs # 24590-LAB-PH-P33T-0001, -00002, and -00003; 24590-LAB-SSC-S15T-00013, Rev. 0 (including ECCN # 00006), Leak Detection Box Support Design, (Calculations); 24590-WTP-PHC-P50-00001, Rev. 1, RPP/WTP Support Standards, including ECCN # 00001 (Calculations).	The Pipe Support Design Criteria document considers all loadings identified in ASME B31.3 Code and utilizes ASME Section III, Division 1, Subsection NF and Appendix F to supplement the requirements of ASME B31.3 Code for seismic design of Seismic Category (SC-III/IV) pipe supports. Loads are evaluated against the design criteria provided in ASME Section III, Division 1, as discussed in the Pipe Support Design Criteria document. Bounding load cases are passed to the pipe support designers from the results of the ancillary equipment piping stress analyses. Analysis is by manual calculation or approved computer programs that have been verified and validated as discussed in the Verification and Validation Test Plan. These are appropriate codes and standards that assure adequate design of ancillary equipment supports for the LAB RLD system. Design standards for vessel internal equipment supports are discussed in the integrity assessment for the RLD system vessels. Review of the sample calculation documents shows that the ancillary equipment supports are adequately designed to meet the requirements of the aforementioned coded and standards.

	Information Assessed	Source of Information	Assessment
Connections	Seams and connections are adequately designed.	Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 3, Basis of Design; 24590-WTP-DC-PS-01-001, Rev. 8, Pipe Stress Design Criteria Including "Pipe Stress Criteria" and "Span Method Criteria"; ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers (1996); ASME Boiler and Pressure Vessel (B&PV) Code, Section IX, Welding and Brazing Qualifications; ASME B16.5 Code, Piping Flanges and Flanged Fittings, (1988); 24590-LAB-P6C-RLD-00006, Rev. 0, Pipe Stress Analysis for LAB RLD System, including ECCN # 00002; 24590-LAB-P6C-RLD-00041, Rev. 0, Richland RPP-WTP LAB Plant RLD System (Pipe Stress Analysis); 24590-LAB-P6C-RLD-00046, Rev. 0, RPP-WTP LAB Plant RLD System, including ECCN # 00002 (Pipe Stress Analysis).	The Basis of Design specifies that in-cell piping that is non-maintainable will be fully welded. The Pipe Stress Design Criteria specifies the ASME B31.3 Code as the design code for the piping systems. Welding is to be performed in accordance with the requirements of ASME B31.3 Code and the ASME B&PV Code, Section IX. ASME B16.5 Code is specified for pipe flanges and equipment flanges where flanges are used for connections. The aforementioned documents provide appropriate requirements and guidelines to adequately design the seams and connections to sustain the applicable loads. Review of sample ancillary equipment calculations and drawings indicates that they are adequately designed meeting the requirements of the aforementioned applicable code and standards.

	Information Assessed	Source of Information	Assessment
Foundation	The system will withstand the effects of frost heave.	Drawings listed above under References; 24590-WTP-DC-ST-01-001, Rev. 13, Structural Design Criteria.	The RLD system ancillary equipment considered in this assessment as shown on the drawings is located in several vessel cells and associated pump and piping pits, and in the building concrete surrounded by the various contaminated laboratory operations areas, and radiological maintenance and waste handling areas inside the LAB Facility. The Structural Design Criteria requires that all structural foundations shall extend into the surrounding soil below the frost line in order to preclude frost heave. The frost line is 30 in. below grade and the RLD system ancillary equipment is inside the building, therefore, is not subject to the effects of frost heave.
Waste Characteristics	Characteristics of the waste to be stored or treated have been identified (ignitable, reactive, toxic, specific gravity, vapor pressure, flash point, temperature)	Drawings and System Design Description listed above under References. 24590-WTP-PER-PR-03-001, Rev. 1, Prevention of Hydrogen Accumulation in WTP Tank Systems and Miscellaneous Treatment Unit Systems; 24590-WTP-PER-PR-03-002, Rev. 3, Control of Toxic Vapors and Emissions from WTP Tank and Miscellaneous Unit Systems.	The System Design Description identifies that the RLD system vessels provide for receipt and temporary storage of secondary wastes from the Laboratory operations. The System Design Description identifies that secondary containment for the C5 vessel cell is the only important-to-safety function in the Laboratory Facility. Administrative controls are placed on the radiological inventory in the C5 vessel and addition of organic chemicals to the C5 tank. Therefore the C5 vessel does not represent a hydrogen or chemical flammability hazard. The System Design Description states that during normal LAB operations, numerous small samples are taken for analysis purposes. Therefore, the quantities of hazardous material being handled by LAB ancillary equipment are typically small, not continuous in time, diluted with water, and flushed back into the system. Various waste characteristics are also discussed in the Control of Toxic Vapors and Emissions document which lists appropriate equipment used to mitigate their emissions. And Prevention of Hydrogen Accumulation document describes that a hydrogen accumulation hazard does not exist in the LAB facility.

	Information Assessed	Source of Information	Assessment
Waste Characteristics (cont'd)	Ancillary equipment is designed to handle the wastes with the characteristics defined above and any treatment reagents.	Drawings and System Design Description listed above under References; 24590-WTP-PER-PL-02-001, Rev. 7, Piping Material Class Description; 24590-WTP-PER-M-02-002, Rev. 3, Materials for Ancillary Equipment.	The RLD system drain manifolds are doubly contained piping to provide for secondary containment of dangerous waste. The System Design Description document states that during normal operations, samples from the laboratory operations will be neutralized with water and flushed to the RLD system. However, the drain manifolds that are likely to receive any reagents by accident are equipped with the primary piping material UNS N06022 (Hastelloy C-22), a material normally used for highly corrosive service (Pipe Class W11B). Drain manifolds that see less severe service use 316L stainless steel for the primary lines (Pipe Class S32B). The secondary containment lines are typically carbon steel. The line identification numbers on the P&ID drawings include the piping material class for each line. The materials for these classes are tabulated in the Piping Material Class Description document. For ancillary equipment downstream from a vessel, the Materials for Ancillary Equipment document specifies that its material should be same or better as of the waste source vessel and with the same corrosion allowance as the source vessel, unless the service seen in the downstream line warrants a different material, corrosion allowance, or other modification. Bounding corrosion/erosion allowances are listed in the Piping Material Class Description document for each piping material class. The aforementioned information ensures that the ancillary equipment is adequately designed to manage the waste and reagents associated with the LAB RLD system.

	Information Assessed	Source of Information	Assessment
Compatibility	The pH range of the waste, waste temperature and the corrosion behavior of the structural materials are adequately addressed. Ancillary equipment material and protective coatings ensure the ancillary equipment structure is adequately protected from the corrosive effects of the waste stream and external environments. The protection is sufficient to ensure the equipment will not leak or fail for the design life of the system.	Drawings and System Design Description listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 3, Basis of Design; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection.	The Basis of Design document identifies a service design life of 40 years for the ancillary equipment. All non-maintainable items will be designed to last the life of the facility. The System Design Description document identifies that the waste to be handled in this ancillary equipment as non-organic liquid process waste. It also states that during normal operations samples from the laboratory operations will be neutralized with water and flushed to the RLD system. However, the drain manifolds that are likely to receive reagents by accident are equipped with the primary piping material UNS N06022 (Hastelloy C-22), a material normally used for highly corrosive service. Drain manifolds that see less severe service use 316L stainless steel for the primary lines. As noted on the P&ID drawings, the exterior surface material of the double-wall pipe that penetrate the RLD vessel cells is to be same as the cell secondary containment liner material. Material Selection document lists appropriate materials to be used for the secondary containment liner in the cell. Therefore, the ancillary equipment will provide the expected design service life.

	Information Assessed	Source of Information	Assessment
Corrosion Allowance	Corrosion allowance is adequate for the intended service life of the ancillary equipment.	Drawings listed above under References; 24590-LAB-N1D-RLD-00005, Rev. 0, Corrosion Evaluation, LAB Hotcell Drain Collection Vessel Pump (RLD-PMP-00183A/B); 24590-WTP-DC-PS-01-001, Rev. 8, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria;" ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers (1996); 24590-WTP-DB-ENG-01-001, Rev. 3, Basis of Design; 24590-WTP-PER-M-02-002, Rev. 3, Materials for Ancillary Equipment; 24590-WTP-PER-PL-02-001, Rev. 7, Piping Material Class Description; 24590-LAB-P6C-RLD-00006, Rev. 0, Pipe Stress Analysis for LAB RLD System, including ECCN # 00002; 24590-LAB-P6C-RLD-00041, Rev. 0, Richland RPP-WTP LAB Plant RLD System (Pipe Stress Analysis); 24590-LAB-P6C-RLD-00046, Rev. 0, RPP-WTP LAB Plant RLD System, including ECCN # 00002 (Pipe Stress Analysis).	The Pipe Stress Design Criteria requires use of the ASME B31.3 Code for ancillary equipment design. Consideration of corrosion allowance is a mandatory requirement of ASME B31.3 Code. A required service life of 40 years is identified in the Basis of Design document for ancillary equipment that is not accessible for maintenance. Those drain manifolds that are likely to receive reagents are equipped with the primary piping material UNS N06022 (Hastelloy C-22), a material normally used for highly corrosive service (Pipe Class W11B-double walled piping). Drain manifolds that see less severe service use 316L stainless steel for the primary lines (Pipe Class S32B-double walled piping). The secondary containment lines are typically carbon steel. Single walled drain lines and transfer lines located in the RLD vessel cells, pumps and piping pits, and other secondary containment components are primary are constructed of piping of Classes S11E and S11P which are 316L stainless steel material. Some N11E (UNS N06022-Hasellow C-22) material is also used for single walled drain lines located inside the LAB secondary containment structures. For ancillary equipment downstream from a vessel, the Materials for Ancillary Equipment document specifies that its material should be same or better as of the waste source vessel and with the same corrosion allowance as the source vessel, unless the service seen in the downstream line warrants a different material, corrosion allowance, or other modification. Bounding corrosion/erosion allowances are listed in the Piping Material Class Description document for each piping material class. The Corrosion Evaluation and selection of materials listed in the Piping Material Class Description document and as shown on drawings, for the ancillary equipment is compatible with the operating environment for their required design life. Review of the sample ancillary equipment documents shows that appropriate corrosion allowances have been used.

	Information Assessed	Source of Information	Assessment
Pressure Controls	Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the vessels are exceeded.	Drawings listed above under References; 24590-WTP-DC-PS-01-001, Rev. 8, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria"; ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers, 1996; 24590-WTP-PER-PL-02-001, Rev. 7, Piping Material Class Description.	The Pipe Stress Design Criteria document specifies ASME B31.3 Code as the design code for the WTP piping. Most of the ancillary equipment in the LAB consists of gravity drain manifolds for the laboratory hotcells, gloveboxes, hoods, and maintenance and waste handling areas. ASME B31.3 Code requires provision be made to safely contain or relieve any pressure to which the piping may be subjected. ASME B31.3 Code piping not protected by a pressure relieving device, or that can be isolated from a pressure relieving device must be designed for at least the highest pressure that can be developed. The Piping Material Class Description document lists enveloping pressure and temperature limits for each piping material class. These requirements are appropriate and adequate for the ancillary equipment design.

	Information Assessed	Source of Information	Assessment
Pressure Controls (cont'd)	Maximum flows and any unusual operating stresses are identified	Drawings listed above under References; 24590-WTP-DC-PS-01-001, Rev. 8, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria"; ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers, 1996; 24590-WTP-PER-PL-02-001, Rev. 7, Piping Material Class Description; 24590-WTP-3DP-G04T-00906, Rev. 10, Isometric Drawings and Associated Calculations; 24590-WTP-3DP-G04B-00037, Rev. 30, Engineering Calculations.	The expected flow paths for the ancillary equipment are identified on the P&ID drawings. The Pipe Stress Design Criteria specifies the ASME B31.3 Code for piping design. This code requires piping to be designed to the highest pressure that can be developed in a piping system assuring that maximum operating stresses remain within code allowables. Piping material classes are shown on the P&ID drawings, embedded in the item numbers for each ancillary equipment component. Ancillary equipment is designed for the highest anticipated temperature and pressure values which are also within the bounding maximum design temperature and pressure values listed for each piping material class in the Piping Material Class General Description document. ASME B31.3 and the associated standards are appropriate and adequate for the design of the ancillary equipment. Furthermore, the fabrication or isometric drawings released for construction by Bechtel National, Inc. (BNI), and the design process and controls described in the Isometric Drawings and Associated Calculations, and Engineering Calculations documents provide adequate assurance that subject ancillary equipment are properly designed to meet the requirements identified in the applicable design criteria established for the project.

	Information Assessed	Source of Information	Assessment
Secondary Containment	Ancillary equipment is designed with secondary containment that is constructed of materials compatible with the waste and of sufficient strength to prevent failure (pressure gradients, waste, climatic conditions, daily operations), provided with a leak-detection system, and designed to drain and remove liquids.	Drawings listed above under References; 24590-WTP-PER-PL-02-001, Rev. 7, Piping Material Class Description; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection.	The ancillary equipment considered in this assessment is located in several vessel cells and associated pump and piping pits, and in the building concrete surrounded by various contaminated laboratory operations areas, and radiological maintenance and waste handling areas inside the LAB Facility. Secondary containment for ancillary equipment within the vessel cells and pits is provided by the liners and sumps within the cells and pits which are outside the scope of this integrity assessment. Secondary containment for the various gravity drain manifolds shown on the P&ID drawings is provided by doubly contained piping arrangements. The primary lines are typically corrosion resistant alloys while the secondary containment pipes are carbon steel as shown on the drawings and as described in the Piping Material Class Description document. All of the manifolds slope toward the RLD vessel cells. The carbon steel secondary containments are all provided with low-point leak detection boxes which are physically located in the cells. Drain manifolds are equipped with "clean outs" to facilitate access for unplugging the lines. Flush water connections are provided at the high points of the drain manifolds. These connections also provide for pneumatic testing of the secondary containment lines and leak detection boxes. The ancillary equipment is designed and constructed per the requirements of Material Selections document. The ancillary equipment material is compatible with the waste, has sufficient strength to prevent failure, provided with leak-detection system, and designed to drain and remove liquids.

Quarter Ending 6/30/2016 24590-WTP-PCN-ENV-16-003

Hanford Facility RCRA Permit Modification Notification Form
Part III, Operating Unit 10
Waste Treatment and Immobilization Plant

Index

Page 2 of 3: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant
Editorial corrections to the current Addendum H Closure Plan to revise all references from Addendum/Addenda to Chapter per the Rev. 8C format.

Submitted by Co-Operator:

Roger J. Landon for 5/26/16
Roger J. Landon Date

Reviewed by ORP Program Office:

J. F. Grindstaff 7/5/16
J. F. Grindstaff Date

Quarter Ending 6/30/2016

24590-WTP-PCN-ENV-16-003

Hanford Facility RCRA Permit Modification Notification Form	
Unit:	Permit Part:
Waste Treatment and Immobilization Plant	**Part III, Operating Unit 10**

Description of Modification:

The purpose of this Class 1 modification is to request that Ecology make editorial corrections to the Dangerous Waste Permit (DWP) Closure Plan by striking all language and references to "...addenda..."/"...addendum...", and replacing that language and references to "...chapter...". Also, a request for editorial changes to the Table of Contents, Figures, Tables, and Sections, and Subsections to revise references to "...H..." and replace with "...11...".

These revisions will change the current closure plan designation from "Addendum H Closure Plan" to "Chapter 11 Closure Plan".

WAC 173-303-830 Modification Class:	Class 1	Class 11	Class 2	Class 3
Please mark the Modification Class:	X			

Enter relevant WAC 173-303-830, Appendix I Modification citation number:

Enter wording of WAC 173-303-830, Appendix I Modification citation:

A1. Administrative and informational changes

A2. Correction of typographical errors.

Modification Approved/Concur: [X] Yes [ ] Denied (state reason below)

Reason for denial: Concur

Reviewed by Ecology:

S. Dahl 10-10-16

S. Dahl — Date

CHAPTER 11~~ADDENDUM H~~
CLOSURE PLAN

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CHAPTER 11~~ADDENDUM H~~
CLOSURE PLAN

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CHAPTER 11~~ADDENDUM H~~
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~~addendum~~ 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).

~~H.1.0~~ 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~~H~~.3.2 and 11~~H~~.7.0.

~~H.1.1~~ 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~~Addendum C~~:

- 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~~Addendum C~~. 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 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~~H~~.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~~H~~.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~~H~~.4.0 describes other activities, including certification of completion of closure, control of run-on and runoff during closure, and equipment reuse.
- Section 11~~H~~.5.0 provides the maximum possible mixed waste inventory.
- Section 11~~H~~.6.0 describes the closure procedures for each type of permitted mixed waste management unit.
- Section 11~~H~~.7.0 provides the schedule for closure.
- Section 11~~H~~.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).

~~H.1.2~~ 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).

~~H.2.0~~ 11.2.0 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~~Addendum F~~ and Chapter 7A~~Addendum F1~~

(*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~~H~~-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~~H~~.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~~H~~-2 and 11~~H~~-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~~H~~-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~~H~~-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~~H~~-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~~H~~-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~~H~~-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~~H~~-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~~H~~-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~~H~~.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~~H~~-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~~H~~-4. Contaminated soil will be removed to meet risk-based concentration limits, referred to as the soil cleanup limits (see Section 11~~H~~.2.1). Soil sampling and analyses will be performed after removal to verify compliance with the soil cleanup standard. Figure 11~~H~~-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~~H~~-1, the example Closure Certification Statement in Figure 11~~H~~-5, and other supporting records as discussed in Section 11~~H~~.4.1.

~~H.2.1~~ 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 I 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).

~~H.2.2~~ 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~~H~~.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~~H~~.3.4 and 11~~H~~.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 pipe
- 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.

~~H.2.3~~ 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~~H~~.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.

~~H.2.4~~ 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~~H~~.2.2.

~~H.2.5~~ 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).

~~H.2.6~~ 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).

~~H.3.0~~ 11.3.0 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~~H~~.3.1 describes the maximum extent of operations. Section 11~~H~~.3.2 describes the process for removing dangerous (mixed) wastes from permitted units. Section 11~~H~~.3.3 identifies several chemical and physical extraction technologies that may be used to achieve the clean debris surface standard. Section 11~~H~~.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~~H~~.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~~H~~.5.0 provides the estimated maximum mixed-waste inventory for each type of dangerous/mixed waste management unit. Section 11~~H~~.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~~H~~.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~~H~~.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~~H~~.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~~H~~.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.

~~H.3.1~~ 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~~Addendum C~~ 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~~Addendum C~~ tables.

~~H.3.2~~ 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~~H~~-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~~Addendum B1~~. This information will be included in the closure documentation supporting certification, which is described in Section 11~~H~~.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.

~~H.3.3~~ 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~~H~~.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.

~~H.3.3.1~~ 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~~H~~.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.

~~H.3.3.2~~ 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.

~~H.3.3.3~~ 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~~H~~.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).

~~H.3.4~~ 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

~~H.3.4.1~~ 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.

~~H.4.0~~ 11.4.0 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.

~~H.4.1~~ 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~~H~~-1 and Figure 11~~H~~-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.

~~H.4.2~~ 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.

~~H.4.3~~ 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~~H~~.3.0 and 11~~H~~.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.

~~H.5.0~~ 11.5.0 MAXIMUM WASTE INVENTORY

The estimated maximum mixed waste inventory for each type of permitted mixed waste management unit is listed in Table 11~~H~~-1. These are total storage capacity volumes from the WTP Part A form in Chapter 11~~Addendum A~~.

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.

~~H.6.0~~ 11.6.0 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~~H~~-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.

~~H.6.1~~ 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~~H~~.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~~H~~.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.

~~H.6.2~~ 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~~H~~.3.4 and 11~~H~~.4.1.

~~H.6.3~~ 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~~H~~.6.1 and 11~~H~~.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~~H~~.6.2), with the added complications of various types of waste handling equipment such as power manipulators, cranes, and the LAW LSMs.

~~H.6.4~~ 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~~H~~.6.1 and 11~~H~~.6.2 for tank systems and container storage areas.

~~H.7.0~~ 11.7.0 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~~H~~-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.

~~H.8.0~~ 11.8.0 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~~H~~.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~~H~~-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~~H~~-2 Clean Closure Performance Standards and Activities[a]

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).

Figure 11H-1 Sample Clean Debris Surface Checklist

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:

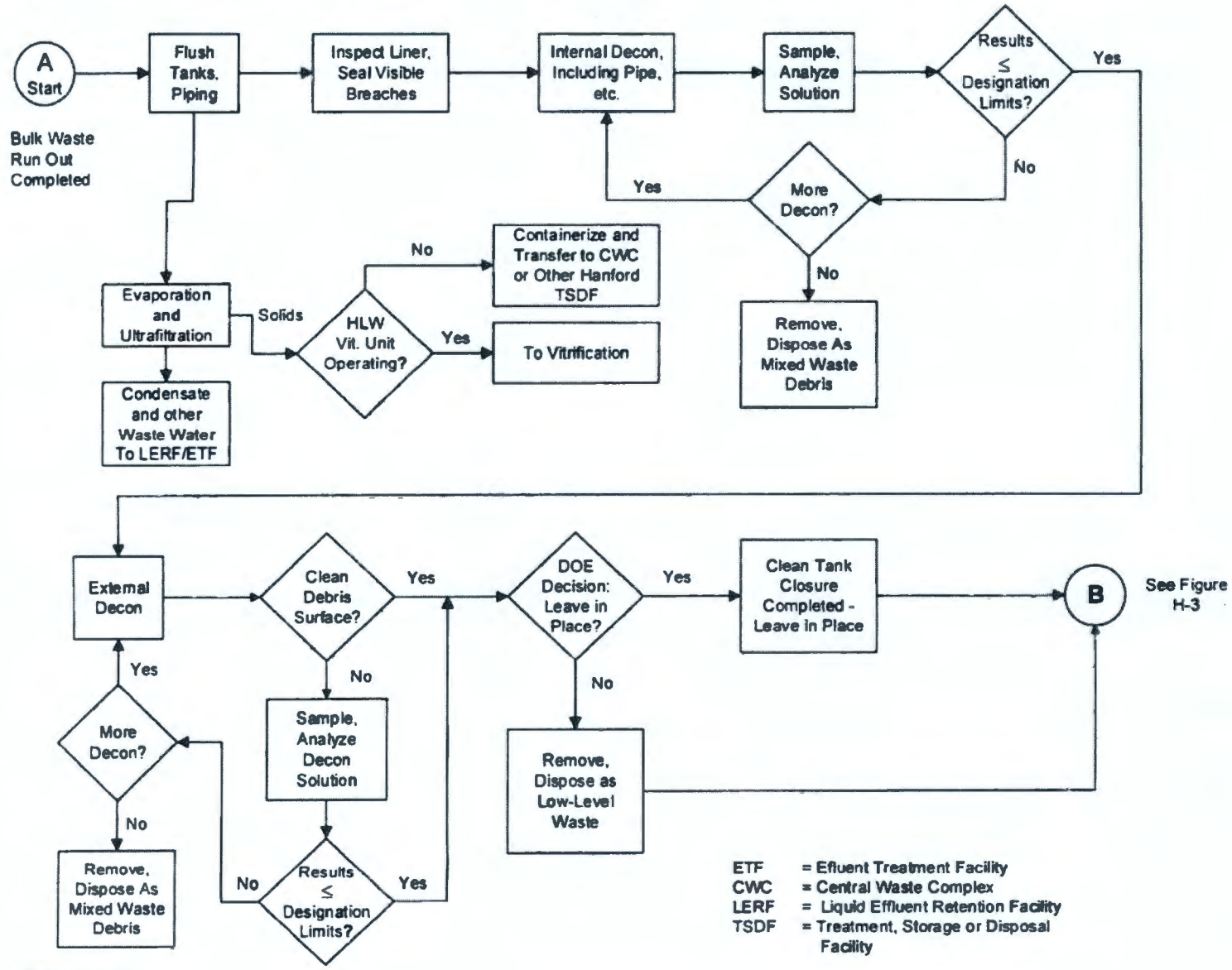
I have visually inspected the above-identified material before / after (circle one) decontamination or treatment in accordance with the closure plan. Dangerous waste residues have / have not (circle one) been removed to attain a clean debris surface[2].

_____	_____ /	_____
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~~H~~-2 Closure Strategy Flowchart for Tank Systems



000315-BDF-01-V004

Figure 11~~H~~-3~~H~~ Closure Strategy for Container Storage, Containment Building, Miscellaneous Unit, and Tank System Secondary Containment Areas

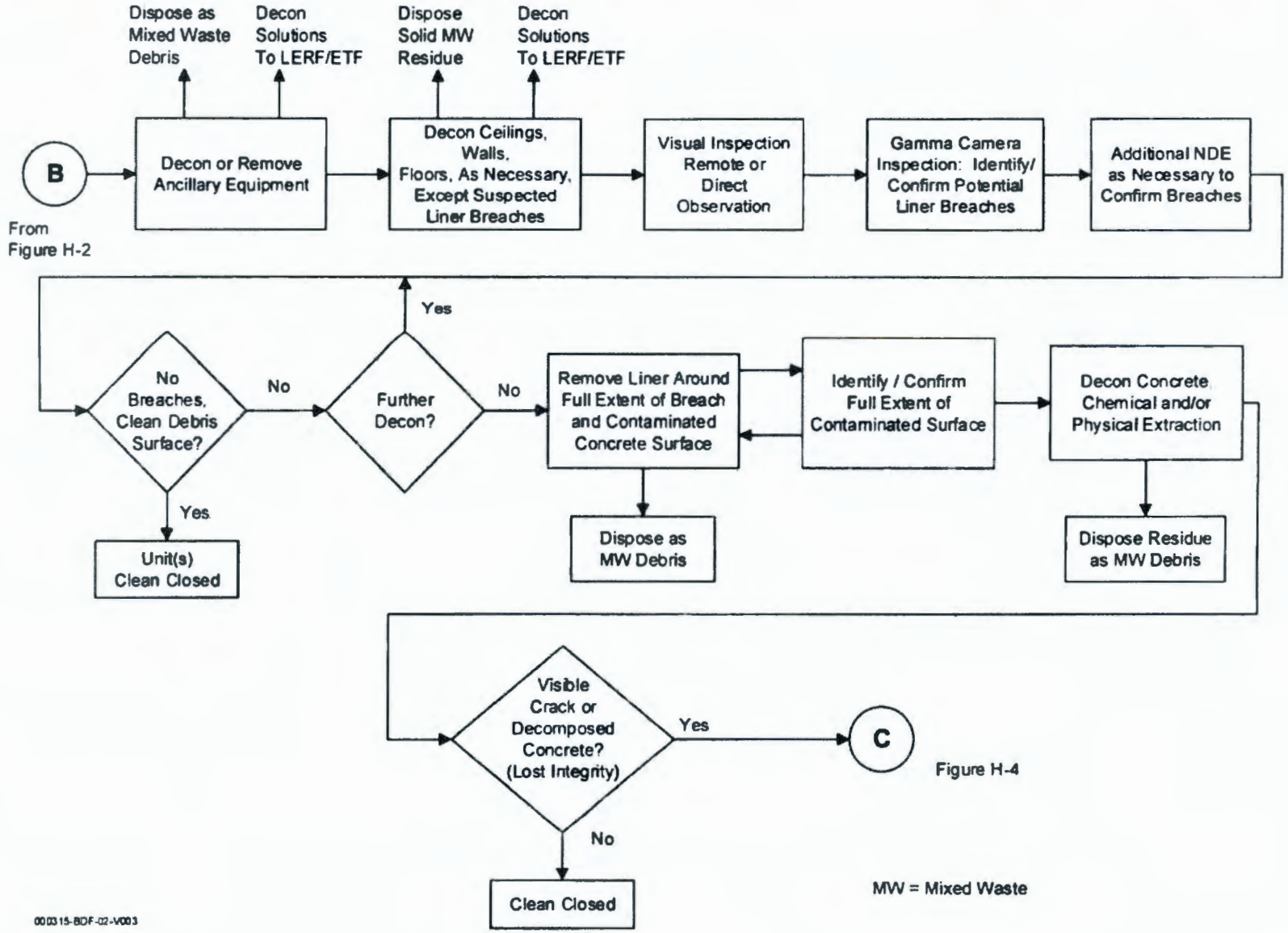


Figure H-4

000315-BDF-02-V003

Figure 11~~H-4H5~~ Closure Strategy Flowchart for Soils and Groundwater

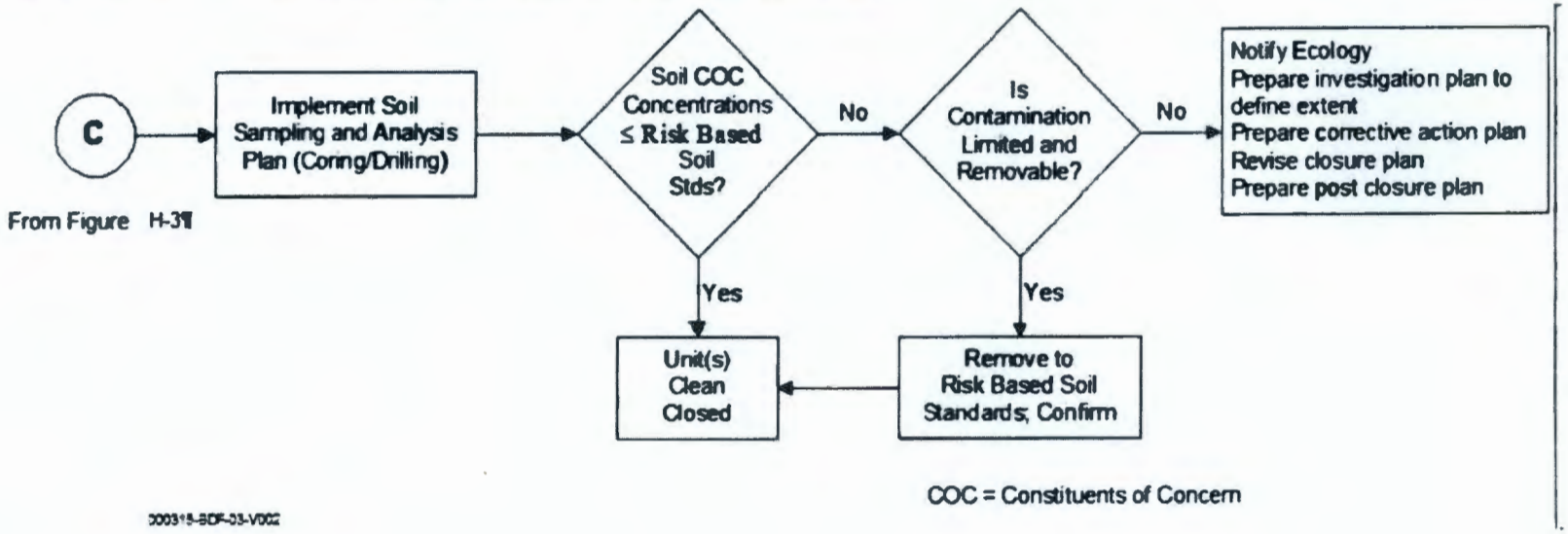


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Figure 11-5 Example Closure Certification Statement

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 # _____

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Figure 11-6 WTP Permitting, Deactivation, and Closure

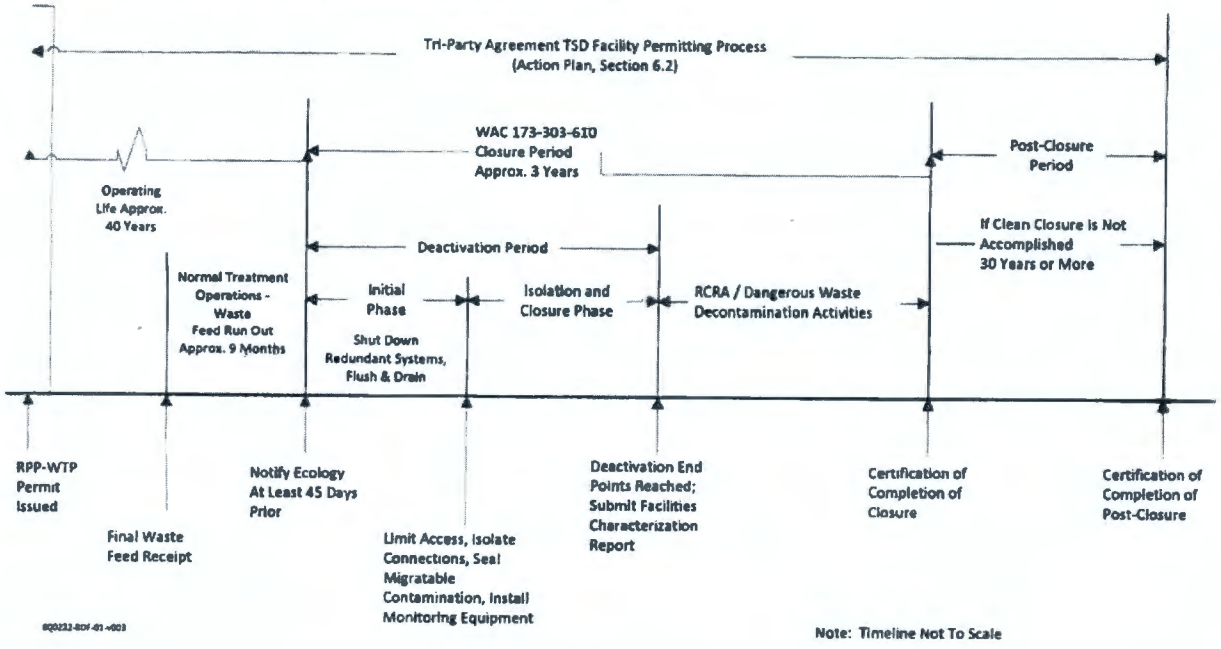

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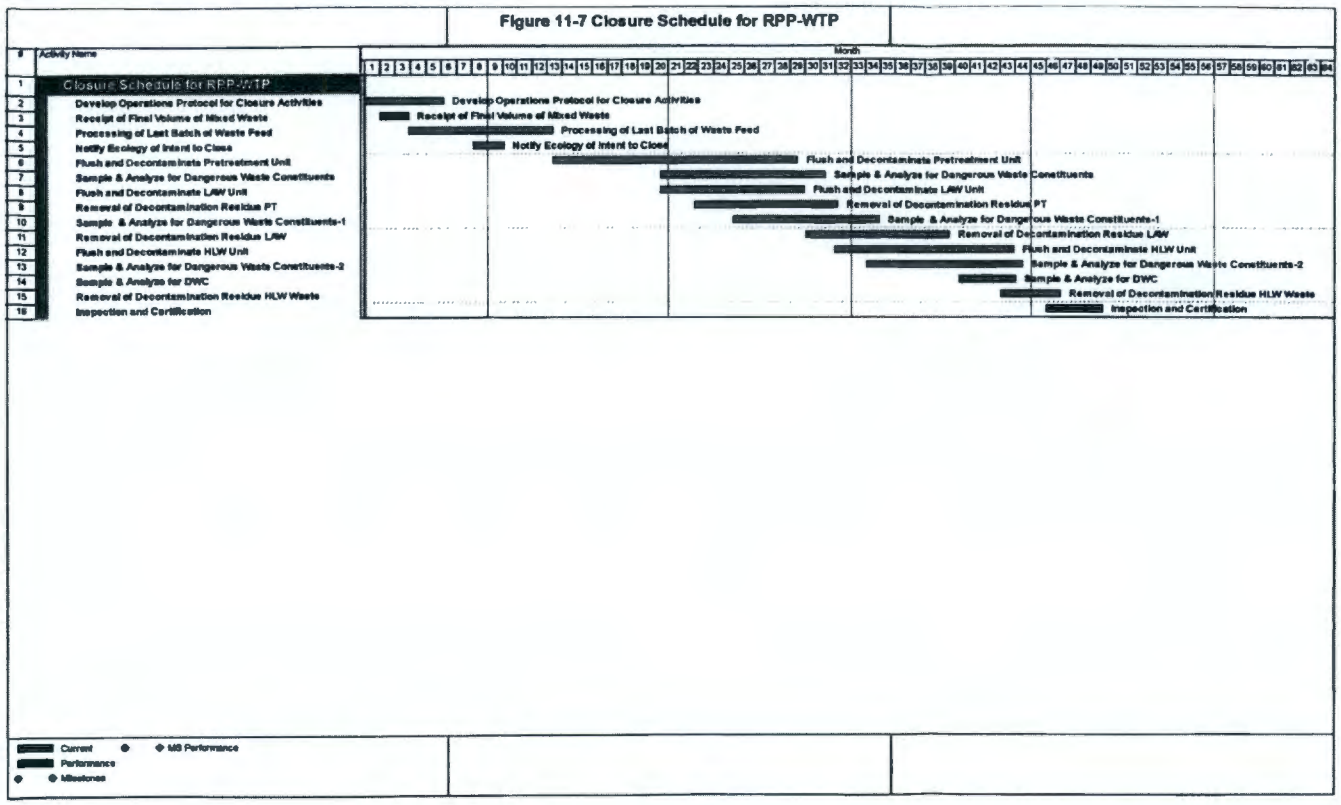
Figure 11-H7 Closure Schedule for WTP



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Hanford Facility RCRA Permit Modification Notification Forms

Part V, Closure Unit Group 4

FS-1 Outdoor Container Storage Area

Index

Page 2 of 8 Parts I & II, Standard & General Conditions (List of Attachments, Page 9)
Page 3 of 8 Parts I & II, Standard & General Conditions (Pages 15, 47, and 48)
Page 4 of 8 Attachment 9, Permit Applicability Matrix
Page 5 of 8 V.4 Conditions
Page 6 of 8 V.4 Addendum H1, Introduction
Page 7 of 8 V.4 Addendum HA, Closure Plan
Page 8 of 8 Revision Instructions

Submitted by Co-Operator: 12/08/16 Date

Reviewed by RL Program Office: 12.12.16 Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
N/A	**Parts I & II, Standard & General Conditions, List of Attachments**

Description of Modification:

Changes are needed on Page 9 to convey change history information for Attachment 9 (Permit Applicability Matrix).

WAC 173-303-830 Modification Class [1 2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:	X			

Enter relevant WAC 173-303-830, Appendix I Modification citation number: A.1 Administrative and informational changes

Modification Concurrence: [✓] Yes [ ] No (state reason)

Reason for non-concurrence:

Reviewed by Ecology:

S. L. Dahl-Crumpler 12-14-16 Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **N/A**	Permit Part **Parts I & II, Standard & General Conditions**

Description of Modification:

Changes are needed to convey the removal of FS-1 Outdoor Container Storage Area Closure Unit Group requirements from the permit. Revisions are being made to pages 15, 47, and 48 to show FS-1 requirements are being retired from the permit Revision 8c and to identify the date of closure (10/25/16, 16-NWP-185).

WAC 173-303-830 Modification Class [1 2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Per WAC 173-303-830(4)(d), the Permittee requests that this modification be reviewed and approved as a Class 1-prime.

The Permittees have completed closure activities following the approved Closure Plan (Addendum HA). Ecology accepted the Independent Qualified Registered Professional Engineer certification of Clean Closure on October 25, 2016 (16-NWP-185).

This modification is the final step in removing requirements for the FS-1 Outdoor Container Storage Area Closure Unit Group from the Permit.

Modification Approved: ☑ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology: S. L. Dahl-Crumpler 12-14-16 Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **N/A**	Permit Part **Attachment 9, Permit Applicability Matrix**

Description of Modification:

Changes are needed to convey the removal of FS-1 Outdoor Container Storage Area Closure Unit Group requirements from the permit. Revisions are being made to page 13 to show FS-1 requirements are being retired from the permit Revision 8c.

WAC 173-303-830 Modification Class [1 2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Per WAC 173-303-830(4)(d), the Permittee requests that this modification be reviewed and approved as a Class 1-prime.

The Permittees have completed closure activities following the approved Closure Plan (Addendum H). Ecology accepted the Independent Qualified Registered Professional Engineer certification of Clean Closure on October 25, 2016 (16-NWP-185).

This modification is the final step in removing requirements for the FS-1 Outdoor Container Storage Area Closure Unit Group from the Permit.

Modification Approved: ☑ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology: S. L. Dahl-Crumpler — Date: 12-14-16

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **FS-1 Outdoor Container Storage Area**	Permit Part **Part V, Closure Unit Group 4**

Description of Modification:
V.4 Conditions

Remove V.4 Conditions (in its entirety) from the Permit

WAC 173-303-830 Modification Class [1 2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Per WAC 173-303-830(4)(d), the Permittee requests that this modification be reviewed and approved as a Class 1-prime.

The Permittees have completed closure activities following the approved Closure Plan (Addendum H). Ecology accepted the Independent Qualified Registered Professional Engineer certification of Clean Closure on October 25, 2016 (16-NWP-185).

This modification is the final step in removing requirements for the FS-1 Outdoor Container Storage Area Closure Unit Group from the Permit.

Modification Approved: ☑ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology: S. L. Dahl-Crumpler 12-19-16 Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **FS-1 Outdoor Container Storage Area**	Permit Part **Part V, Closure Unit Group 4**

Description of Modification:
V.4, Addendum H1

Remove V.4, Addendum H1: Introduction (in its entirety) from the Permit

WAC 173-303-830 Modification Class [1 2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Per WAC 173-303-830(4)(d), the Permittee requests that this modification be reviewed and approved as a Class 1-prime.

The Permittees have completed closure activities following the approved Closure Plan (Addendum H). Ecology accepted the Independent Qualified Registered Professional Engineer certification of Clean Closure on October 25, 2016 (16-NWP-185).

This modification is the final step in removing requirements for the FS-1 Outdoor Container Storage Area Closure Unit Group from the Permit.

Modification Approved: [✓] Yes [ ] No (state reason for denial) Reason for denial:	Reviewed by Ecology: S. L. Dahl-Crumpler — Date: 12/4/16

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **FS-1 Outdoor Container Storage Area**	Permit Part **Part V, Closure Unit Group 4**

Description of Modification:
V.4, Addendum HA

Remove V.4, Addendum HA: Closure Plan (in its entirety) from the Permit

WAC 173-303-830 Modification Class [1 2]	Class 1	Class 1	Class 2	Class 3
Please mark the Modification Class:		X		

Per WAC 173-303-830(4)(d), the Permittee requests that this modification be reviewed and approved as a Class 1-prime.

The Permittees have completed closure activities following the approved Closure Plan (Addendum H). Ecology accepted the Independent Qualified Registered Professional Engineer certification of Clean Closure on October 25, 2016 (16-NWP-185).

This modification is the final step in removing requirements for the FS-1 Outdoor Container Storage Area Closure Unit Group from the Permit.

Modification Approved: [✓] Yes [ ] No (state reason for denial) Reason for denial:	Reviewed by Ecology: S. L. Dahl-Crumpler — Date: 12-14-16

Revision Instructions:

Revise the Parts I & II (Standard & General Conditions) as shown herein

Revise Attachment 9 (Permit Applicability Matrix) as shown herein

Remove V4 Conditions

Remove V.4 (Addendum H1) Introduction

Remove V.4 (Addendum HA) Closure Plan

LIST OF ATTACHMENTS

The following listed documents are attached in their entirety. However, only those portions of the attachments specified in Parts I through VI are enforceable conditions of this Permit and subject to the permit modification requirements of Permit Condition I.C.3. Changes to portions of the attachments, which are not subject to the permit modification process, will be addressed in accordance with Permit Conditions I.E.8, I.E.11, I.E.13, I.E.15, through I.E.20, and I.E.22. The Washington State Department of Ecology (Ecology) has, as deemed necessary, modified specific language in these attachments. These modifications are described in the conditions (Parts I through VI), and thereby supersede the language of the attachment.

Attachment 1	Hanford Federal Facility Agreement and Consent Order, (as amended) http://www.hanford.gov/tpa/coverpg.htm
Attachment 2	Hanford Facility Legal Description, from Class [1]1 modification, dated January 7, 1999
Attachment 3	Security, dated September 30, 2010
Attachment 4	*Hanford Emergency Management Plan*, DOE/RL-94-02 Revision 6, as amended and approved modifications
Attachment 5	Hanford Facility Personnel Training Program, dated September 30, 2015
Attachment 6	Reports and Records, dated September 30, 2015
Attachment 7	Policy on Remediation of Existing Wells and Acceptance Criteria for RCRA and CERCLA, June 1990
Attachment 8	Hanford Well Maintenance and Inspection Plan, HNF-56398, Revision 2, September 30, 2016
Attachment 9	Permit Applicability Matrix, dated ~~June 29, 2016~~December 31, 2016
Attachment 10	Purgewater Management Plan, July 1990

UNIT	Permit Revision		Comments/History
	Incorporated	Retired	
FS-1 Outdoor Container Storage Area Closure	Rev. 8C	Rev.8C	Closed, 10/25/16
Waste Encapsulation and Storage Facility Hot Cells A through F	Rev. 8C		
207-A South Retention Basins	Rev. 8C		
PART VI, POSTCLOSURE UNITS			
183-H Solar Evaporation Basin	Rev. 4		
300 Area Process Trenches	Rev. 3		
PROCEDURALLY CLOSED			
216-U-12 Crib	N/A	N/A	Closed, 7/19/07
221-T Test Facility	N/A	N/A	Closed, 2/22/99
2727-WA SRE Sodium Storage Bldg	N/A	N/A	Closed, 2/22/99
324 Pilot Plant	N/A	N/A	Closed, 6/9/97
332 Storage Facility	N/A	N/A	Closed, 4/21/97
437 Maintenance and Storage Facility	N/A	N/A	Closed, 9/11/03
Biological Treatment Test Facilities	N/A	N/A	Closed, 12/10/96
Physical/Chemical Treatment Test Facilities	N/A	N/A	Closed, 5/13/96
Sodium Storage/Sodium Reaction	N/A	N/A	Closed, 9/17/03
Thermal Treatment Test Facilities	N/A	N/A	Closed, 5/13/96
TO BE INCORPORATED			
1706-KE Waste Treatment System			
216-A-29 Ditch			
216-A-36B Crib			
216-A-37-1 Crib			
216-B-3 Main Pond			
216-B-63 Trench			
216-S-10 Pond & Ditch			
222-S Dangerous & Mixed Waste TSD Unit			
241-CX Tank System			

II.Z.2 The Permittee will maintain each such certification of waste minimization in the operating record as required by Permit Condition II.I.1.

II.AA Air Emission Standards for Process Vents

The Permittees will comply with applicable requirements of WAC 173-303-690 for process vents associated with Part III units performing specific separations processes unless exempted by WAC 173-303-690(1)(d). Threshold limits applied to process vents potentially requiring emission controls subject to WAC 173-303-690 are evaluated based on the summation of applicable emission sources for the entire Hanford Facility. When the summed emissions fall below threshold limits in 40 CFR 264.1032(a)(1), no emission control devices are required. If threshold limits in 40 CFR 264.1032(a)(1) are predicted to be exceeded, the Permittees will notify Ecology to determine the appropriate course of action. Unit-specific information is contained in Part III of the Permit for applicable units.

II.BB Air Emission Standards for Equipment Leaks

The Permittees will comply with applicable requirements of WAC 173-303-691 for certain equipment leaks associated with Part III units unless exempted by WAC 173-303-691(1)(e) or (f). Air emission standards apply to equipment that contacts or contains hazardous wastes with organic concentrations of at least 10 percent by weight. Unit-specific information is contained in Part III of the Permit for applicable units.

II.CC Air Emission Standards for Tanks, Surface Impoundments, and Containers

The Permittees shall comply with applicable requirements of WAC 173-303-692 for containers, tanks, and surface impoundment areas associated with Part III units unless exempted by WAC 173-303-692(1)(b). Unit-specific information is contained in Part III of the Permit for applicable units.

PART III UNIT-SPECIFIC CONDITIONS FOR FINAL STATUS OPERATIONS

Operating Unit 2, PUREX Storage Tunnels
Operating Unit 3, Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility
Operating Unit 4, 242-A Evaporator
Operating Unit 5, 325 Hazardous Waste Treatment Units
Operating Unit 10, Waste Treatment and Immobilization Plant
Operating Unit 11, Integrated Disposal Facility
Operating Unit 16, 400 Area Waste Management Unit

PART IV UNIT SPECIFIC CONDITIONS FOR CORRECTIVE ACTION

Corrective Action Unit 1, 100-NR-1

PART V UNIT-SPECIFIC CONDITIONS FOR UNITS UNDERGOING CLOSURE

Closure Unit 1, 1325-N Liquid Waste Disposal Facility
Closure Unit 2, 1301-N Liquid Waste Disposal Facility
Closure Unit 3, 1324-N Surface Impoundment and 1324-NA Percolation Pond
~~Closure Unit 4, FS-1 Outdoor Container Storage Area~~
Closure Unit 5, 207-A South Retention Basins
Closure Unit 6, Waste Encapsulation and Storage Facility Hot Cells A through F

PART VI UNIT-SPECIFIC CONDITIONS FOR UNITS IN POST-CLOSURE

Post Closure Unit 1, 300 Area Process Trenches

Post Closure Unit 2, 183-H Solar Evaporation Basins

UNITS RETIRED FROM THE PERMIT

100 D Ponds (Closed 8/9/99)

105-DR Large Sodium Fire Facility (Closed 7/1/04)

100-NR-2 Operable Unit (9/30/09)

200 West Area Ash Pit Demolition Site (Closed 11/28/95)

2101-M Pond (Closed 11/28/95)

216-B-3 Expansion Ponds (Closed 7/31/95)

218-E-8 Borrow Pit Demolition Site (Closed 11/28/95)

224-T Transuranic Waste Storage and Assay Facility (Closed 11/12/08)

241-Z Treatment and Storage Tanks (Closed 2/22/07)

2727-S Nonradioactive Dangerous Waste Storage Facility (Closed 7/31/95)

300 Area Solvent Evaporator (Closed 7/31/95)

300 Area Waste Acid Treatment System (Closed 10/30/2005)

303-K Storage Facility (Closed 7/22/02)

303-M Oxide Facility (Closed 6/15/06)

304 Concretion Facility (Closed 1/21/96)

305-B Storage Facility (Closed 7/2/07)

3718-F Alkali Metal Treatment and Storage Facility Closure Plan (Closed 8/4/98)

4843 Alkali Metal Storage Facility Closure Plan (Closed 4/14/97)

Hanford Patrol Academy Demolition Site (Closed 11/28/95)

Plutonium Finishing Plant Treatment Unit (Closed 2/8/05)

Simulated High Level Waste Slurry Treatment and Storage Unit (Closed 10/23/95)

~~Closure Unit 4,~~ FS-1 Outdoor Container Storage Area (Closed 10/25/2016)

PART III									
CONDITION		CATEGORY							QUALIFIERS
PART	TITLE	A	B	C	D	E	F	G	
III.	**UNIT SPECIFIC CONDITIONS FOR FINAL STATUS OPERATIONS**								
III.2	PUREX Storage Tunnels						*		
III.3	Liquid Effluent Retention Facility & 200 Area Effluent Treatment Facility						*		
III.4	242-A Evaporator						*		
III.5	325 Hazardous Waste Treatment Units						*		
III.10	Waste Treatment and Immobilization Plant						*		
III.11	Integrated Disposal Facility						*		
III.16	400 Area Waste Management Unit						*		
PART IV									
IV.	**UNIT SPECIFIC CONDITIONS FOR CORRECTIVE ACTION**								
IV.1	100-NR-1				*	*			
PART V									
V.	**UNIT SPECIFIC CONDITIONS FOR UNITS UNDERGOING CLOSURE**								
V.1	1325-N Liquid Waste Disposal Facility					*			
V.2	1301-N Liquid Waste Disposal Facility					*			
V.3	1324-N Surface Impoundment &1324-NA Surface Impoundment					*			
~~V.4~~	~~FS-1 Outdoor Container Storage Area~~					~~*~~			
V.5	207-A South Retention Basins					*			
V.6	Waste Encapsulation and Storage Facility Hot Cells A through F					*			
PART VI									
VI.	**UNIT SPECIFIC CONDITIONS FOR UNITS IN POST CLOSURE**								
VI.1	300 Area Process Trenches							*	
VI.2	183-H Solar Evaporation Basins							*	

CATEGORIES ARE DEFINED AS FOLLOWS:

A. Leased Land	E. TSD Unit Closures (Part V)
B. North Slope and ALE	F. TSD Operating Units (Part III)
C. Interim Status TSD Units	G. TSD Units in Post Closure/Modified Closure (Part VI)
D. Areas Between TSDs (excluding A and B)	

*Condition applies to this category, as modified by applicable footnotes and qualifiers.