0064528

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

05-ESD-0039

APR 11 2005

RECEIVED
APR 18 2005
EDMC

Ms. Greta P. Davis
Nuclear Waste Program
State of Washington
Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99352

Dear Ms. Davis:

CLASS 1 MODIFICATIONS TO THE HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY ACT PERMIT (QUARTER ENDING MARCH 31, 2005)

In accordance with Condition I.C.3 of the Hanford Facility Resource Conservation and Recovery Act Permit (Permit), enclosed for your notification are the Class 1 modifications for the quarter ending March 31, 2005. These modifications update information in the List of Attachments, Part I, Part II, Part III, and Part V of the Permit. The List of Attachments Class 1 modifications pertain to Attachment 4, Hanford Emergency Management Plan; and Attachment 33, General Information Portion. Part I and Part II Class 1 modifications pertain to the general Permit conditions. Part III Class 1 modifications pertain to the 305-B Storage Facility, and the Waste Treatment and Immobilization Plant. Part V Class 1 modifications pertain to the 1325-N and 1301-N Liquid Waste Disposal Facilities. The Class 1 modifications are being made to ensure that all activities are conducted in compliance with the Permit. A record of these modifications is maintained in the Hanford Facility Operating Record.

If you have any questions, please contact Doug S. Shoop, Assistant Manager for Safety and Engineering on (509) 376-0108.

Sincerely,

Keith A. Klein
Manager

ESD:ACM

Enclosures

cc : See page 2

w/encls:
S. Harris, CTUIR
R. Jim, YN
P. Sobotta, NPT
J. H. Swailes, DOE-ORP
Administrative Record, HF RCRA Permit
Environmental Portal, LMSI
Ecology NWP Library
HF Operating Record, (S. A. Thompson, FHI)

cc w/o encls:
M. Y. Anderson-Moore, Ecology
L. J. Cusack, Ecology
S. L. Dahl-Crumpler, Ecology
R. H. Gurske, FHI
J. P. Henschel, BNI
A. K. Ikenberry, PNNL
R. J. Landon, BHI
J. A. Vanni, Ecology
J. J. Wallace, Ecology
M. A. Wilson, Ecology

Hanford Facility RCRA Permit Modification Notification Forms

General Permit Conditions

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Page 7 of 7:	Permit Condition II.W.1

Submitted by Co-Operator:

Richard H. Gurske — 29 Mar 05 (Date)

Reviewed by RL Program Office:

Lori A. Huffman — 4-5-05 (Date)

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
General	**Introduction**

Description of Modification:

INTRODUCTION

Pursuant to Chapter 70.105 Revised Code of Washington (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 (~~USDOE-~~RL) and Office of River Protection (ORP), [owner/operator], and its contractors, Fluor Daniel Hanford, Inc. (FDH), [co-operator], Pacific Northwest National Laboratory (PNNL), [co-operator], CH2M HILL Hanford Group, Inc. (CHG), [co-operator], Bechtel Hanford, Incorporated (BHI), [co-operator], and Bechtel National, Incorporated (BNI), [co-operator], 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 shall refer to the Dangerous Waste Permit, while use of the term "Permit" within the HSWA Permit, shall refer to the HSWA Permit. Use of the same term in both the Dangerous Waste Permit and the HSWA Permit, shall have the standard meaning associated with the activities addressed by the permit in which the term is used. Such meanings shall prevail, except where specifically stated otherwise.

...

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

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

A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
General	**Acronyms**

Description of Modification:

ACRONYMS

...

USDOE-RL	U.S. Department of Energy, Richland Operations Office
USDOE-ORP	U.S. Department of Energy, Office of River Protection
DQO	Data Quality Objective
DSC	Differential Scanning Colorimetry
EC	Emergency Coordinator
ECN	Engineering Change Notice
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ERA	Expedited Response Action
ERDF	Environmental Restoration and Disposal Facility
ETF	200 Area Effluent Treatment Facility
FFACO	Hanford Federal Facility Agreement and Consent Order
FH	Fluor Hanford
GW	Ground Water
HPADS	Hanford Patrol Academy Demolition Site
HSWA	Hazardous and Solid Waste Amendments of 1984

...

U.S.C.	United States Code

...

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

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

A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
General	**Permit Condition I.C.3**

Description of Modification:

Permit Condition I.C.3:

I.C PERMIT ACTIONS

I.C.1 Modification, Revocation, Reissuance, or Termination

This Permit may be modified, revoked and reissued, or terminated by Ecology for cause per WAC 173-303-810(7) as specified in WAC 173-303-830(3), (4), and (5).

I.C.2 Filing of a Request

The filing of a request for a Permit modification, or revocation and reissuance, or termination, or a notification of planned changes, or anticipated noncompliance on the part of the Permittees, shall not stay ~~the applicability or enforceability of~~ any Permit Condition [WAC 173-303-810(7)]except as provided in WAC 173-303-810(2)~~830(3), (4), and (5)~~ under an emergency permit.

I.C.3 Modifications

Except as provided otherwise by specific language in this Permit, the Permit modification procedures of WAC 173-303-830(2), (3), and (4) shall apply to modifications or changes in design or operation of the Facility, or any modification or change in dangerous waste management practices covered by this Permit. As an exception, the Permittees shall provide notifications to Ecology required by WAC 173-303-830(4)(a)(i)(A) on a quarterly basis. Each quarterly notification shall be submitted within ten (10) days of the end of the quarter, and provide the required information for all such modification s put into effect during that reporting period. Quarterly reporting periods shall be based upon the state Fiscal Year. For notifications required by the Permittees to persons on the facility mailing list described in WAC 173-303-830(4)(a)(i)(B), -830(4)(b)(ii), -830(4)(c)(ii), and -830(4)(e)(ii)(C), use of appropriate FFACO Community Relations Plan publications and/or list servers for public involvement satisfy the notification requirements.

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: D. Other modifications

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

Request the modification be reviewed and approved as a Class [1]1 modification.

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
General	**Permit Condition I.E.14**

Description of Modification:

Permit Condition I.E.14:

I.E.14 Transfer of Permits

I.E.14.a This Permit may be transferred to a new owner/operator only if it is modified, or revoked and reissued, pursuant to WAC 173-303-830(3)(b). ~~The Permit~~ Unit-specific portion may be transferred to a new Co-operator as a Class [1]1 modification with prior approval of the Department's director~~in accordance with the provisions of WAC 173-303-830(2)~~.

I.E.14.b Before transferring ownership or operation of the Facility during its operating life, the ~~Permittees~~ owner/operator shall notify the new owner/operator ~~Co-operator,~~ in writing, of the requirements of WAC 173-303-290(2), -600 and -806, and this Permit.

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

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

A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
General	**Permit Condition II.H**

Description of Modification:

Permit Condition I.H:

I.H. DOCUMENTS TO BE MAINTAINED AT FACILITY SITE

The Permittees shall maintain at the Facility, or some other location approved by Ecology, the following documents and amendments, revisions, and modifications to these documents: ~~1.~~ (1) This Permit and all Attachments; and ~~2.~~ (2)The Facility Operating Record.

All dangerous waste Part B permit applications, post closure permit applications, and closure plan applications are maintained in the Administrative Record located at 2440 Stevens, Room 1101, Richland, WA.

Other approved locations: (1) 700 Area, (2) Locations within the City of Richland under control of one or more of the Permittees, (3) Administrative Record locations within the Stevens Center complex, (4) Consolidated Information Center at Washington State University, Tri-Cities. (5) Archived records at the National Archives and Records Administration (NARA), Pacific Alaska Region, 6125 Sand Point Way NE, Seattle, Washington, 98115-7999.

These documents shall be maintained for ten (10) years after post-closure care or corrective action for the Facility, whichever is later, has been completed and certified as complete.

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

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

A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
General	**Permit Condition II.W.1**

Description of Modification:

Permit Condition II.W.1:

II.W OTHER PERMITS AND/OR APPROVALS

II.W.1 The Permittees shall be responsible for obtaining all other applicable federal, state, and local Permits authorizing the development and operation of the Facility. To the extent that work required by this Permit must be done under a Permit and/or approval pursuant to other regulatory authority, the Permittees shall use their best efforts to obtain such Permits. ~~Copies of all documents relating to actions taken, pursuant to this Condition, shall be kept in the Operating Record.~~

II.W.2 All other Permits related to dangerous waste management activities are severable and enforceable through the permitting authority under which they are issued.

II.W.3 All air emissions from TSD units subject to this Permit shall comply with all applicable state and federal regulations pertaining to air emission controls, including but not limited to, Chapter 173-400 WAC, General Regulations for Air Pollution Sources; Chapter 173-460 WAC, Controls for New Sources of Toxic Air Pollutants; and Chapter 173-480 WAC, Ambient Air Quality Standards and Emission Limits for Radionuclides.

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.

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

A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: [✓] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

G. P. Davis 3-23-05

G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Forms

List of Attachments, Attachment 4
DOE/RL-94-02, Hanford Emergency Management Plan

Index

Page 2 of 4: Attachment 4, Appendix C, Hanford Fire Department Equipment List
Page 3 of 4: Attachment 4, Appendix C, Hanford Fire Department Equipment List
Page 4 of 4: Attachment 4, Appendix C, Hanford Fire Department Equipment List

Submitted by Co-Operator:

Daniel J. Connell — Date: 2/9/05

Reviewed by RL Program Office:

for Karen L. Flynn — Date: 2-15-05

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
List of Attachments	**Attachment 4**

Description of Modification:

Attachment 4, Appendix C, Hanford Fire Department Equipment List

EQUIPMENT	DESCRIPTION	*NORMALLY LOCATED
Engines ~~4~~ 3 ladders 4 pumpers 1 aerial ladder	Examples of equipment contained on engines: • 1,500-2,000 gal/min (5,678.1-7,570.8 L/min) pump; • 300-500 gal (1,135.6-1,892.7 L) ~~portable~~ water tank; • 1 – 85' aerial ladder platform; • 3 – telescoping 65' ladder trucks with nozzle; and Jaws of Life.	1 pumper at each station 1 ladder at Station 91 1 ladder at Station 93 1 ladder at Station 94 Aerial at Station 92
~~Tankers~~ Brush Fire Trucks 6 each	Examples of equipment contained on ~~tankers and pumpers~~ brush fire trucks: • 500 gal/min (1,892.7 L/min) pump; • ~~1,500 gal (5,678.1 L)~~ 2,500 gal (9463.5 L) water tank; 6x6 with ~~2,000 gal (7,570.8 L)~~ 2,500 gal (9463.5	1 at Station ~~1~~ 91 2 at Station ~~2~~ 92 2 at Station ~~3~~ 93 1 at Station 4 94
Water Tenders 1 each	Examples of equipment contained on water tenders: • ~~450 gal/min (1,703.4 L/min)~~ 1000 gal/min (3785.4 L/min) pump; • 2 - 2,500 gal (9463.5 L) porti-tank; • 4,500 gal (17,034.3 L) water tank; and • hose, nozzles, fittings, and tools.	Station ~~1~~92
Grass Fire Units 4 each	Examples of equipment contained on grass fire units: • 100 gal/min (378.5 L/min) pump; • 250 - 400 gal (946.3– 1514.2 L) water tank; • 4-wheel drive; and hose, nozzles, fittings, and tools.	1 at each station

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: B.6.b.

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

B.6.b General Facility Standards, Contingency plan: Replacement with functionally equivalent equipment, upgrade, or relocate emergency equipment listed.

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
List of Attachments	**Attachment 4**

Description of Modification:

Attachment 4, Appendix C, Hanford Fire Department Equipment List

EQUIPMENT	DESCRIPTION	*NORMALLY LOCATED
Ambulances ~~5~~ 6 each	Examples of equipment contained on ambulances: • life support systems; and • medical and emergency response supplies.	1 at Station ~~1~~ 91 2 at Station ~~2~~ 92 ~~1~~2 at Station ~~3~~ 93 1 at Station ~~4~~ 94
Command Vehicles 3 each	Contains communications equipment and protective equipment for commander.	Station ~~2~~ 92
Mobile Incident Command Vehicle 1 each	Examples of equipment contained on mobile incident command vehicle: • communications equipment; • radio communications in Tri-County area; • cell phones (including satellite); • 10,000 watt generator; and • copier, fax.	Station 92
Attack Vehicles 1 each	Examples of equipment contained on attack vehicles: • 450 lb (204.1 kg) of purple-K; • 300 gal (1,1335.6 L) aqueous film-forming foam concentrate; • 300 gal (1,135.6 L) of aqueous film-forming foam pre-mix solution; and • hose, nozzles, fittings, and tools.	Station ~~2~~ 91

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: B.6.b

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

B.6.b General Facility Standards, Contingency plan: Replacement with functionally equivalent equipment, upgrade, or relocate emergency equipment listed.

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
List of Attachments	**Attachment 4**

Description of Modification:

Attachment 4, Appendix C, Hanford Fire Department Equipment List

EQUIPMENT	DESCRIPTION	*NORMALLY LOCATED
Hazardous Materials Vehicle 2 each	Examples of equipment contained on hazardous materials vehicle: • protective clothing for Hazardous Materials Response Team; • breathing apparatus for Hazardous Materials Response Team; diking, plugging, and damming equipment; detection instruments for Hazardous Materials Response Team; • tools for plugging and repairing leaking containers; • overpack containers for leaking containers; • command module with material safety data sheets, software, and portable meteorological station; and • tools and communications devices necessary to provide communications during emergency response activities.	1 at Station ~~2~~ 92 1 at Station ~~3~~ 93
Metal Fire Response Vehicle 1 each	Examples of equipment contained on metal fire response vehicle: • equipment for response to special metals fire; • 500 lb (226.8 kg) of extinguishing powder; and • 1,000 lb (453.6 kg) of carbon microspheroids.	Station-~~4~~ 94
Mobile Air Vehicle 1 each	Examples of equipment contained on mobile air vehicle: • mobile air compressor, recharges self-contained breathing apparatus cylinders; and • tools and fittings for operation of vehicle and spare cylinders.	Station-~~4~~ 91

*The Hanford Fire Department Chief has the authority to:

1) direct the placement of equipment as needed to emergency events; and
2) take proactive action and assign different vehicle locations based on conditions such as fuel moisture content, area fire history, work in progress, or other conditions that could arise.

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: B.6.b

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

B.6.b General Facility Standards, Contingency plan: Replacement with functionally equivalent equipment, upgrade, or relocate emergency equipment listed.

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

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Hanford Facility RCRA Permit Modification Notification Forms

List of Attachments

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Page 3 of 5: Attachment 33, Chapter 6.0
Page 4 of 5: Attachment 33, Chapter 8.0
Page 5 of 5: Attachment 33, Chapter 12.0, Table 12.1

Submitted by Co-Operator:

Richard H. Gurske — 29 Mar 05 — Date

Reviewed by RL Program Office:

Lori A. Huffman — 4-7-05 — Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Attachment 33	**List of Attachments**

Description of Modification:

Attachment 33, replace Chapter 2.0 with the attached Chapter 2.0 dated 3/31/2005. This chapter reflects the Washington State Department of Ecology (Ecology) approvals/denials identified in Ecology letter dated March 17, 2005 and the modifications identified below.

2.2.1.4 Floodplain Area

Three sources of potential flooding of the Hanford Facility are considered: (1) the Columbia River, (2) the Yakima River, and (3) storm-induced run-off in ephemeral streams draining the Hanford Facility. No perennial streams occur in the central part of the Hanford Facility. However, Cold Creek is an intermittent or ephermal stream that exists along Highway 240 during periods of extreme precipitation.

The Federal Emergency Management Agency has not prepared floodplain maps for the Columbia River through the Hanford Site. The flow of the Columbia River is largely controlled by several upstream dams that are designed to reduce major flood flows. Based on a U.S. Army Corps of Engineers study of the flooding potential of the Columbia River that considered historic data and water storage capacity of the dams on the Columbia River (COE 1969), the U.S. DOE~~Department of Energy~~ (RLO-76-4) has estimated the probable maximum flood (Figure 2.7~~8~~). The estimated probable maximum flood would have a larger floodplain than either the 100- or the 500-year floods.

The 100-year floodplain for the Yakima River, as determined by the Federal Emergency Management Agency (FEMA 1980), is shown in Figure 2.8~~9~~.

The only other potential source of flooding of the Hanford Facility is run-off from a large precipitation event in the Cold Creek watershed. This event could result in flooding of the ephemeral Cold Creek. PNNL (PNL-4219) has given an estimate of the probable maximum flood using conservative values of precipitation, infiltration, surface roughness, and topographic features. The 100-year flood is less than the probable maximum flood as shown in Figures 2.7~~8~~ and 2.8~~9~~.

The location of individual 'operating' TSD units with respect to the identified floodplains is addressed in the unit-specific ~~documentation~~ portion.~~A map showing the location of all surface water intake and discharge structures for the Hanford Facility is provided in DOE/RL-91-28, Appendix 2A. In addition, this map shows the location of all potable and industrial groundwater wells that support the Hanford Facility.~~

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

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

A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Attachment 33	**List of Attachments**

Description of Modification:

Attachment 33, replace Chapter 6.0 with the attached Chapter 6.0 dated 3/31/2005. This chapter reflects the Washington State Department of Ecology (Ecology) approvals/denials identified in Ecology letter dated March 17, 2005 and the modifications identified below.

6.1.1 Security Procedures and Equipment [F-1a]

This section describes the 24-hour surveillance system, warning signs, and barriers used to provide security and control access to the Hanford Facility. WAC 173-303-310(2)(b), a 24-hour surveillance system, or WAC 173-303-310(2)(c), artificial or natural barriers, are met at the Hanford Facility level and are not the responsibility of the TSD unit. Operating TSD units contained in Part III of the ~~HF RCRA~~ Permit ~~(DW Portion)~~ may be required to comply with requirements in WAC 173-303-310(2)(c) based on established Part III Permit Conditions. A 24-hour surveillance system, warning signs, and artificial and natural barriers are used to provide security and control access to the Hanford Facility. The entire Hanford Facility is a controlled access area. The Hanford Facility maintains around-the-clock surveillance for protection of government property, classified information, and special nuclear materials. The Hanford Patrol maintains a continuous presence of protective force personnel to provide additional security.

The majority of TSD units are located within, or near, the 200 Areas (refer to Hanford Facility Part A, DOE/RL-88-21~~Chapter 1.0, Table 1-1, Appendix 2A~~). Vehicular access to roads leading to these areas is through controlled access points at the Yakima, Wye, and Rattlesnake Barricades (refer to DOE/RL-91-28, Chapter 2.0, Figure 2.9 and ~~Drawing H-6-958 in~~ Appendix 2A, Location Maps), which are posted with restrictive signage. Perimeter fences, restrictive signage, and random protective force patrols are used to control access to the 300 Area. All personnel accessing locations on the Hanford Site (except for publicly accessible locations) must possess and display a U.S. DOE~~Department of Energy~~ issued security identification badge indicating the appropriate authorization. All personnel entering or exiting the Hanford Site are subject to random security badge inspections by protective force personnel to validate access authorization. All vehicles and hand-carried items entering or exiting the Hanford Site are subject to random security badge inspections and searches by protective force personnel to validate access authorization and preclude the unauthorized introduction of prohibited/controlled articles, or the unauthorized removal of government or contractor assets. Additional means to bar entry or control access (e.g., fences, locked entry doors) are discussed in the unit-specific portion~~of this permit application or, if appropriate, in unit-specific preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application documentation~~.

Operating TSD units in Part III of the ~~HF RCRA~~ Permit ~~(DW Portion)~~ must comply with the requirements found in WAC 173-303-310(2)(a) regarding the placement of signs. Security information for operating TSD units regarding the placement of signs is provided in the unit-specific portion~~documentation of this permit application~~. Security information for non-operating TSD units incorporated into Part III, Part V, or Part VI of the ~~HF RCRA~~ Permit ~~(DW Portion)~~ regarding the placement of signs ~~are~~ is determined on a case-by-case basis. Security information for non-operating TSD units may be documented in the unit-specific ~~preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application~~ portion~~documentation,~~ as appropriate.

Signs are, or will be, posted at area boundaries within the Hanford Site stating *NO TRESPASSING. SECURITY BADGES REQUIRED BEYOND THIS POINT. AUTHORIZED VEHICLES ONLY. PUBLIC ACCESS PROHIBITED* (or an equivalent legend). In addition, warning signs stating *DANGER--UNAUTHORIZED PERSONNEL KEEP OUT* (or an equivalent legend) are, or will be, posted at operating TSD units or at active portions of operating TSD units within the Hanford Facility. These signs are, or will be, written in English, legible from a distance of 7.6 meters, and visible from all angles of approach.

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

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

A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Attachment 33	**List of Attachments**

Description of Modification:

Attachment 33, replace Chapter 8.0 with the attached Chapter 8.0 dated 3/31/2005. This chapter reflects the Washington State Department of Ecology (Ecology) approvals/denials identified in Ecology letter dated March 17, 2005 and the modifications identified below.

8.0 PERSONNEL TRAINING [H]

This chapter addresses the provisions identified in Section H of Ecology's permit application guidance (Ecology ~~1987 and~~ 1996). This chapter focuses on a description of the training programs implemented to meet the requirements of Hanford Facility RCRA Permit (Permit) Condition II.C (Personnel Training) ~~of the HF RCRA Permit (DW Portion)~~.

This chapter discusses personnel training requirements based on WAC 173-303 and the ~~HF RCRA~~ Permit~~(DW Portion)~~. In accordance with WAC 173-303-806(4)(a)(xii), ~~the Hanford Facility Dangerous Waste~~ Part B Permit Applications must contain two items: (1) *an outline of both the introductory and continuing training programs by owners or operators to prepare persons to operate or maintain the TSD facility in a safe manner as required to demonstrate compliance with WAC 173-303-330* and (2) *a brief description of how training will be designed to meet actual job tasks in accordance with the requirements in WAC 173-303-330(1)(d)*. ~~The HF RCRA~~ Permit~~, (DW portion)~~ Condition II.C (Personnel Training) contains training requirements applicable to Hanford Facility personnel and non-Facility personnel.

The general facility training information contained in this chapter need not be duplicated in the unit-specific portion ~~of the *Hanford Facility Dangerous Waste Permit Application*~~, but could be cross-referenced, as appropriate. Pertinent information also can be cross-referenced, if appropriate, in ~~preclosure work plan, closure work plan, closure plan, closure/postclosure plan, or postclosure permit application~~ unit-specific the portion~~documentation~~. In other cases, unit-specific training documentation could be contained in the Hanford Facility operating record or not required at all based on the appropriateness of such requirements at units 'undergoing closure', or units being 'dispositioned through other options'.

WAC 173-303-830 Modification Class [1 2]	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

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

A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Attachment 33	**List of Attachments**

Description of Modification:

Attachment 33, replace Chapters 12.0 with the attached Chapter 12.0 dated 3/31/2005. This chapter reflects Ecology's approvals/denials identified in Ecology letter dated March 17, 2005 and the modification identified below.

Attachment 33, Chapter 12.0, Table 12.1:

Table 12.1 Reports and Records

Permit Condition[1]	Records and/or Reports (Chapter 12.0, Section containing description)		Hanford Facility Operating Record		Type of submittal		
			General Information File	Unit-Specific File	Verbal[2]	Transmittal letter (not certified)	Certified package
~~II.W.1~~	~~Other permit compliance documentation (12.1.40)~~	~~Facility~~	✓				
	~~Annual Hanford Site Environmental Permitting Status Report~~	~~Facility~~	✓				

WAC 173-303-830 Modification Class [1 2]	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

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

A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: [✓] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

G. P. Davis 3-23-05

G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.

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Hanford Facility RCRA Permit Modification Notification Forms

Part III, Chapter 2
305-B Storage Facility

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Page 12 of 28:	Chapter 3.0, §3.3.1	Page 23 of 28:	Chapter 6.0, Figures 6.1, 6.2, 6.3, and 6.4

Submitted by Co-Operator:

Alice K. Ikenberry 3/14/05

Alice K. Ikenberry Date

Reviewed by RL Program Office:

L. Erickson 3-31-05

L. Erickson Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:
Hanford Facility RCRA Permit, III.2:

CHAPTER 2
305-B Storage Facility

The 305-B Storage Facility (305-B) is an active storage unit for dangerous wastes and mixed wastes. These wastes are derived primarily from research and development activities and laboratory activities in the 300 Area. This Chapter sets forth the operating Conditions for this TSD unit.

III.2.A. COMPLIANCE WITH APPROVED PERMIT APPLICATION

The Permittees shall comply with all the requirements set forth in Attachment 18, including all Class 1 modifications specified below, and the Amendments specified in Condition III.2.B. Enforceable portions of the permit application have been incorporated in Attachment 18 and are identified as follows. All subsections, figures, and tables included in these portions are also enforceable, unless stated otherwise:

ATTACHMENT 18:

Chapter 1.0	Part A Dangerous Waste Permit, Revision 1C, from Class 1 modification dated September 30, 2002
Chapter 2.0	Unit Description, from Class 1 modification dated March 31, 2005~~December 31, 2003~~
Chapter 3.0	Waste Analysis Plan, from Class 1 modification dated March 31, 2005~~September 30, 2003~~
Chapter 4.0	Process Information, from Class 1 modification dated December 31, 2003
Chapter 6.0	Procedures to Prevent Hazards, from Class 1 modification dated March 31, 2005~~December 31, 2003~~
Chapter 7.0	Building Emergency Procedure, from Class 1 modification dated September 30, 2004
Chapter 8.0	Personnel Training, from Class 1 modification dated September 30, 2003
Chapter 11.0	Closure and Post-Closure Requirements, from Class 1 modification dated August 2004
Chapter 12.0	Reporting and Recordkeeping, from Class 1 modification dated August 2004
Chapter 13.0	Other Relevant Laws, from Class 1 modification dated August 2004

III.2.B. AMENDMENTS TO THE APPROVED PERMIT APPLICATION

III.2.B.1 For all shipments of dangerous waste to or from this TSD unit, except for shipments which occur wholly within the 300 Area, the Permittees shall comply with Conditions II.P and II.Q of this Permit regarding dangerous waste shipment manifesting and transportation

WAC 173-303-830 Modification Class [1 2]	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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class '1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 2.0 with the attached Chapter 2.0 dated March 31, 2005.
Chapter 2.0, §2.1:

2.1 THE 305-B STORAGE FACILITY

The 305-B Storage Facility is a dangerous waste and mixed waste storage unit owned and operated by DOE and co-operated by PNNL. The unit is used for the collection, consolidation, packaging, storage, and preparation for transport and disposal of both dangerous waste and mixed waste. It is an integral part of the Hanford Site's waste management system.

The 305-B Storage Facility is a one-story frame and masonry building with basement constructed in the early 1950s, with an attached two-story-high metal and concrete building constructed in January 1978, referred to in this document as the "high bay." The unit is located within the 300 Area, as shown in the Chapter 1.0~~Figure 2.1~~, and was formerly used for engineering research and development. Unit upgrades were completed in 1988 to meet requirements for storage of dangerous waste and mixed waste. Waste storage under interim status began in March 1989.

~~A v~~Varieties~~y~~ of small volume chemical wastes are generated by PNNL's research laboratory activities under contract to DOE. These wastes are brought to the 305-B Storage Facility and segregated by compatibility for storage in the unit until enough waste is accumulated to fill a labpack or bulking container, usually a 30- to 55-gallon drum. When a sufficient number of shipping containers of waste have accumulated, they are manifested for shipment, generally to permitted off-site recycling, treatment or disposal facilities.

Dangerous wastes are stored in the high bay. The high bay has been equipped with a secondary containment system to facilitate storage of containerized wastes. In addition, four storage "cells" have been constructed within the high bay area for segregated storage of incompatible waste streams. Each of the cells is approximately 14' x 14', enclosed by 4' high concrete block walls; each cell has its own separate secondary containment system. Drum-quantity storage for incompatible wastes has also been provided in separate areas of the high bay. A description of these areas is given in Chapter 4.0, Section 4.1.1.6.

Mixed waste is stored in the basement of the original wing of the building in an area approximately 18' x 32'. The mixed waste area is also equipped with a secondary containment berm to prevent migration of spilled wastes. Flammable mixed waste cannot be stored below grade (per Uniform Fire Code) and is stored in an independent area on the first floor of the original wing in individual secondary containment structures (refer to Chapter 4.0, Section 4.1.1.6.11).

The 305-B Storage Facility is equipped with a heating, ventilation, and air conditioning (HVAC) system to provide relatively constant temperatures during storage of dangerous wastes. The first floor of the older building and the high bay are served by a dual-compressor heat pump system for both heating and air conditioning. The basement area is served by a separate electric heating and evaporative cooling combined system. These systems are adequate to maintain interior temperatures in the range of 50-85°F during normal ambient temperatures of 10-110°F.

In addition, the unit utilizes a local exhaust system for "bulking" as described in Chapter 4.0, Section 4.1.1.2. This system is located in the flammable liquid bulking module. Local exhaust ~~of 3300 CFM~~ is provided during bulking operations. Another, smaller ventilation system, referred to as the "elephant trunk ventilation system," is located in the high bay storage cell areas for occasional bulking of solids or nonflammable liquids not requiring use of the flammable liquid bulking module. ~~This system has a ventilation capacity of 1550 CFM.~~ A smaller, laboratory-style fume hood has also been installed on the south wall of the high bay for compatibility testing and small-volume waste work.

A simplified building layout is shown in Chapter 4.0, Figure 4.7~~2.2~~. Individual storage cells are described in Chapter 4.0, Section 4.1.

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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

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	G. P Davis — Date

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[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 2.0 with the attached Chapter 2.0 dated March 31, 2005.
Chapter 2.0, §2.2:

2.2 TOPOGRAPHIC MAP

Refer to Chapter 1.0, for ~~Topographic~~ maps information ~~of the Hanford Site and 300 Area are listed below.~~

~~Drawing No.~~	~~Sheet~~	~~Title~~
~~H-13-958~~	~~1 of 1~~	~~General Overview of Hanford Site~~
~~H-13-000300~~	~~1 of 1~~	~~300 Area Topographic Map~~
~~H-13-000301~~	~~1 of 1~~	~~300 Area Topographic Map~~
~~H-13-000302~~	~~1 of 1~~	~~300 Area Topographic Map~~
~~H-13-000303~~	~~1 of 1~~	~~300 Area Topographic Map~~
~~H-13-000304~~	~~1 of 1~~	~~300 Area Topographic Map~~
~~H-13-000305~~	~~1 of 1~~	~~300 Area Topographic Map~~
~~H-13-000306~~	~~1 of 1~~	~~300 Area Topographic Map~~
~~H-13-000307~~	~~1 of 1~~	~~300 Area Topographic Map~~
~~H-13-000308~~	~~1 of 1~~	~~300 Area Topographic Map~~

~~**2.2.1General Requirements**~~

~~Attachment 33, Appendix 2A provides location maps of the Hanford Site property and the surrounding countryside. This figure is intended as a location map and illustrates the following:~~

- ~~The facility boundary of the Hanford Site~~
- ~~Surrounding land use including the Saddle Mountain National Wildlife Refuge and the State Game Reserve to the north, the City of Richland to the south, Rattlesnake Mountain Arid Lands Ecology (ALE) Reserve located to the west, and farmlands or Game Reserves to the east~~
- ~~Contours sufficient to show surface water flow~~
- ~~Fire control facilities located on the Hanford Site~~
- ~~Locations of access roads, internal roads, railroads, and perimeter gates and barricades~~

~~Detailed representation of the Hanford 300 Area where the 305-B Storage Facility is located. These maps provide a detailed profile of the unit and a distance of 1,000 ft around it at a scale noted on the drawings. Contour intervals are shown at every foot, and provide sufficient detail of surface waters and flow, access control, buildings, structures, fire control facilities, etc., to meet the requirements of WAC 173-303-806(4)(a)(xviii) (Ecology 1989).~~

~~Attachment 33, Chapter 2.0, Figure 2.6, Prevailing Wind Direction for the Hanford Site (DOE/RL-91-28). Winds are predominately from the west.~~

WAC 173-303-830 Modification Class [1 2]	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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class '1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 2.0 with the attached Chapter 2.0 dated March 31, 2005.
Chapter 2.0, §2.5 and 2.5.1:

~~2.5MANIFEST SYSTEM~~

~~The Hanford Site has one EPA/state identification number, as required by WAC 173-303-060, and all TSD units on the Hanford Site (such as 305-B Storage Facility) are considered to be part of one dangerous waste facility. Therefore, onsite shipments of dangerous or mixed waste are not subject to the manifesting requirements specified in WAC 173-303-370 and -180. 305-B Storage Facility has an onsite waste tracking system akin to a manifest system, which is voluntarily used for transporting waste on the Hanford Facility.~~

~~An example of a Uniform Hazardous Waste Manifest (Figure 2.3) is used for all off-site shipments of dangerous waste and mixed waste received at 305-B Storage Facility, as well as for all off-site shipments of dangerous waste and mixed waste from 305-B Storage Facility. In addition to the Uniform Hazardous Waste Manifest, wastes subject to land disposal restrictions which are shipped from 305-B Storage Facility to off-site treatment, storage, or disposal facilities are accompanied by the applicable notifications and certifications required under 40 CFR 268.~~

~~The following sections provide information on receiving shipments, response to manifest discrepancies, and provisions for nonacceptance of shipments.~~

~~2.5.1Procedures for Receiving Shipments~~

~~The following are procedures used prior to transport of wastes to the 305-B Storage Facility. First, the generator must submit a chemical disposal/recycle request form to the Waste Management Section. This request form is then reviewed and either approved or rejected. Typical causes of rejection include missing or insufficient information in any of the data fields, or lack of specific information on waste composition. Upon approval, the Waste Management Section reviews the form to determine the dangerous waste designation, waste compatibility class for storage, and containerization and labeling requirements.~~

~~The waste is then inspected at the generating unit by the Waste Management Section to verify the information contained on the request form, such as number, sizes, and types of containers, location of waste, etc., and to check for proper containerization of waste. If discrepancies are noted during the inspection, the waste will not be picked up by the Waste Management Section. Typical discrepancies include waste not as described on request form or lack of supporting data to verify waste characteristics. In such cases, deficiencies will be explained to the generating unit responsible person, who will then be responsible for correcting them.~~

~~If the waste is found to be acceptable for transport, Waste Management staff will check to ensure required labels are in place, and transport (or arrange for transport of) the waste to 305-B Storage Facility. If transport will be over public roadways or highways, a Uniform Hazardous Waste Manifest will be prepared identifying PNNL as the transporter and 305-B Storage Facility as the receiving TSD unit. A copy of all such manifests is returned to the generating unit within 30 days of receipt at 305-B Storage Facility. A copy of the manifest is also retained at 305-B Storage Facility.~~

WAC 173-303-830 Modification Class [1 2]	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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class '1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 2.0 with the attached Chapter 2.0 dated March 31, 2005.
Chapter 2.0, §2.5.2:

~~**2.5.2Response to Significant Discrepancies**~~

~~Waste shipments received at the 305-B Storage Facility containing manifest discrepancies are not accepted unless the discrepancy or discrepancies can be resolved with the generating unit at the time the shipment is received. Manifest discrepancies requiring such resolution include:~~

- ~~Variations exceeding 10% in weight for bulk shipments such as tank trucks or tank cars (generally not applicable to 305-B Storage Facility since most shipments are in drums or other containers);~~
- ~~Any inaccuracy in piece counts in containerized shipments (underages or overages);~~
- ~~Type mismatches (i.e., the waste is not as described on the request form; obvious inaccuracies such as waste acid substituted for waste solvent).~~

~~Manifest information will also be considered incorrect if the written description of wastes does not agree with visual observations, or if observed weights or volumes differ by more than 10 % from those described on the manifest.~~

~~If a discrepancy is noted, the generating unit will be contacted immediately. The waste will not be accepted for storage until the discrepancy is resolved. The generating unit will be asked to identify the source of the discrepancy (e.g., error in estimating volume or weight, incorrect identification of waste, etc.) Once the cause of the discrepancy is identified, and the generating unit and the waste management organization have concurred as to resolution of the discrepancy, the manifest will be corrected. Corrections will be made by drawing a single line through the incorrect entry and entering the correct information. Corrected entries will be initialed and dated by the individual making the correction. Once the manifest has been corrected, the discrepancy will be considered resolved.~~

~~Certain manifest discrepancies may be discovered after receipt, such as analytical data indicating incorrect designation, which may result in incorrect naming of the shipment on the manifest. Such discrepancies will be managed as noted above; if, however, the discrepancy cannot be resolved within 15 days of receipt of the shipment, the 305-B Storage Facility will file the report required by WAC 173-303-370(4)(b) as described in Chapter 12.0, Section 12.4.1.1.1.~~

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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
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	G. P Davis — Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 2.0 with the attached Chapter 2.0 dated March 31, 2005.
Chapter 2.0, §2.5.3 and 2.5.4:

~~**2.5.3Provisions for Nonacceptance of Shipment**~~

~~Provisions for nonacceptance of shipments are discussed in the following sections.~~

~~**2.5.3.1Nonacceptance of Undamaged Shipment**~~

~~As described in Section 2.8.1, all wastes are inspected by staff from the waste management organization prior to shipment and are also transported to 305-B Storage Facility by waste management organization staff. This procedure is designed to prevent receipt of nonacceptable wastes. Waste management organization staff will refuse to accept or transport wastes, which are nonacceptable at 305-B Storage Facility.~~

~~**2.5.3.2Activation of BEP/Contingency Plan for Damaged Shipment**~~

~~As described in Section 2.5.1, all wastes are inspected by staff from the waste management organization prior to shipment and are also primarily transported to 305-B Storage Facility by waste management organization staff. Damaged containers will not be accepted from the generator and will not be transported. The only opportunity for receipt of damaged containers, therefore, would be if containers were damaged during transportation. If a shipment of waste is damaged during transportation and arrives in a condition as to present a hazard to public health or to the environment, the facility BEP/contingency plan will be implemented as described in Chapter 7.0.~~

~~**2.5.4Unmanifested Waste**~~

~~Waste generated within the Hanford Site is not transported over public highways and is not subject to manifest requirements under WAC 173-303. Such waste may be received at the 305-B Storage Facility without a manifest. However, all wastes (including unmanifested waste) must be accompanied by a completed and approved disposal request form.~~

~~If transport is by public roadways or highways, a manifest must be used as noted in Section 2.5. Shipments requiring a manifest and not having one will either be rejected or, at the sole discretion of the unit operator, the unit will accept the waste and file an unmanifested waste report as described in WAC 173-303-390(1) and detailed in Chapter 12.0.~~

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

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 2.0 with the attached Chapter 2.0 dated March 31, 2005.
Chapter 2.0, Figures 2.1, 2.2, and 2.3:

~~Figure 2.1. Location of 305-B Storage Facility~~

~~Figure 2.2. 305-B Storage Facility Floor Plan~~

~~Figure 2.3. Sample Uniform Hazardous Waste Manifest Form~~

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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated March 31, 2005.
Chapter 3.0, §3.1:

3.1 CHEMICAL, BIOLOGICAL, AND PHYSICAL ANALYSIS

The dangerous waste and mixed waste stored at 305-B Storage Facility can be categorized as originating from five basic sources:

...

F-listed waste is designated based on process knowledge (i.e., information from container labels or material safety data sheets), or by sampling. Sampling is performed if the generating unit does not have sufficient information to document the composition and characteristics of the waste. The waste generator is responsible for specifying the characteristics of the waste based on knowledge of the chemical products used (i.e., information supplied by the manufacturer) and the process generating the waste. These listed wastes are all designated as ~~dangerous waste (DW) or extremely hazardous waste (EHW)~~ based on the criteria given in WAC 173-303-070~~100~~. These wastes are also subject to LDR regulations under 40 CFR 268, including disposal prohibitions and treatment standards.

...

WAC 173-303-830 Modification Class [1 2]	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
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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated March 31, 2005.
Chapter 3.0, §3.2.2:

3.2.2 Description of Facility Processes and Activities

Varieties of small volume chemical wastes are generated by PNNL's research laboratory activities. These wastes are brought to the 305-B Storage Facility and segregated by compatibility for storage in the unit until enough waste is accumulated to fill a labpack or bulking container, usually a 30 - 55-gallon drum. When a sufficient number of shipping containers of waste have accumulated, they are manifested for shipment, generally to permitted off-site recycling, treatment or disposal facilities.

Dangerous wastes are stored in the high bay. The high bay has been equipped with a secondary containment system to facilitate storage of containerized waste. In addition, four storage "cells" have been constructed within the high bay area for segregated storage of incompatible waste streams. Each of the cells is approximately 14' x 14', enclosed by 4' high concrete block walls; each cell has its own separate secondary containment system. Drum-quantity storage for incompatible waste is allowed in these cells and in separated areas of the high bay.

Mixed waste is stored in the basement of the original wing of the building in an area approximately 18' x 32'. Flammable mixed waste cannot be stored below grade (per Uniform Fire Code) and is stored in an independent area on the first floor of the original wing in the mixed waste flammable storage module. Knowledge from the generator is generally sufficient to meet the requirements for a "detailed chemical, physical, and/or biological analysis" of wastes accepted at the 305-B Storage Facility for the following reasons:
~~Most of the information necessary to manage waste at 305-B Storage Facility is obtained from generating units without the need to perform detailed chemical, physical, and biological analysis. This approach is used for the following reasons:~~

- Wastes stored at 305-B Storage Facility are generated on the Hanford Site and/or by PNNL research programs; effective administrative control can be maintained over individual waste generating units (i.e., the same organization generates the waste and operates the storage unit)
- Wastes stored at 305-B Storage Facility may be discarded chemical products for which knowledge of waste characteristics is available without further analysis
- Most of the waste stored at 305-B Storage Facility is a result from research activities that are carefully controlled and documented; this documentation includes information on chemical constituents.
- To confirm the sufficiency and reliability of the knowledge provided by generators, onsite visits of the generating unit's areas are performed to familiarize waste management staff with the generator's processes. Data provided by the operations generating the waste is reviewed to identify any special requirements for safe management of the waste. Other methods for confirmation noted in WAC 173-303-300(2)(a) may be used instead of or in conjunction with onsite visits and data review in conjunction with onsite visits and data review in special situations.

WAC 173-303-830 Modification Class [1 2]	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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

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	G. P Davis — Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated March 31, 2005.
Chapter 3.0, §3.2.2:

3.2.2 Description of Facility Processes and Activities

...

The 305-B Storage Facility personnel shall collect from the generating unit(s) the information pursuant to 40 CFR 268.7(a) regarding LDR wastes, the appropriate treatment standards, whether the waste meets the treatment standards, and the certification that the waste meets the treatment standards, if necessary, as well as any waste analysis data that supports the generator's determinations. If this information is not supplied by the generating unit, then the 305-B Storage Facility personnel shall be responsible for completion and transmittal of all subsequent information regarding LDR wastes, pursuant to 40 CFR 268.7(b). All waste streams must be ~~re-characterized at least annually, or~~ reevaluated when the generating unit and/or the 305-B Storage Facility personnel have reason to believe the waste stream has changed, to determine compliance with LDR requirements in 40 CFR 268.

...

Physical Analysis. Visual validation as a physical analysis activity strongly relied upon to confirm the nature of a waste collected or sampled, and to determine the accuracy of the disposal request information received from the generating unit. It is impractical for the waste management organization to analyze chemically each container or vial of waste accepted for storage in 305-B Storage Facility since the amount handled can exceed 10,000 containers per year. A more realistic approach to reducing risks to safety and the environment, and one implemented at 305-B Storage Facility, includes trained and experienced personnel performing a visual inspection of the waste and direct inquiry of the generating unit's personnel. The waste is inspected to verify that it matches the description on the disposal request. If the waste is a discarded product, the contents of the container are inspected to verify that they match the description of the product. For other waste, e.g., spent solvents, waste descriptions are compared with the products in use at the generating unit. Generating unit personnel are queried concerning the source of the waste and the materials used in the process generating the waste. This information is compared to the description of the waste on the disposal request. If, after visual inspection of the waste and interrogation of the generating unit personnel, any doubt remains as to the true identity of the waste, the waste is sampled and analyzed by the generating unit as described in Section 3.5.

...

WAC 173-303-830 Modification Class [1 2]	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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
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Hanford Facility RCRA Permit Modification Notification Form	
Unit: **305-B Storage Facility**	Permit Part & Chapter: **Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated March 31, 2005.
Chapter 3.0, §3.3.1:

3.3.1 Parameter Selection Process

The selection of analytical parameters is based on the State of Washington's *Dangerous Waste Regulations*, WAC 173-303-300 and *EPA Waste Analysis at Facilities That Generate, Treat, Store, and Dispose of Hazardous Wastes, A Guidance Manual* (EPA 1994).

At least five percent of the waste containers received at 305-B during a federal fiscal year (October 1 through September 30) will undergo confirmation of designation pursuant to Sections 3.2.2 and 3.2.3. The number of containers needed to meet the five percent requirement is five percent of the average of containers for the previous three months. For example if 200 containers are received in January, 180 in February, and 220 in March, then 10 containers of received waste must undergo confirmation of designation in April. All non-PNNL Hanford Site generating units, which ship more than 20 containers through 305-B Storage Facility in a fiscal year, will have at least one container sampled and analyzed. Containers, for which there is insufficient process knowledge, or analytical information to designate without sampling and analysis, may not be counted as part of the five percent requirement unless there is additional confirmation of designation independent of the generator designation. The generating unit's staff shall not select the waste containers to be sampled and analyzed other than identifying containers for which insufficient information is available to designate.

Containers of the following are exempt from the confirmation calculation above: Laboratory reagents or other unused products such as paint, lubricants, solvent, or cleaning products, whether received for redistribution, recycling, or as waste. To qualify for this exemption, such materials must be received at 305-B Storage Facility in their original containers.

Prior to acceptance of wastes at 305-B Storage Facility, confirmation of designation may be required ~~(Section 3.7.3)~~as noted above. Wastes that shall undergo confirmation of designation ~~are identified in Condition III.2.B.f. of this Permit and~~ may be divided into two groups; those that easily yield a representative sample (Category I), and those that do not (Category II). The steps for each type are outlined below along with a description of which wastes fall into each category:

...

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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
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Hanford Facility RCRA Permit Modification Notification Form

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305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated March 31, 2005.
Chapter 3.0, §3.4.1:

3.4.1 Sampling Strategies and Equipment

Sample collection methods conform to the representative sample methods referenced in WAC 173-303-110(2). The summary of test parameters, rationales, and testing~~sampling~~ methods are identified in Table 3.1.

Representative samples of liquid waste from containers (vertical 'core sections') are typically obtained using a composite liquid waste sampler (COLIWASA) or tubing, as appropriate. The sampler is long enough to reach the bottom of the container in order to provide a representative sample of all phases of the containerized liquid waste. If a liquid waste has more than one phase, each phase is separated for individual testing depending on the waste management pathways of the phases.

Other waste types that might require sampling are sludge's, powders, and granules. In general, non-viscous sludge's are sampled using a COLIWASA. Highly viscous sludge's and cohesive solids are sampled using a trier, as specified in SW-846. Dry powders and granules are sampled using a thief, also as specified in SW-846.

Samplers are constructed of material compatible with the waste. In general, aqueous liquids are sampled using polyethylene samplers, organic liquids using glass samplers, and solids using polyethylene samplers. Disposable samplers are used whenever possible to eliminate the potential for cross-contamination. If non-disposable sampling equipment is used, it is decontaminated between samples.

Representative sampling may be requested by unit staff to ensure proper waste identification. Sampling may be performed by unit personnel or the generating unit producing the waste. The number of grab samples collected from a container depends on the amount of waste present and on the homogeneity of the waste as determined by observation. In some cases, there will be only one container of waste present. In such cases, only one vertical composite sample will be collected (e.g., COLIWASA). If more than one container is present, a random number of samples will be collected and analyzed statistically using the procedures specified in Section 9.2 of SW-846 (EPA 1986).

In all instances, sampling methods will conform to the representative sample method referenced in WAC 173-303-110(2), i.e., ASTM standards for solids and SW-846 for liquids. The specific sampling methods and equipment used varies with the chemical and physical nature of the waste material and the sampling circumstances.

WAC 173-303-830 Modification Class [1 2]	Class 1	Class '1	Class 2	Class 3
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Hanford Facility RCRA Permit Modification Notification Form

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305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated March 31, 2005.
Chapter 3.0, §3.4.3:

3.4.3 Sampling QA/QC Procedures

Pacific Northwest National Laboratory is committed to maintaining a high standard of quality for all of its activities. A crucial element in maintaining that standard is a quality-assurance program that provides management controls for conducting activities in a planned and controlled manner and enabling the verification of those activities.

The QA/QC objective of the 305-B Storage Facility is to control and characterize errors associated with collected data, and to illustrate that waste testing has been performed according to specification in this waste analysis plan.

The 305-B Storage Facility will ensure that precision and accuracy are maintained throughout the waste analysis process. For analysis using SW-846 methods, the program will follow the QA/QC guidance set forth in SW-846 at a minimum. Good laboratory practices which encompasses sampling, sampling handling, housekeeping, and safety are followed throughout the process. There are many elements of QA/QC associated with the sampling processes at the 305-B Storage Facility. These practices ensure that all data and the decisions based on that data are technically sound, statistically valid, and properly documented.

Activities pertaining to waste analysis include, but are not limited to, the preparation, review, and control of procedures and the selection of analytical laboratories. The Laboratory's QA standards-based management system ~~SBMS~~ subject area has administrative procedures that establish requirements and provide guidance for the preparation of analytical and technical (i.e., sampling, chain-of-custody, work processes) procedures, as well as other administrative procedures. Procedures undergo a review cycle and, once issued, are controlled to ensure that only current copies are used.

...

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

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated March 31, 2005.
Chapter 3.0, §3.4.3:

3.4.3 Sampling QA/QC Procedures

...

QA/QC Objectives

Analysis of samples pursuant to this WAP is performed on parameters selected in accordance with the protocols in Section 3.3. The objectives of the QA/QC program ~~are two-fold. The first objective~~ is to control and characterize any errors associated with the collected data. Quality-assurance activities, such as the use of standard methods for locating and collecting samples, are intended to limit the introduction of error. Quality-control activities, such as the collection of duplicate samples and the inclusion of blanks in sample sets, are intended to provide the information required to characterize any errors in the data. Other QC activities, such as planning the QC program and auditing ongoing and completed activities, ensure that the specified methods are followed and that the QA information needed for characterizing error is obtained.

~~The second QA/QC objective is to illustrate that waste testing has been performed according to specification in this waste analysis plan. The QA/QC activities will include the following:~~

- Field inspections – performed and documented by 305-B Storage Facility staff or designee, depending on the activity. The inspections primarily are visual examinations but might include measurements of materials and equipment used, techniques employed, and the final products. The purpose of these inspections is to verify that a specific guideline, specification, or procedure for the activity is completed successfully.
- Field testing – performed onsite by 305-B Storage Facility staff (or designee) according to *manufacturer's specified instructions for field equipment and/or* ~~specified procedures or protocol identified by the manufactures instructions supplied in the~~ field test kits.
- Laboratory analyses – performed by onsite or offsite laboratories on samples of waste. The purpose of the laboratory analyses is to determine constituents or characteristics present and the concentration or level.

...

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated March 31, 2005. Chapter 3.0, §3.8 and 3.8.1:

3.8 MANIFEST SYSTEM

The Hanford Site has one EPA/state identification number, as required by WAC 173-303-060, and all TSD units on the Hanford Site (such as 305-B Storage Facility) are considered part of one dangerous waste facility. Therefore, onsite shipments of dangerous or mixed waste are not subject to the manifesting requirements specified in WAC 173-303-370 and -180. 305-B Storage Facility has an onsite waste tracking system akin to a manifest system, which is voluntarily used for transporting waste on the Hanford Facility.

A uniform hazardous waste manifest is used for all off-site shipments of dangerous waste and mixed waste received at 305-B Storage Facility, as well as for all off-site shipments of dangerous waste and mixed waste from 305-B Storage Facility. In addition to the uniform hazardous waste manifest, wastes subject to land disposal restrictions which are shipped from 305-B Storage Facility to off-site treatment, storage, or disposal facilities are accompanied by the applicable notifications and certifications required under 40 CFR 268.

The following sections provide information on receiving shipments, response to manifest discrepancies, and provisions for nonacceptance of shipments.

3.8.1 Procedures for Receiving Shipments

The following are procedures used prior to transport of wastes to the 305-B Storage Facility. First, the generator must submit a chemical disposal/recycle request form to the Waste Management Section. This request form is then reviewed and either approved or rejected. Typical causes of rejection include missing or insufficient information in any of the data fields, or lack of specific information on waste composition. Upon approval, the Waste Management Section reviews the form to determine the dangerous waste designation, waste compatibility class for storage, and containerization and labeling requirements.

The waste is then inspected at the generating unit by the Waste Management Section to verify the information contained on the request form, such as number, sizes, and types of containers, location of waste, etc., and to check for proper containerization of waste. If discrepancies are noted during the inspection, the Waste Management Section will not pick up the waste. Typical discrepancies include waste not as described on request form or lack of supporting data to verify waste characteristics. In such cases, deficiencies will be explained to the generating unit responsible person, who will then be responsible for correcting them.

If the waste is found to be acceptable for transport, Waste Management staff will check to ensure required labels are in place, and transport (or arrange for transport of) the waste to 305-B Storage Facility. If transport will be over public roadways or highways, a uniform hazardous waste manifest will be prepared identifying PNNL as the transporter and 305-B Storage Facility as the receiving TSD unit. A copy of all such manifests is returned to the generating unit within 30 days of receipt at 305-B Storage Facility. A copy of the manifest is also retained at 305-B Storage Facility.

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

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated March 31, 2005. Chapter 3.0, §3.8.2:

3.8.2 Response to Significant Discrepancies

Waste shipments received at the 305-B Storage Facility containing manifest discrepancies are not accepted unless the discrepancy or discrepancies can be resolved with the generating unit at the time the shipment is received. Manifest discrepancies requiring such resolution include:

- Variations exceeding 10 percent in weight for bulk shipments such as tank trucks or tank cars (generally not applicable to 305-B Storage Facility since most shipments are in drums or other containers);
- Any inaccuracy in piece counts in containerized shipments (underages or overages);
- Type mismatches (i.e., the waste is not as described on the request form; obvious inaccuracies such as waste acid substituted for waste solvent).

Manifest information will also be considered incorrect if the written description of wastes does not agree with visual observations, or if observed weights or volumes differ by more than 10 percent from those described on the manifest.

If a discrepancy is noted, the generating unit will be contacted immediately. The waste will not be accepted for storage until the discrepancy is resolved. The generating unit will be asked to identify the source of the discrepancy (e.g., error in estimating volume or weight, incorrect identification of waste, etc.) Once the cause of the discrepancy is identified, and the generating unit and the waste management organization have concurred as to resolution of the discrepancy, the manifest will be corrected. Corrections will be made by drawing a single line through the incorrect entry and entering the correct information. Corrected entries will be initialed and dated by the individual making the correction. Once the manifest has been corrected, the discrepancy will be considered resolved.

Certain manifest discrepancies may be discovered after receipt, such as analytical data indicating incorrect designation, which may result in incorrect naming of the shipment on the manifest. Such discrepancies will be managed as noted above; if, however, the discrepancy cannot be resolved within 15 days of receipt of the shipment, the 305-B Storage Facility will file the report required by WAC 173-303-370(4)(b) as described in Chapter 12.0, Section 12.4.1.1.1.

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated March 31, 2005.
Chapter 3.0, §3.8.3, 3.8.3.1, 3.8.3.2,and 3.8.4:

3.8.3 Provisions for Nonacceptance of Shipment

Provisions for nonacceptance of shipments are discussed in the following sections.

3.8.3.1 Nonacceptance of Undamaged Shipment

All wastes are inspected by staff from the waste management organization prior to shipment and are transported to 305-B Storage Facility by waste management organization staff. This procedure is designed to prevent receipt of nonacceptable wastes. Waste management organization staff will refuse to accept or transport wastes, which are nonacceptable at 305-B Storage Facility.

3.8.3.2 Activation of BEP/Contingency Plan for Damaged Shipment

All wastes are inspected by staff from the waste management organization prior to shipment and are primarily transported to 305-B Storage Facility by waste management organization staff. Damaged containers will not be accepted from the generator and will not be transported. The only opportunity for receipt of damaged containers, therefore, would be if containers were damaged during transportation. If a shipment of waste is damaged during transportation, and arrives in a condition that presents a hazard to public health or to the environment, the facility BEP/contingency plan will be implemented as described in Chapter 7.0.

3.8.4 Unmanifested Waste

Waste generated within the Hanford Site is not transported over public highways and is not subject to manifest requirements under WAC 173-303. Such waste may be received at the 305-B Storage Facility without a manifest. However, a completed and approved disposal request form must accompany all wastes (including unmanifested waste).

If transport is by public roadways or highways, a manifest must be used. Shipments requiring a manifest and not having one will either be rejected or, at the sole discretion of the unit operator, the unit will accept the waste and file an unmanifested waste report as described in WAC 173-303-390(1) and detailed in Chapter 12.0.

WAC 173-303-830 Modification Class [1 2]	Class 1	Class '1	Class 2	Class 3
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Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated March 31, 2005.
Chapter 6.0, §6.3.1.1:

6.3.1.1 Internal Communications

Internal communication systems are used to provide immediate emergency instruction to personnel in 305-B Storage Facility. Internal communications address general emergencies that may occur in the 300 Area as well as specific emergencies that may occur in 305-B Storage Facility.

Because of the nature of activities that occur in the 300 Area, the potential exists for emergencies outside of 305-B Storage Facility (e.g., release of mixed waste materials) that could impact operations and staff in 305-B Storage Facility. For this reason, the general emergency signals for the 300 Area are applicable to 305-B Storage Facility. These signals are summarized in Table 6.1. Fire alarm signals are located in each building throughout the 300 Area. The nearest emergency siren for "area evacuation" and "take cover" is located 300 yards southeast of 305-B Storage Facility, on top of the 326 Building, and is audible in all parts of 305-B Storage Facility. Because fissile materials are not handled in 305-B Storage Facility, there is no criticality alarm for the unit.

Internal communications to provide emergency instruction in the event of an emergency in 305-B Storage Facility are fire alarms, public address (PA) system, and telephones. The fire alarms are to be used to provide notification for immediate evacuation of 305-B Storage Facility. Fire alarm pull boxes are located at all exits of the facility such that operating personnel have immediate access to one in all portions of 305-B Storage Facility. Four-fire alarm bells are located within the 305-B Storage Facility and are audible at all locations within the building. The locations of the fire alarm bells are shown in ~~Figure 6.4~~ Chapter 1.0 and are as follows: (1) an office wing on the northeast hall; (2) an office wing next to the east entrance; (3) on the south wall of the basement; and (4) on the northeast wall of the high bay. The PA system is to be used for building-wide broadcasting of verbal emergency instructions to 305-B Storage Facility staff. The PA system can be accessed from any unit telephone by dialing 376-1885. The PA system speakers are located in the high bay, in the basement, and in the office wing of 305-B Storage Facility.

The telephone system is to be used to provide verbal emergency instructions to 305-B Storage Facility staff. The telephone can also be used to transmit verbally emergency data to non-305-B Storage Facility staff, and to request emergency services. A network of telephones covers both floors of the facility. Locations of telephones are shown in ~~Figure 6.4~~ Chapter 1.0.

WAC 173-303-830 Modification Class [1 2]	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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1], if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated March 31, 2005.
Chapter 6.0, §6.3.1.2:

6.3.1.2 External Communications

As mentioned in Section 6.3.1.1 above, both a fire alarm system and telephone network system are in place at 305-B Storage Facility. Both systems can be used to summon emergency assistance. The fire alarm system summons direct response from the Hanford Fire Department's 300 Area Station. The telephone system can be used to access Hanford's Emergency Network directly at 375-2400 or by dialing the emergency number, 911. Locations of fire alarm pull boxes and telephones are shown in Chapter 1.0~~given in Figure 6.4~~.

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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter63.0 dated March 31, 2005.
Chapter 6.0, §6.3.1.3:

6.3.1.3 Emergency Equipment

Emergency equipment available for trained 305-B Storage Facility personnel includes portable fire extinguishers, a fire suppression system, spill response equipment, and decontamination equipment. Seven portable 10-lb ABC fire extinguishers, and one 15-lb (or larger) Class D fire extinguisher for combustible metals, are available at various locations throughout 305-B Storage Facility, as shown in Chapter 1.0~~Figure 6.4~~. The 10-lb ABC extinguishers are located: (1) next to the east entrance; (2) northwest end of the basement; (3) southwest end of the high bay; (4) outside of the bulking module door; (5) north of Cell No. 4 entrance; and (6) northwest end of high bay. (7) office area. A 15-lb ABC extinguisher is located outside cell 7. The 15-lb (or larger) class D extinguisher is located on the exterior of the organics cell wall north of the entrance.

The facility is also equipped with an automatic fire suppression system consisting of galvanized steel, schedule 40 per ASTM A120 pipe and 150-lb malleable iron per ANSI B16.3 fittings. All components are UL-listed or FM-approved and installation of the fire sprinkler system has been conducted in accordance with NFPA 13 for ordinary hazard. Spill cleanup supplies and equipment maintained are summarized in Table 6.2. Four emergency eye wash/showers are available for emergency personnel decontamination. The locations of the emergency eye wash/showers are shown in Chapter 1.0 ~~Figure 6.4~~. If needed, the Hanford Fire Department can provide additional emergency equipment. ~~Emergency equipment available through the Hanford Fire Department for hazardous materials response is identified in Appendix 6A.~~

WAC 173-303-830 Modification Class [1 2]	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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class '1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **305-B Storage Facility**	Permit Part & Chapter: **Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter63.0 dated March 31, 2005.
Chapter 6.0, §6.4.5:

6.4.5 Personnel Protection Equipment

Protective clothing and equipment are provided to employees during normal and emergency operations. During routine operations, the maximum number of employees working in the 305-B Storage Facility is less than fifteen. For dry chemical handling activities, such as labpacking, the minimum protection requirement is eye protection (safety glasses with side shields or chemical goggles), lab coat, and chemical resistant gloves (plastic or other construction as appropriate). Protection levels for other operations, such as bulking, and emergency situations are determined in consultation with a PNNL industrial hygienist, and staffing levels are revised according to the availability of proper protective equipment as shown below. Protective clothing and equipment available in the 305-B Storage Facility includes:

- 6 sets of chemically resistant suits, aprons, boots, and gloves
- 20 pairs of extra protective eyeglasses
- 3 SCBA
- 5 pairs of chemical goggles
- 4 face shields
- 4 full-face respirators with appropriate cartridges.

This protective equipment is stored in cabinets located outside of the operating area east entrance and is well stocked at all times. The location of the storage cabinets is shown in Chapter 1.0~~given in Figure 6.4~~. This equipment is periodically replaced as it is used. The above inventory reflects the quantities of each type of PPE that are typically present at 305-B Storage Facility. Minimum quantities required to be present are given in the weekly inspection checklist found in the Hazardous & Miscellaneous Waste Operations Procedure.

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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
305-B Storage Facility	**Part III, Chapter 2**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter63.0 dated March 31, 2005.
Chapter 6.0, Figures 6.1, 6.2, 6.3, and 6.4::

~~Figure 6.1. Normal Site Access - Entrance at the Southern End of Wisconsin Avenue and the North End of the 300 Area Barrier and Means to Control Entry~~

Figure 6.1. Example of Weekly Inspection Checklist Form

Figure 6.2. Example of Monthly Inspection Checklist Form

~~Figure 6.4. 305-B Storage Facility Building Plan and Location of Emergency Equipment~~

WAC 173-303-830 Modification Class [1 2]	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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis Date

[1] Class 1 modifications requiring prior Agency approval.

[2] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class 1, if appropriate.

Quarter Ending 12/31/04 24590-WTP-PCN-ENV-04-0009

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Page 2 of 2: Hanford Facility RCRA Permit, Part III, Attachment 51
Class [1]1 Modification Notification for the Removal of Charge Vessels and Reverse Flow Diverters from Pretreatment Facility Vessels PWD-VSL-00015 and PWD-VSL-00016

Submitted by Co-Operator:		Reviewed by ORP Program Office:	
F. Beranek	12/1/04 Date	R. J. Schepens	12/14/04 Date

Quarter Ending 12/31/04

24590-WTP-PCN-ENV-04-0009

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to address changes to the Pretreatment facility Plant Wash and Disposal (PWD) system vessels PWD-VSL-00015 and PWD-VSL-00016. Charge vessel PWD-VSL-00106 and the reverse flow diverter PWD-RFD-00106 have been removed from PWD-VSL-00015. Charge vessel PWD-VSL-00116 and reverse flow diverter PWD-RFD-00116 have been removed from VSL-PWD-00016.

The internal piping associate with the charge vessels has also been removed from the vessels, and the associated nozzles (N51 for PWD-VSL-00015 and N39 for PWD-VSL-00016) have been capped. These changes do not affect the form, function, or capacity of vessels PWD-VSL-00015 and PWD-VSL-00016 with respect to their initial submittal and approval by Ecology on 7/23/04. Permit documentation affected by this modification include:

- 24590-PTF-MV-PWD-P0006, Equipment Assembly Acid/Alkaline Effluent Vessel PWD-VSL-00016
- 24590-PTF-MV-PWD-P0007, Equipment Assembly Acid/Alkaline Effluent Vessel PWD-VSL-00015
- 24590-PTF-MVD-PWD-P0011, Mechanical Systems Data Sheet for Pretreatment Vessel PWD-VSL-00015
- 24590-PTF-MVD-PWD-P0012, Mechanical Systems Data Sheet for Pretreatment Vessel PWD-VSL-00016
- 24590-PTF-N1D-PWD-P0003, Plant Item Material Selection Data Sheet for Pretreatment Vessels PWD-VSL-00015 and PWD-VSL-00016

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: N/A

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

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class '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 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: [X] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

G. P. Davis — Date: 1/6/05

Dahl

[1] Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

Quarter Ending 3/31/2005 24590-WTP-PCN-ENV-04-0011

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Page 2 of 2:	Hanford Facility RCRA Permit, Part III, Attachment 51 Class [1] 1 Modification Notification for the Submittal of Updated Mechanical Systems Data Sheets, Equipment Assembly Drawings, and Plant Item Material Selection Data Sheet for the Pretreatment Facility Vessels PWD-VSL-00015 and PWD-VSL-00016
Attachment 1	24590-PTF-MVD-PWD-P0011, Rev. 3, Mechanical Systems Data Sheet for Pretreatment Vessel PWD-VSL-00015
Attachment 2	24590-PTF-MVD-PWD-P0012, Rev. 3, Mechanical Systems Data Sheet for Pretreatment Vessel PWD-VSL-00016
Attachment 3	24590-PTF-MV-PWD-P0006, Rev. 2, Equipment Assembly Acid/Alkaline Effluent Vessel PWD-VSL-00016
Attachment 4	24590-PTF-MV-PWD-P0007, Rev. 2, Equipment Assembly Acid/Alkaline Effluent Vessel PWD-VSL-00015
Attachment 5	24590-PTF-N1D-PWD-P0003, Rev. 2, Plant Item Material Selection Data Sheet for Pretreatment Vessels PWD-VSL-00015 and PWD-VSL-00016

Submitted by Co-Operator: 1/6/05

F. Beranek Date

Reviewed by ORP Program Office: 1/27/05

for R. J. Schepens Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this permit modification is to transmit updated mechanical systems data sheets, equipment assembly drawings, and plant item material selection data sheet associated with the Pretreatment facility Plant Wash and Disposal (PWD) system vessels PWD-VSL-00015 and PWD-VSL-00016. This information is in support of the previously approved permit modification 24590-WTP-PCN-ENV-04-0009, which identified the removal of charge vessel PWD-VSL-00106 and the reverse flow diverter PWD-RFD-00106 from PWD-VSL-00015, and the removal of charge vessel PWD-VSL-00116 and reverse flow diverter PWD-RFD-00116 from PWD-VSL-00016.

The changes identified in the updated documents do not affect the form, function, or capacity of vessels PWD-VSL-00015 and PWD-VSL-00016 with respect to their initial submittal and approval by Ecology on 7/23/04. Permit documentation affected by this modification include:

Mechanical Systems Data Sheets:

The mechanical systems data sheets for vessels PWD-VSL-00015 and PWD-VSL-00016 have been revised to remove the references to the above mentioned charge vessels and reverse flow diverters. These data sheets were also updated to include hydrodynamic loading for the vessel pulse jet mixers and the appropriate notes.

Attachment 51, Appendix 8.6:

Replace 24590-PTF-MVD-PWD-P0011, Rev. 1 with 24590-PTF-MVD-PWD-P0011, Rev. 3, Mechanical Systems Data Sheet for Pretreatment Vessel PWD-VSL-00015

Replace 24590-PTF-MVD-PWD-P0012, Rev. 1 with 24590-PTF-MVD-PWD-P0012, Rev. 3, Mechanical Systems Data Sheet for Pretreatment Vessel PWD-VSL-00016

See Attachment 1 and 2 of this Modification Notification for the updated mechanical system data sheets.

Equipment Assembly Drawings:

The equipment assembly drawings for vessels PWD-VSL-00015 and PWD-VSL-00016 have been revised to remove the above mentioned charge vessels, reverse flow diverters, and their associated piping. These drawings will also be updated to reflect the current permit drawing convention, which includes the insertion of ghosted nozzle schedules and ghosted nozzle identifiers.

Attachment 51, Appendix 8.6:

Replace 24590-PTF-MV-PWD-P0006, Rev. 1 with 24590-PTF-MV-PWD-P0006, Rev. 2, Equipment Assembly Acid/Alkaline Effluent Vessel PWD-VSL-00016

Replace 24590-PTF-MV-PWD-P0007, Rev. 1 with 24590-PTF-MV-PWD-P0007, Rev. 2, Equipment Assembly Acid/Alkaline Effluent Vessel PWD-VSL-00015

See Attachment 3 and 4 of this Modification Notification for the updated mechanical system data sheets.

Material Selection Data Sheets:

The plant item material selection data sheet for vessels PWD-VSL-00015 and PWD-VSL-00016 was revised to remove the references to the above mentioned charge vessels and reverse flow diverters. This data sheet was also updated to be consistent with the material selection data sheets for all black cell vessels, which includes adding text to address inadvertent nitric acid addition to these vessels (done for all black cell vessels) and to discuss routine and non-routine operations for the vessels.

Attachment 51, Appendix 8.9:

Replace 24590-PTF-N1D-PWD-P0003, Rev. 0 with 24590-PTF-N1D-PWD-P0003, Rev. 2, Plant Item Material Selection Data Sheet for Pretreatment Vessels PWD-VSL-00015 and PWD-VSL-00016

See Attachment 5 of this Modification Notification for the updated material selection data sheet.

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: N/A

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

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: [X] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

G. P Davis — Date: Feb 14 2005

Attachment 1

24590-PTF-MVD-PWD-P0011, Rev. 3
Mechanical Systems Data Sheet for Pretreatment Vessel PWD-VSL-00015

MECHANICAL SYSTEMS DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-PWD-VSL-00015

R10452766

Project	*RPP-WTP*	P&ID	*24590-PTF-M6-PWD-P0003, 24590-PTF-M6-PWD-P0023/24* 3
Project No	*24590*	Process Calculation	*Deleted*
Project Site	*Hanford*	Vessel Drawing	*24590-PTF-MV-PWD-P0007* ISSUED BY ~~RPP-WTP PDC~~
Description	*Acidic/Alkaline Effluent Vessel*		

Reference Data

Charge Vessels (Tag Numbers)	*PWD-VSL-00101, PWD-VSL-00102, PWD-VSL-000103, PWD-VSL-00104, PWD-VSL-00105*
Pulsejet Mixers / Agitators (Tag Numbers)	*PWD-PJM-00001, PWD-PJM-00002, PWD-PJM-00003, PWD-PJM-00004, PWD-PJM-00005, PWD-PJM-00006, PWD-PJM-00007, PWD-PJM-00008*
RFDs/Pumps (Tag Numbers)	*PWD-RFD-00101, PWD-RFD-00102, PWD-RFD-00103, PWD-RFD-00104, PWD-RFD-00105*

Design Data

Quality Level		*QL-1*	Fabrication Specs	*24590-WTP-3PS-MV00-TP001*		
Seismic Category		*SC-I*	Design Code	*ASME VIII Div 1*		
Service/Contents		*Radioactive Liquid*	Code Stamp	*Yes*		
Design Specific Gravity		*1.52*	NB Registration	*Yes*		
Operating Volume	gal	*105,850*	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	*119,150*	Estimated	*281,000*	*1,640,000*	*1,285,000*
			Actual *			

Inside Diameter	inch	*264*			Wind Design	*Not Required*	
Length/Height (TL-TL)	inch	*415*			Snow Design	*Not Required*	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	*24590-WTP-3PS-SS90-T0001* *24590-WTP-3PS-MV00-TP002*	
Internal Pressure	psig	*Atm*	*15*	*N/A*	Seismic Base Moment *	ft*lb	
External Pressure	psig	*0.22*	*10*	*N/A*	Postweld Heat Treat	*Not Required*	
Temperature	°F	*212*	*237*	*N/A*	Corrosion Allowance	Inch	*0.08 (Notes 7, 8)*
Min. Design Metal Temp.	°F	*0*			Hydrostatic Test Pressure *	Psig	

Note: 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.

MARK W. HOFFMANN
STATE OF WASHINGTON
0030952
REGISTERED
PROFESSIONAL ENGINEER

12/29/04
12/29/04

EXPIRES 12/10/06

This Bound Document Contains a total of 5 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
3	12/29/04	Issued for Permitting Use				
2	11/17/04	Issued for Permitting Use	C. Thompson	H. Khurana	C. Slater	M. Hoffmann
1	2/24/04	Issued for Permitting Use	J. Jackson	S. Suharto	C. Slater	M. Hoffmann
0	09/17/02	Issued for Permitting Use	J. Jackson	C. Slater	N/A	S. Kirk

	MECHANICAL SYSTEMS DATA SHEET: VESSEL	PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00015

Materials of Construction

Component	Material	Minimum Thickness/Size	Containment
Top Head	SA 240 316 with max. Carbon of 0.030%	See Drawing	Auxiliary (Note 1)
Shell	SA 240 316 with max. Carbon of 0.030%	See Drawing	Primary (Note 1)
Bottom Head	SA 240 316 with max. Carbon of 0.030%	See Drawing	Primary (Note 1)
Support	SA 240 304 with max. Carbon of 0.030%	See Drawing	N/A
Jacket/Coils/Half-Pipe Jacket	N/A	N/A	N/A
Internals	SA240 316 with max. Carbon of 0.030%	See Drawing	Thermowell Primary (Note 1)
Pipe	SA312 TP316 Smls with max. Carbon of 0.030%	See Drawing	Note 1
Forgings/ Bar stock	SA182 F316 / SA479 316 with max. Carbon of 0.030%	See Drawing	As Note 1 for Nozzle Necks
Gaskets	N/A	N/A	N/A
Bolting	N/A	N/A	N/A

Miscellaneous Data

Orientation	Vertical	Support Type	Skirt
Insulation Function	Not Applicable	Insulation Material	Not Applicable
Insulation Thickness (inch)	Not Applicable	Weld Surface Finish	De-scaled as laid

Remarks

* To be determined by the vendor.

Note 1: All welds forming part of the primary and auxiliary containments, including the nozzle attachment welds shall be subjected to 100% volumetric examination.

Note 2: Radiography for this vessel shall be per para. 6.2 of specification 24590-WTP-3PS-MV00-TP001. Nozzle repads shall not be used.

Note 3: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals.

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

Note 5: This vessel is located in a Black Cell.

Note 6: Deleted

Note 7: BNI shall ensure that an additional 0.093" is available for erosion in the bottom head and shall report the minimum thickness required for all specified loading conditions, exclusive of erosion and corrosion allowances. 3

Note 8: BNI shall ensure that an additional 0.065" is available for erosion in the interior conical surface of the pulse jet mixers. 3

Note 9. All Hydrodynamic loads are for BNI internal use only and are to be disregarded by the seller. 3

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** *24590-PTF-MV-PWD-VSL-00015*

Equipment Cyclic Data Sheet

Plant Item Number	*24590-PTF-MV-PWD-VSL-00015*
Component Description	*Parent Vessel*

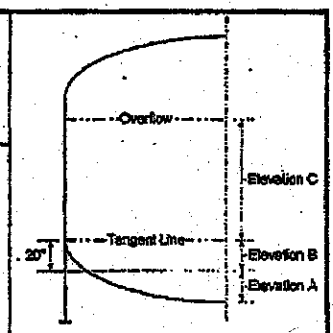
The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*SA 240 316 with max. Carbon of 0.030 %*
Design Life	*40 years*
Component Function and Life Cycle Description	*This is a "batch" vessel and cycle from nearly empty to nearly full every six days.*

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*-10*	*15*	*10*	*Nominal assumption*
Operating Pressure	psig	*-0.22*	*0.00*	*2,450*	
Operating Temperature	°F	*59*	*212*	*2,450*	*Uniform material temperature range, not between two points*
Contents Specific Gravity		*1.00*	*1.52*	*N/A*	
Contents Level	inch	*Empty*	*Flooded*	*2,450*	*Coincident with pressure cycles*
Localized Features					
Nozzles		*Within 50°F of vessel operating range*		*As above*	

Hydrodynamic Loading

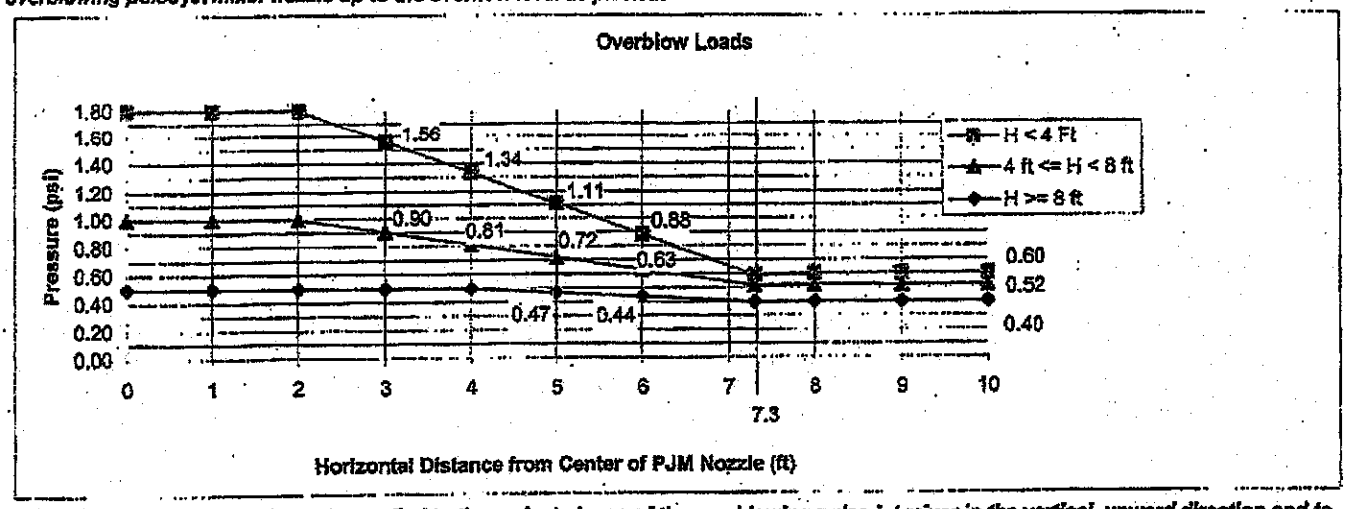
In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overblow loads, and this load combination is also to be assumed to act concurrently with seismic loads.



The following table indicates the normal hydrodynamic pressure for at ranges of elevations in the vessel and the number of design cycles for each condition. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Seller shall apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Normal Operation Hydrodynamic Pressure Range, psi						Number of Cycles
Elevation A		Elevation B		Elevation C		
Radial	Vertical	Radial	Vertical	Radial	Vertical	
-0.15 to 0.25	*-0.15 to 0.15*	*-0.05 to 0.12*	*-0.15 to 0.15*	*-0.03 to 0.05*	*-0.06 to 0.15*	*14.1 X 10⁶*

Overblow loads vary as a function of the distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle up to the overflow level as plotted:



The overblow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Seller shall consider that any single pulse jet mixer may overblow 100 cycles.

Notes

- *Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.*

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** *24590-PTF-MV-PWD-VSL-00015*

Equipment Cyclic Data Sheet

Plant Item Number	*PWD-VSL-00101, PWD-VSL-00102, PWD-VSL-000103, PWD-VSL-00104, PWD-VSL-00105, ~~PWD-VSL-00106~~* 2
Component Description	*Charge Vessels*

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*SA 240 316 with max. Carbon of 0.030 %*
Design Life	*40 years*
Component Function and Life Cycle Description	*These charge vessels are cyclically loaded using vacuum to fully fill the charge vessel with process liquid and compressed air to fully empty the charge vessel. The charge vessels are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The charge vessel supports shall be designed to cycle between fully buoyant (charge vessel empty and parent vessel full) and fully loaded (charge vessel full and parent vessel empty).*

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*55*	*10*	*Nominal assumption*
Operating Pressure	psig	*FV*	*30*	*391,000*	
Operating Temperature	°F	*59*	*212*	*2,450*	*Pressure cycles to be at 212° F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.*
Contents Specific Gravity		*1.00*	*1.52*	*N/A*	
Contents Level	inch	*Empty*	*Flooded*	*391,000*	*Coincident with pressure cycles*
Localized Features					
Supports		*As above*		*As above with contents level changing coincident with pressure cycles.*	

Notes

- *Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.*

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** *24590-PTF-MV-PWD-VSL-00015*

Equipment Cyclic Data Sheet

Plant Item Number	*PWD-PJM-00001, PWD-PJM-00002, PWD-PJM-00003, PWD-PJM-00004, PWD-PJM-00005, PWD-PJM-00006, PWD-PJM-00007, PWD-PJM-00008*
Component Description	*Pulse Jet Mixers*

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*SA 240 316 with max. Carbon of 0.030 %*
Design Life	*40 years*
Component Function and Life Cycle Description	*These pulse jet mixers (PJMs) are cyclically loaded using vacuum to fully fill the PJM with process liquid and compressed air to fully empty the PJM. The PJMs are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The PJM supports shall be designed to cycle between fully buoyant (PJM empty and parent vessel full) and fully loaded (PJM full and parent vessel empty) in addition to thrust.*

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*85*	*10*	*Nominal assumption*
Operating Pressure	psig	*FV*	*60*	*14.1×10^6*	
Operating Temperature	°F	*59*	*212*	*14.1×10^6*	*Pressure cycles to be at 212° F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.*
Contents Specific Gravity		*1.00*	*1.52*	*N/A*	
Contents Level	inch	*Empty*	*Flooded*	*14.1×10^6*	*Coincident with pressure cycles*
Thrust	lbf	*0*	*280*	*14.1×10^6*	
Localized Features					
Supports		*As above*		*As above with contents level changing coincident with pressure cycles.*	

Notes

- *Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.*

Attachment 2

24590-PTF-MVD-PWD-P0012, Rev. 3
Mechanical Systems Data Sheet for Pretreatment Vessel PWD-VSL-00016

MECHANICAL SYSTEMS DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-PWD-VSL-00016

R1045276

Project	*RPP-WTP*	P&ID	*24590-PTF-M6-PWD-P0003, 24590-PTF-M6-PWD-P0024I25* 3
Project No	*24590*	Process Calculation	*Deleted*
Project Site	*Hanford*	Vessel Drawing	*24590-PTF-MV-PWD-P0006* ISSUED BY ~~RPP-WTP PDC~~
Description	*Acidic/Alkaline Effluent Vessel*		

Reference Data

Charge Vessels (Tag Numbers)	*PWD-VSL-00111, PWD-VSL-00112, PWD-VSL-000113, PWD-VSL-00114, PWD-VSL-00115*
Pulsejet Mixers / Agitators (Tag Numbers)	*PWD-PJM-00011, PWD-PJM-00012, PWD-PJM-00013, PWD-PJM-00014, PWD-PJM-00015, PWD-PJM-00016, PWD-PJM-00017, PWD-PJM-00018*
RFDs/Pumps (Tag Numbers)	*PWD-RFD-00111, PWD-RFD-00112, PWD-RFD-00113, PWD-RFD-00114, PWD-RFD-00115*

Design Data

Quality Level		*QL-1*	Fabrication Specs	*24590-WTP-3PS-MV00-TP001*		
Seismic Category		*SC-I*	Design Code	*ASME VIII Div 1*		
Service/Contents		*Radioactive Liquid*	Code Stamp	*Yes*		
Design Specific Gravity		*1.52*	NB Registration	*Yes*		
Operating Volume	gal	*105,850*	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	*119,150*	Estimated	*281,000*	*1,640,000*	*1,285,000*
			Actual *			

Inside Diameter	inch	*264*			Wind Design	*Not Required*	
Length/Height (TL-TL)	inch	*415*			Snow Design	*Not Required*	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	*24590-WTP-3PS-SS90-T0001* *24590-WTP-3PS-MV00-TP002*	
Internal Pressure	psig	*Atm*	*15*	*N/A*	Seismic Base Moment *	ft*lb	
External Pressure	psig	*0.22*	*10*	*N/A*	Postweld Heat Treat	*Not Required*	
Temperature	°F	*212*	*237*	*N/A*	Corrosion Allowance	Inch	*0.08 (Notes 7, 8)*
Min. Design Metal Temp.	°F	*0*			Hydrostatic Test Pressure*	Psig	

Note: 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.

MARK W. HOFFMANN
STATE OF WASHINGTON
0030952
REGISTERED PROFESSIONAL ENGINEER
12/29/04
EXPIRES 12/10/06

This Bound Document Contains a total of 5 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
3	12/29/04	Issued for Permitting Use				
2	11/17/04	Issued for Permitting Use	C. Thompson	H. Khurana	C. Slater	M. Hoffmann
1	2/24/04	Issued for Permitting Use	J. Jackson	S. Suharto	C. Slater	M. Hoffmann
0	09/17/02	Issued for Permitting Use	J. Jackson	C. Slater	N/A	S. Kirk

Materials of Construction

Component	Material	Minimum Thickness/Size	Containment
Top Head	SA 240 316 with max. Carbon of 0.030%	See Drawing	Auxiliary (Note 1)
Shell	SA 240 316 with max. Carbon of 0.030%	See Drawing	Primary (Note 1)
Bottom Head	SA 240 316 with max. Carbon of 0.030%	See Drawing	Primary (Note 1)
Support	SA 240 304 with max. Carbon of 0.030%	See Drawing	N/A
Jacket/Coils/Half-Pipe Jacket	N/A	N/A	N/A
Internals	SA240 316 with max. Carbon of 0.030%	See Drawing	Thermowell Primary (Note 1)
Pipe	SA312 TP316 Smls with max. Carbon of 0.030%	See Drawing	See Note 1
Forgings/ Bar stock	SA182 F316/SA479 316 with max. Carbon of 0.030%	See Drawing	As Note 1 for Nozzle Necks
Gaskets	N/A	N/A	N/A
Bolting	N/A	N/A	N/A

Miscellaneous Data

Orientation	Vertical	Support Type	Skirt
Insulation Function	Not Applicable	Insulation Material	Not Applicable
Insulation Thickness (inch)	Not Applicable	Weld Surface Finish	De-scaled as laid

Remarks

* To be determined by the vendor.

Note 1: All welds forming part of the primary and auxiliary containments, including the nozzle attachment welds shall be subjected to 100% volumetric examination.

Note 2: Radiography for this vessel shall be per para. 6.2 of specification 24590-WTP-3PS-MV00-TP001. Nozzle repads shall not be used.

Note 3: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals

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

Note 5: This vessel is located in a Black Cell.

Note 6: Deleted.

Note 7: BNI shall ensure that an additional 0.077" is available for erosion in the bottom head and shall report the minimum thickness required for all specified loading conditions, exclusive of erosion and corrosion allowances. 3

Note 8: BNI shall ensure that an additional 0.054" is available for erosion in the interior conical surface of the pulse jet mixers. 3

Note 9 All Hydrodynamic loads are for BNI internal use and are to be disregarded by the seller. 3

MECHANICAL SYSTEMS DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-PWD-VSL-00016

Equipment Cyclic Data Sheet

Plant Item Number	*24590-PTF-MV-PWD-VSL-00016*
Component Description	*Parent Vessel*

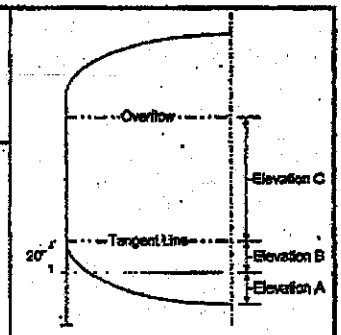
The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*SA 240 316 with max. Carbon of 0.030 %*
Design Life	*40 years*
Component Function and Life Cycle Description	*This is a "batch" vessel and cycle from nearly empty to nearly full every six days.*

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*-10*	*15*	*10*	*Nominal assumption*
Operating Pressure	psig	*-0.22*	*0.00*	*2,450*	
Operating Temperature	°F	*59*	*212*	*2,450*	*Uniform material temperature range, not between two points*
Contents Specific Gravity		*1.00*	*1.52*	*N/A*	
Contents Level	inch	*Empty*	*Flooded*	*2,450*	*Coincident with pressure cycles*
Localized Features					
Nozzles		*Within 50°F of vessel operating range*	*As above*		

Hydrodynamic Loading

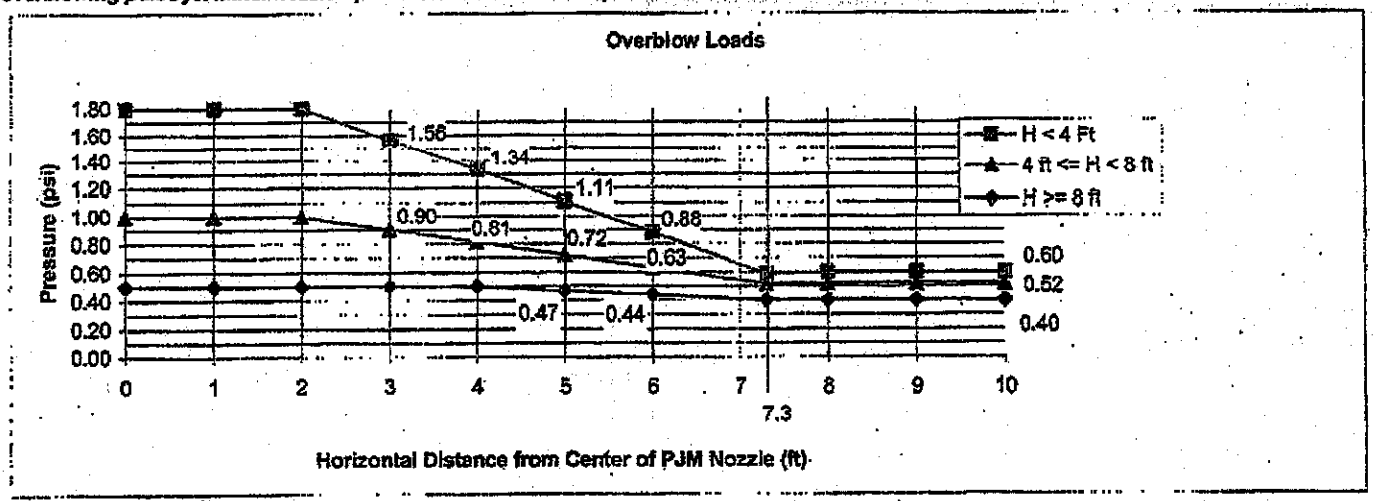
In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overblow loads, and this load combination is also to be assumed to act concurrently with seismic loads.



The following table indicates the normal hydrodynamic pressure for at ranges of elevations in the vessel and the number of design cycles for each condition. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Seller shall apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Normal Operation Hydrodynamic Pressure Range, psi						Number of Cycles
Elevation A		Elevation B		Elevation C		
Radial	Vertical	Radial	Vertical	Radial	Vertical	
-0.15 to 0.25	*-0.15 to 0.15*	*-0.05 to 0.12*	*-0.15 to 0.15*	*-0.03 to 0.05*	*-0.06 to 0.15*	*14.1×10^6*

Overblow loads vary as a function of the distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle up to the overflow level as plotted:



The overblow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Seller shall consider that any single pulse jet mixer may overblow 100 cycles.

Notes

- ***Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***

Equipment Cyclic Data Sheet

Plant Item Number	PWD-VSL-00111, PWD-VSL-00112, PWD-VSL-000113, PWD-VSL-00114, PWD-VSL-00115, ~~PWD-VSL-00116~~ 3
Component Description	Charge Vessels

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	SA 240 316 with max. Carbon of 0.030 %
Design Life	40 years
Component Function and Life Cycle Description	These charge vessels are cyclically loaded using vacuum to fully fill the charge vessel with process liquid and compressed air to fully empty the charge vessel. The charge vessels are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The charge vessel supports shall be designed to cycle between fully buoyant (charge vessel empty and parent vessel full) and fully loaded (charge vessel full and parent vessel empty).

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	FV	55	10	Nominal assumption
Operating Pressure	psig	FV	30	391,000	
Operating Temperature	°F	59	212	2,450	Pressure cycles to be at 212° F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.
Contents Specific Gravity		1.00	1.52	N/A	
Contents Level	inch	Empty	Flooded	391,000	Coincident with pressure cycles
Localized Features					
Supports		As above		As above with contents level changing coincident with pressure cycles.	

Notes

- *Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.*

Equipment Cyclic Data Sheet

Plant Item Number	PWD-PJM-00011, PWD-PJM-00012, PWD-PJM-00013, PWD-PJM-00014, PWD-PJM-00015, PWD-PJM-00016, PWD-PJM-00017, PWD-PJM-00018
Component Description	Pulse Jet Mixers

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	SA 240 316 with max. Carbon of 0.030 %
Design Life	40 years
Component Function and Life Cycle Description	These pulse jet mixers (PJMs) are cyclically loaded using vacuum to fully fill the PJM with process liquid and compressed air to fully empty the PJM. The PJMs are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The PJM supports shall be designed to cycle between fully buoyant (PJM empty and parent vessel full) and fully loaded (PJM full and parent vessel empty) in addition to thrust.

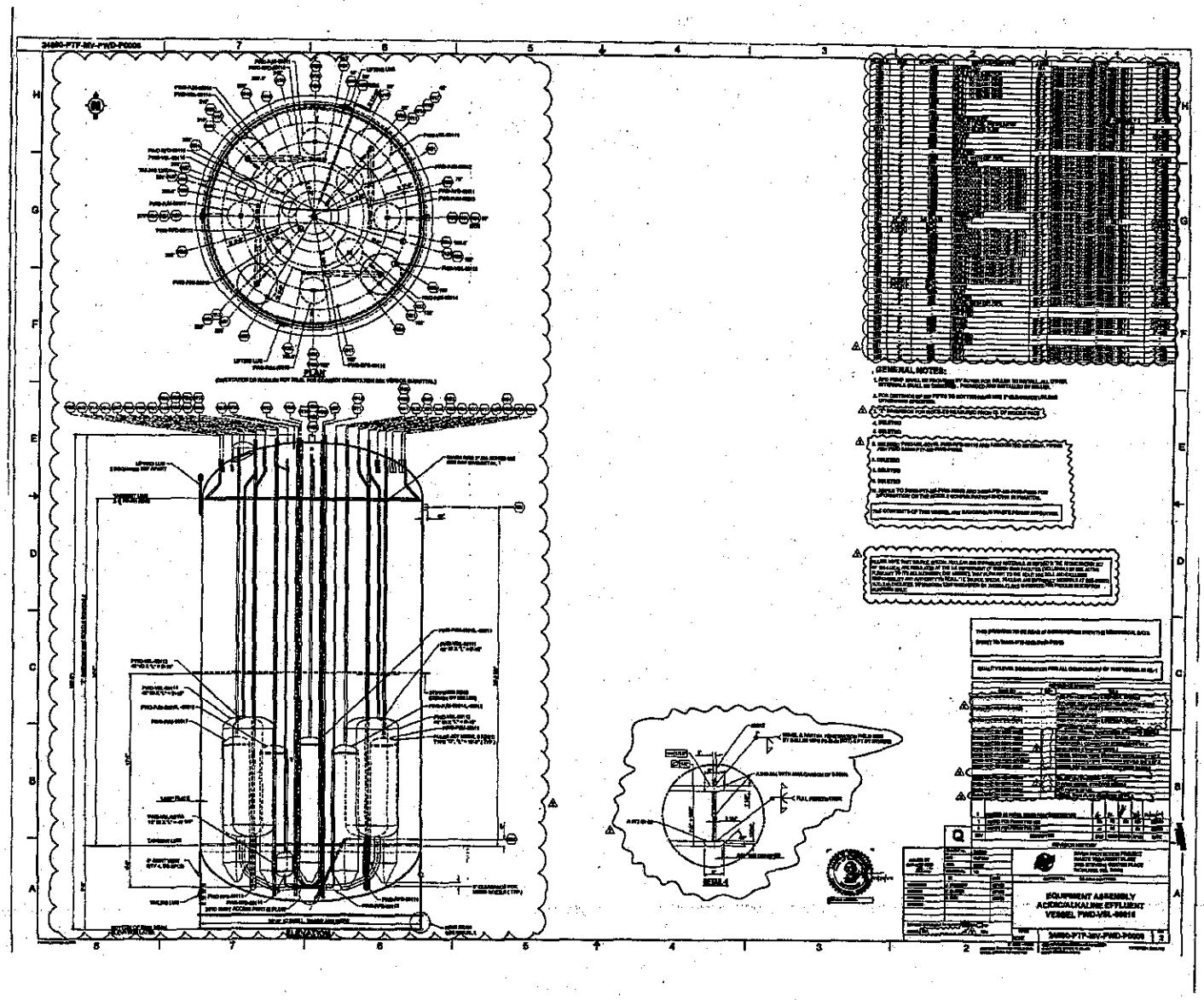
Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	FV	85	10	Nominal assumption
Operating Pressure	psig	FV	60	14.1×10^6	
Operating Temperature	°F	59	212	14.1×10^6	Pressure cycles to be at 212° F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.
Contents Specific Gravity		1.00	1.52	N/A	
Contents Level	inch	Empty	Flooded	14.1×10^6	Coincident with pressure cycles
Thrust	lbf	0	280	14.1×10^6	
Localized Features					
Supports		As above		As above with contents level changing coincident with pressure cycles.	

Notes

- Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.

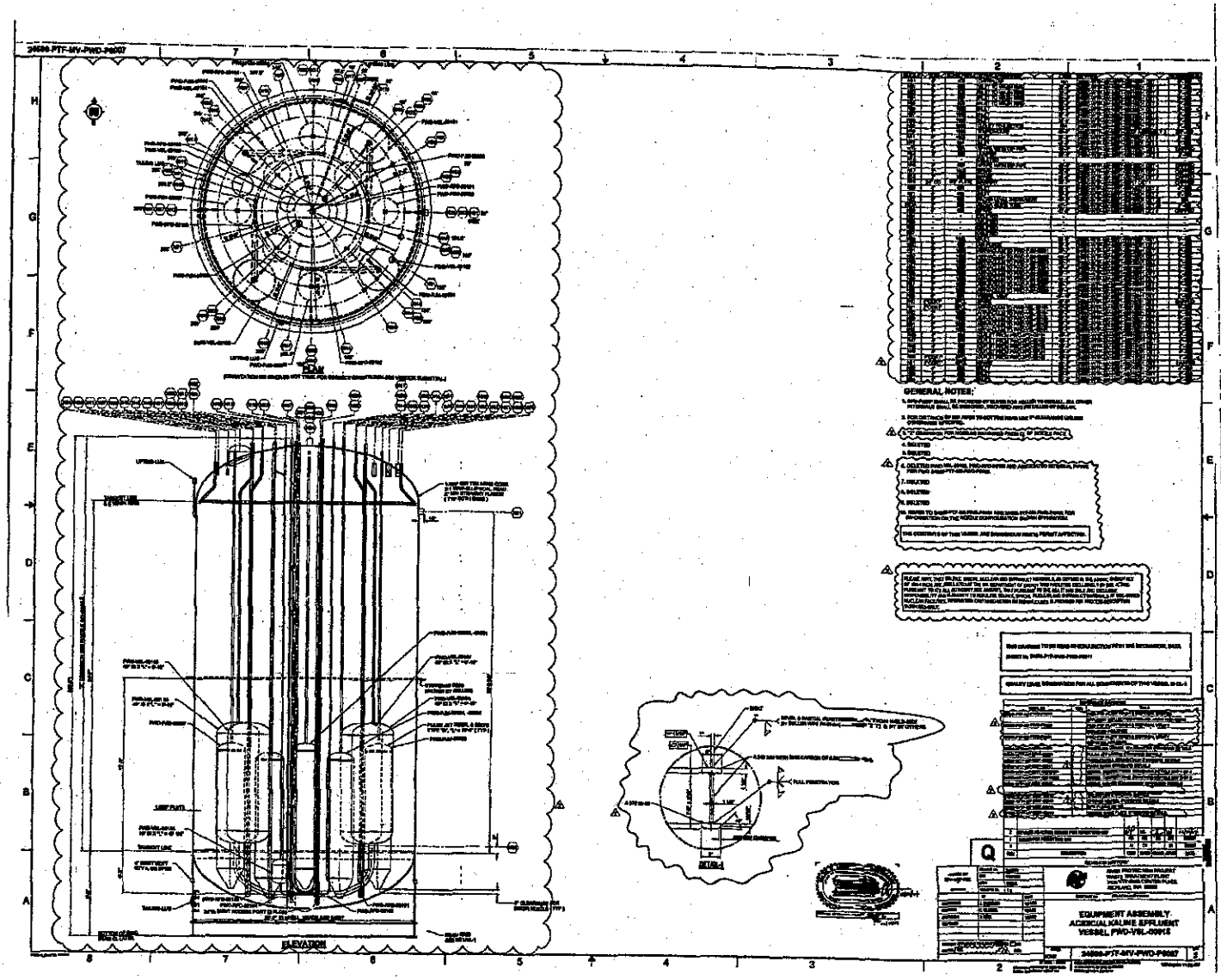
Attachment 3

24590-PTF-MV-PWD-P0006, Rev. 2
Equipment Assembly Acid/Alkaline Effluent Vessel PWD-VSL-00016


PLAN
ELEVATION
DETAIL-1
GENERAL NOTES:
EQUIPMENT ASSEMBLY
ACIDIC/ALKALINE EFFLUENT
VESSEL PWD-VSL-00016

Attachment 4

24590-PTF-MV-PWD-P0007, Rev. 2
Equipment Assembly Acid/Alkaline Effluent Vessel PWD-VSL-00015


PLAN
ELEVATION
DETAIL-1
GENERAL NOTES:
EQUIPMENT ASSEMBLY
ACIDICIAL KALIME EFFLUENT
VESSEL PWD-VSL-0001E

Attachment 5

24590-PTF-N1D-PWD-P0003, Rev. 2
Plant Item Material Selection Data Sheet for Pretreatment Vessels
PWD-VSL-00015 and PWD-VSL-00016

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10450894

PWD-VSL-00015 & PWD-VSL-00016 (PTF)
Acidic/Alkaline Effluent Vessel

- Design Temperature (°F)(max/min): 237/0
- Design Pressure (psig) (max/min): 15/-10
- Location: incell
- PJM Discharge Velocity (fps): 40
- Drive Cycle: 17 % (at 40 fps)

ISSUED BY
RPF-WTP PDC

Offspring items

PWD-VSL-00015–
- PWD-VSL-00101 – PWD-VSL-00105
- PWD-PJM-00001 – PWD-PJM-00008
- PWD-RFD-00101 – PWD-RFD-00105

PWD-VSL-00016–
- PWD-VSL-00111 – PWD-VSL-00115
- PWD-PJM-00011 – PWD-PJM-00018,
- PWD-RFD-00111 – PWD-RFD-00115

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on sheets 6, 7, & 8

Options Considered:

- Normal operating conditions.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 316 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.04 inch (includes 0.00 inch erosion allowance; localized protection will be provided as necessary as discussed in section j)

Process & Operations Limitations:

- Develop rinsing/flushing procedure for acid operation or ensure a sufficient alkaline heel exists during acid addition.

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED PROFESSIONAL ENGINEER
12/23/04
EXPIRES: 12/07/05

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.

This bound document contains a total of 8 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
2	12/23/04	Issued for Permitting Use			
1	11/10/04	Issued for Permitting Use	DLA	JRD	APR
0	2/26/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

These vessels receive acidic/alkaline cleaning effluent and solutions from equipment in the CNP, CXP and UFP systems, as well as non-routine transfers from other PWD system vessels.

a General Corrosion
The normal operating temperature is 80 to 100 °F. Periodically, steam can heat incoming streams to 212 °F (with a design temperature of 237 °F). The high temperature is anticipated to be localized and of short duration.

In Hamner's data (1981), 304 (and 304L) lists a corrosion rate in NaOH of less than 20 mpy (500 µm/y) at 77 °F and over 20 mpy at 122 °F. He shows 316 (and 316L) has a rate of less than 2 mpy up to 122 °F and 50 % NaOH. Sedriks (1996) states that the 300 series alloys are acceptable in up to 50 % NaOH at temperatures up to about 122 °F or slightly above. Davis (1994) states the corrosion rate for 304L in pure NaOH will be less than about 0.1 mpy up to about 212 °F though Sedriks (1996) states the data beyond about 122 °F are low because of the presence of oxidizing agents – similar to nitrates and nitrites. Danielson & Pitman (2000), based on short term studies, suggest a corrosion rate of about 0.5 mpy for 316L in simulated waste at boiling, >212 °F. Research with simulated-radwaste evaporators showed that 304L was slightly more resistant to corrosion (<0.2 mpy) than was 316L (<0.6 mpy). It should be noted that the Savannah River evaporator vessels, operating at about 300 °F, are made of 304L and have suffered no failures in about 30 years; 304L heat transfer surfaces have failed however after about 10 years.

The amount of fluoride is expected to be small although ultrafilter washing with nitric acid might result in a high acidic fluoride concentration. Studies have shown that in 5 % nitric acid with 1000 ppm fluoride at 290 °F, the corrosion rate of 304L can be as high as 5 mpy. If it is assumed that the corrosion rate is roughly proportional to the fluoride concentration, even at high temperatures, normal conditions will result in low rates – the unknown is the acid wash conditions. If acid is added from another source, the vessel should either be flushed prior to addition of acid or retain a sufficient alkaline heel.

If the solutions vary between strongly oxidizing (permanganate), alkaline, and acidic, then the conditions are similar to those in nuclear reactor systems during decontamination and enhanced corrosion should be expected.

Conclusion:
304L or 316L will be sufficiently resistant to the waste solution at the expected temperatures with a probable general corrosion rate of less than 1 mpy. Based on the Savannah River experience with Hanford-like waste at higher temperatures, 304L is expected to be satisfactory in hot waste. Rinsing procedure should remove as much waste as possible followed by a water rinse prior to acid cleaning to prevent acid cleaning in the presence of excessive fluoride.

b Pitting Corrosion
Chloride is known to cause pitting in acid and neutral solutions with 316L more resistant than 304L. It is thought that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices even with 304L. Koch (1995) is of the opinion that fluoride will have little effect. It has been stated that localized corrosion can occur under the deposits on tubes, probably due to the chlorides. Further, Revie (2000) and Uhlig (1948) note that nitrates inhibit chloride pitting. Other studies suggest that nitric acid inhibits chloride attack though their data are at higher temperatures and concentrations.

The vessels are shown to have substantial concentrations of chlorides and fluorides under normal operation. No indication of how much can be present from ultrafilter washing. At the stated levels of halides and under alkaline conditions, 304L is expected to be satisfactory even at 237 °F. If the pH drops below 12, the halides must be removed. Pulse jet mixers provide sufficient agitation to prevent deposits.

Conclusion:
Under normal conditions with agitation, 304L may be acceptable. However, because of non-routine low pH conditions, the more pitting resistant 316L is recommended for conservatism.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion:
Not applicable to this system.

PLANT ITEM MATERIAL SELECTION DATA SHEET

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment but also because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as 10 ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140 °F. The "L" grades of both 304 and 316 are also more resistant to cracking than the higher carbon versions. Further, the presence of nitrate is expected to inhibit cracking. If the concentrations are as stated, stress corrosion cracking will be minimized. Because of the high chloride concentrations, the likelihood of residual halides is high. Therefore a minimum of 316L is recommended

Conclusion:
With the normal operating environment, 316L stainless steel is expected to be acceptable.

e Crevice Corrosion
The pitting discussion covers this area.

Conclusion:
See Pitting

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating temperatures are slightly high for microbial growth but, additionally, the location of the system in the process suggests little chance of the introduction of microbes. Further, the alternation between acidic and alkaline conditions is not conducive to their growth.

Conclusion:
MIC is not expected to be a problem.

h Fatigue/Corrosion Fatigue
At the operating pH, corrosion fatigue is not expected to be a problem in a proper designed vessel.

Conclusions
Not considered to be a problem.

i Vapor Phase Corrosion
The vapor phase portion of the vessel will be spattered with solution. The presence of wash rings within the vessels will allow this area to be rinsed.

Conclusion:
Not considered to be a problem.

j Erosion
Based on past experiments by Smith & Elmore (1992), the solids are soft and erosion is not expected to be a concern for the vessel wall. Additional 316L stainless steel should be provided as localized protection for the applicable portions of the bottom head to accommodate PJM discharge velocities of up to 12 m/s with solids concentrations of 2.0 wt% for a usage of 65 % (PWD-VSL-00015) or 54 % (PWD-VSL-00016) operation. PWD-VSL-00015 requires at least 0.093-inch additional protection and PWD-VSL-00016 requires at least 0.077 inch additional protection. The 2.0 wt% is considered to be conservative and is based on the WTP Prime Contract maximum. During normal operation, the solids content of the PWD-VSL-00015/16 vessels is expected to be well below the anticipated maximum.

The wear of the PJM nozzles can occur from flow for both the discharge and reflood cycles of operation. At least 0.065 inch, for PWD-VSL-00015, and 0.054 inch, for PWD-VSL-00016, of additional 316L stainless steel should be provided on the inner surface of the PJM nozzle to accommodate wear due to PJM discharge and suction velocities with solids concentrations of 2.0 wt% for 65 % (PWD-VSL-00015) or 54 % (PWD-VSL-00016) operation.

Conclusion:
The recommended corrosion allowance provides sufficient protection for erosion of the vessel wall. Additional localized protection for the bottom head will accommodate PJM discharge velocities and for the PJM nozzles will accommodate PJM discharge and reflood velocities.

PLANT ITEM MATERIAL SELECTION DATA SHEET

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
Fretting/wear is not anticipated due to the lack of moving parts.

Conclusion:
Not a concern.

m Galvanic Corrosion
In the proposed environment and with the lack of dissimilar alloys, there are no potential differences. Therefore, no galvanic corrosion is expected.

Conclusion:
Not a concern.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
Higher chloride contents and higher temperatures usually require higher alloy materials. Nitrate ions inhibit the pitting and crevice corrosion of stainless alloys. Furthermore, nitric acid passivates these alloys; therefore, lower pH values brought about by increases in the nitric acid content of process fluid will not cause higher corrosion rates for these alloys. The upset condition that was most likely to occur is lowering of the pH of the vessel content by inadvertent addition of 2 M nitric acid. Lowering of pH may make a chloride-containing solution more likely to cause pitting of stainless alloys. Increasing the nitric acid content of the process fluid adds more of the pitting-inhibiting nitrate ion to the process fluid. In addition, adding the nitric acid solution to the stream will dilute the chloride content of the process fluid.

Conclusion:
The recommended materials will be able to withstand a plausible inadvertent addition of 2 M nitric acid for a limited period.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. Danielson, MJ & SG Pitman, 2000, *Corrosion Tests of 316L and Hastelloy C-22 in Simulated Tank Waste Solutions*, PNWD-3015 (BNFL-RPT-019, Rev 0), Pacific Northwest Laboratory, Richland WA.
2. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
3. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
4. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX
5. Koch, GH, 1995, *Localized Corrosion in Halides Other Than Chlorides*, MTI Pub No. 41, Materials Technology Institute of the Chemical Process Industries, Inc, St Louis, MO 63141
6. Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
7. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
8. Smith, H. D. and M. R. Elmore, 1992, *Corrosion Studies of Carbon Steel under Impinging Jets of Simulated Slurries of Neutralized Current Acid Waste (NCAW) and Neutralized Cladding Removal Waste (NCRW)*, PNL-7816, Pacific Northwest Laboratory, Richland, Washington.
9. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158

Bibliography:

1. Agarwal, DC, *Nickel and Nickel Alloys*, In: Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
2. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
3. Phull, BS, WL Mathay, & RW Ross, 2000, *Corrosion Resistance of Duplex and 4-6% Mo-Containing Stainless Steels in FGD Scrubber Absorber Slurry Environments*, Presented at Corrosion 2000, Orlando, FL, March 26-31, 2000, NACE International, Houston TX 77218.
4. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

OPERATING CONDITIONS

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Acidic/alkaline effluent vessels (PWD-VSL-00015,16)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	2.02E+01	1.15E+01			
Chloride	g/l	4.28E+00	4.74E+00			
Fluoride	g/l	4.75E+00	5.32E+00			
Iron	g/l	7.14E+00	5.41E+00			
Nitrate	g/l	1.23E+02	1.23E+02			
Nitrite	g/l	2.20E+01	2.45E+01			
Phosphate	g/l	1.82E+01	1.78E+01			
Sulfate	g/l	8.54E+00	9.50E+00			
Mercury	g/l	7.79E-02	7.84E-02			
Carbonate	g/l	5.66E+01	5.46E+01			
Undissolved solids	wt%	1.3%	1.4%			
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Note 3
Temperature	°F					Note 2
						Note 4

List of Organic Species:

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. T normal operation 80 °F to 100 °F.
3. pH 14 but could receive 2M nitric acid (pH -0.3) from UF cleaning, on non-routine basis.
4. 19M NaOH can be added to these vessels.

Assumptions:

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.9.9 Acidic/Alkaline Effluent Vessel (PWD-VSL-00015)

Routine Operations

The vessel is sized to accommodate one wash/cleaning cycle from ultrafiltration with allowances for the other small streams that are received along with enough space to neutralize material.

During normal operations, vessel PWD-VSL-00015 receives acidic/alkaline effluent from the following sources:

- Alkaline cleaning effluent via breakpot PWD-BRKPT-00015 from ultrafiltration feed vessels (UFP-VSL-00002A/B)
- Caustic rinse from cesium ion exchange columns (CXP-IXC-00001, CXP-IXC-00002, CXP-IXC-00003, and CXP-IXC-00004)
- Process condensate from cesium nitric acid recovery (CNP-HX-00002, 3, and 4)
- Nitric acid, demineralized water, and sodium hydroxide drains from reagent bulge UFP-BULGE-00001

Non-Routine Operations that Could Affect Corrosion/Erosion

During non-routine operations, vessel PWD-VSL-00015 receives acidic/alkaline effluent from the following sources:

- Caustic rinse from cesium ion exchange via caustic rinse collection tank (CXP-VSL-00004)
- Acidic cleaning effluent via breakpot PWD-BRKPT-00015 from ultrafiltration feed vessels (UFP-VSL-00002A/B)
- Caustic rinses from solids washing/leaching (UFP-VSL-00062A/B/C)
- During abnormal operations, vessel PWD-VSL-00015 receives effluent from the following source:
- Overflow from PWD-VSL-00016
- An air in-bleed is provided to dilute hydrogen generated in vessel PWD-VSL-00015. The level and temperature in vessel PWD-VSL-00015, as well as the temperature in the acidic/alkaline effluent breakpot, are monitored in the main control room. Pulse jet mixers are used to provide a uniform mixture during neutralization within vessel PWD-VSL-00015. An RFD supplies a representative sample of the vessel contents, which will be analyzed for pH in the laboratory. Excess acidic effluent is neutralized with 19 M sodium hydroxide supplied from a reagent header. Wash rings are used for vessel and breakpot washing. A vessel-emptying ejector is used for non-routine transfers to the plant wash vessel (PWD-VSL-00044).
- An RFD supplies a representative sample of the contents of vessel PWD-VSL-00015 for analysis. If the pH is confirmed to be 12 or above, RFDs transfer the high-active effluent from vessel PWD-VSL-00015 to the waste feed evaporator feed vessels (FEP-VSL-00017A or B) for recycle.
- Vessel PWD-VSL-00015 vents to the vessel vent caustic scrubber (PVP-SCB-00002) via the vessel vent header, overflows to the acidic/alkaline effluent vessel (PWD-VSL-00016), and ultimately overflows to vessel PWD-VSL-00033. Breakpot PWD-BRKPT-00015 vents to scrubber PVP-SCB-00002 via the vessel vent header and overflows to vessel PWD-VSL-00015.

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.9.10 Acidic/Alkaline Effluent Vessel (PWD-VSL-00016)

Routine Operations

The vessel is sized to accommodate one wash/cleaning cycle from ultrafiltration with allowances for the other small streams that are received along with enough space to neutralize material.

During normal operations, vessel PWD-VSL-00016 receives acidic/alkaline effluent from the following sources:

- Alkaline Acidic cleaning effluent via breakpot PWD-BRKPT-00016 from ultrafiltration feed vessels (UFP-VSL-00002A/B)
- Caustic leach solutions (UFP-VSL-00062A/B/C)
- Ultrafiltration solides wash (UFP-VSL-00062A/B/C)
- Nitric acid, demineralized water, and sodium hydroxide drains from reagent bulge UFP-BULGE-00002

Non-Routine Operations that Could Affect Corrosion/Erosion

- During non-routine operations, vessel PWD-VSL-00016 receives acidic/alkaline effluent from the following sources:
  - Caustic rinse from cesium ion exchange via caustic rinse collection tank (CXP-VSL-00004)
  - Caustic rinse from cesium ion exchange columns (CXP-IX-00001/2/3/4).
  - Process condensate from cesium nitric acid recovery (CNP-HX-00002, 3 and 4).
  - Alkline cleaning effluent via breakpot PWD-BRKPT-00016 from Ultrafiltration Feed Vessels (UFP-VSL-00002A/B).
  - Plant wash from PWD-VSL-00044.
  - Overflow from PWD-VSL-00015

Quarter Ending 3/31/2005 24590-HLW-PCN-ENV-04-0001

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Page 2 of 2: Hanford Facility RCRA Permit, Part III, Chapter 10, Attachment 51
Modification to Update SBS Condensate Receiver Vessels (HOP-VSL-00903/4) Assembly Drawings (24590-HLW-MV-HOP-P0001/3, Rev. 1 and Rev. 0) in the Dangerous Waste Permit.

Submitted by Co-Operator:		Reviewed by ORP Program Office:	
F. Beranek	1/6/05 Date	R.J. Schepens	1/28/05 Date

Quarter Ending 3/31/2005

24590-HLW-PCN-ENV-04-0001

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update the assembly drawings for the SBS Condensate Receiver Vessels (HOP-VSL-00903/4). These mechanical assembly drawings (24590-HLW-MV-HOP-P0001/3, Rev. 1 and Rev. 0, respectively) reside in Attachment 51, Appendix 10.6, and depict HOP-VSL-00903/4 without wear plates.

Wear plates are included with HOP-VSL-00903/4, as depicted in Detail 1 of 24590-HLW-MV-HOP-P0001/3, Rev. 2, for both, attached. The wear plates are constructed of SB-575 - UNS N06022 with a single layer of Stellite #6 weld overlay.

Please replace 24590-HLW-MV-HOP-P0001, Rev. 1 with 24590-HLW-MV-HOP-P0001, Rev. 2 and 24590-HLW-MV-HOP-P0003, Rev. 0 with 24590-HLW-MV-HOP-P0003, Rev. 2 in Attachment 51, Appendix 10.6.

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: N/A

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

A.3: Equipment replacement or upgrading with functionally equivalent components.

G.3: Replacement of a tank with a tank that meets the same design standards and has the capacity within +/- 10% of the replaced tank provided.

Modification Approved: [X] Yes [ ] No (state reason for denial)

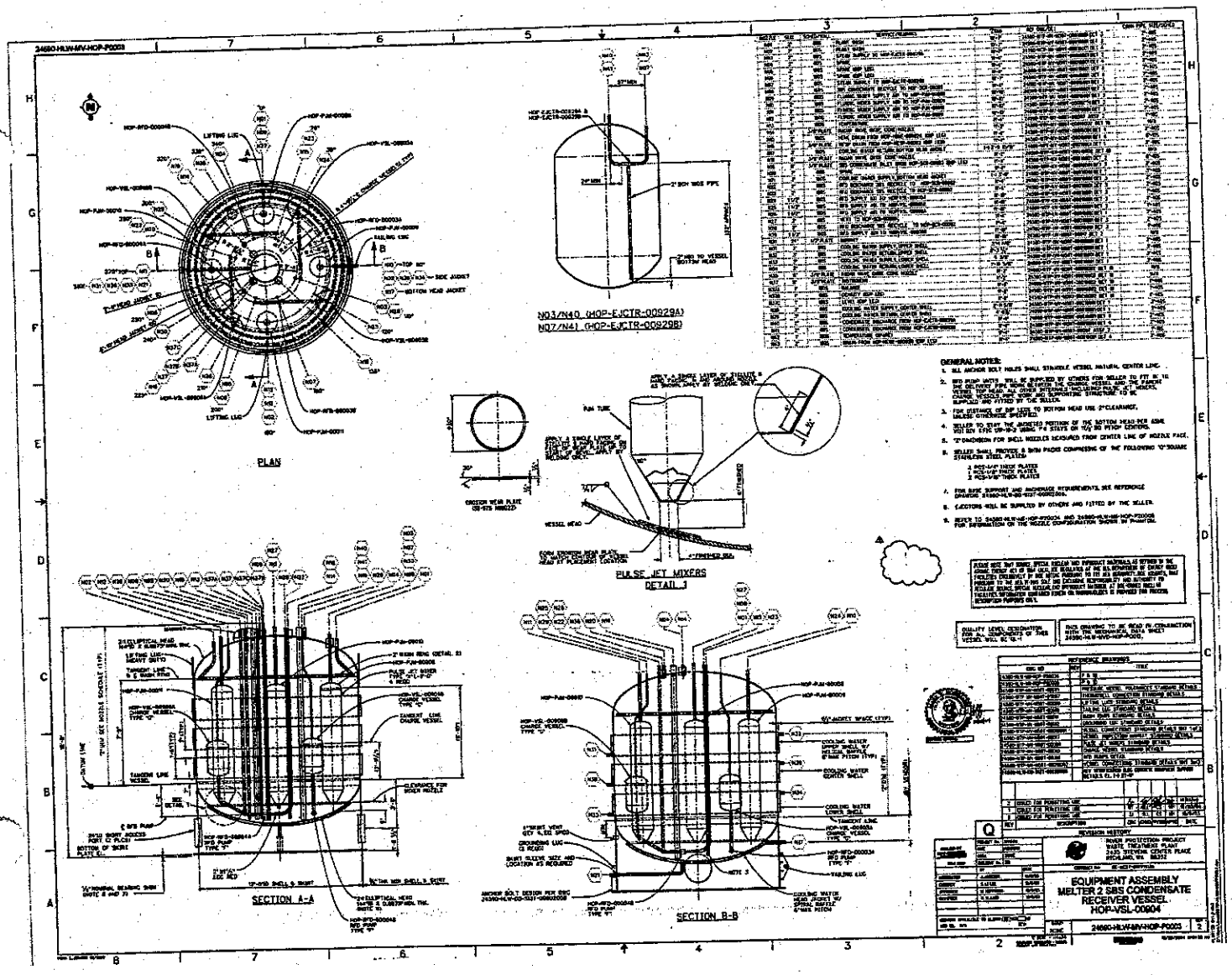
Reason for denial:

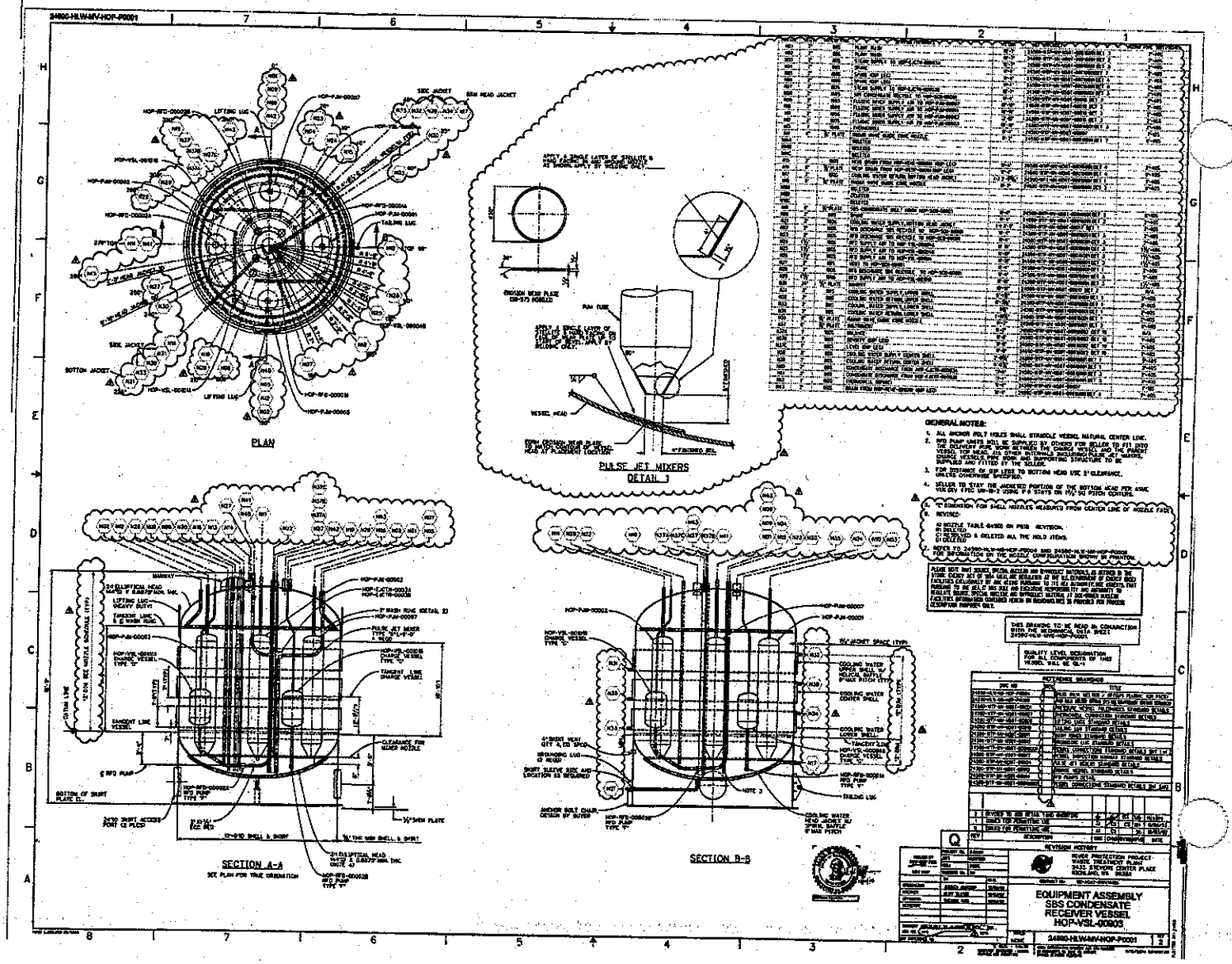
Reviewed by Ecology:

G. P Davis — Date: Feb 14 2005

[1] Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.


PLAN
N03/N40 (HOP-EJCTR-00929A)
N07/N41 (HOP-EJCTR-00929B)
PULSE JET MIXERS
DETAIL 1
SECTION A-A
SECTION B-B
GENERAL NOTES:
EQUIPMENT ASSEMBLY
MELTER 2 SBS CONDENSATE
RECEIVER VESSEL
HOP-VSL-00904


PLAN
PULSE JET MIXERS
DETAIL 1
SECTION A-A
SECTION B-B
GENERAL NOTES:
EQUIPMENT ASSEMBLY
SBS CONDENSATE
RECEIVER VESSEL
HOP-VSL-00903

Quarter Ending 3/31/2005 24590-PTF-PCN-ENV-04-0002

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Page 2 of 3:	Hanford Facility RCRA Permit, Part III, Attachment 51 Class [1]1 Permit Modification to the Mechanical System Data Sheets and the Plant Item Material Selection Data Sheet for Pretreatment Facility Vessels FEP-VSL-00017A and FEP-VSL-00017B
Attachment 1	24590-PTF-MVD-FEP-P0001, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel FEP-VSL-00017A
Attachment 2	24590-PTF-MVD-FEP-P0002, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel FEP-VSL-00017B
Attachment 3	24590-PTF-N1D-FEP-P0002, Rev. 1, Plant Item Material Selection Data Sheet for Pretreatment Vessels FEP-VSL-00017A and FEP-VSL-00017B

Submitted by Co-Operator: 2/13/05

F. Beranek Date

Reviewed by ORP Program Office: 2/17/05

for R. J. Schepens S.J. Olinger Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update the mechanical systems data sheets and the plant item material selection data sheet associated with the Pretreatment facility Waste Feed Evaporation Process (FEP) system vessels FEP-VSL-00017A and FEP-VSL-00017B. Minimal changes to these documents have been made since their initial submittal and approval by Ecology on 7/23/2004. These changes do not affect the form, function, or capacity of the vessels and are discussed by the following:

Mechanical Systems Data Sheets:

The mechanical systems data sheets for vessels FEP-VSL-00017A and FEP-VSL-00017B were updated to include hydrodynamic loading for the vessel pulse jet mixers and the appropriate notes. Additional changes include updates to the Vessel Operating Internal and External Pressures and actual vessel weights determined by the vendor.

Attachment 51, Appendix 8.6:

Replace 24590-PTF-MVD-FEP-P0001, Rev. 1 with 24590-PTF-MVD-FEP-P0001, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel FEP-VSL-00017A

Replace 24590-PTF-MVD-FEP-P0002, Rev. 1 with 24590-PTF-MVD-FEP-P0002, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel FEP-VSL-00017B

See Attachment 1 and Attachment 2 of this Modification Notification for the updated mechanical system data sheets.

Plant Item Material Selection Data Sheet:

The plant item material selection data sheet for vessels FEP-VSL-00017A and FEP-VSL-00017B was updated to be consistent with the material selection data sheets for all black cell vessels. Text was added to address inadvertent nitric acid addition to these vessels, as was done for all black cell vessels. Also, discussions for routine and non-routine operations for the vessels were added. The materials of construction and the corrosion allowance previously identified for FEP-VSL-00017A and FEP-VSL-00017B are unchanged.

Attachment 51, Appendix 8.9:

Replace 24590-PTF-N1D-FEP-P0002, Rev. 0 with 24590-PTF-N1D-FEP-P0002, Rev. 1, Plant Item Material Selection Data Sheet for Pretreatment Vessels FEP-VSL-00017A and FEP-VSL-00017B

See Attachment 3 of this Modification Notification for the updated material selection data sheet.

[1] Class 1 modifications requiring prior Agency approval.
[2] This is only an advanced notification of an intended Class [1] 1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

Quarter Ending 3/31/2005

24590-PTF-PCN-ENV-04-0002

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: N/A

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

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: [X] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

G. P Davis — Date: 3/2/05

Attachment 1

24590-PTF-MVD-FEP-P0001, Rev. 2
Mechanical Systems Data Sheet for Pretreatment Vessel FEP-VSL-00017A

R10463346

MECHANICAL SYSTEMS DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-FEP-VSL-00017A

Project:	RPP-WTP	P&ID.	24590-PTF-M6-FEP-P0001
Project No:	24590	Process Calculation:	Deleted 2
Project Site:	Hanford	Vessel Drawing	24590-PTF-MV-FEP-P0001
Description.	Waste Feed Evaporator Feed Vessel		

ISSUED BY RPP-WTP PDC

Reference Data

Charge Vessels Tag Numbers	Deleted
Pulsejet Mixers / Agitators Tag Numbers	FEP-PJM-00001 Thru -00007 and FEP-PJM-00017
RFDs/Pumps Tag Numbers	Deleted

Design Data

Quality Level		QL-1	Fabrication Specs	24590-WTP-3PS-MV00-TP001		
Seismic Category		SC-I	Design Code	ASME VIII Div 1		
Service/Contents		Radioactive Liquid	Code Stamp	Yes		
Design Specific Gravity		1.27	NB Registration	Yes		
Maximum Operating Volume	gal	71,292	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	85,496	Estimated	160,000	936,000	874,000
			Actual *	164,200 2	928,700 2	903,700 2

Inside Diameter	inch	264			Wind Design	Not Required	
Length/Height (TL-TL)	inch	273			Snow Design	Not Required	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-SS90-T0001	
Internal Pressure	psig	Atm 2	15	N/A	Seismic Base Moment *	ft*lb	
External Pressure	psig	0.123 2	10	N/A	Postweld Heat Treat	Not Required	
Temperature	°F	212	237	N/A	Corrosion Allowance	inch	0.04 (Notes 9, 10) 2
Min. Design Metal Temp.	°F	40			Hydrostatic Test Pressure *	psig	

Note: 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.

MARK W. HOFFMANN
STATE OF WASHINGTON
0030952
REGISTERED PROFESSIONAL ENGINEER
1/26/05
EXPIRES 12/10/06

This Bound Document Contains a total of 4 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
2	~~1/26/05~~ 2/1/05	Issued for Permitting Use				
1	3/19/04	Issued for Permitting Use	K. Brightman	H. Khurana	C. Slater	M. Hoffmann
0	10/29/02	Issued for Permitting Use	J. Jackson	C. Slater	N/A	M. Hoffmann

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-PTF-MV-FEP-VSL-00017A***

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	***SA 240 316 Note 1***	***See Drawing***	***Primary (See Note 6)***
Shell	***SA 240 316 Note 1***	***See Drawing***	***Primary (See Note 6)***
Bottom Head	***SA 240 316 Note 1***	***See Drawing***	***Primary (See Note 6)***
Support	***SA 240 304 Note 1***	***See Drawing***	***N/A***
Jacket/Coils/Half-Pipe Jacket	***N/A***	***N/A***	***N/A***
Internals	***SA 240 316 Note 1***	***See Drawing***	***Thermowell Primary***
Pipe Nozzles	***SA 312 TP316 Seamless Note 1***	***See Drawing***	***Primary (See Note 6)***
Forgings/ Bar stock	***SA 182 F316 Note 1***	***See Drawing***	***N/A***
Gaskets	***N/A***	***N/A***	***N/A***
Bolting	***N/A***	***N/A***	***N/A***

Miscellaneous Data

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

Remarks

* To be determined by the vendor.

Note 1: ***Maximum carbon content 0.030 %***

Note 2: ***Deleted***

Note 3: ***Welds descaled as laid.***

Note 4: ***Vessel volumes are approximate and do not account for the manufacturing tolerances, nozzles, and displacement of internals.***

Note 5: ***This vessel is in Black Cell.***

Note 6: ***All welds forming part of the primary and auxiliary containment including nozzle attachment welds shall be subjected to 100% volumetric examination.***

Note 7: ***Contents of this document are Dangerous Waste Permit affecting.***

Note 8: ***Deleted*** 2

Note 9: ***BNI shall ensure that an additional 0.094" is available for erosion in the bottom head and shall report the minimum thickness required for all specified loading conditions, exclusive of erosion and corrosion allowances.*** 2

Note 10: ***BNI shall ensure that an additional 0.060" is available for erosion in the lower 4" of the interior conical surface of the pulse jet mixers.*** 2

Note 11: ***All hydrodynamic and overblow loads are for BNI internal use only and are to be disregarded by the seller.*** 2

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-PTF-MV-FEP-VSL-00017A***

Equipment Cyclic Data Sheet

Component Plant Item Number	*24590-PTF-MV-FEP-VSL-000017A*
Component Description	*Waste Feed Evaporator Feed Vessel*

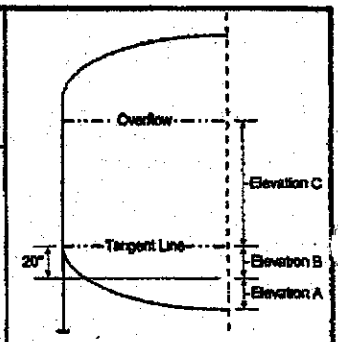
The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*ASME SA240 316 with 0.030 % max. Carbon*
Design Life	*40 years*
Component Function and Life Cycle Description	*This vessel operates with two modes, filling and emptying. It is filled in 6.7 hours and emptied in 16.7 hours. Washdown is once a year.*

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*-10*	*15*	*10*	*Nominal assumption*
Operating Pressure	psig	*-0.123* /2\	*0*	*15,491*	
Operating Temp	°F	*59*	*212*	*15,491*	*Uniform material temperature range, not between two points.*
Contents Specific Gravity		*1.12*	*1.27*	*15,491*	
Contents Level	inch	*30*	*303*	*15,491*	*Liquid level measured from crown of bottom head*
Localized Features					
Nozzles		*Within 50° F of Vessel operating Temp*		*As above*	

Hydrodynamic Loading /2\

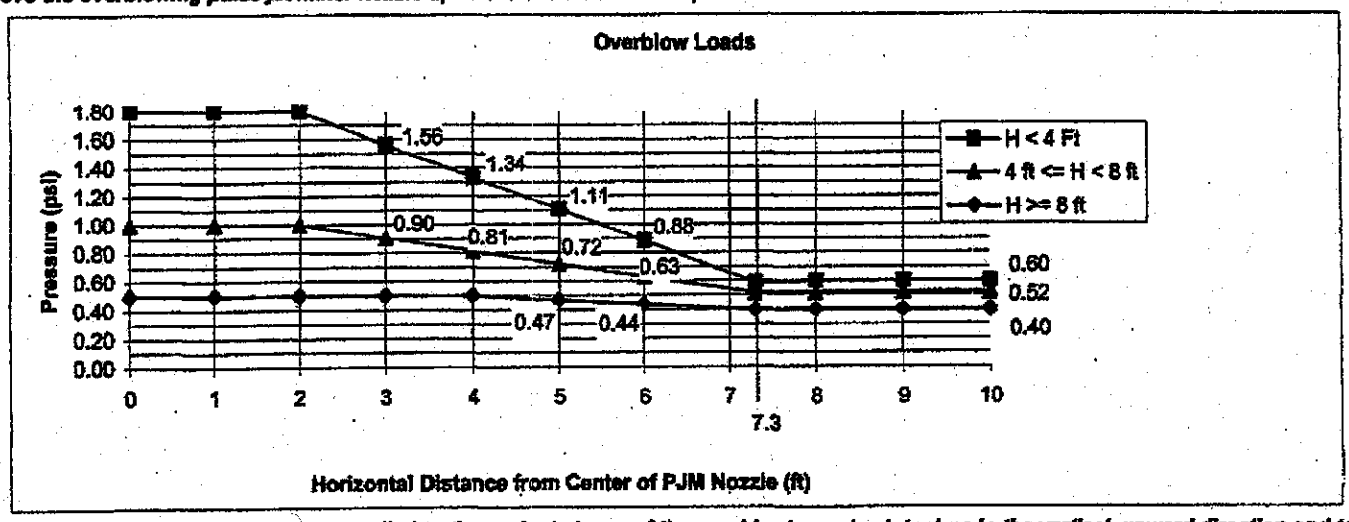
In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overblow loads, and this load combination is also to be assumed to act concurrently with seismic loads.



The following table indicates the normal hydrodynamic pressure at ranges of elevations in the vessel and the number of design cycles for each condition. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Normal Operation Hydrodynamic Pressure Range, psi						Number of Cycles
Elevation A		Elevation B		Elevation C		
Radial	Vertical	Radial	Vertical	Radial	Vertical	
-0.15 to 0.25	*-0.15 to 0.15*	*-0.05 to 0.12*	*-0.15 to 0.15*	*-0.03 to 0.10*	*-0.06 to 0.15*	*7.9 X 10⁶*

Overblow loads vary as a function of the horizontal distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle up to the overflow level as plotted:



The overblow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Any single pulse jet mixer may overblow 100 cycles. /2\

Notes

1. Cycle increase: Increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted. /2\

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-PTF-MV-FEP-VSL-00017A***

Equipment Cyclic Data Sheet

Component Plant Item Number	*PTF-MP-FEP-PJM-00001 Thru –00007 and PTF-MP-FEP-PJM-00017*
Component Description	***Pulse Jet Mixers***

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*ASME SA240 316 with 0.030 % max. Carbon*
Design Life	*40 years*
Component Function and Life Cycle Description	*These pulse jet mixers (PJMs) are cyclically loaded using vacuum to fully fill the PJM with process liquid and compressed air to fully empty the PJM. The PJMs are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The PJM supports shall be designed to cycle between fully buoyant (PJM empty and parent vessel full) and fully loaded (PJM full and parent vessel empty) states. Thrust load shall be applied only to the fully buoyant state. Assume the parent vessel is full for 50% of the number of PJM cycles.* 2

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*80*	*10*	*Nominal assumption*
Operating Pressure	psig	*FV*	*72.5*	*7.9×10^5*	
Operating Temperature	°F	*59*	*212*	*<100*	*Pressure cycles to be at 212°F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.*
Contents Specific Gravity		*1.12*	*1.27*	*<1000*	
Contents Level	inch	*Empty*	*Flooded*	*7.9×10^5*	
Thrust 2	lbf	*0*	*275*	*7.9×10^5*	
Localized Features					
Nozzles					
Supports		*Buoyant / Loaded*		*7.9×10^5*	

Notes

Cycle Increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.

Attachment 2

24590-PTF-MVD-FEP-P0002, Rev. 2
Mechanical Systems Data Sheet for Pretreatment Vessel FEP-VSL-00017B

R10463347

MECHANICAL SYSTEMS DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-FEP-VSL-00017B

Project:	RPP-WTP	P&ID:	24590-PTF-M6-FEP-P0001
Project No:	24590	Process Calculation:	Deleted 2
Project Site:	Hanford	Vessel Drawing	24590-PTF-MV-FEP-P0002
Description:	Waste Feed Evaporator Feed Vessel		

ISSUED BY: RPP-WTP PDC

Reference Data

Charge Vessels Tag Numbers	Deleted
Pulsejet Mixers / Agitators Tag Numbers	FEP-PJM-00008 Thru -00015
RFDs/Pumps Tag Numbers	Deleted

Design Data

Quality Level		QL-1	Fabrication Specs	24590-WTP-3PS-MV00-TP001		
Seismic Category		SC-I	Design Code	ASME VIII Div 1		
Service/Contents		Radioactive Liquid	Code Stamp	Yes		
Design Specific Gravity		1.27	NB Registration	Yes		
Maximum Operating Volume	gal	71,292	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	85,496	Estimated	160,000	936,000	874,000
			Actual *	164,200 2	928,700 2	903,700 2

Inside Diameter	inch	264			Wind Design	Not Required	
Length/Height (TL-TL)	inch	273			Snow Design	Not Required	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-SS90-T0001	
Internal Pressure	psig	Atm 2	15	N/A	Seismic Base Moment *	ft*lb	
External Pressure	psig	0.123 2	10	N/A	Postweld Heat Treat	Not Required	
Temperature	°F	212	237	N/A	Corrosion Allowance	inch	0.04 (Notes 9, 10) 2
Min. Design Metal Temp.	°F	40			Hydrostatic Test Pressure *	psig	

Note: 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.

MARK W. HOFFMANN
STATE OF WASHINGTON
0030952
REGISTERED PROFESSIONAL ENGINEER
1/26/05
EXPIRES 12/10/06

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REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
2	~~1/26/05~~ 2/1/05	Issued for Permitting Use				
1	3/19/04	Issued for Permitting Use	K. Brightman	H. Khurana	C. Slater	M. Hoffmann
0	10/29/02	Issued for Permitting Use	J. Jackson	C. Slater	N/A	M. Hoffmann

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-PTF-MV-FEP-VSL-00017B***

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	***SA 240 316 Note 1***	***See Drawing***	***Auxiliary (Note 6)***
Shell	***SA 240 316 Note 1***	***See Drawing***	***Primary (Note 6)***
Bottom Head	***SA 240 316 Note 1***	***See Drawing***	***Primary (Note 6)***
Support	***SA 240 304 Note 1***	***See Drawing***	***N/A***
Jacket/Coils/Half-Pipe Jacket	***N/A***	***N/A***	***N/A***
Internals	***SA 240 316 Note 1***	***See Drawing***	***Thermowell Primary***
Pipe	***SA 312 TP316 Note 1***	***See Drawing***	***Primary (Note 6)***
Forgings/ Bar stock	***SA 182 F316 Note 1***	***See Drawing***	***N/A***
Gaskets	***N/A***	***N/A***	***N/A***
Bolting	***N/A***	***N/A***	***N/A***

Miscellaneous Data

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

Remarks

* To be determined by the vendor.

Note 1: ***Max. Carbon content 0.030 %***

Note 2: ***Deleted***

Note 3: ***Welds descaled as laid.***

Note 4: ***Vessel volumes are approximate and do not account for the manufacturing tolerances, nozzles, and displacement of internals.***

Note 5: ***This vessel is in a Black Cell.***

Note 6: ***All welds forming part of the primary and auxiliary containment including nozzle attachment welds shall be subjected to 100% volumetric examination.***

Note 7: ***Contents of this document are Dangerous Waste Permit affecting.*** 2

Note 8: ***Deleted*** 2

Note 9: ***BNI shall ensure that an additional 0.094" is available for erosion in the bottom head and shall report the minimum thickness required for all specified loading conditions, exclusive of erosion and corrosion allowances.*** 2

Note 10: ***BNI shall ensure that an additional 0.060" is available for erosion in the lower 4" of the interior conical surface of the pulse jet mixers.*** 2

Note 11: ***All hydrodynamic and overblow loads are for BNI internal use only and are to be disregarded by the seller.*** 2

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** *24590-PTF-MV-FEP-VSL-00017B*

Equipment Cyclic Data Sheet

Component Plant Item Number	*24590-PTF-MV-FEP-VSL-000017B*
Component Description	*Waste Feed Evaporator Feed Vessel*

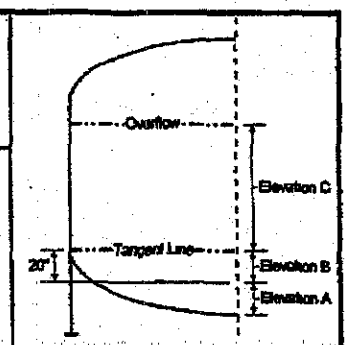
The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*ASME SA240 316 with 0.030% max. Carbon*
Design Life	*40 years*
Component Function and Life Cycle Description	*This vessel operates with two modes, filling and emptying. It is filled in 6.0 hours and emptied in 16.7 hours. Washdown is once a year.*

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*-10*	*15*	*10*	*Nominal assumption*
Operating Pressure	psig	*-0.123* /2\	*0*	*15,491*	
Operating Temperature	°F	*59*	*212*	*15,491*	*Uniform material temperature range, not between two points.*
Contents Specific Gravity		*1.12*	*1.27*	*15,491*	
Contents Level	inch	*30*	*303*	*15,491*	*Liquid level measured from crown of bottom head*
Localized Features					
Nozzles		*Within 50° of vessel operating temp.*		*As above*	

Hydrodynamic Loading /2\

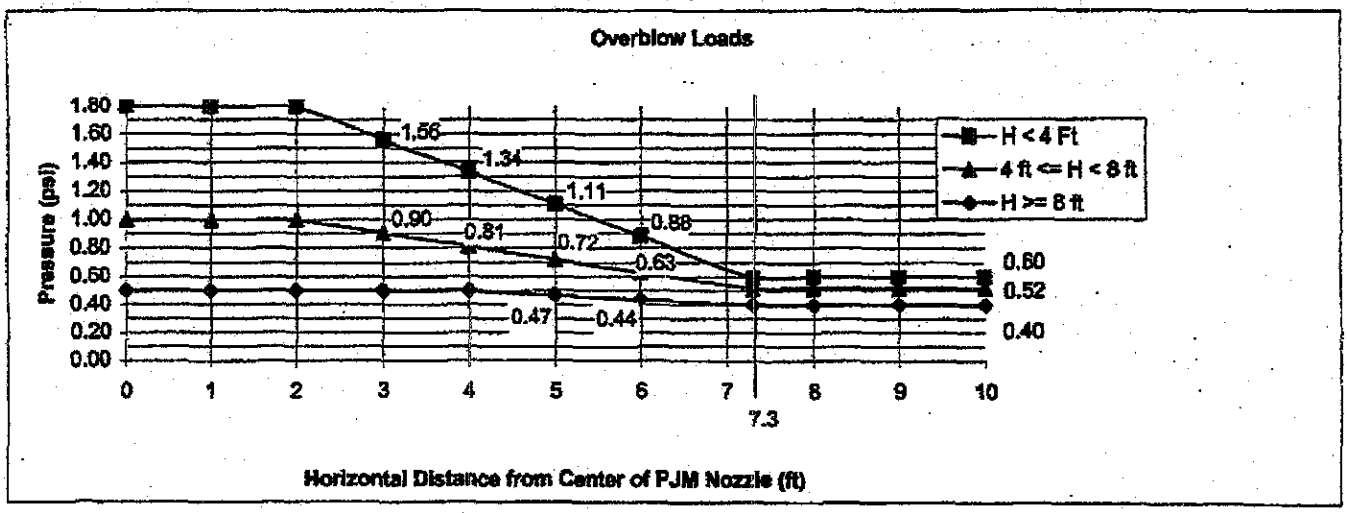
In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overblow loads, and this load combination is also to be assumed to act concurrently with seismic loads.



The following table indicates the normal hydrodynamic pressure at ranges of elevations in the vessel and the number of design cycles for each condition. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Normal Operation Hydrodynamic Pressure Range, psi						Number of Cycles
Elevation A		Elevation B		Elevation C		
Radial	Vertical	Radial	Vertical	Radial	Vertical	
-0.15 to 0.25	*-0.15 to 0.15*	*-0.05 to 0.12*	*-0.15 to 0.15*	*-0.03 to 0.10*	*-0.06 to 0.15*	*7.9 X 10⁶*

Overblow loads vary as a function of the horizontal distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle up to the overflow level as plotted:



The overblow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Any single pulse jet mixer may overblow 100 cycles. /2\

Notes

1. Cycle Increase: Increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted. /2\

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-PTF-MV-FEP-VSL-00017B***

Equipment Cyclic Data Sheet

Component Plant Item Number	*PTF-MP-FEP-PJM-00008 Thru –00015*
Component Description	*Pulse Jet Mixers*

The Information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*ASME SA240 316 with 0.030% max. Carbon*
Design Life	*40 years*
Component Function and Life Cycle Description	*These pulse jet mixers (PJMs) are cyclically loaded using vacuum to fully fill the PJM with process liquid and compressed air to fully empty the PJM. The PJMs are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The PJM supports shall be designed to cycle between fully buoyant (PJM empty and parent vessel full) and fully loaded (PJM full and parent vessel empty) states. Thrust load shall be applied only to the fully buoyant state. Assume the parent vessel is full for 50% of the number of PJM cycles.* 2

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*80*	*10*	*Nominal assumption*
Operating Pressure	psig	*FV*	*72.5*	*7.9 X 10⁴*	
Operating Temperature	°F	*59*	*212*	*<100*	*Pressure cycles to be at 212°F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.*
Contents Specific Gravity		*1.12*	*1.27*	*<1000*	
Contents Level	inch	*Empty*	*Flooded*	*7.9 X 10⁴*	
Thrust 2	lbf	*0*	*275*	*7.9 X 10⁴*	
Localized Features					
Supports		*Buoyant / Loaded*		*7.9 X 10⁴*	

Notes

Cycle Increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.

Attachment 3

24590-PTF-N1D-FEP-P0002, Rev. 1
Plant Item Material Selection Data Sheet for Pretreatment
Vessels FEP-VSL-00017A and FEP-VSL-00017B

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10460393

FEP-VSL-00017A/B (PTF)
Waste Feed Evaporator Feed Vessel

- Design Temperature (°F)(max/min): 237/40
- Design Pressure (psig) (max/min): 15/-10
- Location: incell
- PJM Discharge Velocity (fps): 40
- Drive Cycle: 17 % (at 40 fps)

Off spring items

FEP-VSL-00017A
FEP-PJM-00001 – FEP-PJM-00007,
FEP-PJM-00017
FEP-VSL-00017B
FEP-PJM-00008 – FEP-PJM-00015

Contents of this document are Dangerous Waste Permit affecting

ISSUED BY RPP-WTP PDC

Operating conditions are as stated on sheets 6 and 7

Assumptions: No steam ejectors, no acid additions without prior water flush.

Operating Modes Considered:

- Normal operations

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 316 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.04 inch (includes 0.00 inch erosion allowance; additional localized protection required and discussed in section j)

Process & Operations Limitations:

- Develop rinsing/flushing procedure for water and acid

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED PROFESSIONAL ENGINEER
EXPIRES: 12/07/05

1/24/05

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This bound document contains a total of 7 sheets.

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1	1/24/05	Issued for Permitting Use			
0	3/19/04	Issued for Permitting Use	DLA	JRD	SWV

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

Vessels receive waste feed from FRP-VSL-00002A/B/C/D and recycles routed from PWD-VSL-00044, PWD-VSL-00015/16, RDP-VSL-00002A/B/C and UFP-VSL-00001A/B. Vessels are equipped with emptying ejectors to remove vessel heel. Emptying ejectors are located external to vessel.

a General Corrosion
Based on Hamner's data (1981), 304 (and 304L) has a corrosion rate of less than 20 mpy (500 μm/y) in NaOH at 77°F and over 20 mpy at 122°F. He shows 316 (and 316L) has a rate of less than 2 mpy in 50% NaOH at up to 122°F. Sedriks (1996) states that the 300 series are acceptable in up to 50% NaOH at temperatures up to about 122°F.

Danielson & Pitman (2000), based on short-term studies, suggest a corrosion rate of about 0.5 mpy for 316L. This corroborates Sedriks.

Work has shown that 304L corroded less than 316L in simulated complexant waste with fluorides and chlorides at 140°F. The corrosion rate of 304L after six months of testing was less than 0.2 mpy and that of 316L about 0.6 mpy.

In review of the 242-A Evaporator, it has been found that in waste similar to that expected in WTP, the corrosion, of 304L after about 2 years of operation was less than the accepted variability of the plate. The uncertainties in the starting thickness made the exact calculation of a corrosion rate uncertain though for 304L it appeared to be less than about 10 mpy. However, no cracking or pitting was noted.

Conclusion:
At temperatures less than 122°F, 304L, or higher alloys, is expected to be sufficiently resistant to the waste solution with a probable general corrosion rate of less than 1 mpy.

b Pitting Corrosion
It is thought that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices. 304L would probably be acceptable, but the use of 316L would provide a benefit because of their resistance to pitting by chlorides. Davis (1994) recommends the use of 316L over 304L. Koch (1995) is of the opinion that fluoride will have little effect. No hint of pitting was evident after six months at 140°F with heat transfer in simulated evaporator waste.

Revie (2000) notes that nitrate inhibits chloride corrosion. Therefore, the high nitrate concentrations in the waste are expected to be beneficial.

Conclusion:
316L is recommended to offer greater protection against pitting.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions. This system is generally alkaline. If nitric acid is used for cleaning, cleaning should not be performed at higher than 122°F.

Conclusion:
Not applicable to this system.

d Stress Corrosion Cracking
The exact amount of chloride required to stress corrosion crack stainless steel is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as 10 ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140°F. Further, the use of "L" grade stainless reduces the opportunity for sensitization. From the above references, it also observed that alkaline conditions reduce the probability of the initiation of stress corrosion cracking to essentially zero. However, should a pit or crevice, including a deposit, be present where the environment can become acid, then the alkaline environment will no longer have an effect.

Conclusion:
316L is recommended to offer greater protection against pitting and therefore reduce the likelihood of cracking.

e Crevice Corrosion
Essentially the same comments and conclusions obtained for pitting are valid here.

Conclusion:
Same as for pitting.

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

PLANT ITEM MATERIAL SELECTION DATA SHEET

g Microbiologically Induced Corrosion (MIC)
MIC typically is not prevalent in high pH solutions. Most microbes prefer a pH below 7 though some have been grown at above 9.5. Further, microbial growth is normally not a concern in tanks.

Conclusion:
MIC is not a concern in the vessels.

h Fatigue/Corrosion Fatigue
Corrosion fatigue is a not expected to be a problem in these vessels.

Conclusions
Not expected to be a concern.

i Vapor Phase Corrosion
Because of the highly alkaline conditions, no free HF or HCl is expected to be present in the vapor phase and no uniform/general corrosion is expected. However, because of the air operated ejectors and agitators, it is likely aerosols will be formed that will deposit on the roof of the tank. If there is condensation, these might be washed off.

Conclusion:
Vapor phase corrosion will not be a concern. 316L is recommended.

j Erosion
Based on past experiments by Smith & Elmore (1992), the solids are soft and erosion is not expected to be a concern for the vessel wall. Additional 316L stainless steel should be provided as localized protection for the applicable portions of the bottom head to accommodate PJM discharge velocities of up to 12 m/s with normal maximum solids concentrations of 4 wt% and maximum solids concentrations of 5 wt% with a usage of 46 % operation. Vessels FEP-VSL-00017A/B require at least 0 094-inch additional protection. The 5 wt% is considered to be conservative. The faction of time the solids concentration is expected to be at maximum is 10 %. During normal operation, 90 % of the time, the solids content of FEP-VSL-00017A/B is expected to be 4 %.

The wear of the PJM nozzles can occur from flow for both the discharge and reflood cycles of operation. At least 0.060–inch of additional 316L stainless steel should be provided on the inner surface of the PJM nozzle to accommodate wear due to PJM discharge and suction velocities with normal solids concentrations of 4 wt% and a maximum solids concentration of 5 wt% for usage of 46 % operation

Conclusion:
The recommended corrosion allowance provides sufficient protection for erosion of the vessel wall. Additional localized protection for the bottom head will accommodate PJM discharge velocities and for the PJM nozzles will accommodate PJM discharge and reflood velocities.

k Galling of Moving Surfaces
There are no moving surfaces within the vessels. Connections are welded and not bolted.

Conclusion:
Galling is of no concern in these vessels.

l Fretting/Wear
There are no contacting surfaces that are part of the vessel.

Conclusion:
Fretting and wear are not of concern.

m Galvanic Corrosion
The vessel contains no dissimilar metals.

Conclusion:
Galvanic corrosion is not a concern.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
Creep is a high temperature phenomenon, occurring at greater than about 932°F. This system operates at approximately 75 °F.

Conclusion:
Creep is not a concern.

PLANT ITEM MATERIAL SELECTION DATA SHEET

p Inadvertent Nitric Acid Addition

Higher chloride contents and higher temperatures usually require higher alloy materials. Nitrate ions inhibit the pitting and crevice corrosion of stainless alloys. Furthermore, nitric acid passivates these alloys; therefore, lower pH values brought about by increases in the nitric acid content of process fluid will not cause higher corrosion rates for these alloys. The upset condition that was most likely to occur is lowering of the pH of the vessel content by inadvertent addition of 0.5 M nitric acid. Lowering of pH may make a chloride-containing solution more likely to cause pitting of stainless alloys. Increasing the nitric acid content of the process fluid adds more of the pitting-inhibiting nitrate ion to the process fluid. In addition, adding the nitric acid solution to the stream will dilute the chloride content of the process fluid.

Conclusion:

The recommended materials will be able to withstand a plausible inadvertent addition of 0.5 M nitric acid for a limited period.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. Danielson, MJ & SG Pitman, 2000, *Corrosion Tests of 316L and Hastelloy C-22 in Simulated Tank Waste Solutions*, PNWD-3015 (BNFL-RPT-019, Rev 0), Pacific Northwest Laboratory, Richland WA.
2. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
3. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
4. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX 77218
5. Koch, GH, 1995, *Localized Corrosion in Halides Other Than Chlorides*, MTI Pub No. 41, Materials Technology Institute of the Chemical Process Industries, Inc, St Louis, MO 63141
6. Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
7. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
8. Smith, H. D. and M. R. Elmore, 1992, *Corrosion Studies of Carbon Steel under Impinging Jets of Simulated Slurries of Neutralized Current Acid Waste (NCAW) and Neutralized Cladding Removal Waste (NCRW)*, PNL-7816, Pacific Northwest Laboratory, Richland, Washington.

Bibliography:

1. Agarwal, DC, *Nickel and Nickel Alloys*, In: Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
2. Berhardsson, S, R Mellstrom, and J Oredsson, 1981, *Properties of Two Highly corrosion Resistant Duplex Stainless Steels*, Paper 124, presented at Corrosion 81, NACE International, Houston, TX 77218
3. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
4. Phull, BS, WL Mathay, & RW Ross, 2000, *Corrosion Resistance of Duplex and 4-6% Mo-Containing Stainless Steels in FGD Scrubber Absorber Slurry Environments*, Presented at Corrosion 2000, Orlando, FL, March 26-31, 2000, NACE International, Houston TX 77218.
5. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158
6. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

OPERATING CONDITIONS

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Waste feed evaporator feed vessel (FEP-VSL-00017A/B)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Max		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	9.79E+01	7.25E+01			
Chloride	g/l	4.24E+01	3.14E+01			
Fluoride	g/l	5.08E+01	3.76E+01			
Iron	g/l	2.34E+01	1.74E+01			
Nitrate	g/l	6.83E+02	5.06E+02			
Nitrite	g/l	2.34E+02	1.73E+02			
Phosphate	g/l	1.67E+02	1.23E+02			
Sulfate	g/l	9.00E+01	6.66E+01			
Mercury	g/l	9.26E-02	6.86E-02			
Carbonate	g/l	2.57E+02	1.91E+02			
Undissolved solids	wt%	4.6%	3.9%			
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Note 2
Temperature	°F					Note 3

List of Organic Species:

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. Receives resin flush solution(RDP09) pH approx 1.0 with reportable Cl & F, and neutralized high active effluent from PWD-VSL-00015/16 pH approx 14. RDP09 volume is small relative to the other streams but administrative controls and precautions should be taken not to transfer RDP09 to the vessel without sufficient alkaline heel present.
3. T normal operation 59 °F to 122 °F.

Assumptions:

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.4.4 Waste Feed Evaporator Feed Vessel (FEP-VSL-00017A/B)

Routine Operations

Two waste feed evaporator feed vessels (FEP-VSL-00017 A/B) receive waste feed and recycles. Waste feed is transferred from the waste feed receipt vessels (FRP-VSL-00002 A/B/C/D). Recycles are routed from the plant wash and disposal vessel (PWD-VSL-00044), acidic/alkaline effluent vessels (PWD-VSL-00015 and PWD-VSL-00016), spent resin collection and dewatering process vessels (RDP-VSL-00002 A/B/C), and ultrafiltration feed preparation vessels (UFP-VSL-00001 A/B). Each feed vessel is equipped with remote sampling capability.

The feed vessels (FEP-VSL-00017 A/B) can operate by both filling and discharging at the same time or by alternating one vessel filling and the other discharging. The design basis for normal operations is to have the feed vessels alternating on 12-hour cycles (i.e., 12 hours filling, 12 hours discharging). This cycle time is based on WTP contract conditions for LAW glass production of 80 t/day (DOE 2000). Operations can vary this cycle time according to equipment availability; operator preferences for recycle management, and throughput requirements. The discharge is accomplished with a waste feed evaporator feed pump (FEP-PMP-00007 A or B) normally dedicated to one feed vessel, but with the ability to receive from either feed vessel (FEP-VSL-00017 A or B).

Each vessel is equipped with PJMs that blend and maintain solids suspension in the waste. The vessel vent system draws air into the vapor space of each vessel while removing gases to maintain the hydrogen concentration to below the lower flammability limit. Forced purge air is also supplied to the vessels. The two vessels are connected by a bi-directional overflow line that overflows to the ultimate overflow vessel (PWD-VSL-00033). For purposes of decontamination, each vessel is equipped with wash rings.

Non-Routine Operations that Could Affect Corrosion/Erosion

None identified.

Quarter Ending 3/31/2005 24590-PTF-PCN-ENV-04-0004

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Page 2 of 3:	Hanford Facility RCRA Permit, Part III, Attachment 51
	Class [1]1 Permit Modification to the Mechanical System Data Sheets and the Plant Item Material Selection Data Sheet for Pretreatment Facility Vessels RLD-VSL-00017A and RLD-VSL-00017B
Attachment 1	24590-PTF-MVD-RLD-P0005, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel RLD-VSL-00017A
Attachment 2	24590-PTF-MVD-RLD-P0006, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel RLD-VSL-00017B
Attachment 3	24590-PTF-N1D-RLD-P0002, Rev. 1, Plant Item Material Selection Data Sheet for Pretreatment Vessels RLD-VSL-00017A and RLD-VSL-00017B

Submitted by Co-Operator:

F. Beranek — 1/13/05 Date

Reviewed by ORP Program Office:

for R. J. Schepens S.J. Olinger — 2/17/05 Date

Quarter Ending 3/31/2005

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **Waste Treatment and Immobilization Plant**	Permit Part & Chapter: **Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update mechanical systems data sheets and the plant item material selection data sheet associated with the Pretreatment facility Radioactive Liquid Waste Disposal System (RLD) system vessels RLD-VSL-00017A and RLD-VSL-00017B. Minimal changes to these documents have been made since their initial submittal and approval by Ecology on 7/23/2004. These changes do not affect the form, function, or capacity of the vessels and are discussed by the following:

Mechanical Systems Data Sheets:

The mechanical systems data sheets for vessels RLD-VSL-00017A and RLD-VSL-00017B were updated to include hydrodynamic loading for the vessel pulse jet mixers and the appropriate notes. Additional changes include updates to the maximum operating temperature, the maximum design temperature, the maximum operating volume, and the actual vessel weights determined by the vendor.

Attachment 51, Appendix 8.6:

Replace 24590-PTF-MVD-RLD-P0005, Rev. 1 with 24590-PTF-MVD-RLD-P0005, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel RLD-VSL-00017A

Replace 24590-PTF-MVD-RLD-P0006, Rev. 1 wit h24590-PTF-MVD-FEP-P0006, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel RLD-VSL-00017B

See Attachment 1 and Attachment 2 of this Modification Notification for the updated mechanical system data sheets.

Plant Item Material Selection Data Sheet:

The plant item material selection data sheet for vessels RDP-VSL-00017A and RDP-VSL-00017B was updated to be consistent with the material selection data sheets for all black cell vessels. Text was added to address inadvertent nitric acid addition to these vessels, as was done for all black cell vessels. Discussions for routine and non-routine operations for the vessels were added. Also, the maximum design temperature was changed. The materials of construction and the corrosion allowance previously approved for RLD-VSL-00017A and RLD-VSL-00017B are unchanged.

Attachment 51, Appendix 8.9:

Replace 24590-PTF-N1D-FEP-P0002, Rev. 0 with 24590-PTF-N1D-FEP-P0002, Rev. 1, Plant Item Material Selection Data Sheet for Pretreatment Vessels FEP-VSL-00017A and FEP-VSL-00017B

See Attachment 3 of this Modification Notification for the updated material selection data sheet.

[1] Class 1 modifications requiring prior Agency approval.
[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

Quarter Ending 3/31/2005

24590-PTF-PCN-ENV-04-0004

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: N/A

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

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: [X] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

G. P Davis — Date: 3/2/05

Attachment 1

24590-PTF-MVD-RLD-P0005, Rev. 2
Mechanical Systems Data Sheet for Pretreatment Vessel RLD-VSL-00017A

R10461324

ISSUED BY RPP-WTP PDC

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-RLD-VSL-000017A

Project	RPP-WTP	P&ID	24590-PTF-M6-RLD-P0003
Project No	24590	Process Calculation	Deleted
Project Site	Hanford	Vessel Drawing	24590-PTF-MV-RLD-P0001
Description	Alkaline Effluent Vessel		

Reference Data

Charge Vessels Tag Numbers	N/A
Pulsejet Mixers / Agitators Tag Numbers	RLD-MXR-00001
RFDs/Pumps Tag Numbers	N/A

Design Data

Quality Level		CM	Fabrication Specs	24590-WTP-3PS-MV00-TP001			
Seismic Category		SC-III	Design Code	ASME Sec. VIII Div 1			
Service/Contents		Alkaline Effluent	Code Stamp	Yes			
Design Specific Gravity		1.10	NB Registration	Yes			
Maximum Operating Volume	gal	28,072 (2)	Weights (lbs)	Empty	Operating	Test	
Total Volume	gal	34,340	Estimated	87,300	354,500	373,900	
			Actual *	93,580 (2)	380,190 (2)	355,910 (2)	

Inside Diameter	inch	192			Wind Design	Not Required	
Length/Height (TL-TL)	inch	210			Snow Design	Not Required	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-FB01-T0001	
						24590-WTP-3PS-MV00-TP002	
Internal Pressure	psig	0	15	N/A	Seismic Base Moment *	ft*lb	
External Pressure	psig	0.22	8	N/A	Postweld Heat Treat	Not Required	
Temperature	°F	155 (2)	180 (2)	N/A	Corrosion Allowance	Inch	0.08
Min. Design Metal Temp	°F	40			Hydrostatic Test Pressure *	psig	

Note: 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.

MARK W. HOFFMANN
STATE OF WASHINGTON
0030952
REGISTERED PROFESSIONAL ENGINEER
1/25/05
EXPIRES 12/10/06

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0	12/18/02	Issued for Permitting Use	J. Jackson	C. Slater	N/A	M. Hoffmann

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-PTF-MV-RLD-VSL-000017A***

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	***SA 240 304 with max. Carbon of 0.030 %***	***See Drawing***	***Auxiliary***
Shell	***SA 240 304 with max. Carbon of 0.030 %***	***See Drawing***	***Primary***
Bottom Head	***SA 240 304 with max. Carbon of 0.030 %***	***See Drawing***	***Primary***
Support (Skirt)	***SA 240 304 with max. Carbon of 0.030 %***	***See Drawing***	***N/A***
Jacket/Coils/Half-Pipe Jacket	***N/A***	***N/A***	***N/A***
Internals	***SA 240 304 with max. Carbon of 0.030 %***	***See Drawing***	***Thermowell Primary***
Pipe	***SA312 TP304 Seamless with max. Carbon of 0.030%***	***See Drawing***	***See Note-1***
Forgings/ Bar stock	***SA182 F304 with max. Carbon of 0.030 %***	***See Drawing***	***As Note-1 for Nozzle Necks***
Gaskets	***Spiral Wound, 304L Winding with Flexible Graphite Filler***	***See Drawing***	***As Note-1 for Nozzle Necks***
Bolting	***Austenitic SS type 304L***	***See Drawing***	***N/A***

Miscellaneous Data

Orientation	***Vertical***	Support Type	***Skirt***
Insulation Function	***Not Applicable***	Insulation Material	***Not Applicable***
Insulation Thickness (inch)	***Not Applicable***	Welds Surface Finish	***De-scaled as laid***

Remarks

* To be determined by the vendor.

Note 1: Nozzle necks below the high operating liquid level are Primary, others Auxiliary.

Note 2: NDE for this vessel must meet requirements per para. 6.4.2 of specification no. 24590-WTP-3PS-MV00-TP001.

Note 3: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals.

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

Note 5: Deleted 2

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-PTF-MV-RLD-VSL-000017A***

Equipment Cyclic Data Sheet

Plant Item Number	***24590-PTF-MV-RLD-VSL-00017A***
Component Description	***Parent Vessel***

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	***SA 240 304 with max. Carbon of 0.030 %***
Design Life	***40 years***
Component Function and Life Cycle Description	***This is a "batch" vessel and cycles from nearly empty to nearly full. The vessel will be in the fill mode for two days, then in the discharge mode over the next two days.***

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***FV***	***15***	***10***	***Nominal assumption***
Operating Pressure	psig	***-0.22***	***0***	***3500***	
Operating Temperature	°F	***59***	2 ***155***	***3500***	***Uniform material temperature range, not between two points***
Contents Specific Gravity		***1.1***	***1.1***	***N/A***	
Contents Level	inch	***Empty***	***Flooded***	***3500***	***Coincident with pressure cycles***
Localized Features					
Nozzles		***Within 50°F of vessel operating range***		***As above***	

Notes

Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.

Attachment 2

24590-PTF-MVD-RLD-P0006, Rev. 2
Mechanical Systems Data Sheet for Pretreatment Vessel RLD-VSL-00017B

R10461325

ISSUED BY
RPP-WTP PDC

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-RLD-VSL-000017B

Project	RPP-WTP	P&ID.	24590-PTF-M6-RLD-P0003
Project No	24590	Process Calculation	Deleted
Project Site	Hanford	Vessel Drawing	24590-PTF-MV-RLD-P0002
Description	Alkaline Effluent Vessel		

Reference Data

Charge Vessels Tag Numbers	N/A
Pulsejet Mixers / Agitators Tag Numbers	RLD-MXR-00002
RFDs/Pumps Tag Numbers	N/A

Design Data

TP001 1-27-05

Quality Level		CM		Fabrication Specs	~~24590-WTP-3PS-MV00-T0001~~		
Seismic Category		SC-III		Design Code	ASME Sec. VIII Div 1		
Service/Contents		Alkaline Effluent		Code Stamp	Yes		
Design Specific Gravity		1.10		NB Registration	Yes		
Maximum Operating Volume	gal	28,072 (2)		Weights (lbs)	Empty	Operating	Test
Total Volume	gal	34,340		Estimated	87,300	354,500	373,900
				Actual *	93,580 (2)	380,180 (2)	355,910 (2)

Inside Diameter	inch	192			Wind Design	Not Required	
Length/Height (TL-TL)	inch	210			Snow Design	Not Required	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-FB01-T0001 24590-WTP-3PS-MV00-TP002	
Internal Pressure	psig	0	15	N/A	Seismic Base Moment *	ft*lb	
External Pressure	psig	0.22	8	N/A	Postweld Heat Treat	Not Required	
Temperature	°F	155 (2)	180 (2)	N/A	Corrosion Allowance	inch	0.08
Min. Design Metal Temp.	°F	40			Hydrostatic Test Pressure *	psig	

Note: 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.

MARK W. HOFFMANN
STATE OF WASHINGTON
0030952
REGISTERED PROFESSIONAL ENGINEER
1/25/05
EXPIRES 12/10/06

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	MECHANICAL DATA SHEET: VESSEL	PLANT ITEM No. 24590-PTF-MV-RLD-VSL-000017B

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	***SA 240 304 with max. Carbon of 0.030 %***	***See Drawing***	***Auxiliary***
Shell	***SA 240 304 with max. Carbon of 0.030 %***	***See Drawing***	***Primary***
Bottom Head	***SA 240 304 with max. Carbon of 0.030 %***	***See Drawing***	***Primary***
Support (Skirt)	***SA 240 304 with max. Carbon of 0.030 %***	***See Drawing***	***N/A***
Jacket/Coils/Half-Pipe Jacket	***N/A***	***N/A***	***N/A***
Internals	***SA 240 304 with max. Carbon of 0.030 %***	***See Drawing***	***Thermowell Primary***
Pipe	***SA312 TP304 Seamless with max. Carbon of 0.030%***	***See Drawing***	***See Note-1***
Forgings/ Bar stock	***SA182 F304 with max. Carbon of 0.030 %***	***See Drawing***	***As Note-1 for Nozzle Necks***
Gaskets	***Spiral Wound, 304L Winding with Flexible Graphite Filler***	***See Drawing***	***As Note-1 for Nozzle Necks***
Bolting	***Austenitic SS type 304L***	***See Drawing***	***N/A***

Miscellaneous Data

Orientation	***Vertical***	Support Type	***Skirt***
Insulation Function	***Not Applicable***	Insulation Material	***Not Applicable***
Insulation Thickness (inch)	***Not Applicable***	Welds Surface Finish	***De-scaled as laid***

Remarks

* To be determined by the vendor.

Note 1: Nozzle necks below the high operating liquid level are Primary, others Auxiliary.

Note 2: NDE for this vessel must meet requirements per para. 6.4.2 of specification no. 24590-WTP-3PS-MV00-TP001.

Note 3: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals.

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

Note 5: Deleted. 2

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-PTF-MV-RLD-VSL-000017B***

Equipment Cyclic Data Sheet

Plant Item Number	***24590-PTF-MV-RLD-VSL-00017B***
Component Description	***Parent Vessel***

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	***SA 240 304 with max. Carbon of 0.030 %***
Design Life	***40 years***
Component Function and Life Cycle Description	***This is a "batch" vessel and cycles from nearly empty to nearly full. The vessel will be in the fill mode for two days, then in the discharge mode over the next two days.***

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***FV***	***15***	***10***	***Nominal assumption***
Operating Pressure	psig	***-0.22***	***0***	***3500***	
Operating Temperature	°F	***59***	2 ***155***	***3500***	***Uniform material temperature range, not between two points***
Contents Specific Gravity		***1.1***	***1.1***	***N/A***	
Contents Level	inch	***Empty***	***Flooded***	***3500***	***Coincident with pressure cycles***
Localized Features					
Nozzles		***Within 50°F of vessel operating range***		***As above***	

Notes

Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.

Attachment 3

24590-PTF-N1D-RLD-P0002, Rev. 1
Plant Item Material Selection Data Sheet for Pretreatment
Vessels RLD-VSL-00017A and RLD-VSL-00017B

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10460392

RLD-VSL-00017-A/B (PTF)
Alkaline Effluent Vessels

- Design Temperature (°F)(max/min): 180/40
- Design Pressure (psig) (max/min): 15/FV
- Location: inceil

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on sheets 5 and 6

ISSUED BY
RPP-WTP PDC

Operating Modes Considered:

- Normal operating conditions

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00	X	
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 304 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.08 inch (includes 0.00 inch erosion allowance)

Process & Operations Limitations:

- Develop rinsing/flushing procedure for acid or water.

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED
PROFESSIONAL ENGINEER
1/25/05
EXPIRES: 12/07/05

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.

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PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

These vessels will normally receive caustic effluent from LVP-VSL-00001, spent reagents from CRP-VSL-00001 and potentially active material from PWD-VSL-00046.

a General Corrosion
Hanner's data (1981) shows a corrosion rate for 304 (and 304L) in NaOH of less than 20 mpy (500 μm/y) at 77°F and over 20 mpy at 122°F. He shows 316 (and 316L) has a rate of less than 2 mpy up to 122°F and 50% NaOH. Sedriks (1996) states that the 300 series alloys are acceptable in up to 50% NaOH at temperatures up to about 122°F or slightly above. Work with simulated-radwaste evaporators, six months at 140°F, showed 304L was slightly more resistant to corrosion (<0.2 mpy) than was 316L (<0.6 mpy); Ni 200, pure nickel, was much less resistant (≈7 mpy) probably due to the complexants. The Savannah River evaporator vessels, operating at about 300°F, are made of 304L and have suffered no failures in about 30 years; 304L heat transfer surfaces have failed however after about 10 years.

Davis (1994) states the corrosion rate for 304L in pure NaOH will be less than about 0.1 mpy up to about 212°F though Sedriks (1996) states the data beyond about 122°F are incorrect. Danielson and Pitman (2000), based on short term studies, suggest a corrosion rate of about 0.5 mpy for 316L in simulated waste at boiling, >212°F.

In review of the 242-A Evaporator, it was found that in waste similar to that expected in LAW, the corrosion of 304L after about two years of operation at 140°F was less than the accepted variability of the plate. Because of uncertainties in the starting thickness of the metal, a review of the raw data was inconclusive.

Uhlig (1948) has shown that pure nickel is resistant to corrosion by NaOH. However, the presence of complexing agents may reverse the trend. Agarwal (2000) states that the higher nickel alloys, such as C-22, are highly corrosion resistant though specific mention of alkaline media is not made. The general literature mainly discusses cracking problems (see below) rather than uniform corrosion.

In these vessels, the hydroxide concentration will be significantly lower as is the temperature; thus, the corrosion rates will be smaller.

Conclusion:
At temperatures less than about 140°F, 304L or 316L are expected to be sufficiently resistant to the waste solution with a probable general corrosion rate of less than 1 mpy. Based on the Savannah River experience with Hanford-like waste at higher temperatures, 304L is expected to be satisfactory to 180 °F. Rinsing procedure should be developed to minimize effects of acid in the presence of fluoride A 0.08 inch corrosion allowance is recommended to compensate for the possibility of high fluoride concentrations in acid conditions.

b Pitting Corrosion
Chloride is known to cause pitting in acid and neutral solutions. It is thought that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices. Koch (1995) is of the opinion that fluoride will have little effect. Jenkins (1998) has stated that localized corrosion can occur under the deposits on tubes, probably due to the chlorides. Further, Revie (2000) and Uhlig (1948) note that nitrates inhibit chloride pitting. Other studies indicate that nitric acid inhibits chloride attack though their data are at higher temperatures and concentrations.

Conclusion:
Localized corrosion, such as pitting, is not expected to be a concern at the normal operating conditions. 304L is satisfactory.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion: Not applicable to this system.

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as 10 ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140°F. The "L" grades are also more resistant to cracking than the higher carbon versions. If the concentrations are as stated, stress corrosion cracking will be minimized.

Conclusion:
Because of the normal operating environment 304L stainless steel is expected to be acceptable even to 180 °F.

e Crevice Corrosion
For the most part, the pitting discussion covers this area.

Conclusion:
See Pitting

PLANT ITEM MATERIAL SELECTION DATA SHEET

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating temperatures are slightly high for microbial growth. Additionally, the location of the system in the process suggests little chance of the introduction of microbes.

Conclusion:
MIC is not expected to be a problem.

h Fatigue/Corrosion Fatigue
Corrosion fatigue is not expected to be a problem in this vessel.

Conclusions
Not considered to be a problem.

i Vapor Phase Corrosion
The vapor phase portion of the vessel will be spattered with solution and pitting or crevice corrosion may be a concern. A rinsing procedure should be developed to minimize the formation of deposits.

Conclusion:
Provided deposits are not allowed to remain, vapor phase corrosion is not a concern.

j Erosion
Velocities within the vessel are expected to be small.

Conclusion:
Not expected to be a concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
Not expected to be applicable.

Conclusion:
Not a concern.

m Galvanic Corrosion
For the environment and the proposed alloys, there is not believed to be a concern.

Conclusion:
Not a concern.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
Higher chloride contents and higher temperatures usually require higher alloy materials. Nitrate ions inhibit the pitting and crevice corrosion of stainless alloys. Furthermore, nitric acid passivates these alloys; therefore, lower pH values brought about by increases in the nitric acid content of process fluid will not cause higher corrosion rates for these alloys. The upset condition that was most likely to occur is lowering of the pH of the vessel content by inadvertent addition of 0.5 M nitric acid. Lowering of pH may make a chloride-containing solution more likely to cause pitting of stainless alloys. Increasing the nitric acid content of the process fluid adds more of the pitting-inhibiting nitrate ion to the process fluid. In addition, adding the nitric acid solution to the stream will dilute the chloride content of the process fluid.

Conclusion:
The recommended materials will be able to withstand a plausible inadvertent addition of 0.5 M nitric acid for a limited period.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

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4. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
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Bibliography:

1. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
2. Phull, BS, WL Mathay, & RW Ross, 2000, *Corrosion Resistance of Duplex and 4-6% Mo-Containing Stainless Steels i FGD Scrubber Absorber Slurry Environments*, Presented at Corrosion 2000, Orlando, FL, March 26-31, 2000, NACE International, Houston TX 77218.
3. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

OPERATING CONDITIONS

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Alkaline effluent vessel (RLD-VSL-00017A/B)

Facility PTF

In Black Cell? No

Chemicals	Unit[1]	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l					
Chloride	g/l	8.16E-01	1.78E+00			
Fluoride	g/l	2.09E+00	4.55E+00			
Iron	g/l					
Nitrate	g/l	3.62E+00	7.88E+00			
Nitrite	g/l					
Phosphate	g/l					
Sulfate	g/l					
Mercury	g/l					
Carbonate	g/l					
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Note 3
Temperature	°F					Note 2

List of Organic Species:

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. T normal operation 59 °F to 125 °F, nominal 111 °F; could receive caustic scrubber purge non routinely at 125 °F
3. pH approximately 13 to 15

Assumptions:

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.11.2 Alkaline Effluent Vessel (RLD-VSL-00017 A/B)

Routine Operations

During normal operations, RLD-VSL-00017A will receive the following feeds:

- Caustic effluent from caustic collection vessel LVP-VSL-00001
- Caustic effluent from a future caustic collection vessel
- Spent reagents from CRP-VSL-00001
- Potentially active material from the C3 drain vessel PWD-VSL-00046

Non-Routine Operations that Could Affect Corrosion/Erosion

During non-routine operations, RLD-VSL-00017A/B will receive the following feeds:

- Process condensate area sump RLD-SUMP-00003
- PWD-VSL-00045 contents that do not meet BOF transfer criteria
- Overflow from reagent vessels (from floor berms of SHR-TK-00009, DIW-TK-00001/SHR-TK-00001, and NAR-TK-00007)
- Potentially active material from non-radioactive liquid effluent tank in BOF (NLD-TK-00001)

Quarter Ending 3/31/2005 24590-PTF-PCN-ENV-05-0003

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Page 2 of 3:	Hanford Facility RCRA Permit, Part III, Attachment 51 Class [1]1 Permit Modification to the Mechanical Systems Data Sheets for Pretreatment Facility Separators FEP-SEP-00001A, FEP-SEP-00001B, and TLP-SEP-00001
Attachment 1	24590-PTF-MVD-FEP-P0006, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Separator FEP-SEP-00001A
Attachment 2	24590-PTF-MVD-FEP-P0007, Rev. 1, Mechanical Systems Data Sheet for Pretreatment Separator FEP-SEP-00001B
Attachment 3	24590-PTF-MVD-TLP-P0005, Rev. 1, Mechanical Systems Data Sheet for Pretreatment Separator TLP-SEP-00001
Attachment 4	24590-PTF-N1D-FEP-P0007, Rev. 1, Plant Item Material Selection Data Sheet for Pretreatment Separator FEP-SEP-00001A and FEP-SEP-00001B
Attachment 5	24590-PTF-N1D-TLP-P0005, Rev. 1, Plant Item Material Selection Data Sheet for Pretreatment Separator TLP-SEP-00001

Submitted by Co-Operator: 2/4/05

F. Beranek Date

Reviewed by ORP Program Office: 2/28/05

for R. J. Schepens S. J. Dollinger Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update mechanical systems data sheets and plant item material selection data sheets associated with the Pretreatment facility Waste Feed Evaporation Process (FEP) system separators FEP-SEP-00001A and FEP-SEP-00001B, and Treated LAW Evaporation Process (TLP) system separator TLP-SEP-00001. Changes to these documents include minimal revisions since their initial submittal and approval by Ecology on 7/23/2004. These changes do not affect the form, function, or capacity of the separators and are discussed by the following:

Mechanical Systems Data Sheets:

The mechanical systems data sheets for separators FEP-SEP-00001A, FEP-SEP-00001B, and TLP-SEP-00001 were updated to identify an increase to the Top Head, Shell, and Bottom Head thicknesses, and to include the associated notes. In addition, minor changes were made to the Service Data (i.e., Design Specific Gravity, Max Operating Volume, and Total Volume) and Design Data (i.e., Insider Diameter, Length/Height, and various temperatures and pressures) as identified by the vendor.

Attachment 51, Appendix 8.6:

Replace 24590-PTF-MVD-FEP-P0006, Rev. 1 with 24590-PTF-MVD-FEP-P0006, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Separator FEP-SEP-00001A

Replace 24590-PTF-MVD-FEP-P0007, Rev. 0 with 24590-PTF-MVD-FEP-P0007, Rev. 1, Mechanical Systems Data Sheet for Pretreatment Separator FEP-SEP-00001B

Replace 24590-PTF-MVD-TLP-P0005, Rev. 0 with 24590-PTF-MVD-TLP-P0005, Rev. 1, Mechanical Systems Data Sheet for Pretreatment Separator TLP-SEP-00001

See Attachment 1, Attachment 2, and Attachment 3 of this Modification Notification for the updated mechanical system data sheets.

Plant Item Material Selection Data Sheets:

The plant item material selection data sheets for separators FEP-SEP-00001A, FEP-SEP-00001B, and TLP-SEP-00001 were updated to be consistent with the material selection data sheets for all black cell vessels and plant items. Text was added to address inadvertent nitric acid addition to these plant items, as was done for all black cell vessels. Also, discussions for routine and non-routine operations for the plant items were added. The materials of construction and the corrosion allowance previously identified for FEP-SEP-00001A, FEP-SEP-00001B, and TLP-SEP-00001 are unchanged.

[1] Class 1 modifications requiring prior Agency approval.
[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

Attachment 51, Appendix 8.9:

Replace 24590-PTF-N1D-FEP-P0007, Rev. 0 with 24590-PTF-N1D-FEP-P0007, Rev. 1, Plant Item Material Selection Data Sheet for Pretreatment Separators FEP-SEP-00001A and FEP-SEP-00001B

Replace 24590-PTF-N1D-TLP-P0005, Rev. 0 with 24590-PTF-N1D-TLP-P0005, Rev. 1, Plant Item Material Selection Data Sheet for Pretreatment Separator TLP-SEP-00001

See Attachment 4 and Attachment 5 of this Modification Notification for the updated plant item material selection data sheets.

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: N/A

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

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: [X] Yes [ ] No (state reason for denial) Reason for denial:	Reviewed by Ecology: G. P Davis — Date 3/3/05

Attachment 1

24590-PTF-MVD-FEP-P0006, Rev. 2
Mechanical Systems Data Sheet for Pretreatment Separator FEP-SEP-00001A

BECHTEL	Mechanical Data Sheet: Vessel	Plant Item No. 24590-PTF-MV-FEP-SEP-00001A Data Sheet No. 24590-PTF-MVD-FEP-P0006

Project	RPP-WTP	P&IDs	24590-PTF-M6-FEP-P0002
Project No	24590		
Project Site	DOE Hanford	Process Data Sheets	Deleted 2
System No	FEP		
Building	PTF	Vessel Drawings	Deleted 2
Description	Waste Feed Evaporator Separator Vessel FEP-SEP-00001A		

Reference Data

Charge Vessels (Tag Numbers)	N/A
Pulse Jet Mixers / Agitators (Tag Numbers)	N/A
RFDs/Pumps (Tag Numbers)	N/A

Service Data

Quality Level	QL-1	Fabrication Specification	24590-WTP-3PS-MV00-TP001
Seismic Category	SC-1	Design Code	ASME Section VIII Division 1
Service/Contents	Radioactive Slurry	Code Stamp	U1 Stamp
Design Specific Gravity	1.50 2	NB Registration	Yes
Max Operating Volume gal	3,341 2	Wind Design	None
Total Volume gal	13,359 2	Snow/Ash Design	None
Postweld Heat Treat	Not Required	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-SS90-T0001
Seismic Base Moment* ft*lb	N/A 2		

Design Data

Inside Diameter inch	7'6" (Upper), 11'6" (Lower) 2	Corrosion Allowance inch	0.04
Length/Height (TL-TL) inch	406 3/4 2		

		Vessel Operating	Vessel Design	Coil/Jacket Design	Notes
Internal Pressure	PSIG	-13.4	50 2	N/A	Vessel operating at 1.3 psia
External Pressure	PSIG	0	14.7	N/A	
Temperature	°F	129 2	175 2	N/A	
Min Design Metal Temp	°F	49		Hydrostatic Test Pressure PSIG	66 2

Material of Construction

Component	Material	Containment	Notes
Top Head 2	SA 240 304 SS	Auxiliary (Note 6)	1/2" thickness; maximum carbon content of 0.030% for welded components
Shell 2	SA 240 304 SS	Primary (Note 6)	1/2" thickness; maximum carbon content of 0.030% for welded components
Bottom Head 2	SA 240 304 SS	Primary (Note 6)	1/2" thickness; maximum carbon content of 0.030% for welded components
Vessel Support 2	SA 240 304 SS	N/A	Maximum carbon content of 0.030% for welded components
Jacket/Coils/Half-Pipe Jacket	N/A	N/A	
Internals 2	SA 240 304 SS	Thermowell Primary (Note 6)	Maximum carbon content of 0.030% for welded components
Pipe 2	SA 312 304 SS	Note 6	Maximum carbon content of 0.030% for welded components
Forgings/ Bar stock 2	SA 479 304 SS	Note 1	Maximum carbon content of 0.030% for welded components
Gaskets 2	304 SS		Flexitallic spiral wound, Graphite Filler
Bolting 2	Nitronic 60		Captive Bolts
Other 2	SA 403 WP 304 SS		Maximum carbon content of 0.030% for welded components

Note: 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

GERALD RUSSEL CHIARAMONTE
STATE OF WASHINGTON
026043
REGISTERED
PROFESSIONAL ENGINEER

2-10-05

EXPIRES. 11/9/ 2006

The Bound Document Contains a total of 2 pages.

REV	REASON FOR REVISION	PREPARER	Checked	APPROVER	Date
2	Issued for Permitting Use	E. Le	S. Crow	J. Julyk	2/10/05
1	Issued for Permitting Use	E. Le	D. Reinemann	J. Julyk	3/17/2004
0	Issued for Permitting Use	J. Jackson	C. Slater	S. Kirk	10/29/2002

R10483374

ISSUED BY RPP-WTP PDC

	Mechanical Data Sheet: Vessel	Plant Item No. 24590-PTF-MV-FEP-SEP-00001A Data Sheet No. 24590-PTF-MVD-FEP-P0006

Miscellaneous Data

Orientation	*Vertical*
Support Type	*Stainless steel legs*
Insulation Function	*None*
Insulation Thickness inch	*None*
Insulation Material	*None*
External Finish	*Welds descaled as laid*
Internal Finish	*Welds ground smooth; lower 15'-3 7/16" shell and cone to be polished to a #4 finish.* (1)

Notes

(1) Nozzles located below the top of the overflow nozzle are primary containment. See 24590-WTP-3PS-MV00-TP001 for NDE requirements.
(2) Nozzle tolerance +/- 1/4"
(3) Material for demister pad is Inconel 625 fine mesh (2)
(4) Non-replaceable 40 years design life (except demister pads section)
(5) NDE for this vessel must meet requirements per para. 6.1, 6.2 and 7.2 of specification 24590-WTP-3PS-MV00-TP001 (2)
(6) All welds forming part of the primary and auxiliary containments, including the nozzle attachment welds shall be subjected to 100% volumetric examination (3)
(7) This vessel is located in a Black Cell (2) (2)
(8) Vendor to specify all metal thickness

Attachment 2

24590-PTF-MVD-FEP-P0007, Rev. 1
Mechanical Systems Data Sheet for Pretreatment Separator FEP-SEP-00001B

	Mechanical Data Sheet: Vessel	Plant Item No. 24590-PTF-MV-FEP-SEP-00001B Data Sheet No. 24590-PTF-MVD-FEP-P0007

R10483375

Project:	RPP-WTP	P&IDs	24590-PTF-M6-FEP-P0004
Project No:	24590		
Project Site:	DOE Hanford	Process Data Sheets	Deleted 1
System No.	FEP		
Building:	PTF	Vessel Drawings	Deleted 1
Description.	Waste Feed Evaporator Separator Vessel FEP-SEP-00001B		

Reference Data

Charge Vessels (Tag Numbers)	N/A
Pulse Jet Mixers / Agitators (Tag Numbers)	N/A
RFDs/Pumps (Tag Numbers)	N/A

Service Data

Quality Level	QL-1	Fabrication Specification	24590-WTP-3PS-MV00-TP001
Seismic Category	SC-1	Design Code	ASME Section VIII Division 1
Service/Contents	Radioactive Slurry	Code Stamp	U1 Stamp
Design Specific Gravity	1.50 1	NB Registration	Yes
Max Operating Volume gal	3,343 2	Wind Design	None
Total Volume gal	13,369 1	Snow/Ash Design	None
Postweld Heat Treat	Not Required	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-SS90-T0001
Seismic Base Moment* ft*lb	N/A 1		

Design Data

Inside Diameter inch	7'6" (Upper), 11'6" (Lower) 2		Corrosion Allowance inch	0.04	
Length/Height (TL-TL) inch	406 3/4 2				
	Vessel Operating	Vessel Design	Coil/Jacket Design	Notes	
Internal Pressure PSIG	-13.4	50 1	N/A	Vessel operating at 1.3 psia	
External Pressure PSIG	0	14.7	N/A		
Temperature °F	129 1	175 1	N/A		
Min Design Metal Temp °F	49		Hydrostatic Test Pressure PSIG	67 1	

Material of Construction

Component	Material	Containment	Notes
Top Head 1	SA 240 304 SS	Auxiliary (Note 6)	1/2" thickness; maximum carbon content of 0.030% for welded components
Shell 1	SA 240 304 SS	Primary (Note 6)	1/2" thickness; maximum carbon content of 0.030% for welded components
Bottom Head 1	SA 240 304 SS	Primary (Note 6)	1/2" thickness; maximum carbon content of 0.030% for welded components
Vessel Support 1	SA 240 304 SS	N/A	Maximum carbon content of 0.030% for welded components
Jacket/Coils/Half-Pipe Jacket	N/A	N/A	
Internals 1	SA 240 304 SS	Thermowell Primary (Note 6)	Maximum carbon content of 0.030% for welded components
Pipe 1	SA 312 304 SS	Note 6	Maximum carbon content of 0.030% for welded components
Forgings/ Bar stock 1	SA 479 304 SS	Note 1	Maximum carbon content of 0.030% for welded components
Gaskets 1	304 SS		Flexitallic spiral wound, Graphite Filler
Bolting 1	Nitronic 60		Captive Bolts
Other 1	SA 403 WP 304 SS		Maximum carbon content of 0.030% for welded components

Note: 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.

GERALD RUSSEL CHIARAMONTE
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1	Issued for Permitting Use	E. Le	S. Crow	J. Julyk	2/10/05
0	Issued for Permitting Use	E. Le	D. Reinemann	J. Julyk	3/17/2004

	Mechanical Data Sheet: Vessel	Plant Item No. 24590-PTF-MV-FEP-SEP-00001B Data Sheet No. 24590-PTF-MVD-FEP-P0007

Miscellaneous Data

Orientation	*Vertical*
Support Type	*Stainless steel legs*
Insulation Function	*None*
Insulation Thickness inch	*None*
Insulation Material	*None*
External Finish	*Welds descaled as laid*
Internal Finish	*Welds ground smooth; lower 16'-3 7/16" shell and cone to be polished to a #4 finish.* (1)

Notes

(1) Nozzles located below the top of the overflow nozzle are primary containment. See 24590-WTP-3PS-MV00-TP001 for NDE requirements.
(2) Nozzle tolerance +/- 1/4"
(3) Material for demister pad is inconel 625 fine mesh (1)
(4) Non-replaceable 40 years design life (except demister pads section)
(5) NDE for this vessel must meet requirements per para. 6.1, 6.2 and 7.2 ofspecification 24590-WTP-3PS-MV00-TP001 (1)
(6) All welds forming part of the primary and auxiliary containments, including the nozzle attachment welds shall be subjected to 100% volumetric examination (1)
(7) This vessel is located in a Black Cell (1) (1)
(8) Vendor to specify all metal thickness

Attachment 3

24590-PTF-MVD-TLP-P0005, Rev. 1
Mechanical Systems Data Sheet for Pretreatment Separator TLP-SEP-00001

BECHTEL	Mechanical Data Sheet: Vessel	Plant Item No. 24590-PTF-MV-TLP-SEP-00001 Data Sheet No. 24590-PTF-MVD-TLP-P0005

R10483376

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Project:	RPP-WTP	P&IDs	24590-PTF-M6-TLP-P0003
Project No:	24590		
Project Site	DOE Hanford	Process Data Sheets	Deleted 1
System No.	TLP		
Building:	PTF	Vessel Drawings	Deleted 1
Description:	Treated LAW Evaporator Separator Vessel TLP-SEP-00001		

Reference Data

Charge Vessels (Tag Numbers)	N/A
Pulse Jet Mixers / Agitators (Tag Numbers)	N/A
RFDs/Pumps (Tag Numbers)	N/A

Service Data

Quality Level	QL-1 1	Fabrication Specification	24590-WTP-3PS-MV00-TP001
Seismic Category	SC-1 1	Design Code	ASME Section VIII Division 1
Service/Contents	Radioactive Slurry	Code Stamp	U1 Stamp
Design Specific Gravity	1.67	NB Registration	Yes
Max Operating Volume gal	3,341 2	Wind Design	None
Total Volume gal	13,369 3	Snow/Ash Design	None
Postweld Heat Treat	Not Required	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-SS00-T0001
Seismic Base Moment* ft*lb	N/A 1		

Design Data

Inside Diameter inch	7'6" (Upper), 11'5" (Lower) 1		Corrosion Allowance inch	0.04	
Length/Height (TL-TL) Inch	406 3/4 1				
	Vessel Operating	Vessel Design	Coil/Jacket Design	Notes	
Internal Pressure PSIG	-13.4/ 1	50 1	N/A	Vessel operating at 1.3 psia	
External Pressure PSIG	0	14.7	N/A		
Temperature °F	129 1	175 1	N/A		
Min Design Metal Temp °F	40		Hydrostatic Test Pressure PSIG	65 1	

Material of Construction

Component	Material	Containment	Notes
Top Head 1	SA 240 304 SS	Auxiliary (Note 6)	1/2" thickness; maximum carbon content of 0.030% for welded components
Shell 1	SA 240 304 SS	Primary (Note 6)	1/2" thickness; maximum carbon content of 0.030% for welded components
Bottom Head 1	SA 240 304 SS	Primary (Note 6)	1/2" thickness; maximum carbon content of 0.030% for welded components
Vessel Support 1	SA 240 304 SS	N/A	Maximum carbon content of 0.030% for welded components
Jacket/Coils/Half-Pipe Jacket	N/A	N/A	
Internals 1	SA 240 304 SS	Thermowell Primary (Note 6)	Maximum carbon content of 0.030% for welded components
Pipe 1	SA 312 304 SS	Note 6	Maximum carbon content of 0.030% for welded components
Forgings/ Bar stock 1	SA 479 304 SS	Note 1	Maximum carbon content of 0.030% for welded components
Gaskets 1	304 SS		Flexitallic spiral wound, Graphite Filler
Bolting 1	Nitronic 60		Captive Bolts
Other 1	SA 403 WP 304 SS		Maximum carbon content of 0.030% for welded components

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0	Issued for Permitting Use	E. Le	D. Reinemann	J. Julyk	3/24/2004

BECHTEL	Mechanical Data Sheet: Vessel	Plant Item No. 24590-PTF-MV-TLP-SEP-00001
		Data Sheet No. 24590-PTF-MVD-TLP-P0005

Miscellaneous Data

Orientation	*Vertical*
Support Type	*Stainless steel legs*
Insulation Function	*None*
Insulation Thickness inch	*None*
Insulation Material	*None*
External Finish	*Welds descaled as laid*
Internal Finish	*Welds ground smooth; lower 16'-3 7/16" shell and cone to be polished to a #4 finish.* (1)

Notes

(1) Nozzles located below the top of the overflow nozzle are primary containment. See 24590-WTP-3PS-MV00-TP001 for NDE requirements.
(2) Nozzle tolerance +/- 1/4"
(3) Material for demister pad is Inconel 625 fine mesh
(4) Non-replaceable 40 years design life (except demister pads section)
(5) NDE for this vessel must meet requirements per para. 6.1, 6.2 and 7.2 ofspecification 24590-WTP-3PS-MV00-TP001 (1)
(6) All welds forming part of the primary and auxiliary containments, including the nozzle attachment welds shall be subjected to 100% volumetric examination (1)
(7) This vessel is located in a Black Cell (1)
(8) Vendor to specify all metal thickness (1)

Attachment 4

24590-PTF-N1D-FEP-P0007, Rev. 1
Plant Item Material Selection Data Sheet for Pretreatment
Separators FEP-SEP-00001A and FEP-SEP-00001B

PLANT ITEM MATERIAL SELECTION DATA SHEET

[redacted]
R10464131

ISSUED BY
RPP-WTP PDC

FEP-SEP-00001A/B (PTF)
Waste Feed Evaporator Separator Vessels

- Design Temperature (max/min) (°F): 175/49
- Design Pressure (psig) (internal/external): 50/14.7
- Location: incell

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on sheets 5 and 6

Cannot be maintained nor replaced during the 40 y design life. No method of totally removing solids or heels is present.

Operating Modes Considered:

- The vessel is always alkaline, pH 13, at the normal operating temperature.
- The vessel will be cleaned using 2 N HNO_3 with residual chlorides and fluorides at normal operating temperatures; the condition of high temperature and acid is not examined.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00	X	
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 304 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.04 inch (includes 0.00 inch erosion allowance)

Process & Operations Limitations:

- Develop rinsing/flushing procedure for acid and water

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
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12/23/04
EXPIRES: 12/07/05

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.

This bound document contains a total of 6 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	4/16/04	Issued for Permitting Use			
0	3/18	Issued for Permitting Use	DLA	JRD	SWV

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

a General Corrosion
Hamner's data (1981) lists a corrosion rate for 304 (and 304L) in NaOH of less than 20 mpy (500 μm/y) at 77°F and over 20 mpy at 122°F. He shows 316 (and 316L) has a rate of less than 2 mpy up to 122°F and 50% NaOH. Sedriks (1996) states that the 300 series stainless steels are acceptable in up to 50% NaOH at temperatures up to about 122°F or slightly above. Work with simulated-radwaste evaporators, six months at 140°F, showed 304L was slightly more resistant to corrosion (<0.2 mpy) than was 316L (<0.6 mpy). Ni 200, pure nickel, was much less resistant (≈7 mpy) probably due to the complexants present in the waste.

Davis (1994) states the corrosion rate for 304L in pure NaOH will be less than about 1 mpy up to about 212°F though Sedriks states the data beyond about 122°F are incorrect. Danielson & Pitman (2000), based on short term studies, suggest a corrosion rate of about 0.5 mpy for 316L in simulated waste at boiling, >212°F.

In review of the 242-A Evaporator in waste similar to that expected in LAW, it was found that the corrosion of 304L after about two years of operation at 140°F was less than the accepted variability of the plate. Because of uncertainties in the starting thickness of the metal, a review of the raw data was inconclusive.

Uhlig (1948) has shown that pure nickel is resistant to corrosion by NaOH. However, the presence of complexing agents may reverse the trend. Agarwal (2000) states that the higher nickel alloys are highly corrosion resistant though specific mention of alkaline media is not made. The general literature mainly discusses cracking problems (see below) rather than uniform corrosion.

The Savannah River evaporator vessels are made of 304L and have suffered no failures in about 30 years.

Conclusion:
Based on uniform corrosion and operating within the defined temperature limits, Savannah River experience and the testing, 304L would be satisfactory.

b Pitting Corrosion
Chloride is notorious for causing pitting in acid and neutral solutions. It is thought that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices. Koch (1995) is of the opinion that fluoride will have little effect.

Revie (2000) and Uhlig (1948) note that nitrate inhibits chloride corrosion. Therefore the high nitrate concentrations in the LAW are expected to be beneficial.

The apparent lack of pitting in the 242-A Evaporator suggests 304L is acceptable at the design conditions. Other studies confirm the good behavior of 304L when it is not a heat transfer surface; the SRS evaporator shell has been in existence for over 30 years.

Rinsing is expected to be sufficiently infrequent as to mandate the better operational behavior of 304L compared to 316L.

Conclusion:
Localized corrosion appears to be relatively minor in alkaline solutions except under heat transfer conditions or where deposits can form. As long as the temperatures remain in the normal operating range, ≤140 °F and the surfaces are not used for heat transfer, 304L is satisfactory.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion: Not applicable to this system.

d Stress Corrosion Cracking
The exact amount of chloride required to stress corrosion crack stainless steel is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as 10 ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140°F. Further, the use of "L" grade stainless reduces the opportunity for sensitization. From the above references, it also observed that alkaline conditions reduce the probability of the initiation of stress corrosion cracking to essentially zero. However, should a pit or crevice, including a deposit, be present where the environment can become acid, then the alkaline environment will no longer have an effect.

Caustic cracking tends to occur above 140 °F according to Sedriks or above 212 °F according to other work. Because the maximum operating temperature is < 140°F, all sources suggest caustic cracking should be minimal. Data from the Savannah River Site evaporators suggests cracking is not a concern in waste even to the design temperature.

Conclusion:
The use of 304L is expected to be acceptable for the vessel during operation.

e Crevice Corrosion
The comments on Pitting are equally valid here.

Conclusion:
The Pitting conclusions are valid.

PLANT ITEM MATERIAL SELECTION DATA SHEET

f Corrosion at Welds
Weld corrosion other than pitting or crevice corrosion is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
MIC is normally observed at lower pH conditions and temperatures. Although microbes can live at very low pH, and probably high pH, as well as at 572°F, no reports of MIC in the proposed conditions have been reported.

Conclusion:
MIC is not considered a problem.

h Fatigue/Corrosion Fatigue
Corrosion fatigue is a not expected to be a problem in these vessels.

Conclusions
Not expected to be a concern.

i Vapor Phase Corrosion
The vapor phase portion of the tank will be continually washed with condensing vapors while also being spattered with caustic.

Conclusion:
No vapor phase corrosion is anticipated.

j Erosion
Velocities within the vessel are expected to be sufficiently low in the recirculation system that erosion is not expected to occur.

Conclusion:
Not expected to be a concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:.
Not applicable.

l Fretting/Wear
Not applicable.

Conclusion:
Not applicable.

m Galvanic Corrosion
Not applicable.

Conclusion:
Not applicable.

n Cavitation
Not applicable.

Conclusion:
Not applicable.

o Creep
Not applicable.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
Higher chloride contents and higher temperatures usually require higher alloy materials. Nitrate ions inhibit the pitting and crevice corrosion of stainless alloys. Furthermore, nitric acid passivates these alloys; therefore, lower pH values brought about by increases in the nitric acid content of process fluid will not cause higher corrosion rates for these alloys. The upset condition that was most likely to occur is lowering of the pH of the vessel content by inadvertent addition of 0.5 M nitric acid. Lowering of pH may make a chloride-containing solution more likely to cause pitting of stainless alloys. Increasing the nitric acid content of the process fluid adds more of the pitting-inhibiting nitrate ion to the process fluid. In addition, adding the nitric acid solution to the stream will dilute the chloride content of the process fluid.

Conclusion:
The recommended materials will be able to withstand a plausible inadvertent addition of 0.5 M nitric acid.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. Agarwal, DC, *Nickel and Nickel alloys*, In: Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
2. Danielson, MJ & SG Pitman, 2000, *Corrosion Tests of 316L and Hastelloy C-22 in Simulated Tank Waste Solutions*, PNWD-3015 (BNFL-RPT-019, Rev 0), Pacific Northwest Laboratory, Richland WA.
3. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
4. Davis, JR, 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
5. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX
6. Koch, GH, 1995, *Localized Corrosion in Halides Other Than Chlorides*, MTI Pub No. 41, Materials Technology Institute of the Chemical Process Industries, Inc, St Louis, MO 63141
7. Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
8. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
9. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158

Bibliography:

1. Jenkins, CF, 1998, *Performance of Evaporators in High Level Radioactive Chemical Waste Service*, Presented at Corrosion 98, NACE International, Houston TX 77084
2. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
3. Smith, HD and MR Elmore, 1992, *Corrosion Studies of Carbon Steel under Impinging Jets of Simulated Slurries of Neutralized Current Acid Waste (NCAW) and Neutralized Cladding Removal Waste (NCRW)*, PNL-7816, Pacific Northwest Laboratory, Richland, Washington.
4. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

OPERATING CONDITIONS

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Waste feed evaporator separator vessel (FEP-SEP-00001A/B)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Max		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	7.25E+01	6.91E+01			
Chloride	g/l	2.65E+01	2.93E+01			
Fluoride	g/l	3.14E+01	3.49E+01			
Iron	g/l	1.62E+01	1.70E+01			
Nitrate	g/l	4.96E+02	5.34E+02			
Nitrite	g/l	1.44E+02	1.60E+02			
Phosphate	g/l	1.06E+02	1.15E+02			
Sulfate	g/l	5.56E+01	6.17E+01			
Mercury	g/l	5.66E-01	3.53E-01			
Carbonate	g/l	1.92E+02	2.01E+02			
Undissolved solids	wt%	3.0%	3.4%			Note 4
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Note 3
Temperature	°F					Note 2

List of Organic Species:

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. Toperation 77 °F to 122 °F.
   boiling occurs at approximately 122 °F since the evaporator vessels are under vacuum.
3. pH approximately 13 to 14
4. Fluid in reboiler loop could contains solids as high as 8.9 wt%.

Assumptions:

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.4.2 Waste Feed Evaporator Separator Vessel (FEP-SEP-00001A/B)

Routine Operations

The FEP system contains two evaporator trains of the same capacity. Although the evaporator trains can operate simultaneously (each contains independent control logic), a single evaporator train has sufficient capacity to support the maximum production requirements of LAW and HLW glass. The evaporator product will have a liquid specific gravity of approximately 1.27, which corresponds to a Na concentration of 5 M, in order to optimize the operation of downstream processes, particularly the cesium ion exchange process system (CXP) and UFP system.

Solids within the evaporator recirculation loop are maintained in a suspended state by the waste feed evaporator recirculation pump (FEP-PMP-00009A or B). This pump recirculates waste at a high volumetric flowrate to limit fluid temperature rise when passing through the reboiler and subsequent flash evaporation. The evaporator feed pumps have variable speed drives. Separator vessel level is used to control feed rate to the evaporator. An increasing level in the separator vessel causes a decrease in feed rate while a decreasing level causes an increase in feed rate. At steady state, however, a relatively constant feed rate is maintained at an established boil-off rate. The buildup of solids on the separator vessel wall above the liquid level will be mitigated by an intermittent spray of recycled condensate.

Foaming tendencies in the separator vessel can be detected by elevations in pressure drop across the demister pads. Foaming in the separator vessel will be minimized by the addition of an antifoam agent from AFR-TK-00001. This addition is expected to be part of normal operations.

Non-Routine Operations that Could Affect Corrosion/Erosion

None identified.

Attachment 5

24590-PTF-N1D-TLP-P0005, Rev. 1
Plant Item Material Selection Data Sheet for Pretreatment Separator TLP-SEP-00001

PLANT ITEM MATERIAL SELECTION DATA SHEET

[redacted]
R10464130

ISSUED BY
RPP-WTP PDC

TLP-SEP-00001 (PTF)
Treated LAW Evaporator Separator Vessel

- Design Temperature (°F)(max/min): 175/49
- Design Pressure (psig) (internal/external): 50/14.7
- Location: incell

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on sheets 5, 6, and 7

Options Considered:

- Normal operating conditions
- The vessel will be cleaned using 2 N HNO_3 with residual chlorides and fluorides at reduced temperatures

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00	X	
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 304 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.04 inch (includes 0.00 inch erosion allowance)

Process & Operations Limitations:

- Develop rinsing/flushing procedure for acid and water

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED PROFESSIONAL ENGINEER
1/24/05
EXPIRES: 12/07/05

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1	11/29/04	Issued for Permitting Use	[signature]	[signature]	[signature]
0	3/24/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

a General Corrosion
The vessel has a normal operating temperature of 122°F. According to Hamner (1981), 304 (and 304L) has a corrosion rate of less than 20 mpy (500 μm/y) at 77°F and over 20 mpy in NaOH at 122°F. He shows 316 (and 316L) has a rate of less than 2 mpy up to 122°F and 50% NaOH. These data are qualified by Sedriks (1996) who states that the 300 series are acceptable in up to 50% NaOH at temperatures up to about 122°F. Davis (1994) states the corrosion rate for 304L will be less than about 0.1 mpy at these temperatures. Based on short term studies, Danielson & Pitman (2000), suggest a corrosion rate of about 0.5 mpy for 316L in simulated waste at 122°F. Other studies have noted the successful use of 304L as the shell of the Savannah River evaporators.

Uhlig (1948) has shown that pure nickel is more resistant to corrosion by NaOH than stainless steel. However, the presence of complexing agents [part of the total organic carbon (TOC) measured] may reverse the trend. Agarwal (2000) states that the higher nickel alloys are highly corrosion resistant though specific mention of alkaline media is not made. Their high nickel content is a positive feature. The general literature mainly discusses cracking problems (see below) rather than uniform corrosion.

In review of the 242-A Evaporator, it was found that after about 2 years of operation in waste similar to LAW, the corrosion of 304L was less than the accepted variability of the plate. Thus the NDE data are sufficiently uncertain to prevent definite conclusions from being drawn.

Studies have shown that in 5% nitric acid with 1000 ppm fluoride at 290°F, the corrosion rate of 304L can be kept as low as 5 mpy by the use of Al^{+++}. Additionally, Sedriks (1996) has noted with 10% (≈2N) nitric acid and 3,000 ppm fluoride at 158°F, the corrosion rate of 304L is over 4,000 mpy. Therefore, there is a concern about excessive corrosion rates during acid cleaning unless the fluoride is well inhibited. The use of acid cleaning while operating at higher temperatures would require the use of a 6% Mo alloy. Keeping the vessel as cool as possible would reduce the extent of attack by chloride (pitting and crevice corrosion) and, with the addition of Al^{+++}, general corrosion due to fluoride. 304L will be suitable if properly protected by temperature and fluoride complexants such as Al^{+++}.

Conclusion:
At temperatures less than 140°F, 304L or 316L are expected to be sufficiently resistant to the waste solution with a probable general corrosion rate of less than 1 mpy. The Savannah River work suggests they will be acceptable to higher temperatures in waste.

b Pitting Corrosion
Chloride is notorious for causing pitting in acid and neutral solutions. It is thought that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices. Koch (1995) is of the opinion that fluoride will have little effect.

Revie (2000) and Uhlig (1948) both note nitrate inhabits chloride corrosion. Therefore the high nitrate concentrations in the LAW are expected to be beneficial. The 18,000 – 20,000 ppm chloride concentration will mean residual chloride is present during acid cleaning.

The apparent lack of pitting in the 242-A Evaporator suggests 304L is acceptable at the design conditions - ≤140°F. Studies confirm the good behavior of 304L in the shell. The 304L shell of the evaporator at Savannah River has performed successfully for approximately 30 years.

Conclusion:
Localized corrosion, such as pitting, is common but probably can be mitigated by alloys with higher nickel and molybdenum contents even under heat transfer conditions or where deposits can form. Based on Savannah River data, the vessel is expected to be free of significant corrosion and can be constructed of 304L. Rinsing/flushing procedure will be developed to eliminate concern during acid cleaning.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion: Not applicable to this system.

d Stress Corrosion Cracking
The exact amount of chloride required to stress corrosion crack stainless steel is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment and because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as 10 ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140°F. Further, the use of "L" grade stainless reduces the opportunity for sensitization. From the above references, it is observed that alkaline conditions reduce the probability of the initiation of stress corrosion cracking to essentially zero. However, should a pit or crevice, including a deposit, be present where the environment can become acid, then the alkaline environment will no longer have an effect and stress corrosion can occur.

Caustic cracking tends not to occur below 140°F (Sedriks 1996) or below 212°F (Zapp 1998). Because the maximum operating temperature is 122°F, all sources suggest caustic cracking should be minimal. Zapp's data from the Savannah River Site evaporators is auspicious for the use of 304L for the vessel.

Conclusion:
The use of 304L is expected to be acceptable for the vessel during operation. During rinsing and flushing, the temperature should be kept as low as possible. A rinsing/flushing procedure is needed to define temperature/time limits.

PLANT ITEM MATERIAL SELECTION DATA SHEET

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting.

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are too extreme for MIC with high temperatures and pH. Additionally, MIC is not normally observed in operating systems except for those exposed to process water.

Conclusion:
MIC is not considered a problem.

h Fatigue/Corrosion Fatigue
Corrosion fatigue is a not expected to be a concern.

Conclusions
Not applicable.

i Vapor Phase Corrosion
Due to flashing liquid, the surface is expected to be continually sprayed with liquid and be kept relatively clean.

Conclusion:
No vapor phase corrosion is expected.

j Erosion
Velocities within the vessel should generally be small.

Conclusion:
Not a concern.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not applicable.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

p Inadvertent Nitric Acid Addition

Higher chloride contents and higher temperatures usually require higher alloy materials. Nitrate ions inhibit the pitting and crevice corrosion of stainless alloys. Furthermore, nitric acid passivates these alloys; therefore, lower pH values brought about by increases in the nitric acid content of process fluid will not cause higher corrosion rates for these alloys. The upset condition that was most likely to occur is lowering of the pH of the vessel content by inadvertent addition of 0.5 M nitric acid. Lowering of pH may make a chloride-containing solution more likely to cause pitting of stainless alloys. Increasing the nitric acid content of the process fluid adds more of the pitting-inhibiting nitrate ion to the process fluid. In addition, adding the nitric acid solution to the stream will dilute the chloride content of the process fluid.

Conclusion:

The recommended materials will be able to withstand a plausible inadvertent addition of 0.5 M nitric acid for a limited period.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. Agarwal, DC, *Nickel and Nickel Alloys*, In: Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
2. Danielson, MJ & SG Pitman, 2000, *Corrosion Tests of 316L and Hastelloy C-22 in Simulated Tank Waste Solutions*, PNWD-3015 (BNFL-RPT-019, Rev 0), Pacific Northwest Laboratory, Richland WA
3. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
4. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
5. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX
6. Koch, GH, 1995, *Localized Corrosion in Halides Other Than Chlorides*, MTI Pub No. 41, Materials Technology Institute of the Chemical Process Industries, Inc, St Louis, MO 63141
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9. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158

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1. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
2. Phull, BS, WL Mathay, & RW Ross, 2000, *Corrosion Resistance of Duplex and 4-6% Mo-Containing Stainless Steels in FGD Scrubber Absorber Slurry Environments*, Presented at Corrosion 2000, Orlando, FL, March 26-31, 2000, NACE International, Houston TX 77218
3. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

OPERATING CONDITIONS

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Waste feed evaporator separator vessel (TLP-SEP-00001)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	3.85E+01	3.52E+01			
Chloride	g/l	1.83E+01	2.00E+01			
Fluoride	g/l	1.84E+01	2.01E+01			
Iron	g/l	2.83E+00	2.89E+00			
Nitrate	g/l	2.72E+02	2.88E+02			
Nitrite	g/l	8.19E+01	8.89E+01			
Phosphate	g/l	5.91E+01	6.28E+01			
Sulfate	g/l	3.15E+01	3.42E+01			
Mercury	g/l	8.96E-01	3.14E-02			
Carbonate	g/l	1.27E+02	1.10E+02			
Undissolved solids	wt%					
Other	g/l					
Other	g/l					
pH	N/A					Note 3
Temperature	°F					Note 2

List of Organic Species:

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. T normal operation 122 °F.
3. pH approximately 12 to 14

Assumptions:

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.13.3 Treated LAW Evaporator Separator Vessel (TLP-SEP-00001)

Routine Operations

When the recirculating liquor reaches the separator vessel, flash evaporation occurs due to reduced pressure in the vessel. The liquid continues to flash, separating the vapor and liquid streams. The liquid stream recirculates in this closed loop while the vapor stream enters the evaporator overheads. The maximum designed boil-off rate for the TLP evaporator system will be 30 gpm of vapor condensate.

The pressure in the separator vessel is maintained at about 1 psia by a controlled in-bleed of air to the suction side of the primary vacuum ejector. This reduced pressure lowers the boiling point of the liquor to about 122 °F. If the pressure in the separator vessel rises, the air in-bleed is reduced to allow a higher rate of vapor to be withdrawn from the separator vessel, thereby reducing the pressure.

The overhead vapor produced in the separator vessel is superheated by about 24 °F due to the boiling point elevation of the concentrate. The overhead vapor is passed through a set of demister pads for de-entrainment purposes. The demister pads are sprayed with recycled condensate from the treated LAW evaporator condensate vessel, or in the event that evaporator condensate is unavailable, the process condensate tanks (RLD-TK-00006A/B). This spray ensures that the demister pads are always wetted completely to mitigate solids formation and plugging. This also diminishes solids formation on the walls of the separator above the liquid level in the vessel.

The nature of the evaporator feed, coupled with the boiling action, creates the potential for foaming in the separator vessel (TLP-SEP-00001). The separator vessel design includes an antifoam agent feed line from the antifoam vessel. The need for, and magnitude of, the antifoam addition will be determined by development and commissioning work. This addition is expected to be part of normal operations.

The treated LAW evaporator will concentrate the waste to between 8 and 10 M sodium or a maximum specific gravity of approximately 1.44. Concentrate is removed continuously from the treated LAW evaporator at the lowest point on the suction side of the recirculation pump using the variable-speed evaporator concentrate pumps (TLP-PMP-00011A/B).

While in operation, the evaporator train provides sufficient vapor space dilution to prevent the build-up of hydrogen.

For purposes of decontamination, the separator vessel is equipped with wash rings.

Non-Routine Operations that Could Affect Corrosion/Erosion

None identified.

Quarter Ending 3/05 24590-LAW-PCN-ENV-05-0001

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Page 1 of 2:	Hanford Facility RCRA Permit, Chapter 10, Attachment 51, Minor modification of WTP low-activity waste vitrification (LAW) facility elevation 28 ft secondary containment and the C3 workshop containment building
Attachment A	LAW Vitrification Building General Arrangement Plan at El. 28'-0", 24590-LAW-P1-P01T-P0004, Rev. 1
Attachment B	Flooding Volume for LAW Facility, 24590-LAW-PER-M-02-002, Rev. 5

Submitted by Co-Operator: Reviewed by ORP Program Office:

F. Beranek — Date 2/10/05 — for R. J. Schepens S. J. Olinger — Date 3/3/05

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The general arrangement drawing and Flooding Volume for LAW Facility document have been modified to reflect minor changes to the low-activity waste vitrification facility elevation 28 ft secondary containment and the C3 workshop containment building. These changes are:

1) The secondary containment berm configuration for room L-0218 containing the LAW caustic collection tank (LVP-TK-00001) was modified resulting in a room area decrease of approximately 1%.

2) The C3 workshop containment building located in room L-226A was modified resulting in a room area decrease of approximately 57%.

Attachment 51, Appendix 9.4

Replace Revision 0 of LAW Vitrification Building General Arrangement Plan at El. 28'-0", 24590-LAW-P1-P01T-P0004, with the attached Revision 1 of this drawing.

Attachment 51, Appendix 9.8

Replace Revision 4 of Flooding Volume for LAW Facility, 24590-LAW-PER-M-02-002, with the attached Revision 5 of this document.

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: (4)(d)(i)(A)

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

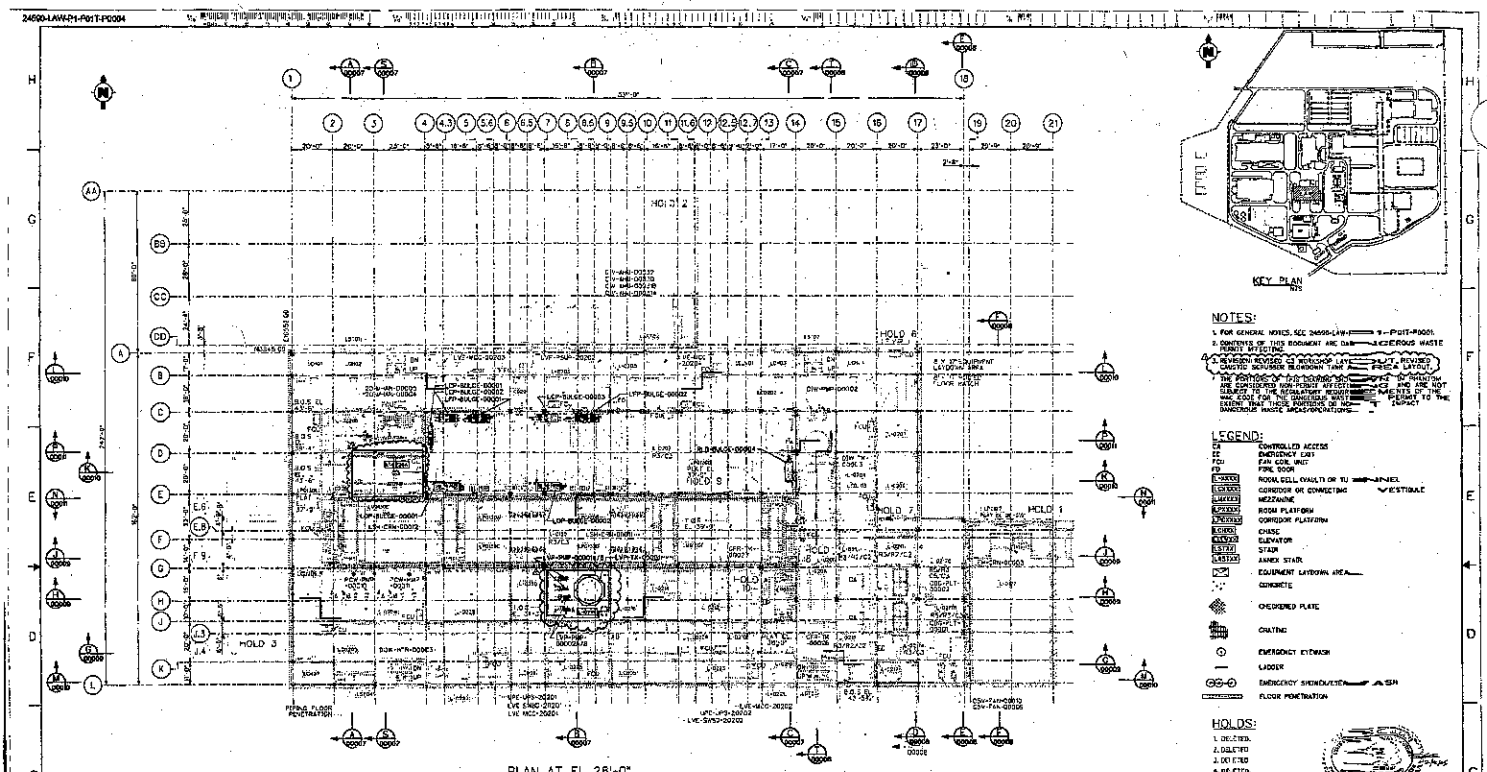
Modification Approved: [X] Yes [ ] No (state reason for denial)	Reviewed by Ecology:
Reason for denial:	S. Dahl 3/9/05 Date

1. Class 1 modifications requiring prior Agency approval.
2. This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

Attachment A to 24590-LAW-PCN-ENV-05-0001

LAW Vitrification Building General Arrangement Plan at El. 28'-0", 24590-LAW-P1-P01T-P0004, Rev. 1

24590-LAW-P1-P01T-P0004



NOTES:

1. FOR GENERAL NOTES, SEE 24590-LAW-[illegible]-P01T-P0001.
2. CONTENTS OF THIS ROOM/AREA ARE DAN[illegible] HAZARDOUS WASTE [illegible] AFFECTED.
4. REVISION REVISED [illegible] WORKING LAY[illegible] PER LAYOUT. REVISED CAUSTIC SCRUBBER BLOWDOWN TANK [illegible] PER LAYOUT.
THE POTENTIAL [illegible] DOWN [illegible] OF PLUTONIUM AND CONTAINS NO HIGHER ACTIVITY [illegible] AND ARE NOT MADE FOR THE DANGEROUS WASTE [illegible] MEETS THE EXTENT THAT THEIR CONTENTS DO NO[illegible] PERMIT TO THE DANGEROUS WASTE MODIFICATIONS.

LEGEND:

CA	CONTROLLED ACCESS
EC	EMERGENCY CART
FCU	FAN COIL UNIT
FD	FIRE DOOR
E-XXXX	ROOM, CELL (VAULT) OR TU
C-XXXX	CORRIDOR OR CONNECTING
M-XXXX	MEZZANINE
P-XXXX	ROOM PLATFORM
CP-XXXX	CORRIDOR PLATFORM
C-XXXX	CHASE
E-XXXX	ELEVATOR
S-XXXX	STAIR
AS-XXXX	ANNEX STAIR
	EQUIPMENT LAYDOWN AREA
	CONCRETE
	CHECKERED PLATE
	GRATING
	EMERGENCY EYEWASH
	LADDER
	EMERGENCY SHOWER/EYEWASH
	FLOOR PENETRATION

HOLDS:

1. DELETED.
2. DELETED
3. DELETED
4. DELETED.
5. DELETED
6. DELETED.
7. DELETED
8. DELETED.
9. DELETED.
10. DELETED.

MECHANICAL HANDLING DESIGN INPUT

ROOM SCHEDULE		
ROOM NUMBER	ROOM NAME	BUILDING COLUMN LOCATION
L-0010	[illegible]	[illegible]
L-0101	[illegible]	[illegible]
L-0102	PROCESS CELL CHANGE ROOM	[illegible]
L-0111	[illegible]	[illegible]
L-0114	[illegible]	[illegible]
L-0201	[illegible]	[illegible]
L-0202	[illegible]	[illegible]
L-0203	[illegible]	[illegible]
L-0204	[illegible]	[illegible]
L-0206	[illegible]	[illegible]
L-0208	[illegible]	[illegible]
L-0209	[illegible]	[illegible]
L-0210	[illegible]	[illegible]
L-0212	[illegible]	[illegible]
L-0213	[illegible]	[illegible]
L-0214	[illegible]	[illegible]
L-0215	[illegible]	[illegible]
L-0216	[illegible]	[illegible]
L-0217	[illegible]	[illegible]
L-0218	[illegible]	[illegible]
L-0219	[illegible]	[illegible]
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L-0222	[illegible]	[illegible]
L-0223	[illegible]	[illegible]
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L-0225	[illegible]	[illegible]
L-0226	[illegible]	[illegible]
L-0227	[illegible]	[illegible]
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L-0232	[illegible]	[illegible]
L-0233	[illegible]	[illegible]
L-0234	[illegible]	[illegible]
L-0235	[illegible]	[illegible]
L-0236	[illegible]	[illegible]

ROOM SCHEDULE		
ROOM NUMBER	ROOM NAME	BUILDING COLUMN LOCATION
L-0237	[illegible]	[illegible]
L-0238	[illegible]	[illegible]
L-0239	[illegible]	[illegible]
L-0240	[illegible]	[illegible]
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L-0242	[illegible]	[illegible]
L-0243	[illegible]	[illegible]
L-0244	[illegible]	[illegible]
L-0245	[illegible]	[illegible]
L-0246	[illegible]	[illegible]
L-0247	[illegible]	[illegible]
L-0248	[illegible]	[illegible]
L-0249	[illegible]	[illegible]
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L-0258	[illegible]	[illegible]
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L-0262	[illegible]	[illegible]
L-0263	[illegible]	[illegible]
L-0264	[illegible]	[illegible]
L-0265	[illegible]	[illegible]

REVISION HISTORY			
1	ISSUED FOR PERMIT REVIEW	[illegible]	[illegible]
0	ISSUED FOR PERMITTING USE	[illegible]	[illegible]
REV	DESCRIPTION	DRN	CHK	APVD	DATE

LAW VITRIFICATION BUILDING
GENERAL ARRANGEMENT
PLAN AT EL. 26'-0"

24590-LAW-P1-P01T-P0004

Attachment B to 24590-LAW-PCN-ENV-05-0001

Flooding Volume for LAW Facility, 24590-LAW-PER-M-02-002, Rev. 5

R10484703

Document title: **Flooding Volume for LAW Facility**

Contract number: DE-AC27-01RV14136

Department: Mechanical Systems

Author(s): Dana F. Miller

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Checked by: Lisa Han

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Approved by: Janet Roth

Approver's position: LAW Area Project Engineering Manager

Approver signature:

MACARIO C. SANVICTORES
STATE OF WASHINGTON
REGISTERED
PROFESSIONAL ENGINEER
2-9-05
EXPIRES: 09/21/05

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River Protection Project
Waste Treatment Plant
2435 Stevens Center Place
Richland, WA 99352
United States of America
Tel: 509 371 2000

Notice

Please note that source, special nuclear, and byproduct materials, as defined in the *Atomic Energy Act of 1954* (AEA), are regulated at the US 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.

History Sheet

Rev	Date	Reason for revision	Revised by
0	7/16/02	Issued for permitting use.	J. Rewari
1	9/20/02	Revised to include +3 ft elevation and Appendix A	J. Rewari
2	12/05/02	Revised Appendix A	J. Rewari
3	3/27/03	Revised Section 3, Appendix A & Issued for permitting use.	J. Rewari
4	3/23/04	Revised to include +28 ft elevation and remove Melter 3 tankage. Issued for permitting use.	J. Rewari
5	02/08/05	Revised to include changes to -21 and +28 ft elevations.	D.F. Miller

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3.2 Flooding Volume Description for LAW Facility at +3 Ft Elevation 2

3.3 Flooding Volume Description for LAW Facility at +28 Ft Elevation 3

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Figure 1 LAW Effluent General Flow Diagram 5

1 Introduction

The Washington Administrative Code, WAC 173-303, requires that secondary containment be designed and operated to contain 100 % of the capacity of the largest tank within its boundary for tank systems containing dangerous waste. This report discusses the assessment of flooding volume that is required to be contained for the low-activity waste vitrification (LAW) facility.

2 Applicable Documents

- WAC 173-303. *Dangerous Waste Regulations.* Washington Administrative Code.

3 Description

3.1 Flooding Volume Description for LAW Facility at −21 Ft Elevation

The only vessel in the LAW facility containing dangerous waste at −21 ft elevation is the C3/C5 drains/sump collection vessel (RLD-VSL-00004). In the event of a line break, vessel failure, or tank overflow, flooding could occur in the cell. The C3/C5 drains/sump collection vessel (RLD-VSL-00004) is in an enclosed C3/C5 cell area, in room L-B001B (C3/C5 drain collection cell).

To conservatively calculate the available area of the cell where the flooding volume could leak, the largest cross-sectional area of the vessel is subtracted from the cross-sectional area of the rectangular cell. The required height of the liner is equal to the flooding volume divided by the available cross-sectional area of the room.

In order to calculate the minimum height of C3/C5 drain collection cell (room L-B001B) stainless steel liner, the following 2 scenarios are considered.

a Leakage and spillage of the C3/C5 drains/sump collection vessel (RLD-VSL-00004) when the total volume of fluid contained in the vessel is discharged into the cell. The flooding volume is the larger of 110 % (used as a conservative criteria) of the maximum operating volume of the largest vessel, or 100 % of the total volume of the largest vessel. The vessel total volume is defined as internal volume of the vessel including the shell and both heads. The total vessel volume of 7730 gallons is greater than 110 % of the maximum operating volume. Fire sprinklers are provided in this cell; therefore, fire water from sprinklers in the cell is added to the flooding volume. Thus, 10497 gallons is the total volume used for calculating the cell liner height. Minimum liner height required for this case is 3.6 ft.

b The vessel is full and intact so only fire water runoff from higher elevation floor drains is considered for the flooding volume. This scenario is based on the design of the LAW facility systems and uses a conservative volume of water for calculation of the liner height, almost 3 times the volume required in WAC 173-303. As shown in Figure 1, several of the LAW facility floor drains, sumps, and overflow lines drain to the C3/C5 drains/sump collection vessel (RLD-VSL-00004). In the event of a fire, the fire water would collect on the higher elevations and drain to the tank. Since the tank is full and not leaking in this scenario, fire water would flow out of the tank and into the cell via the overflow nozzle. The fire area used in this scenario is the largest design requirement for the LAW

facility. Volume of fire water is calculated to be 21,420 gallons. Minimum liner height required for this case is 9.3 ft.

Based on these scenarios, the cell is lined with stainless steel plates to a minimum height of 9.3 ft. The calculation for the volume of fire water includes a safety factor of 1.4 for conservatism and to compensate for construction tolerances. The largest cross-sectional area of the vessel is used to conservatively calculate the cross-sectional area of the rectangular cell, even though the cross-sectional area of the vessel at the bottom is much smaller. Additionally, the actual liner height will be rounded up to the next half-foot.

3.2 Flooding Volume Description for LAW Facility at +3 Ft Elevation

LAW facility has the following vessels, containing dangerous waste, in the process cells, and effluent cell rooms, at +3 ft elevation:

Process Cell Room L-0123

LCP-VSL-00001	melter 1 concentrate receipt vessel
LFP-VSL-00001	melter 1 feed preparation vessel
LFP-VSL-00002	melter 1 feed vessel
LOP-VSL-00001	melter 1 submerged bed scrubber (SBS) condensate vessel
LOP-WESP-00001	melter 1 wet electrostatic precipitator (WESP)
LOP-SCB-00001	melter 1 SBS

Process Cell Room L-0124

LCP-VSL-00002	melter 2 concentrate receipt vessel
LFP-VSL-00003	melter 2 feed preparation vessel
LFP-VSL-00004	melter 2 feed vessel
LOP-VSL-00002	melter 2 SBS condensate vessel
LOP-WESP-00002	melter 2 WESP
LOP-SCB-00002	melter 2 SBS

Effluent Cell Room L-0126

RLD-VSL-00003	plant wash vessel
RLD-VSL-00005	SBS condensate collection vessel

3.2.1 Process Cells

The process cells have 6 vessels in each cell. Both process cells are identical in size and contain a similar set of vessels.

For calculating the minimum height of stainless steel liners for process cell rooms L-0123, and L-0124, the following scenario is considered:

The total volume of fluid contained in the largest vessel is discharged by leakage or spillage into the cell.

To conservatively calculate the available area of the cell where the flooding volume could leak, the largest cross-sectional area of each of the vessels are subtracted from the cross-sectional area of the rectangular cell. The required height of the liner is equal to the flooding volume divided by the available cross-sectional area of the room.

The liners are sized to hold 100 % of the total volume of the largest vessel or 110 % of its maximum operating volume, whichever is greater. In all cases, the total volume is used because this is larger than 110 % of the volume up to the overflow nozzle.

The largest vessel in each cell is the concentrate receipt vessel, (LCP-VSL-00001, -00002), and the total volume for each is 18,130 gallons (2424 ft^3). This is the volume used for calculating the process cell room (L-0123 and L-0124) liner height. The available cross-sectional area of the room into which the liquid could flow is calculated to be 1279 ft^2. The liner height is calculated by dividing the volume of the largest vessel (2424 ft^3) by the available area of the room (1279 ft^2).

The minimum liner height required for each process cell is 1.9 ft. Conservative values for the vessel volume are used in the calculation of the liner height by using the volume of the vessel without subtracting the volume of the internal equipment. The largest cross-sectional area of the vessel is used to conservatively calculate the cross-sectional area of the rectangular cell, even though the cross-sectional area of the vessel at the bottom is much smaller. Additionally, the actual liner height will be rounded up to the next half-foot.

3.2.2 Effluent Cell

Effluent cell room L-0126 has 2 vessels in it. Both vessels are identical in size. Using the same method as for the process cells, the total volume of each of these vessels is 25,780 gallons (3446 ft^3). The available cross-sectional area of the room into which the liquid could flow was calculated to be 799 ft^2. The liner height is calculated by dividing the volume of the largest vessel (3446 ft^3) by the available area of the room (799 ft^2).

The minimum liner height required for effluent cells is 4.32 ft. Conservative values for the vessel volume are used in the calculation of the liner height by using the volume of the vessel without subtracting the volume of the internal equipment. The largest cross-sectional area of the vessel is used to conservatively calculate the cross-sectional area of the rectangular cell, even though the cross-sectional area of the vessel at the bottom is much smaller. Additionally, the actual liner height will be rounded up to the next half-foot.

3.3 Flooding Volume Description for LAW Facility at +28 Ft Elevation

LAW facility has the following tank, containing dangerous waste, at +28 ft elevation:

Caustic Scrubber Blowdown Pump Room, Room L-0218

LVP-TK-00001 caustic collection tank

3.3.1 Room L-0218

Caustic Scrubber Blowdown Pump Room, Room L-0218, at elevation +28 contains the caustic collection tank (LVP-TK-00001). The tank sets on a 6" high octagonal pedestal. Also located in this room are 4

pumps on individual pedestals. The room's concrete walls with special protective coating are provided to contain liquid in case of leakage. For simplicity, these walls will be referred to as the "secondary containment".

For calculating the minimum height of the secondary containment walls, the following scenario is considered:

The total volume of the fluid contained in the tank is discharged by leakage or spillage in to the secondary containment. In addition to this, if there is a fire in the area during this event, the automatic fire protection sprinkler system will activate and add fire protection water to the fluid discharged from the tank. Therefore, the secondary containment wall is sized to handle the volume of the fire protection water from the sprinkler system over the design area for a period of 20 minutes in addition to the 100% capacity of the tank.

To calculate the minimum secondary containment wall height, the available volume of the room and the volume of fire water must also be calculated; altogether, the calculation is done in four steps.

Step 1: Calculate the volume of available secondary containment up to 6". This step excludes the 6" tank pedestal and the 4-6" pump pedestals from the available area.

Step 2: Calculate the volume of available secondary containment from 6" to 2'- 5 1/4". This excludes the area above the 4 pump pedestals to the height of the pump discharge. This area is conservatively considered unavailable for the pumps themselves.

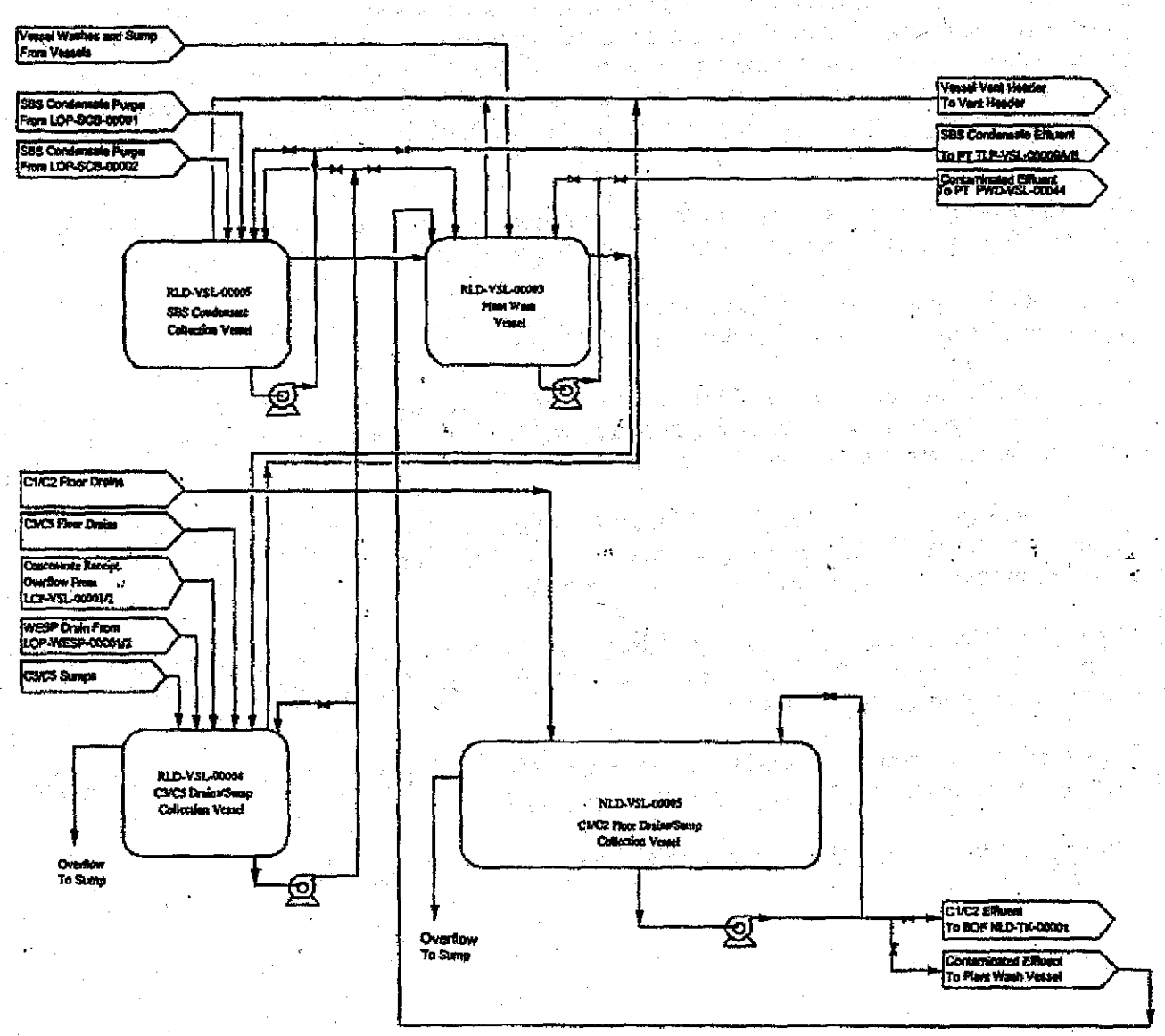
Step 3: Calculate the additional height of the secondary containment wall (above the first 2' - 5 1/4") required to accommodate the remaining total tank volume: (Volume of the tank minus the volume calculated in Steps 1 and 2) divided by the area of the room.

Step 4: Calculate the volume of 20 minutes of fire water from the sprinkler system, multiplied by a safety factor of 1.4. Calculate the height of the secondary containment wall for fire water by dividing the volume of fire water by the area of the room.

The secondary containment wall height required is then: 2' - 5 1/4" (Steps 1 and 2) plus additional height of the wall (Step 3) plus height required for fire water (Step 4).

The minimum secondary containment wall height required for this room is 4 ft.

Figure 1 LAW Effluent General Flow Diagram



Appendix A

Calculation of Volume and Liner Height

Appendix A: Calculation of Volume and Liner Height

1 Purpose

The purpose of this calculation is to size the height of the liners in the process cells for LAW vitrification facility at elevation −21 ft and elevation +3 ft. C3/C5 drains/sump collection vessel (RLD-VSL-00004) room L-B001B is shown at elevation −21 ft on drawing 24590-LAW-P1-P01T-P0001 (*LAW Vitrification Building General Arrangement Plan at El.−21' 0"*). Process cell rooms L-0123 and L-0124 and effluent cell room L-0126 on elevation +3 ft are shown on drawing 24590-LAW-P1-P01T-P0002 (*LAW Vitrification Building General Arrangement Plan At El 3' 0"*).

Additionally, this calculation will size the height of the secondary containment with protective coating required for the caustic scrubber blowdown pump room, Room L-0218 on elevation +28. This room is shown on drawing 24590-LAW-P1-P01T-P0004 (*LAW Vitrification Building General Arrangement Plan At El 28' 0"*).

2 Criteria and Design Input

2.1 Process and Effluent Cell Liner Height

To provide the worst case scenario, the vessels are conservatively assumed to be completely filled (including the top head) and sitting on the floor, and that the largest vessel total volume is used as the volume in determining the liner height. To allow for the worst case scenario, the volume of the vessel is assumed to leak completely onto the floor.

The liners are sized to hold 100 % of the total volume of the largest tank or 110 % of its maximum operating volume, whichever is larger. In all cases, the total volume is used because this is larger than 110 % of the volume up to the overflow nozzle.

In the case of C3/C5 drain collection cell (room L-B001B), 2 scenarios are considered: namely, leakage and spillage of the C3/C5 drains/sump collection vessel (RLD-VSL-00004), and collection of fire water from higher elevation floor drains when the vessel is full.

In the case of the process cells and the effluent cells, the largest vessel total volume is used as the volume in determining the liner height.

The following vessels are contained within the process and effluent cells.

LCP-VSL-00001	melter 1 concentrate receipt vessel
LCP-VSL-00002	melter 2 concentrate receipt vessel
LFP-VSL-00001	melter 1 feed preparation vessel
LFP-VSL-00002	melter 1 feed vessel
LFP-VSL-00003	melter 2 feed preparation vessel
LFP-VSL-00004	melter 2 feed vessel

RLD-VSL-00003	plant wash vessel
RLD-VSL-00005	SBS condensate collection vessel
LOP-VSL-00001	melter 1 SBS condensate vessel
LOP-SCB-00001	melter 1 SBS vessel
LOP-VSL-00002	melter 2 SBS condensate vessel
LOP-SCB-00002	melter 2 SBS vessel
LOP-WESP-00001	melter 1 WESP
LOP-WESP-00002	melter 2 WESP

Location and size of the C3/C5 drain collection cell (room L-B001B) is based on drawing 24590-LAW-P1-P01T-P0001 (*LAW Vitrification Building General Arrangement Plan at El. −21' 0"*). Location and size of process rooms L-0123, and L-0124 and effluent room L-0126, at elevation 3 ft are shown on drawing 24590-LAW-P1-P01T-P0002 (*LAW Vitrification Building General Arrangement Plan at El. 3' 0"*).

For the C3/C5 drain collection cell (room L-B001B), the fire protection system fire water runoff from higher elevation floor drains has been calculated on the basis of 3000 ft^2 of fire area. The density of the fire water spray is 0.17 gal/min/ft^2 , for 30 minutes and multiplied by a safety factor of 1.4.

2.2 Secondary Containment Wall Height

The caustic collection tank (LVP-TK-00001) is located in the caustic scrubber blowdown tank room L-0218 at elevation +28'-0". The containment wall is sized to handle the volume of fire-protection water from the fire protection system over the design area for a period of 20 minutes in addition to the 100% capacity (or total volume) of the tank. The fire protection water automatic sprinkler design density is 0.17 gpm/sq. ft. Location and size of room L-0218 at elevation +28 ft is shown on drawing 24590-LAW-P1-P01T-P0004 (*LAW Vitrification Building General Arrangement Plan at El. 28' 0"*).

3 Assumptions

None.

4 Methodology

As stated above in the criteria and design input section, to calculate for worst case, the calculation methodology assumes that the vessels are completely filled and sitting on the floor and that the largest tank leaks completely into the room. For the C3/C5 drain collection cell (room L-B001B), the maximum leakage volume to the cell is fire water input from higher elevation floor drains to a filled C3/C5 drains/sump collection vessel (RLD-VSL-00004).

4.1 Basic Equations

$\pi = 3.14$

Area of a Rectangle = Length x Width

Area of Circle $= \pi \frac{D_i^2}{4}$

Volume of Cylinder $= \frac{\pi}{4} \cdot D_i^2 \cdot h$

Volume of Rectangular Room = Length x Width x Height

Area of a Regular Polygon = 1/2 x a x p (where a = apothem and p = perimeter)

Volume of Firewater = Area of Room x fire water spray density x 20 minutes x 1.4 safety factor

4.2 Room Dimension Equations and Symbology

L = length of room (ft)

W = width of room (ft)

H = height of room (ft)

A = area of room (ft^2)

4.3 Volume Calculation

Volume of a vessel or tank is calculated by using the following equations:

$$V_s = \frac{\pi * D_i^2}{4} * L_{T-T}$$

where:

V_s = volume of the cylindrical portion of the vessel or tank

D_i = inside diameter

L_{T-T} = tangent to tangent length

Volume (V_h) of 1 F&D (flanged and dished) head is calculated using the following equation:

$$V_h = 0.0847 * D_i^3$$

$$d = 0.162 * D_i$$

d is the depth of the F&D head

Refer to *Pressure Vessel Design Manual* (Moss, 1987).

Volume (V_c) of conical head is calculated using the following equation:

$$V_c = (1/3)*\{(\pi/4)*(D_i)^2\}*d$$

d is the height of the conical head

The total volume of the vessel or tank = volume of the cylindrical portion + volume of top head + volume of bottom.

4.4 Available Area for Liquid Containment

a) For Cells:

To calculate the possible area that the liquid in the vessel could leak into, the sum of the cross sectional areas of the vessels is subtracted from the cross sectional area of the room.

Area available = area of the room minus sum of the cross sectional areas of the vessels (ft^2)

The height of liner is equal to the volume of the largest vessel divided by the available area of room. This excludes the cross sectional area of the leaking vessel.

Height of the liner (ft) = volume of the largest vessel / area available

b) For Room L-0218:

Room L-0218 contains 4 pumps and 1 tank. To calculate the possible area that the liquid could leak into, the available volume of the room and the volume of the firewater must be calculated. This is done in four steps, calculating available volume by height.

1. Available volume up to 6" excluding pump and tank pedestals.
2. Available volume from 6" to 2'- 5 1/4" excluding area above pump pedestals to the height of the pump discharge.
3. Calculate additional height required to accommodate the remaining total tank volume. Volume of the tank minus the volume calculated in steps 1 and 2 divided by the area of room.
4. Calculate the volume of 20 minutes of firewater from the sprinklers multiplied by safety factor of 1.4. Calculate the height of the containment wall for fire water by dividing the volume of firewater by the area of the room.

The secondary containment wall height required is then: 2' - 5 1/4" (Steps 1 and 2) plus additional height of the wall (Step 3) plus height required for fire water (Step 4).

5 Calculations

Complete calculations for the liner height are as follows for each individual cell:

5.1 C3/C5 Drain Collection Cell, Room L-B001B, Elevation −21 ft

Vessel Number	Diameter (D_i) ft	L_{T-T} ft	Head Type (Flange and Dished)	Total Height (including bottom and top head) ft	Remark
RLD-VSL-00004	10	11	F&D (bottom and top)	14.24	

Volume of RLD-VSL-00004 = volume of cylindrical portion + volume of heads = 1034 ft^3

Two scenarios are considered:

a Collection of fire water runoff when the vessel is full and intact with a safety factor of 1.4

b Leakage and spillage of the C3/C5 drains/sump collection vessel RLD-VSL-00004

5.1.1 Calculations

A Volume of fire water runoff from higher elevation floor drains will flow into the vessel, and if the vessel is already full, water will overflow into the room (L-B001B). The calculation for the liner height is based on the 3000 ft^2 of fire area with 0.17 gal/min/ft^2 of fire water spray density for 30 minutes multiplied by a safety factor of 1.4.

Volume of fire water = 3000 ft^2 × 0.17 gal/min/ft^2 × 30 minutes × 1.4 = 21,420 gallons = 2864 ft^3
Area of the room available = (16.58 × 23.33) − $\pi/4 \times (10)^2$ = 309 ft^2
Liner height required = 2864/309= 9.3 ft

B If only the vessel fails (including 20 minutes of fire water from the in cell sprinkler system, multiplied by a safety factor of 1.4), and there is no fire water runoff from higher elevation floor drains, then the liner height is calculated as follows: (total area of the cell, including vessel cross-sectional area is used)

Total volume of vessel RLD-VSL-00004 (using formula given in 4.32 above)
= Volume of the cylindrical portion + volume of top head + volume of bottom
= $[\pi/4 \times (10)^2 \times 11] + [0.0847 \times (10)^3] + [0.0847 \times (10)^3]$
= 863.94 + 84.7 + 84.7 = 1033.34, rounded to 1034 ft^3
Area of the room = (16.58 × 23.33) = 387 ft^2
Volume of fire water from in cell sprinkler system
= Area of room x fire water spray density x 20 minutes x 1.4 safety factor
= 387 ft^2 x 0.17 gal/min/ft^2 x 20 min x 1.4 = 1842 gal = 246 ft^3
Liner height required = (1034 + 246)/387 = 3.31 ft

Thus, based on the calculation in section A, the minimum required liner height is 9.3 ft.

5.2 Melter 1 and 2 Process Cells, Rooms L-0123 and L-0124, Elevation +3 ft

The dimensions of these vessels are as follows:

Room Number	Vessel Number	Diameter (D_i) ft	L_{T-T} ft	Head Type	Total Height (including bottom and top head) ft	Remark
L-0123	LCP-VSL-00001	14	12.75	F&D (bottom and top)	17.29	Largest vessel in the room
	LFP-VSL-00001	11	10.46	F&D (bottom and top)	14.02	
	LFP-VSL-00002	11	10.46	F&D (bottom and top)	14.02	
	LOP-VSL-00001	12	8.12	F&D (bottom and top)	12	
	LOP-WESP-00001	7	17	F&D (bottom and top)	19	
	LOP-SCB-00001	10	6.5	F&D (bottom and top)	9.74	
L-0124	LCP-VSL-00002	14	12.75	F&D (bottom and top)	17.29	Largest vessel in the room
	LFP-VSL-00003	11	10.46	F&D (bottom and top)	14.02	
	LFP-VSL-00004	11	10.46	F&D (bottom and top)	14.02	
	LOP-VSL-00002	12	8.12	F&D (bottom and top)	12	
	LOP-WESP-00002	7	17	F&D (bottom and top)	19	
	LOP-SCB-00002	10	6.5	F&D (bottom and top)	9.74	
	*					

Volume of largest vessel from table above = volume of cylindrical portion + volume of heads
$= [\pi/4 \times (14)^2 \times 12.75] + [0.0847 \times (14)^3] + [0.0847 \times (14)^3]$
$= 1962.71 + 232.41 + 232.41 = 2428\ ft^3$

Area of the room available $= (38.33 \times 48.33) - [\pi/4 \times \{(7)^2 + (11)^2 + (12)^2 + (10)^2 + (11)^2 + (14)^2\}]$
$= 1279\ ft^2$
(Area of the leaking vessel was also subtracted for conservatism.)

Liner height required = 2428/1279 = 1.9 ft

* Melter 3 room and tankage deleted from table.

5.3 Effluent Cell Calculations, Room L-0126, Elevation +3

Room Number	Vessel Number	Diameter (D_i) ft	L_{T-T} ft	Head Type	Total Height (including bottom and top head) ft	Remark
L-0126	RLD-VSL-00003	16	14.66	Flat top and F&D bottom	18	Both vessels in this room

	RLD-VSL-00005	16	14.66	Flat top and F&D bottom	18	

Volume of the largest vessel from above table
= volume of the plant wash/SBS condensate collection vessel (RLD-VSL-00003/RLD-VSL-00005)
= volume of cylindrical portion + volume of F&D bottom + volume of flat head (cylindrical) portion
$= [\pi/4 \times (16)^2 \times 14.66] + [0.0847 \times (16)^3] + [\pi/4 \times (16)^2 \times \{18 - 14.66 - (0.162 \times 16)\}]$
$= 2947.57 + 346.93 + 150.39$
$= 3445\ ft^3$

Area of the room available $= (38.33 \times 31.33) - [\pi/4 \times \{(16)^2 + (16)^2\}] = 799\ ft^2$
(Area of the leaking vessel was also subtracted for conservatism.)

Liner height required = 3445 / 799 = 4.32 ft

5.4 Caustic Scrubber Blowdown Pump Room, Room L-0218, Elevation + 28

Room Number	Tank Number	Diameter (D_i) ft	L_{T-T} ft	Head Type	Total Height (including top head) ft	Remark
L-0218	LVP-TK-00001	13	14.32	Flat bottom and conical top with 1: 6 slope;	15.41	d = height of conical head portion $d = (D_i/2) \times (1/6)$ (due to 1:6 slope)

Volume of the tank from above table
= Volume of the caustic collection tank (LVP-TK-00001)
= Volume of cylindrical portion + volume of conical head portion
$= [\pi/4 \times (13)^2 \times 14.32] + [1/3 \times \pi/4 \times (13)^2 \times \{1.08\}]$
$= 1899.76 + 47.76$
$= 1948\ ft^3$

Dimensions of the pump pedestals, 4 each, are as follows:
5.0 ft by 1.83 ft

Step 1: The secondary containment area has a 0.5 ft high octagonal pedestal for the tank and the distance between the parallel sides of the pedestal is 15 ft. Each side of this octagonal pedestal is 6.21 ft.

Using the equation for a regular polygon:
The area of the tank pedestal is $= 1/2 \times 7.5 \times 8 \times 6.21 = 186\ ft^2$

The area of Room L-0218 can be calculated by dividing the room into three rectangles. Refer to the general arrangement drawing for elevation +28 (see References).

The area of the room available for secondary containment up to 0.5 ft height is

= {Area of the room} – {cross sectional area of pump pedestals} – {cross sectional area of the tank pedestal)
= {(9.19 × 21.25) + (15.25 × 22.33) + (5.35 × 19.25)} – {4(5 × 1.83)} – {186.42}
= {(195.29) + (340.53) + (102.99)} – {36.60} – {186.42}
= 638.81 – 36.60– 186.42 = 415.79 ft^2
Volume of liquid contained by 6" high containment wall = 415.79 × 0.5 = 207.90 ft^3

Step 2: Calculate the volume of available secondary containment from 6" to 2'- 5 1/4". This excludes the area above the 4 pump pedestals to the height of the pump discharge.

= {(Area of Room) - (Cross sectional area of pump pedestals)} × {height of containment wall}
= {(638.81) – (36.60)} × {1.94}
= 1168.29 ft^3

Total volume of liquid contained by 2' - 5 1/4" high containment wall = 207.90 + 1168.29 = 1376.19 ft^3

Step 3: The height of wall required to accommodate the remaining total tank volume (above the first 2' - 5 1/4"):
= {(Volume of the Tank) – (1376.19)} / {Area of the room}
={(1949.97) – (1376.19)} / {638.81}
= 573.78 / 638.81 = 0.9 ft.

Step 4: If there is fire in the area during this event and the fire water sprinklers activate, the volume of water added to the secondary containment will be based on the fire water spray density of 0.17 gal/min/ft^2 for 20 minutes multiplied by a safety factor of 1.4.

Volume of fire water = Area of containment in ft^2 × 0.17 gal/min/ft^2 × 20 minutes × 1.4
= 638.81 ft^2 × 0.17 gal/min/ ft^2 × 20 minutes × 1.4
=3040.74 gallons = 406.49 ft^3

Therefore, additional height of containment wall required to accommodate firewater volume
= Volume of firewater / {Area of the room} - {cross sectional area of pump pedestals}
= 406.49 / 638.81 = 0.64 ft

Therefore containment wall height required = 2.44 + 0.9 + 0.64 = 3.98 rounded off to 4 ft.

6 Summary

The minimum required liner heights using the method above for the rooms are as follows:

Table of Liner Height

Cell	Room Number	Minimum Liner Height	Liner Height Rounded Up to Nearest Half Foot
C3/C5 Drain Collection Cell	L-B001B	9.3 ft	9.5 ft
M1 Process Cell	L-0123	1.9 ft	2.0 ft
M2 Process Cell	L-0124	1.9 ft	2.0 ft
Effluent Cell	L-0126	4.32 ft	4.5 ft

Table of Secondary containment Wall Height with Special Protective Coating			
Room	Room Number	Minimum Wall Height	Wall Height Rounded Up to Nearest Half Foot
Caustic Scrubber Blowdown Pump Room	L-0218	3.98 ft	4 ft

7 References

24590-LAW-P1-P01T-P0001, *LAW Vitrification Building General Arrangement Plan at El. −21'0"*

24590-LAW-P1-P01T-P0002, *LAW Vitrification Building General Arrangement Plan at El. 3'0"*

24590-LAW-P1-P01T-P0004, *LAW Vitrification Building General Arrangement Plan at El. 28'0"*

Moss, Dennis R. 1987. *Pressure Vessel Design Manual*, Gulf Publishing Co.

Quarter Ending 3/31/2005 24590-PTF-PCN-ENV-04-0001

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Page 2 of 3:	Hanford Facility RCRA Permit, Part III, Attachment 51
	Class [1]1 Permit Modification to the Mechanical System Data Sheet and the Plant Item Material Selection Data Sheet for Pretreatment Facility Vessel CNP-VSL-00004
Attachment 1	24590-PTF-MVD-CNP-P0007, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel CNP-VSL-00004
Attachment 2	24590-PTF-N1D-CNP-P0006, Rev. 2, Plant Item Material Selection Data Sheet for Pretreatment Vessel CNP-VSL-00004

Submitted by Co-Operator:		Reviewed by ORP Program Office:	
	1/13/05		3/4/05
F. Beranek	Date	R. J. Schepens	Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update mechanical systems data sheet and the plant item material selection data sheet associated with the Pretreatment facility Cesium Nitric Acid Recovery Process (CNP) system vessel CNP-VSL-00004. Minimal changes to these documents have been made since their initial submittal and approval by Ecology on 12/23/2004. These changes do not affect the form, function, or capacity of the vessels and are discussed by the following:

Mechanical Systems Data Sheet:

The mechanical systems data sheet for vessel CNP-VSL-00004 was updated to include hydrodynamic loading for the vessel pulse jet mixers and the appropriate notes. Design data previously identified for CNP-VSL-00004 is unchanged.

Attachment 51, Appendix 8.6:

> Replace 24590-PTF-MVD-CNP-P0007, Rev. 1 with 24590-PTF-MVD-CNP-P0007, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel CNP-VSL-00004

See Attachment 1 of this Modification Notification for the updated mechanical system data sheet.

Plant Item Material Selection Data Sheet:

The plant item material selection data sheet for vessel CNP-VSL-00004 was updated to be consistent with the material selection data sheets for all black cell vessels. Text was added to address inadvertent nitric acid addition to these vessels, as was done for all black cell vessels. Also, discussions for routine and non-routine operations for the vessels were added. The material of construction and the corrosion allowance previously identified for CNP-VSL-00004 are unchanged.

Attachment 51, Appendix 8.9:

> Replace 24590-PTF-N1D-CNP-P0006, Rev. 1 with 24590-PTF-N1D-CNP-P0006, Rev. 2, Plant Item Material Selection Data Sheet for Pretreatment Vessel CNP-VSL-00004

See Attachment 2 of this Modification Notification for the updated material selection data sheet.

[1] Class 1 modifications requiring prior Agency approval.
[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

Quarter Ending 3/31/2005

24590-PTF-PCN-ENV-04-0001

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: N/A

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

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: [X] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

G. P Davis 3-22-05

Date

Attachment 1

24590-PTF-MVD-CNP-P0007, Rev. 2
Mechanical Systems Data Sheet for Pretreatment Vessel CNP-VSL-00004

R10486410

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-CNP-VSL-00004

Project:	RPP-WTP	P&ID:	24590-PTF-M6-CNP-P0002/24590-PTF-M6-CNP-P0004/24590-PTF-M6-CXP-P0007
Project No:	24590	Process Calculation	Deleted 2
Project Site:	Hanford	Vessel Drawing	24590-PTF-MV-CNP-P0002
Description:	Cs Evaporator Recovered Nitric Acid Vessel		

ISSUED BY RPP-WTP PDC

Reference Data

Charge Vessels (Tag Numbers)	CNP-VSL-00162
Pulsejet Mixers / Agitators (Tag Numbers)	4 (CNP-PJM-00019, CNP-PJM-00020, CNP-PJM-00021, CNP-PJM-00022)
RFDs/Pumps (Tag Numbers)	CNP-RFD-00005

Design Data

Quality Level		CM	Fabrication Specs	24590-WTP-3PS-MV00-TP001		
Seismic Category		SC-III	Design Code	ASME VIII Div 1		
Service/Contents		Recovered Nitric Acid	Code Stamp	Yes		
Design Specific Gravity		1.07	NB Registration	Yes		
Maximum Operating Volume	gal	10,065	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	11,115	Estimated	29,365	121,375	123,200
			Actual *			

Inside Diameter	inch	114			Wind Design	Not Required	
Length/Height (TL-TL)	inch	228			Snow Design	Not Required	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-FB01-T0001	
Internal Pressure	psig	0 (Note 8)	15		Seismic Base Moment *	ft*lb	
External Pressure	psig	0.22	FV		Postweld Heat Treat	Not Required	
Temperature	°F	115-140	255 (Note 7)		Corrosion Allowance	inch	0.04
Min. Design Metal Temp.	°F	40			Hydrostatic Test Pressure *	psig	

Note: 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.

MARK W. HOFFMANN
STATE OF WASHINGTON
0030952
REGISTERED PROFESSIONAL ENGINEER
1/26/05
EXPIRES 12/10/06

This Bound Document Contains a total of 6 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
2	2/7/05 ~~1/26/05~~	Issued for Permitting Use				
1	6/26/04	Issued for Permitting Use	K. Brightman	H. Khurana	C. Slater	M. Hoffmann
0	12/17/02	Issued for Permitting Use	J. Jackson	C. Slater	N/A	M. Hoffmann

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	PLANT ITEM No. *24590-PTF-MV-CNP-VSL-00004*

Materials of Construction

Component	Material		Minimum Thickness / Size	Containment
Top Head	*SA 240 304*	*Note 1*	*See Drawing*	*Auxiliary (See note 5)*
Shell	*SA 240 304*	*Note 1*	*See Drawing*	*Primary (See note 5)*
Bottom Head	*SA 240 304*	*Note 1*	*See Drawing*	*Primary (See note 5)*
Support	*SA 240 304*	*Note 1*	*See Drawing*	*N/A*
Jacket/Coils/Half-Pipe Jacket	*N/A*		*N/A*	*N/A*
Internals	*SA 240 304*	*Note 1*	*See Drawing*	*Thermowells Primary*
Pipe Nozzles	*SA 312 TP304*	*Note 1*	*See Drawing*	*Primary (See note 5)*
Forgings/ Bar stock	*SA 182 F304*	*Note 1*	*See Drawing*	*N/A*
Gaskets	*N/A*		*N/A*	*N/A*
Bolting	*N/A*		*N/A*	*N/A*

Miscellaneous Data

Orientation	*Vertical*	Support Type	*Skirt*
Insulation Function	*N/A*	Insulation Material	*N/A*
Insulation Thickness (inch)	*N/A*	Internal Finish	*Note 3*
		External Finish	*Note 3*

Remarks

**** To be determined by the vendor.***
Note 1: Max. Carbon Content 0.030%.
Note 2: Deleted
Note 3: Welds descaled as laid.
Note 4: This vessel is in a Black Cell.
Note 5: All welds forming part of the Primary and Auxiliary Containment including nozzle attachment welds shall be subjected to 100% volumetric examination
Note 6: Contents of this document are Dangerous Waste Permit affecting.
Note 7: Max. design temperature kept equal to that of CNP-VSL-00003
Note 8: 0 psig is the maximum internal vessel operating pressure. The internal vessel operating pressure will range from -0.22 psig to 0 psig.
Note 9: Deleted 2
Note 10: All hydrodynamic and overblow loads are for BNI internal use only and are to be disregarded by the seller. 2

	MECHANICAL DATA SHEET: VESSEL	PLANT ITEM No. 24590-PTF-MV-CNP-VSL-00004

Equipment Cyclic Data Sheet

Component Plant Item Number:	***CNP-VSL-00004***
Component Description	***Parent Vessel***

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	***SA 240 304 with max. carbon of 0.030 %***
Design Life	***40 Years***
Component Function and Life Cycle Description	***The purpose of the Cs Evaporator Recovered Nitric Acid Vessel is to receive eluant (0.5M nitric acid) from the Cs Evaporator Nitric Acid Rectifier and serve as a feed vessel to the Cs Ion Exchange Columns. Filling cycle is based on a 48 hour (every 33 hours for a 15 hour period) elution cycle over 40 years.***

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***FV***	***15***	***10***	***Nominal assumption for Testing***
Operating Pressure	psig	***-0.22***	***0***	***N/A***	***The vessel will remain under constant pressure depending upon the plant HVAC***
Operating Temperature	°F	***115***	***140***	***N/A***	***Uniform material temperature range, not between two points.***
Contents Specific Gravity		***1.00***	***1.1***	***N/A***	***Normally 1.02 without cycling.***
Contents Level	inch	***40***	***235***	***7,300***	***Based on a 48 hr elution cycle over 40 years***
Localized Features					
Nozzles					
Supports					

Notes

- ***Cycle Increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***

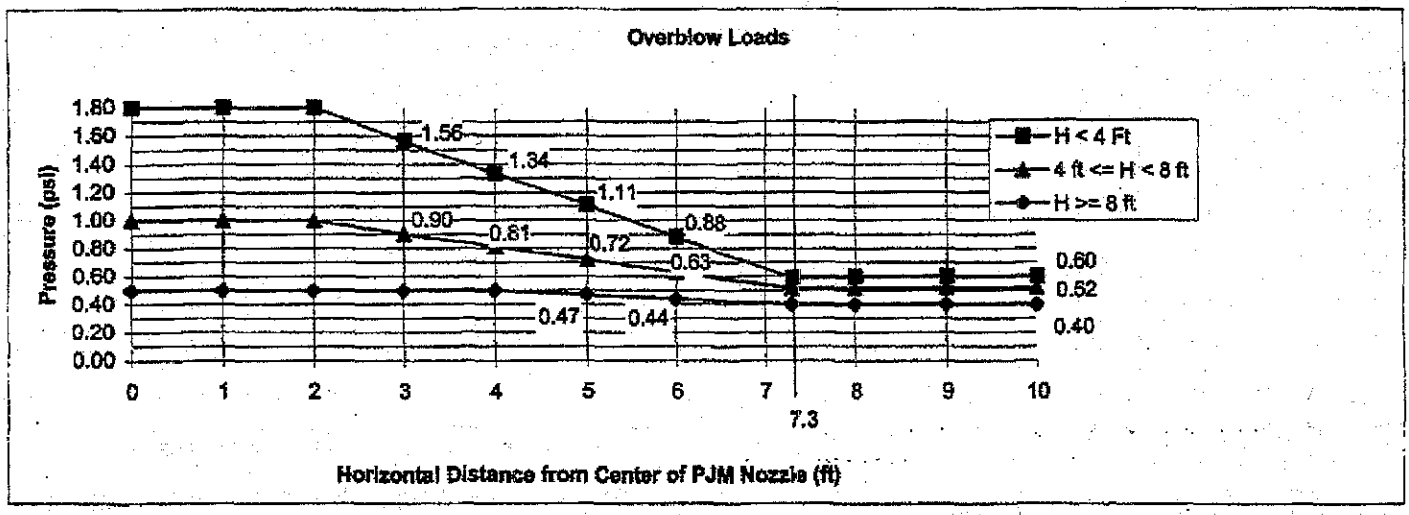
Hydrodynamic Loading 2

In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overblow loads, and this load combination is also to be assumed to act concurrently with seismic loads.

Hydrodynamic loads acting on a surface vary with the location of the surface within the vessel. The following table indicates the normal hydrodynamic pressure ranges and the number of design cycles. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Condition	Hydrodynamic Pressure Range, psi				Number of Cycles
	Between PJM Center and Vessel Wall		Between Vessel Center and PJM Center		
	Radial	Vertical	Radial	Vertical	
Normal Operation	*-0.80 to 0.80*	*-0.80 to 0.40*	*-0.20 to 0.30*	*-0.20 to 0.25*	*7.5×10^6*

Overblow loads vary as a function of the horizontal distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle up to the overflow level as plotted:



The overblow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Any single pulse jet mixer may overblow 100 cycles. 2

Notes

- ***Cycle Increase: Increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.*** 2

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	**PLANT ITEM No.** *24590-PTF-MV-CNP-VSL-00004*

Equipment Cyclic Data Sheet

Component Plant Item Number:	*CNP-VSL-00162 and CNP-RFD-00005*
Component Description	*Charge Vessel Type 'C'(Sampling) & RFD Model 125M*

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*SA 240 304 with max. carbon of 0.030 %*
Design Life	*40 Years*
Component Function and Life Cycle Description	*The charge vessel is cyclically loaded using vacuum to fully fill the charge vessel with process liquid and compressed air to fully empty the charge vessel. The charge vessel is contained within a parent vessel with varying liquid level. It shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The charge vessel supports shall be designed to cycle between fully buoyant (charge vessel empty and parent vessel full) and fully loaded (charge vessel full and parent vessel empty).*

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*80*	*10*	*Nominal assumption for Testing*
Operating Pressure	psig	*FV*	*72.5*	*2,400***	
Operating Temperature	°F	*115*	*140*	*N/A*	*Uniform Temperature range, not between two points*
Contents Specific Gravity		*1.00*	*1.1*	*N/A*	*Normally 1.02 without cycling.*
Contents Level	inch	*Empty*	*Flooded*	*2,400***	
Localized Features					
Nozzles					
Supports		*Buoyant/ Loaded*		*2,400***	

Notes

- ***Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***
- *****Based on 40 year life expectancy. Sampling takes place 12 times/year (Analytical Laboratory Design Requirements: WTP Sampling and Analysis Plan 24590-WTP-PL-PR-01-004 Rev. 2, pg. C-6). To obtain an accurate sample, we assume that each sampling averages 5 attempts.***

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	**PLANT ITEM No.** *24590-PTF-MV-CNP-VSL-00004*

Equipment Cyclic Data Sheet

Component Plant Item Number:	*CNP-PJM-00019, CNP-PJM-00020, CNP-PJM-00021, CNP-PJM-00022*
Component Description	*Pulse Jet Mixers (PJM Type A)*

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*SA240 304 with 0.030 max. carbon*
Design Life	*40 Years*
Component Function and Life Cycle Description	*These pulse jet mixers (PJMs) are cyclically loaded using vacuum to fully fill the PJM with process liquid and compressed air to fully empty the PJM. The PJMs are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The PJM supports shall be designed to cycle between fully buoyant (PJM empty and parent vessel full) and fully loaded (PJM full and parent vessel empty) states. Thrust load shall be applied only to the fully buoyant state. Assume the parent vessel is full for 50% of the number of PJM cycles.* 2

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*80*	*10*	*Nominal assumption for testing*
Operating Pressure	psig	*FV*	*72.5*	*7.5×10^5*	*Based on 40 year life expectancy*
Operating Temperature	°F	*115*	*140*	*N/A*	*Uniform temperature range, not between two points*
Contents Specific Gravity		*1.00*	*1.1*	*N/A*	*Normally 1.02 without cycling.*
Contents Level	inch	*Empty*	*Flooded*	*7.5×10^5*	
Thrust 2	lbf	*0*	*262*	*7.5×10^5*	
Localized Features					
Nozzles					
Supports		*Buoyant/ Loaded*		*7.5×10^5*	

Notes

- ***Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***

Attachment 2

24590-PTF-N1D-CNP-P0006, Rev. 2
Plant Item Material Selection Data Sheet for Pretreatment Vessel CNP-VSL-00004

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10460389

CNP-VSL-00004 (PTF)

Cs Evaporator Recovered Nitric Acid Vessel

- Design Temperature (°F)(Max/min): 255/40
- Design Pressure (psig) (Max/min): 15/FV
- Location: incell
- PJM Discharge Velocity (fps): 40
- Drive Cycle: 17 % (at 40 fps)

Offspring items

CNP-PJM-00019, CNP-PJM-00020, CNP-PJM-00021, CNP-PJM-00022, CNP-VSL-00162, CNP-RFD-00005

ISSUED BY
RPP-WTP PDC

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on sheets 5 and 6

Operating Modes Considered:

- The vessel is the stated pH at the normal operating temperature

Materials Considered:

Material (UNS No.,)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00	X	
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 304 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.04 inch (includes 0.00 inch erosion allowance)

Process & Operations Limitations:

- Develop rinsing/flushing procedure for acid and water

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED PROFESSIONAL ENGINEER
1/25/05
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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.

This bound document contains a total of 6 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
2	1/25/05	Issued for Permitting Use			
1	6/25/04	Issued for Permitting Use	DLA	APR	SWV
0	1/13/03	Issues for Permitting Use	DLA	JRD	SWV

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

CNP-VSL-00004 stores recovered nitric acid from CNP-DISTC-00001 at between 115 °F and 140 °F.

a General Corrosion
Hammer (1981) lists a corrosion rate for 304 (and 304L) in 2 M HNO_3 of less than 2 mpy. Davis (1994) states the corrosion rate for 304L in 12% HNO_3 will be less than about 1 mpy up to about 212°F.

Conclusion:
304L is expected to be sufficiently resistant to the waste solution with a probable general corrosion rate of less than 1 mpy.

b Pitting Corrosion
With the stated conditions, 304L will be adequate.

Conclusion:
The data provided suggest there are insufficient halides to cause pitting and 304L would be adequate.

c End Grain Corrosion
Not believed to be applicable to this system.

Conclusion:
Not applicable to this system.

d Stress Corrosion Cracking
The exact amount of chloride required to stress corrosion crack stainless steel is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as a few ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140°F. Further, the use of "L" grade stainless reduces the opportunity for sensitization. At the concentrations of chloride expected, 304L will be satisfactory.

Conclusion:
The use of 304L is expected to be acceptable for chloride free conditions.

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting

f Corrosion at Welds
Corrosion at welds is a potential problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are generally not acceptable for MIC.

Conclusion:
Not considered a concern.

h Fatigue/Corrosion Fatigue
Corrosion fatigue is not expected to be a concern.

Conclusions
Not a concern.

i Vapor Phase Corrosion
Not expected to be a concern.

Conclusion:
Vapor phase corrosion is not expected.

PLANT ITEM MATERIAL SELECTION DATA SHEET

j Erosion
Based on past experiments by Smith & Elmore (1992), the solids are soft and erosion is not expected to be a concern for the vessel wall. Because of the negligible concentration of undissolved solids, no localized protection is necessary for the applicable portions of the bottom head to accommodate PJM discharge velocities of up to 12 m/s for a usage of 100 % operation.

The PJM nozzle requires no additional protection

Conclusion:
The recommended corrosion allowance provides sufficient protection for erosion of the vessel.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not applicable.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
Vessel routinely operates at low pH.

Conclusion:
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
2. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
3. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX
4. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
5. Smith, H. D. and M. R. Elmore, 1992, *Corrosion Studies of Carbon Steel under Impinging Jets of Simulated Slurries of Neutralized Current Acid Waste (NCAW) and Neutralized Cladding Removal Waste (NCRW)*, PNL-7816, Pacific Northwest Laboratory, Richland, Washington.

Bibliography:

1. Agarwal, DC, *Nickel and Nickel Alloys*, In: Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
2. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
3. Phull, BS, WL Mathay, & RW Ross, 2000, *Corrosion Resistance of Duplex and 4-6% Mo-Containing Stainless Steels in FGD Scrubber Absorber Slurry Environments*, Presented at Corrosion 2000, Orlando, FL, March 26-31, 2000, NACE International, Houston TX 77218.
4. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158
5. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

OPERATING CONDITIONS

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Evaporator recovered nitric acid vessel (CNP-VSL-00004)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Max		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	3.84E-04	3.86E-04			
Chloride	g/l	4.28E-04	5.12E-04			
Fluoride	g/l					
Iron	g/l					
Nitrate	g/l					Assumption 1
Nitrite	g/l	5.11E-04	6.11E-04			
Phosphate	g/l	8.88E-04	1.04E-03			
Sulfate	g/l	3.36E-04	4.01E-04			
Mercury	g/l					
Carbonate	g/l	1.66E-03	1.82E-03			
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Note 3
Temperature	°F					Note 2
						Note 4

List of Organic Species:

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. Tnormal operation 115 °F to 140 °F
3. Will be highly acidic, pH approximately 0.3
4. 2M nitric acid is added to the vessel.

Assumptions:

1. Based on the presence of 0.5M HNO_3 the nitrate concentration is expected to be approximately 31 g/l

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.1.3 Cs Evaporator Recovered Nitric Acid Vessel (CNP-VSL-00004)

Routine Operations

Nitric acid vapor enters the nitric acid distillation column, CNP-DISTC-00001, which separates water from the acid. The recovered nitric acid is stored in the Cs evaporator recovered nitric acid vessel CNP-VSL-00004. During elution, nitric acid is pumped from the storage vessel by the Cs IX feed pump, through the feed cooler, and distributed into the system CXP ion exchange columns.

Non-Routine Operations that Could Affect Corrosion/Erosion

None identified.

Quarter Ending 3/31/2005 24590-PTF-PCN-ENV-04-0003

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Page 2 of 3:	Hanford Facility RCRA Permit, Part III, Attachment 51 Class [1] 1 Permit Modification to the Mechanical System Data Sheets and the Plant Item Material Selection Data Sheet for Pretreatment Facility Vessels RDP-VSL-00002A, RDP-VSL-00002B, and RDP-VSL-00002C
Attachment 1	24590-PTF-MVD-RDP-P0005, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel RDP-VSL-00002A
Attachment 2	24590-PTF-MVD-RDP-P0006, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel RDP-VSL-00002B
Attachment 3	24590-PTF-MVD-RDP-P0007, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel RDP-VSL-00002C
Attachment 4	24590-PTF-N1D-RDP-P0001, Rev. 1, Plant Item Material Selection Data Sheet for Pretreatment Vessels RDP-VSL-00002A, RDP-VSL-00002B, and RDP-VSL-00002C

Submitted by Co-Operator:		Reviewed by ORP Program Office:	
11/13/05		3/4/05	
F. Beranek	Date	R. J. Schepens	Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update mechanical systems data sheets and the plant item material selection data sheet associated with the Pretreatment facility Spent Resin Collection and Dewatering Process (RDP) system vessels RDP-VSL-00002A, RDP-VSL-00002B, and RDP-VSL-00002C. Minimal changes to these documents have been made since their initial submittal and approval by Ecology on 10/27/2004. These changes do not affect the form, function, or capacity of the vessels and are discussed by the following:

Mechanical Systems Data Sheets:

The mechanical systems data sheets for vessels RDP-VSL-00002A, RDP-VSL-00002B, and RDP-VSL-00002C were updated to include hydrodynamic loading for the vessel pulse jet mixers and the appropriate notes. Additional changes include updates to the vessel operation internal and external pressures and actual vessel weights determined by the vendor.

Attachment 51, Appendix 8.6:

Replace 24590-PTF-MVD-RDP-P0005, Rev. 1 with 24590-PTF-MVD-RDP-P0005, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel RDP-VSL-00002A

Replace 24590-PTF-MVD-RDP-P0006, Rev. 1 with 24590-PTF-MVD-RDP-P0006, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel RDP-VSL-00002B

Replace 24590-PTF-MVD-RDP-P0007, Rev. 1 with 24590-PTF-MVD-RDP-P0007, Rev. 2, Mechanical Systems Data Sheet for Pretreatment Vessel RDP-VSL-00002C

See Attachment 1, Attachment 2, and Attachment 3 of this Modification Notification for the updated mechanical system data sheets.

Plant Item Material Selection Data Sheet:

The plant item material selection data sheet for vessels RDP-VSL-00002A, RDP-VSL-00002B, and RDP-VSL-00002C was updated to be consistent with the material selection data sheets for all black cell vessels. Text was added to address inadvertent nitric acid addition to these vessels, as was done for all black cell vessels. Also, discussions for routine and non-routine operations for the vessels were added. The materials of construction and the corrosion allowance previously identified for RDP-VSL-00002A, RDP-VSL-00002B, and RDP-VSL-00002C are unchanged.

Attachment 51, Appendix 8.9:

Replace 24590-PTF-N1D-RDP-P0001, Rev. 0 with 24590-PTF-N1D-RDP-P0001, Rev. 1, Plant Item Material Selection Data Sheet for Pretreatment Vessels RDP-VSL-00002A, RDP-VSL-00002B, and RDP-VSL-00002C

See Attachment 4 of this Modification Notification for the updated material selection data sheet.

[1] Class 1 modifications requiring prior Agency approval.
[2] This is only an advanced notification of an intended Class [1] 1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

Quarter Ending 3/31/2005

24590-PTF-PCN-ENV-04-0003

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: N/A

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

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: [X] Yes [ ] No (state reason for denial) Reason for denial:	Reviewed by Ecology: G. P Davis 3-22-05 Date

Attachment 1

24590-PTF-MVD-RDP-P0005, Rev. 2
Mechanical Systems Data Sheet for Pretreatment Vessel RDP-VSL-00002A

R10486405

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-RDP-VSL-00002A

Project	RPP-WTP	P&ID	24590-PTF-M6-RDP-P0001, 24590-PTF-M6-RDP-P0006, 24590-PTF-M6-CNP-P0005
Project No:	24590	Process Calculation:	Deleted 2
Project Site	Hanford	Vessel Drawing	24590-PTF-MV-RDP-P0001
Description.	Spent Resin Slurry Vessel		ISSUED BY ~~RPP-WTP PDC~~

Reference Data

Charge Vessels (Tag Numbers)	N/A
Pulsejet Mixers / Agitators (Tag Numbers)	RDP-PJM-00001-00002-00003-00004
RFDs/Pumps (Tag Numbers)	

Design Data

Quality Level		QL-1	Fabrication Specs	24590-WTP-3PS-MV00-TP001		
Seismic Category		SC-I	Design Code	ASME VIII Div 1		
Service/Contents		Resin Slurry (Radioactive)	Code Stamp	Yes		
Design Specific Gravity		1.22	NB Registration	Yes		
Maximum Operating Volume	gal	12,688	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	15,230	Estimated	36,500	168,000	164,000
			Actual *			

Inside Diameter	inch	144			Wind Design	Not Required	
Length/Height (TL-TL)	inch	168			Snow Design	Not Required	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-SS90-T0001	
Internal Pressure	psig	0	15	N/A	Seismic Base Moment *	ft*lb	
External Pressure	psig	0.22	FV	N/A	Postweld Heat Treat	Not Required	
Temperature	°F	113	138	N/A	Corrosion Allowance	inch	0.04 (Notes 8, 9) 2
Min. Design Metal Temp	°F	30			Hydrostatic Test Pressure *	psig	

Note: 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.

MARK W. HOFFMANN
STATE OF WASHINGTON
0030952
REGISTERED PROFESSIONAL ENGINEER
1/25/05
EXPIRES 12/10/06

This Bound Document Contains a total of 5 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
2	1/25/05	Issued for Permitting Use				
1	4/25/04	Issued for Permitting Use	K. Brightman	H. Khurana	C. Slater	M. Hoffmann
0	12/18/03	Issued for Permitting Use	J. Jackson	C. Slater	N/A	S. Kirk

	MECHANICAL DATA SHEET: VESSEL	PLANT ITEM No. 24590-PTF-MV-RDP-VSL-00002A

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	SA 240 316 Note 1	See Drawing	Auxiliary (See Note 5)
Shell	SA 240 316 Note 1	See Drawing	Primary (See Note 5)
Bottom Head	SA 240 316 Note 1	See Drawing	Primary (See Note 5)
Support	SA 240 304 Note 1	See Drawing	N/A
Jacket/Coils/Half-Pipe Jacket	N/A	N/A	N/A
Internals	SA 240 316 Note 1	See Drawing	N/A
Pipe/Nozzles	SA 312 TP 316 Note 1 (Seamless)	See Drawing	Primary (See Note 5)
Forgings/ Bar stock	SA 182 F316 Note 1	See Drawing	N/A
Gaskets	N/A	N/A	N/A
Bolting	N/A	N/A	N/A

Miscellaneous Data

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

Remarks

* To be determined by the vendor.

Note 1: Max. Carbon content 0.030%

Note 2: Deleted

Note 3: Welds de-scaled as laid

Note 4: This vessel is in a Black Cell

Note 5: All welds forming part of the Primary and Auxiliary Containment, including nozzle attachment welds, shall be subjected to 100% volumetric examination.

Note 6: The contents of this document are Dangerous Waste Permit affecting. 2

Note 7: Deleted. 2

Note 8 : Seller shall ensure that an additional 0.060" is available for erosion in the bottom head and shall report the minimum thickness required for all specified loading conditions, exclusive of erosion and corrosion allowances. 2 2

Note 9: Seller shall ensure that an additional 0.038" is available for erosion in the lower 4" of the interior conical surface of the pulse jet mixers. 2

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	PLANT ITEM No. **24590-PTF-MV-RDP-VSL-00002A**

Equipment Cyclic Data Sheet

Component Plant Item Number:	***RDP-VSL-00002A***
Component Description	***Parent Vessel***

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	***SA 240 316 with 0.03% max. carbon***
Design Life	***40 Years***
Component Function and Life Cycle Description	***The purpose of the Spent Resin Slurry Vessel is to receive and hold one batch of spent resin.***

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***FV***	***15***	***10***	***Nominal Assumption***
Operating Pressure	psig	***-0.22***	***0***	***N/A***	***This vessel will remain under constant pressure depending upon the vessel plant HVAC system.***
Operating Temperature	°F	***59***	***113°F***	***N/A***	***Temperature will not cycle appreciably with vessel cycling.***
Contents Specific Gravity		****1.00***	***1.22***	***N/A***	****The value given is for the pure liquid phase of vessel contents. The vessel will normally contain slurry of resin particles with particle density of approximately 1.4g/cc. The slurry solids content will be between 0 and 35 % by volume.***
\Contents Level	inch	***0***	***139***	***1.66×10^4***	
Localized Features					
Nozzles					
Supports					

Notes

- ***Cycle increase: The seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***

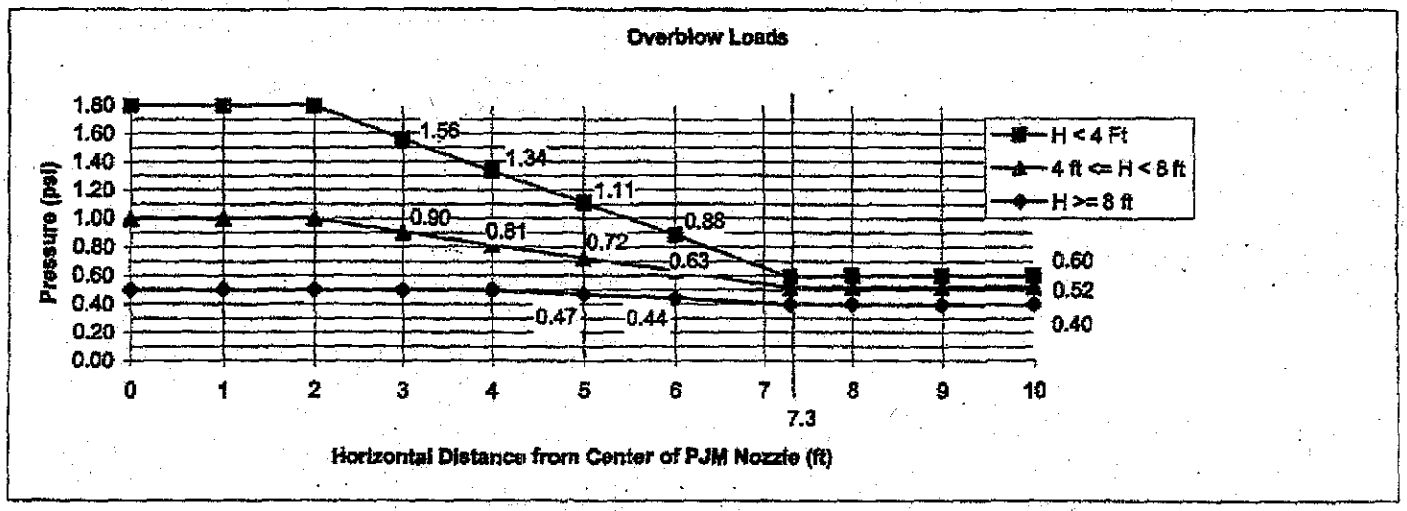
Hydrodynamic Loading (2)

In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overblow loads, and this load combination is also to be assumed to act concurrently with seismic loads.

Hydrodynamic loads acting on a surface vary with the location of the surface within the vessel. The following table indicates the normal hydrodynamic pressure ranges and the number of design cycles. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Seller shall apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Condition	Hydrodynamic Pressure Range, psi				Number of Cycles
	Between PJM Center and Vessel Wall		Between Vessel Center and PJM Center		
	Radial	Vertical	Radial	Vertical	
Normal Operation	*-0.80 to 0.80*	*-0.80 to 0.40*	*-0.20 to 0.30*	*-0.20 to 0.25*	*6.2×10^5*

Overblow loads vary as a function of the distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle up to the overflow level as plotted:



The overblow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Seller shall consider that any single pulse jet mixer may overblow 100 cycles.

Notes

- ***Cycle Increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	PLANT ITEM No. ***24590-PTF-MV-RDP-VSL-00002A***

Equipment Cyclic Data Sheet

Component Plant Item Number:	***24590-PTF-MV-RDP-PJM-00001, 00002, 00003 & 00004***
Component Description	***Pulse Jet Mixers***

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	***SA 240 316 with 0.03% max. carbon***
Design Life	***40 Years***
Component Function and Life Cycle Description	***These pulse jet mixers are cyclically loaded using vacuum to fully fill the pulse jet mixer with process liquid and compressed air to fully empty the pulse jet mixer. The pulse jet mixers are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum operating pressure and the minimum operating pressure plus the external static head imposed by the parent vessel. The pulse jet mixer supports shall be designed to cycle between fully buoyant (pulse jet mixer empty and parent vessel full) and fully loaded (pulse jet mixer full and parent vessel empty) in addition to thrust. Thrust load shall be applied only to the fully Buoyant state. Assume the parent vessel is full for 50% of number of cycles of PJM.*** 2

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***FV***	***80***	***6.2×10^5***	***Based upon 168 sec cycle time, assuming that the parent vessel will be used 200 times in 40 years for 2 months at a time.***
Operating Pressure	psig	***FV***	***72.5***	***6.2×10^5***	
Operating Temperature	°F	***59***	***113***	***N/A***	***Temperature will not cycle appreciably with vessel cycling.***
Contents Specific Gravity		***1.00***	***1.22***	***N/A***	***The value given is for the pure liquid phase of vessel contents. The vessel will normally contain slurry of resin particles with particle density of approximately 1.4g/cc. The slurry solids content will be between 0 and 35 % by volume.***
Contents Level	inch	***Empty***	***Flooded***	***6.2×10^5***	***Based upon 168 sec cycle time, assuming that the parent vessel will be used 200 times in 40 years for 2 months at a time.***
Thrust 2		***0*** 2	***262*** 2	***6.2×10^5*** 2	
Localized Features					
Nozzles					
Supports					

Notes

- ***Cycle increase: The seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***

Attachment 2

24590-PTF-MVD-RDP-P0006, Rev. 2
Mechanical Systems Data Sheet for Pretreatment Vessel RDP-VSL-00002B

R10486406

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-RDP-VSL-00002B

Project	RPP-WTP	P&ID	24590-PTF-M6-RDP-P0001, 24590-PTF-M6-RDP-P0006, 24590-PTF-M6-CNP-P0005
Project No	24590	Process Calculation	Deleted 2
Project Site	Hanford	Vessel Drawing	24590-PTF-MV-RDP-P0002
Description	Spent Resin Slurry Vessel.		

ISSUED BY RPP-WTP PDC

Reference Data

Charge Vessels (Tag Numbers)	N/A
Pulsejet Mixers / Agitators (Tag Numbers)	RDP-PJM-00005-00006-00007-00008
RFDs/Pumps (Tag Numbers)	

Design Data

Quality Level		QL-1	Fabrication Specs	24590-WTP-3PS-MV00-TP001		
Seismic Category		SC-I	Design Code	ASME VIII Div 1		
Service/Contents		Resin Slurry (Radioactive)	Code Stamp	Yes		
Design Specific Gravity		1.22	NB Registration	Yes		
Maximum Operating Volume	gal	12,688	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	15,230	Estimated	36,500	168,000	164,000
			Actual *			

Inside Diameter	inch	144			Wind Design	Not Required	
Length/Height (TL-TL)	inch	168			Snow Design	Not Required	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-SS90-T0001	
Internal Pressure	psig	0	15	N/A	Seismic Base Moment *	ft*lb	
External Pressure	psig	0.22	FV	N/A	Postweld Heat Treat	Not Required	
Temperature	°F	113	138		Corrosion Allowance	Inch	0.04 (Notes 8, 9) 1
Min Design Metal Temp	°F	30			Hydrostatic Test Pressure *	psig	

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MARK W. HOFFMANN
STATE OF WASHINGTON
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1/25/05
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0	12/18/03	Issued for Permitting Use	J. Jackson	C. Slater	N/A	S. Kirk

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	PLANT ITEM No. 24590-PTF-MV-RDP-VSL-00002B

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	***SA 240 316 Note 1***	***See Drawing***	***Auxiliary (See Note 5)***
Shell	***SA 240 316 Note 1***	***See Drawing***	***Primary (See Note 5)***
Bottom Head	***SA 240 316 Note 1***	***See Drawing***	***Primary (See Note 5)***
Support	***SA 240 304 Note 1***	***See Drawing***	***N/A***
Jacket/Coils/Half-Pipe Jacket	***N/A***	***N/A***	***N/A***
Internals	***SA 240 316 Note 1***	***See Drawing***	***N/A***
Pipe/Nozzles	***SA 312 TP 316 Note 1 (Seamless)***	***See Drawing***	***Primary (See Note 5)***
Forgings/ Bar stock	***SA 182 F316 Note 1***	***See Drawing***	***N/A***
Gaskets	***N/A***	***N/A***	***N/A***
Bolting	***N/A***	***N/A***	***N/A***

Miscellaneous Data

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

Remarks

**** To be determined by the vendor.***

Note 1: Max. Carbon content 0.030%

Note 2: Deleted

Note 3: Welds de-scaled as laid

Note 4: This vessel is in a Black Cell

Note 5: All welds forming part of the Primary and Auxiliary Containment, including nozzle attachment welds, shall be subjected to 100% volumetric examination

Note 6: Contents of this document are Dangerous Waste Permit affecting. 2

Note 7: Deleted. 2

Note 8: Seller shall ensure that an additional 0.060" is available for erosion in the bottom head and shall report the minimum thickness required for all specified loading conditions, exclusive of erosion and corrosion allowances. 2

Note 9: Seller shall ensure that an additional 0.038" is available for erosion in the lower 4" of the interior conical surface of the pulse jet mixers. 2

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	PLANT ITEM No. ***24590-PTF-MV-RDP-VSL-00002B***

Equipment Cyclic Data Sheet

Component Plant Item Number:	***RDP-VSL-00002B***
Component Description	***Parent Vessel***

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	***SA 240 316 with 0.03% max. carbon***
Design Life	***40 Years***
Component Function and Life Cycle Description	***The purpose of the Spent Resin Slurry Vessel is to receive and hold one batch of spent resin.***

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***FV***	***15***	***10***	***Nominal Assumption***
Operating Pressure	psig	***-0.22***	***0***	***N/A***	***This vessel will remain under constant pressure depending upon the vessel plant HVAC system.***
Operating Temperature	°F	***59***	***113***	***N/A***	***Temperature will not cycle appreciably with vessel cycling.***
Contents Specific Gravity		****1.00***	***1.22***	***N/A***	****The value given is for the pure liquid phase of vessel contents. The vessel will normally contain slurry of resin particles with particle density of approximately 1.4g/cc. The slurry solids content will be between 0 and 35 % by volume.***
Contents Level	inch	***0***	***139***	***1.66×10^4***	
Localized Features					
Nozzles					
Supports					

Notes

- ***Cycle increase: The seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***

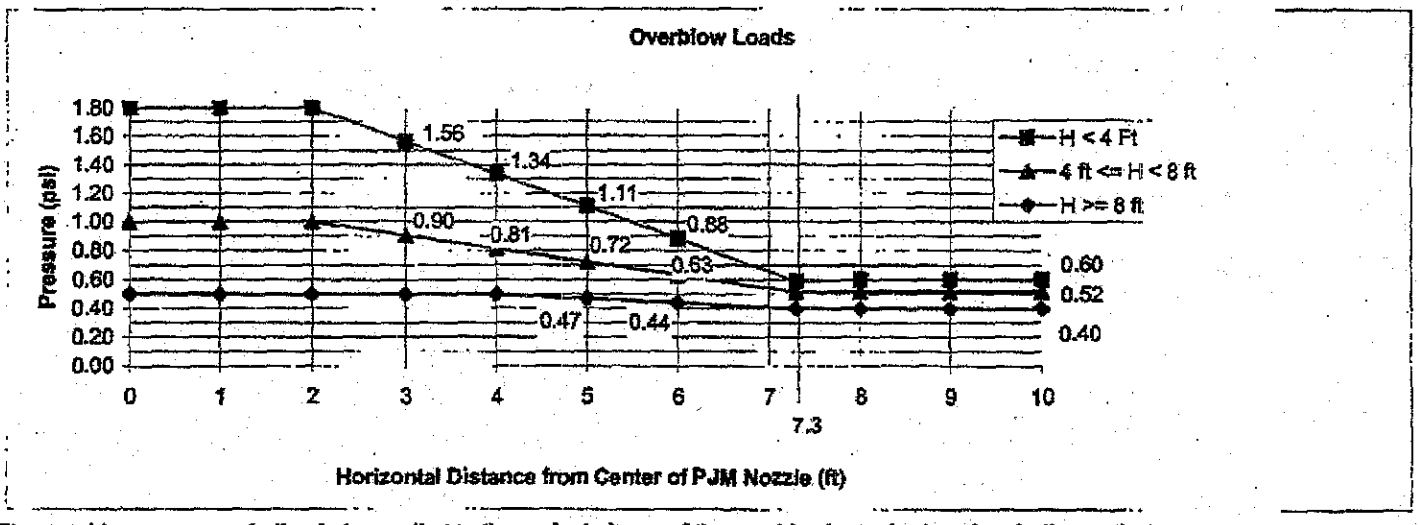
Hydrodynamic Loading (2)

In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overblow loads, and this load combination is also to be assumed to act concurrently with seismic loads.

Hydrodynamic loads acting on a surface vary with the location of the surface within the vessel. The following table indicates the normal hydrodynamic pressure ranges and the number of design cycles. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Seller shall apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Condition	Hydrodynamic Pressure Range, psi				Number of Cycles
	Between PJM Center and Vessel Wall		Between Vessel Center and PJM Center		
	Radial	Vertical	Radial	Vertical	
Normal Operation	*-0.80 to 0.80*	*-0.80 to 0.40*	*-0.20 to 0.30*	*-0.20 to 0.25*	*6.2×10^8*

Overblow loads vary as a function of the distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle up to the overflow level as plotted:



The overblow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Seller shall consider that any single pulse jet mixer may overblow 100 cycles.

Notes

- ***Cycle Increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	PLANT ITEM No. *24590-PTF-MV-RDP-VSL-00002B*

Equipment Cyclic Data Sheet

Component Plant Item Number:	*24590-PTF-MV-RDP-PJM-00005, 00006, 00007, 00008*
Component Description	*Pulse Jet Mixers*

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*SA 240 316 with 0.03% max. carbon*
Design Life	*40 Years*
Component Function and Life Cycle Description	*These pulse jet mixers are cyclically loaded using vacuum to fully fill the pulse jet mixer with process liquid and compressed air to fully empty the pulse jet mixer. The pulse jet mixers are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum operating pressure and the minimum operating pressure plus the external static head imposed by the parent vessel. The pulse jet mixer supports shall be designed to cycle between fully buoyant (pulse jet mixer empty and parent vessel full) and fully loaded (pulse jet mixer full and parent vessel empty) in addition to thrust. Thurst load shall be applied only to the fully Buoyant state. Assume the parent vessel is full for 50% of number of cycles of PJM.* 2

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*80*	*6.2×10^6*	*Based upon 168 sec cycle time, assuming that the parent vessel will be used 200 times in 40 years for 2 months at a time.*
Operating Pressure	psig	*FV*	*72.5*	*6.2×10^6*	
Operating Temperature	°F	*59*	*113*	*N/A*	*Temperature will not cycle appreciably with vessel cycling.*
Contents Specific Gravity		**1.00*	*1.22*	*N/A*	**The value given is for the pure liquid phase of vessel contents. The vessel will normally contain slurry of resin particles with particle density of approximately 1.4g/cc. The slurry solids content will be between 0 and 35 % by volume.*
Contents Level	inch	*Empty*	*Flooded*	*6.2×10^6*	*Based upon 168 sec cycle time, assuming that the parent vessel will be used 200 times in 40 years for 2 months at a time.*
Thrust 2		*0* 2	*262* 2	*6.2×10^6* 2	
Localized Features					
Nozzles					
Supports					

Notes

- *Cycle increase: The seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.*

Attachment 3

24590-PTF-MVD-RDP-P0007, Rev. 2
Mechanical Systems Data Sheet for Pretreatment Vessel RDP-VSL-00002C

R10486407

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-RDP-VSL-00002C

Project	RPP-WTP	P&ID	24590-PTF-M6-RDP-P0001, 24590-PTF-M6-RDP-P0006, 24590-PTF-M6-CNP-P0005
Project No:	24590	Process Calculation	Deleted 2
Project Site:	Hanford	Vessel Drawing	24590-PTF-MV-RDP-P0003
Description	Spent Resin Slurry Vessel		

ISSUED BY RPP-WTP PDC

Reference Data

Charge Vessels (Tag Numbers)	N/A
Pulsejet Mixers / Agitators (Tag Numbers)	RDP-PJM-00009-00010-00011-00012
RFDs/Pumps (Tag Numbers)	

Design Data

Quality Level		QL-1	Fabrication Specs	24590-WTP-3PS-MV00-TP001		
Seismic Category		SC-I	Design Code	ASME VIII Div 1		
Service/Contents		Resin Slurry	Code Stamp	Yes		
Design Specific Gravity		1.22	NB Registration	Yes		
Maximum Operating Volume	gal	12,688	Weights (lbs)	Empty	Operating	Test
otal Volume	gal	15,230	Estimated	36,500	168,000	164,000
			Actual *			

Inside Diameter	inch	144			Wind Design	Not Required	
Length/Height (TL-TL)	inch	168			Snow Design	Not Required	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-SS90-T0001	
Internal Pressure	psig	0	15	N/A	Seismic Base Moment *	ft*lb	
External Pressure	psig	0.22	FV	N/A	Postweld Heat Treat	Not Required	
Temperature	°F	113	138		Corrosion Allowance	Inch	0.04 (Notes 8, 9) 2
Min Design Metal Temp.	°F	30			Hydrostatic Test Pressure *	psig	

Note: 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.

MARK W. HOFFMANN
STATE OF WASHINGTON
0030952
REGISTERED
PROFESSIONAL ENGINEER
1/26/05
EXPIRES 12/10/06

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REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
2	1/25/05	Issued for Permitting Use				
1	4/28/04	Issued for Permitting Use	K. Brightman	H. Khurana	C. Slater	M. Hoffmann
0	12/18/02	Issued for Permitting Use	J. Jackson	C. Slater	N/A	S. Kirk

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	PLANT ITEM No. 24590-PTF-MV-RDP-VSL-00002C

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	***SA 240 316 Note 1***	***See Drawing***	***Auxiliary (See Note 5)***
Shell	***SA 240 316 Note 1***	***See Drawing***	***Primary (See Note 5)***
Bottom Head	***SA 240 316 Note 1***	***See Drawing***	***Primary (See Note 5)***
Support	***SA 240 304 Note 1***	***See Drawing***	***N/A***
Jacket/Coils/Half-Pipe Jacket	***N/A***	***N/A***	***N/A***
Internals	***SA 240 316 Note 1***	***See Drawing***	***N/A***
Pipe/Nozzles	***SA 312 TP 316 Note 1 (Seamless)***	***See Drawing***	***Primary (See Note 5)***
Forgings/ Bar stock	***SA 182 F316 Note 1***	***See Drawing***	***N/A***
Gaskets	***N/A***	***N/A***	***N/A***
Bolting	***N/A***	***N/A***	***N/A***

Miscellaneous Data

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

Remarks

**** To be determined by the vendor.***
Note 1: Max. Carbon content 0.030%
Note 2: Deleted
Note 3: Welds de-scaled as laid
Note 4: This vessel is in a Black Cell
Note 5: All welds forming part of the Primary and Auxiliary Containment, including nozzle attachment welds, shall be subjected to 100% volumetric examination
Note 6: Contents of this document are Dangerous Waste Permit affecting. 2
Note 7: Deleted. 2
Note 8 : Seller shall ensure that an additional 0.060" is available for erosion in the bottom head and shall report the minimum thickness required for all specified loading conditions, exclusive of erosion and corrosion allowances. 2
Note 9: Seller shall ensure that an additional 0.038" is available for erosion in the lower 4" of the interior conical surface of the pulse jet mixers. 2

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	PLANT ITEM No. *24590-PTF-MV-RDP-VSL-00002C*

Equipment Cyclic Data Sheet

Component Plant Item Number:	***RDP-VSL-00002C***
Component Description	***Parent Vessel***

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	***SA 240 316 with 0.03% max. carbon***
Design Life	***40 Years***
Component Function and Life Cycle Description	***The purpose of the Spent Resin Slurry Vessel is to receive and hold one batch of spent resin.***

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***FV***	***15***	***10***	***Nominal Assumption***
Operating Pressure	psig	***-0.22***	***0***	***N/A***	***This vessel will remain under constant pressure depending upon the vessel plant HVAC system.***
Operating Temperature	°F	***59***	***138°F*** (2)	***N/A***	***Temperature will not cycle appreciably with vessel cycling.***
Contents Specific Gravity		****1.00***	***1.22***	***N/A***	**** The value given is for the pure liquid phase of vessel contents. The vessel will normally contain slurry of resin particles with particle density of approximately 1.4g/cc. The slurry solids content will be between 0 and 35 % by volume.***
\Contents Level	inch	***0***	***139***	***1.66×10^4***	
Localized Features					
Nozzles					
Supports					

Notes

- ***Cycle increase: The seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***

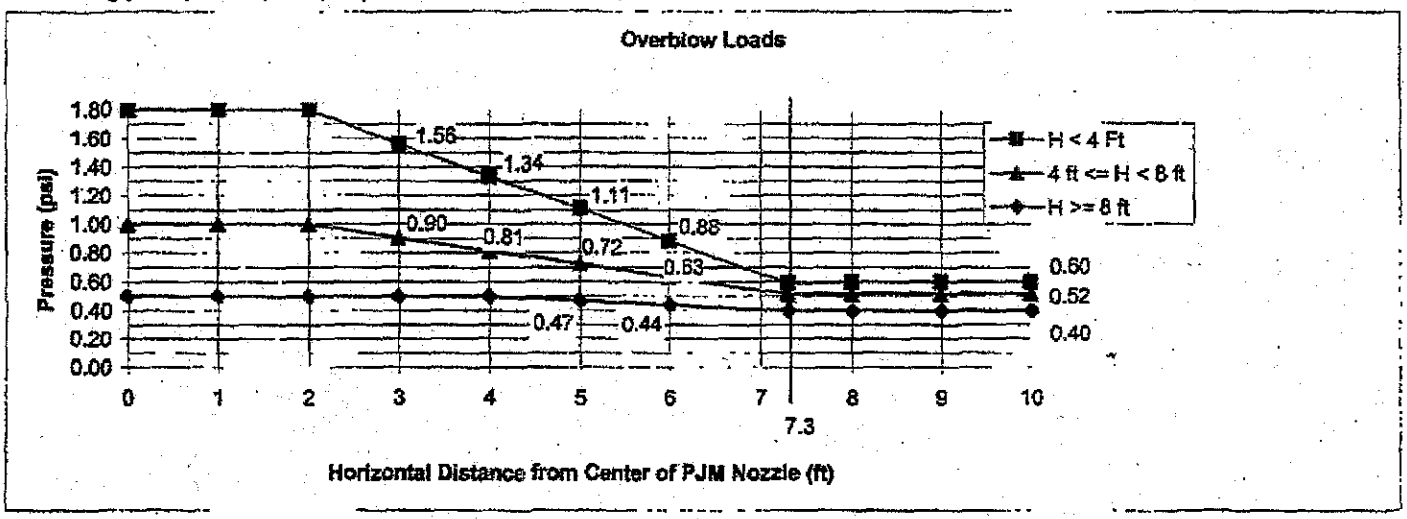
Hydrodynamic Loading 2

In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overblow loads, and this load combination is also to be assumed to act concurrently with seismic loads.

Hydrodynamic loads acting on a surface vary with the location of the surface within the vessel. The following table indicates the normal hydrodynamic pressure ranges and the number of design cycles. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Seller shall apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Condition	Hydrodynamic Pressure Range, psi				Number of Cycles
	Between PJM Center and Vessel Wall		Between Vessel Center and PJM Center		
	Radial	Vertical	Radial	Vertical	
Normal Operation	*-0.80 to 0.80*	*-0.80 to 0.40*	*-0.20 to 0.30*	*-0.20 to 0.25*	*6.2×10^6*

Overblow loads vary as a function of the distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle up to the overflow level as plotted:



The overblow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Seller shall consider that any single pulse jet mixer may overblow 100 cycles.

Notes

- ***Cycle Increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	PLANT ITEM No. *24590-PTF-MV-RDP-VSL-00002C*

Equipment Cyclic Data Sheet

Component Plant Item Number:	***24590-PTF-MV-RDP-PJM-00009, 00010, 00011, 00012***
Component Description	***Pulse Jet Mixers***

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	***SA 240 316 with 0.03% max. carbon***
Design Life	***40 Years***
Component Function and Life Cycle Description	***These pulse jet mixers are cyclically loaded using vacuum to fully fill the pulse jet mixer with process liquid and compressed air to fully empty the pulse jet mixer. The pulse jet mixers are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum operating pressure and the minimum operating pressure plus the external static head imposed by the parent vessel. The pulse jet mixer supports shall be designed to cycle between fully buoyant (pulse jet mixer empty and parent vessel full) and fully loaded (pulse jet mixer full and parent vessel empty) in addition to thrust. Thrust load shall be applied only to the fully Buoyant state. Assume the parent vessel is full for 50% of number of cycles of PJM.*** 2

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***FV***	***80***	***$6.2x10^6$***	***Based upon 168 sec cycle time, assuming that the parent vessel will be used 200 times in 40 years for 2 months at a time.***
Operating Pressure	psig	***FV***	***72.5***	***$6.2x10^6$***	
Operating Temperature	°F	***59***	***113***	***N/A***	***Temperature will not cycle appreciably with vessel cycling.***
Contents Specific Gravity		****1.00***	***1.22***	***N/A***	****The value given is for the pure liquid phase of vessel contents. The vessel will normally contain slurry of resin particles with particle density of approximately 1.4g/cc. The slurry solids content will be between 0 and 35 % by volume.***
Contents Level	inch	***Empty***	***Flooded***	***$6.2x10^6$***	***Based upon 168 sec cycle time, assuming that the parent vessel will be used 200 times in 40 years for 2 months at a time.***
Thrust 2		***0*** 2	***262*** 2	***$6.2x10^6$*** 2	
Localized Features					
Nozzles					
Supports					

Attachment 4

24590-PTF-N1D-RDP-P0001, Rev. 1
Plant Item Material Selection Data Sheet for Pretreatment Vessels
RDP-VSL-00002A, RDP-VSL-00002B, and RDP-VSL-00002C

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10460394

RDP-VSL-00002A/B/C (PTF)
Spent Resin Slurry Vessels

- Design Temperature (°F)(max/min): 138/30
- Design Pressure (psig) (max/min): 15/FV
- Location: incell
- PJM Discharge Velocity (fps): 40
- Drive Cycle: 17 % (at 40 fps)

Associated Items

RDP-PJM-00001 – RDP-PJM-00012

Contents of this document are Dangerous Waste Permit affecting

ISSUED BY RPP-WTP PDC

Operating conditions are as stated on sheets 5 and 6

Options Considered:

- Normal operations include receipt, storage and transfer of spent IX media
- Slurry received contains approximately 20 volume% solids (not considered normal operating condition)
- Off-normal conditions include the receipt of fresh resin overflow from system CRP and the receipt of un-eluted or off-spec Cs resin to be returned for further elution

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1	X	

Recommended Material: 316 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.04 inch (includes 0.00 inch erosion allowance; localized protection will be provided as necessary as discussed in section j)

Process & Operations Limitations:

- Develop flushing/rinsing procedure

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED PROFESSIONAL ENGINEER
EXPIRES: 12/07/05

1/24/05

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REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	1/24/05	Issued for Permitting Use			
0	4/26/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

RDP-VSL-00002A/B/C collect and transfer spent resin. These vessels receive both transport liquid and spent resin slurry streams. Normally the vessels operate at 100°F with a maximum fluid temperature of 113°F.

a General Corrosion
Hammer (1981) lists a corrosion rate for 304 (and 304L) in 2 M HNO_3 of less than 2 mpy. Davis (1994) states the corrosion rate for 304L in 12% HNO_3 will be less than about 1 mpy up to about 212°F.

In this system, the conditions are such that 304L stainless steel will be acceptable.

Conclusion:
Under normal conditions either 304L or 316L will be satisfactory.

b Pitting Corrosion
While chloride is known to cause pitting in acid and neutral solutions, with no chloride present in reportable concentrations, both 304L and 316L stainless steel are acceptable.

Conclusion:
The use of 304L or 316L is acceptable.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion:
Not expected in this system.

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as a few ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), chloride stress corrosion cracking does not usually occur below about 140°F. During the normal operations, either 304L or 316L is expected to be satisfactory.

Conclusion:
At the normal operating environment, either 304L or 316L is acceptable.

e Crevice Corrosion
Comments under Pitting are generally applicable here. However, the one additional factor is the presence of resin beads. These will form crevices at the wall could initiate crevice corrosion.

Conclusion:
The presence of resin increases the probability of initiating crevice corrosion. The more pitting resistant 316L is recommended

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion:
Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
MIC is not considered a problem in this system.

Conclusion:
Not a concern.

h Fatigue/Corrosion Fatigue
Corrosion fatigue is not expected to be a concern. The pressures encountered are so low and the strength of the material is so comparatively high that corrosion fatigue is not a problem.

Conclusions
Not a concern.

PLANT ITEM MATERIAL SELECTION DATA SHEET

i Vapor Phase Corrosion
Not expected in this system.

Conclusion:
Not considered to be a concern.

j Erosion
Based on past experiments by Smith & Elmore (1992), the solids are soft and erosion is not expected to be a concern for the vessel wall. Additional 316L stainless steel should be provided as localized protection for the applicable portions of the bottom head to accommodate PJM discharge velocities of up to 12 m/s with normal maximum solids concentrations of 7.0 wt% and maximum solids concentrations of 53 wt% with a usage of 19 % operation. Vessels RDP-VSL-00002A/B/C require at least 0.060-inch additional protection. The 53 wt% is considered to be conservative. The fraction of time the solids concentration is expected to be at maximum is 10 %. During normal operation, 90 % of the time, the solids content of RDP-VSL-00002A/B/C is expected to be 7.0 wt%.

The wear of the PJM nozzles can occur from flow for both the discharge and reflood cycles of operation. At least 0.038-inch of additional 316L stainless steel should be provided on the inner surface of the PJM nozzle to accommodate wear due to PJM discharge and suction velocities with normal solids concentrations of 7.0 wt% and a maximum solids concentrations of 53 wt% with a usage of 19 % operation.

Conclusion:
The recommended corrosion allowance provides sufficient protection for erosion of the vessel wall. Additional localized protection for the bottom head will accommodate PJM discharge velocities and for the PJM nozzles will accommodate PJM discharge and reflood velocities.

k Galling of Moving Surfaces
Not applicable.

Conclusion:
Not applicable.

l Fretting/Wear
No contacting surfaces expected.

Conclusion:
Not applicable.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion:
Not applicable.

n Cavitation
None expected.

Conclusion:
Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion:
Not applicable.

p Inadvertent Nitric Acid Addition
Vessels normally operate at low pH.

Conclusion:
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
2. Davis, JR (Ed), 1994, *Stainless Steels*, in ASM Metals Handbook, ASM International, Metals Park, OH 44073
3. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX 77218
4. Koch, GH, 1995, *Localized Corrosion in Halides Other Than Chlorides*, MTI Pub No. 41, Materials Technology Institute of the Chemical Process Industries, Inc, St Louis, MO 63141
5. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
6. Smith, H. D. and M. R. Elmore, 1992, Corrosion Studies of Carbon Steel under Impinging Jets of Simulated Slurries of Neutralized Current Acid Waste (NCAW) and Neutralized Cladding Removal Waste (NCRW), PNL-7816, Pacific Northwest Laboratory, Richland, Washington.

Bibliography:

1. Agarwal, DC, *Nickel and Nickel Alloys*, In: Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
2. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
3. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158
4. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

OPERATING CONDITIONS

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Spent resin slurry vessel (RDP-VSL-00002A/B/C)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l					
Chloride	g/l					
Fluoride	g/l					
Iron	g/l					
Nitrate	g/l			4.65E-04	4.65E-04	
Nitrite	g/l					
Phosphate	g/l					
Sulfate	g/l					
Mercury	g/l					
Carbonate	g/l					
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Note 3
Temperature	°F					Note 2

List of Organic Species:

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. 100 °F to 113 °F
3. pH approximately 1

Assumptions:

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.10.1 Spent Resin Slurry Vessel (RDP-VSL-00002A/B/C)

Routine Operations

The spent resin slurry vessels (RDP-VSL-00002-A/B/C) are designed to collect and transfer a batch of spent resin every week. The system is capable of processing alternate batch types. After commissioning, the time between spent resin batch transfers and the type of transfer will be determined by operational experience. The spent resin slurry vessels (RDP-VSL-00002-A/B/C) are 12.0 ft in diameter and 19.8 ft in total height with a working volume of 7500 gal.

The spent resin slurry vessels (RDP-VSL-00002-A/B/C) receive both liquid and slurry streams.

These vessels, with associated piping and controls, serve as both the source of transport liquid and the receipt vessels for spent resin slurry. Each vessel is designed to contain one full batch of ion exchange resin plus the transport liquid associated with transferring the resin bed out of an IX column. The total working volume required for removing the spent resin from an IX column is 7500 gallons per vessel (6900 gallons of transport fluid and 600 gallons of resin). During normal operation, the vessels will contain approximately 8 % vol/vol solids. The solids content is greater during the first few minutes of displacement when the incoming slurry line could be very high in solids, but the high solids content is gradually diluted to 8 % vol/vol solids as the clear column sequence is completed and the full batch of transport fluid is transferred. Nozzles will be included as required for process feed streams, overflow lines, reagent addition, ventilation, and recycle return lines.

Non-Routine Operations that Could Affect Corrosion/Erosion

None identified.

Quarter Ending 3/31/2005 24590-PTF-PCN-ENV-04-0005

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Page 2 of 3:	Hanford Facility RCRA Permit, Part III, Attachment 51 Class [1] 1 Permit Modification to Mechanical System Data Sheets and Plant Item Material Selection Data Sheet for Pretreatment Facility Vessels UFP-VSL-00062A and UFP-VSL-00062B
Attachment 1	24590-PTF-MVD-UFP-P0005, Rev. 1, Mechanical Systems Data Sheet for Pretreatment Vessel UFP-VSL-00062A
Attachment 2	24590-PTF-MVD-UFP-P0006, Rev. 1, Mechanical Systems Data Sheet for Pretreatment Vessel UFP-VSL-00062B
Attachment 3	24590-PTF-N1D-UFP-P0008, Rev. 1, Plant Item Material Selection Data Sheet for Pretreatment Vessels UFP-VSL-00062A, UFP-VSL-00062B, and UFP-VSL-00062C

Submitted by Co-Operator:		Reviewed by ORP Program Office:	
	1/13/05		3/4/05
F. Beranek	Date	R. J. Schepens	Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to update mechanical systems data sheets and plant item material selection data sheet associated with the Pretreatment facility Ultrafiltration Process (UFP) system vessels UFP-VSL-00062A and UFP-VSL-00062B. Minimal changes to these documents have been made since their initial submittal and approval by Ecology on 4/22/2004. These changes do not affect the form, function, or capacity of the vessels and are discussed by the following:

Mechanical Systems Data Sheets:

The mechanical systems data sheets for vessels UFP-VSL-00062A, and UFP-VSL-00062B were updated to include hydrodynamic loading for the vessel pulse jet mixers and the appropriate notes. Changes to Design Data for vessels UFP-VSL-00062A, and UFP-VSL-00062B include the vessel external operating pressure and the actual vessel weights determined by the vendor.

Attachment 51, Appendix 8.6:

Replace 24590-PTF-MVD-UFP-P0005, Rev. 0 with 24590-PTF-MVD-UFP-P0005, Rev. 1, Mechanical Systems Data Sheet for Pretreatment Vessel UFP-VSL-00062A

Replace 24590-PTF-MVD-UFP-P0006, Rev. 0 with 24590-PTF-MVD-UFP-P0006, Rev. 1, Mechanical Systems Data Sheet for Pretreatment Vessel UFP-VSL-00062B

See Attachment 1 and Attachment 2 of this Modification Notification for the updated mechanical system data sheets.

Plant Item Material Selection Data Sheet:

The plant item material selection data sheet for vessels UFP-VSL-00062A and UFP-VSL-00062B was updated to be consistent with the material selection data sheets for all black cell vessels. Text was added to address inadvertent nitric acid addition to these vessels, as was done for all black cell vessels. Also, discussions for routine and non-routine operations for the vessels were added. The materials of construction and the corrosion allowance previously identified for UFP-VSL-00062A and UFP-VSL-00062B are unchanged.

Attachment 51, Appendix 8.9:

Replace 24590-PTF-N1D-UFP-P0008, Rev. 0 with 24590-PTF-N1D-UFP-P0008, Rev. 1, Plant Item Material Selection Data Sheet for Pretreatment Vessels UFP-VSL-00062A, UFP-VSL-00062B, and UFP-VSL-00062C

See Attachment 3 of this Modification Notification for the updated material selection data sheet.

[1] Class 1 modifications requiring prior Agency approval.
[2] This is only an advanced notification of an intended Class [1], 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

Quarter Ending 3/31/2005

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: N/A

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

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: [X] Yes [ ] No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

G. P Davis — Date: 3-22-05

Attachment 1

24590-PTF-MVD-UFP-P0005, Rev. 1
Mechanical Systems Data Sheet for Pretreatment Vessel UFP-VSL-00062A

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	PLANT ITEM No. R10456408 24590-PTF-MV-UFP-VSL-00062A

Project:	RPP-WTP	P&ID:	24590-PTF-M6-UFP-P0004 IP0005I00006IP0015
Project No:	24590	Process Calculation:	DELETED 1
Project Site:	Hanford	Vessel Drawing	24590-PTF-MV-UFP-P0005
Description:	Ultrafilter Permeate Collection Vessel 1		ISSUED BY RPP-WTP PDC

Reference Data

Charge Vessels (Tag Numbers)	UFP-VSL-00032, UFP-VSL-00033, UFP-VSL-00034, UFP-VSL-00072, UFP-VSL-00073, UFP-VSL-00082
Pulsejet Mixers / Agitators (Tag Numbers)	UFP-PJM-00018, UFP-PJM-00019, UFP-PJM-00020, UFP-PJM-00021, UFP-PJM-00022, UFP-PJM-00052
RFDs/Pumps (Tag Numbers)	UFP-RFD-00027, UFP-RFD-00028, UFP-RFD-00030, UFP-RFD-00037, UFP-RFD-00038, UFP-RFD-00049

Design Data

Quality Level		QL-1	Fabrication Specs	24590-WTP-3PS-MV00-TP001 1		
Seismic Category		SC-I	Design Code	ASME VIII Div 1		
Service/Contents		Radioactive Liquid	Code Stamp	Yes		
Design Specific Gravity		1.26	NB Registration	Yes		
Maximum Operating Volume	gal	30,072	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	34,700	Estimated	95,300	417,000	385,000
			Actual *	100,000 1	427,800 1	398,100 1

Inside Diameter	inch	180			Wind Design	Not Required	
Length/Height (TL-TL)	inch	255			Snow Design	Not Required	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-SS90-T0001	
Internal Pressure	psig	ATM	15	N/A	Seismic Base Moment *	ft*lb	
External Pressure	psig	0.217 1	10.29	N/A	Postweld Heat Treat	Not Required	
Temperature	°F	86	120	N/A	Corrosion Allowance	Inch	0.04
Min. Design Metal Temp.	°F	40			Hydrostatic Test Pressure *	psig	

Note: 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.

MARK W. HOFFMANN
STATE OF WASHINGTON
0030253
REGISTERED PROFESSIONAL ENGINEER
1/25/05
EXPIRES 12/10/06

This Bound Document Contains a total of 6 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
1	2/17/05	Issued for Permitting Use				
0	10/8/03	Issued for Permitting Use	J. Jackson	C. Slater	C. Slater	M. Hoffmann

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-PTF-MV-UFP-VSL-00062A***

Materials of Construction

Component	Material		Minimum Thickness / Size	Containment
Top Head	***SA 240 316***	***Note 1***	***See Drawing***	***Auxiliary (See Note 6)*** 1
Shell	***SA 240 316***	***Note 1***	***See Drawing***	***Primary (See Note 6)*** 1
Bottom Head	***SA 240 316***	***Note 1***	***See Drawing***	***Primary (See Note 6)*** 1
Support	***SA 240 304***	***Note 1***	***See Drawing***	***N/A***
Jacket/Coils/Half-Pipe Jacket	***N/A***		***N/A***	***N/A***
Internals	***SA 240 316***	***Note 1***	***See Drawing***	***Thermowells Primary***
Pipe Nozzles	***SA 312 TP316***	***Note 1***	***See Drawing***	***Primary (See Note 6)*** 1
Forgings/ Bar stock	***SA 182 F316***	***Note 1***	***See Drawing***	***N/A***
Wash Ring Pipe	***SA 312 TP316***	***Note 1***	***See Drawing***	***N/A***
Bolting/ Gaskets	***N/A***		***N/A***	***N/A***

Miscellaneous Data

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

Remarks

* To be determined by the vendor.

Note 1. ***Maximum 0.030% carbon.***

Note 2. ***Deleted***

Note 3. ***Welds de-scaled as laid.***

Note 4. ***Vessel volumes are approximate and do not account for the manufacturing tolerances, nozzles, and displacement of internals.***

Note 5. ***This vessel is in a Black Cell.*** 1

Note 6. ***All welds forming part of the primary and auxiliary containment including nozzle attachment welds shall be subjected to 100% volumetric examination.*** 1

Note 7. ***Contents of this document are Dangerous Waste Permit affecting.*** 1

Note 8. ***Deleted*** 1

Note 9. ***All hydrodynamic and overblow loads are for BNI internal use only and are to be disregarded by the seller.*** 1

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-PTF-MV-UFP-VSL-00062A***

Equipment Cyclic Data Sheet

Component Plant Item Number:	*PTF-MV-UFP-VSL-00062A*
Component Description	*Ultrafilter Permeate Collection Vessel (Parent Vessel)* 1

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*ASME SA 240 316 with max. Carbon of 0.030%*
Design Life	*40 Years*
Component Function and Life Cycle Description	*This vessel collects permeate from the Ultrafiltration tube units. The permeate is transferred from this vessel to the Cesium Ion Exchange Process System, vessel CXP-VSL-00001, for further processing. The permeate is also sampled to check for solids in this vessel. The vessel is filled over a period of approximately 32 hours. An operating cycle for this vessel, filled then emptied, in approximately 48 hours.*

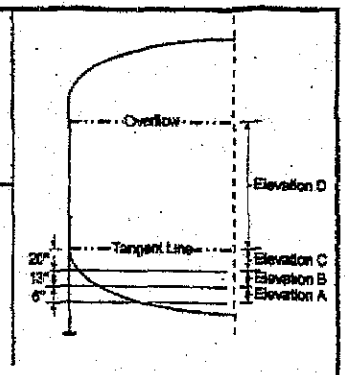
Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*-10.29*	*15*	*10*	*Nominal assumption for testing*
Operating Pressure	psig	*-0.217*	*0.000*	*N/A*	*The vessel will remain under constant pressure depending upon the HVAC plant.*
Operating Temp	°F	*68*	*86*	*10,400*	
Contents Specific Gravity		*1.00*	*1.26*	*10,400*	
Contents Level	inch	*27*	*288*	*10,400*	
Localized Features					
Nozzles		*Within 9 °F of operating temperature range.*		*As above*	

Notes

- ***Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***
- ***DELETED***

Hydrodynamic Loading 1

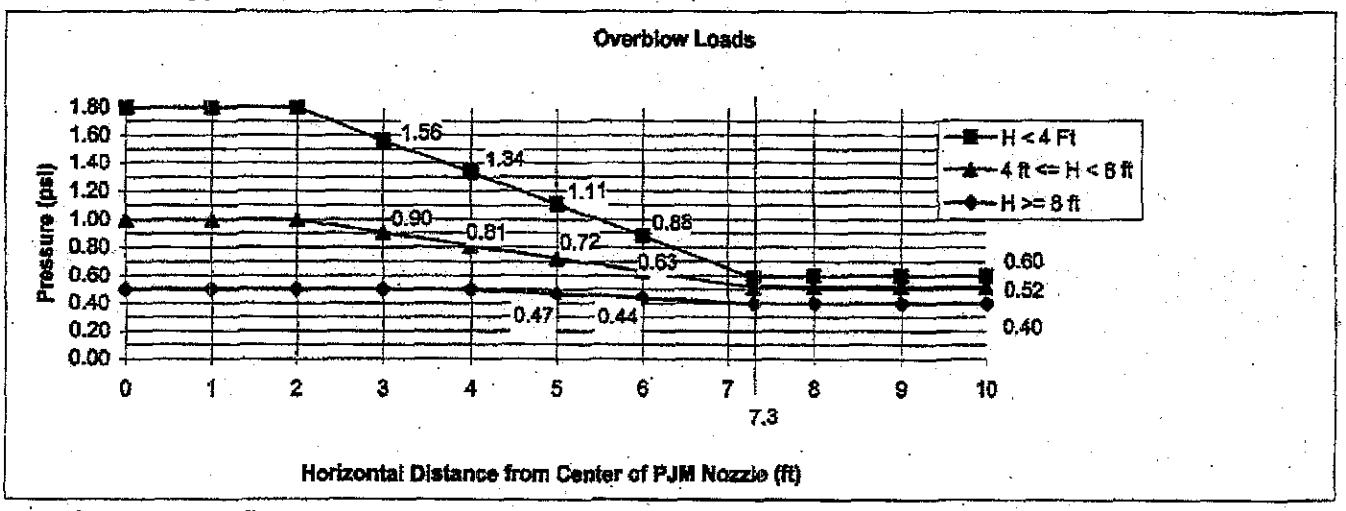
In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overblow loads, and this load combination is also to be assumed to act concurrently with seismic loads.



The following table indicates the normal hydrodynamic pressure at ranges of elevations in the vessel and the number of design cycles for each condition. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Normal Operation Hydrodynamic Pressure Range, psi								Number of Cycles
Elevation A		Elevation B		Elevation C		Elevation D		
Radial	Vertical	Radial	Vertical	Radial	Vertical	Radial	Vertical	
-0.09 to 0.29	-0.74 to 0.48	-0.02 to 0.22	-0.01 to 0.40	-0.05 to 0.12	-0.01 to 0.40	-0.03 to 0.10	-0.01 to 0.40	20.7×10^6

Overblow loads vary as a function of the horizontal distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle up to the overflow level as plotted:



The overblow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Any single pulse jet mixer may overblow 100 cycles. 1

Notes

- *Cycle increase: Increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.* 1

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-PTF-MV-UFP-VSL-00062A***

Equipment Cyclic Data Sheet

Component Plant Item Number:	*PTF-MV-UFP-VSL-00032, PTF-MV-UFP-VSL-00033, PTF-MV-UFP-VSL-00034, PTF-MV-UFP-VSL-00072, PTF-MV-UFP-VSL-00073, PTF-MV-UFP-00062*
Component Description	*Charge Vessels for the following RFDs UFP-RFD-00027, UFP-RFD-00028, UFP-RFD-00030, UFP-RFD-00037, UFP-RFD-00038 , UFP-RFD-00049*

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*ASME SA 240 316 with max. Carbon of 0.030%*
Design Life	*40 Years*
Component Function and Life Cycle Description	*These charge vessels are cyclically loaded using vacuum to fully fill the charge vessel with process liquid and compressed air to fully empty the charge vessel. The charge vessels are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The charge vessel supports shall be designed to cycle between fully buoyant (charge vessel empty and parent vessel full) and fully loaded (charge vessel full and parent vessel empty)* /1

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*80*	*10*	*Nominal assumption for testing*
Operating Pressure	psig	*FV*	*72.5*	*10,400*	
Operating Temperature	°F	*68*	*86*	*10,400*	*Parent vessel will be operating normally at a temperature of 77°F*
Contents Specific Gravity		*1.00*	*1.26*	*10,400*	
Contents Level	inch	*Empty*	*Flooded*	*10,400*	
Localized Features					
Nozzles		*Within 9°F of operating temperature range.*		*As above*	
Supports		*Buoyant*	*Loaded*	*10,400*	

Notes

- ***Cycle Increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***
- ***DELETED***

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	PLANT ITEM No. 24590-PTF-MV-UFP-VSL-00062A

Equipment Cyclic Data Sheet

Component Plant Item Number:	*UFP-PJM-00018, UFP-PJM-00019, UFP-PJM-00020, UFP-PJM-00021, UFP-PJM-00022, UFP-PJM-00052*
Component Description	*Pulse Jet Mixers*

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*ASME SA 240 316 with max. Carbon of 0.030%*
Design Life	*40 Years*
Component Function and Life Cycle Description	*These pulse jet mixers (PJMs) are cyclically loaded using vacuum to fully fill the PJM with process liquid and compressed air to fully empty the PJM. The PJMs are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The PJM supports shall be designed to cycle between fully buoyant (PJM empty and parent vessel full) and fully loaded (PJM full and parent vessel empty) states. Thrust load shall be applied only to the fully buoyant state. Assume the parent vessel is full for 50% of the number of PJM cycles.* 1

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*80*	*10*	*Nominal assumption for testing*
Operating Pressure	psig	*FV*	*72.5*	*2.07X10⁷* 1	
Operating Temperature	°F	*68*	*86*	*10,400*	*Parent vessel will operating normally at a temperature of 77 °F*
Contents Specific Gravity		*1.0*	*1.26*	*2.07X10⁷* 1	
Contents Level	inch	*Empty*	*Flooded*	*2.07X10⁷*	
Thrust 1	lbf	*0*	*330*	*2.07X10⁷*	
Localized Features					
Nozzles		*Within 9°F of operating temperature range.*		*As above*	
Supports		*Buoyant*	*Loaded*	*2.07X10⁷*	

Notes

- ***Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***
- ***DELETED***

Attachment 2

24590-PTF-MVD-UFP-P0006, Rev. 1
Mechanical Systems Data Sheet for Pretreatment Vessel UFP-VSL-000062B

MECHANICAL SYSTEMS DATA SHEET: VESSEL

PLANT ITEM No. R10486409

24590-PTF-MV-UFP-VSL-00062B

Project:	RPP-WTP	P&ID:	24590-PTF-M6-UFP-P0004/P0005/P0006/P0015
Project No:	24590	Process Calculation:	DELETED 1
Project Site:	Hanford	Vessel Drawing	24590-PTF-MV-UFP-P0006
Description:	Ultrafilter Permeate Collection Vessel 1		ISSUED BY RPP-WTP PDC

Reference Data

Charge Vessels (Tag Numbers)	UFP-VSL-00035, UFP-VSL-00036, UFP-VSL-00075, UFP-VSL-00037, UFP-VSL-00051, UFP-VSL-00083
Pulsejet Mixers / Agitators (Tag Numbers)	UFP-PJM-00039, UFP-PJM-00040, UFP-PJM-00041, UFP-PJM-00042, UFP-PJM-00043, UFP-PJM-00051
RFDs/Pumps (Tag Numbers)	UFP-RFD-00031, UFP-RFD-00032, UFP-RFD-00033, UFP-RFD-00034, UFP-RFD-00039, UFP-RFD-00047

Design Data

Quality Level		QL-1	Fabrication Specs	24590-WTP-3PS-MV00-TP001 1		
Seismic Category		SC-I	Design Code	ASME VIII Div 1		
Service/Contents		Radioactive Liquid	Code Stamp	Yes		
Design Specific Gravity		1.26	NB Registration	Yes		
Maximum Operating Volume	gal	30,072	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	34,700	Estimated	95,300	417,000	385,000
			Actual *	100,000 1	427,800 1	398,100 1

Inside Diameter	inch	180			Wind Design	Not Required	
Length/Height (TL-TL)	inch	255			Snow Design	Not Required	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-SS90-TD001	
Internal Pressure	psig	ATM	15	N/A	Seismic Base Moment *	ft*lb	
External Pressure	psig	0.217 1	10.29	N/A	Postweld Heat Treat	Not Required	
Temperature	°F	86	120	N/A	Corrosion Allowance	Inch	0.04
Min. Design Metal Temp	°F	40			Hydrostatic Test Pressure *	psig	

Note: 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.

MARK W. HOFFMANN
STATE OF WASHINGTON
0030952
REGISTERED
PROFESSIONAL ENGINEER
1/25/05
EXPIRES 12/10/06

This Bound Document Contains a total of 6 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
1	2/17/05	Issued for Permitting Use				
0	10/8/03	Issued for Permitting Use	J. Jackson	C. Slater	C. Slater	M. Hoffmann

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	PLANT ITEM No. *24590-PTF-MV-UFP-VSL-00062B*

Materials of Construction

Component	Material		Minimum Thickness / Size	Containment
Top Head	*SA 240 316*	*Note 1*	*See Drawing*	*Auxiliary (See Note 6)* 1
Shell	*SA 240 316*	*Note 1*	*See Drawing*	*Primary (See Note 6)* 1
Bottom Head	*SA 240 316*	*Note 1*	*See Drawing*	*Primary (See Note 6)* 1
Support	*SA 240 304*	*Note 1*	*See Drawing*	*N/A*
Jacket/Coils/Half-Pipe Jacket	*N/A*		*N/A*	*N/A*
Internals	*SA 240 316*	*Note 1*	*See Drawing*	*Thermowells Primary*
Pipe Nozzles	*SA 312 TP316*	*Note 1*	*See Drawing*	*Primary (See Note 6)* 1
Forgings/ Bar stock	*SA 182 F316*	*Note1*	*See Drawing*	*N/A*
Wash Ring Pipe	*SA 312 TP316*	*Note 1*	*See Drawing*	*N/A*
Bolting/ Gaskets	*N/A*		*N/A*	*N/A*

Miscellaneous Data

Orientation	*Vertical*	Support Type	*Skirt*
Insulation Function	*Not Applicable*	Insulation Material	*Not Applicable*
Insulation Thickness (inch)	*Not Applicable*	Internal Finish	*Note 2* 1
		External Finish	*Note 2* 1

Remarks

* To be determined by the vendor.

Note 1. ***Maximum 0.030% carbon.***

Note 2. ***Welds de-scaled as laid.***

Note 3. ***Deleted***

Note 4. ***Vessel volumes are approximate and do not account for the manufacturing tolerances, nozzles, and displacement of internals.***

Note 5. ***This vessel is in a Black Cell.*** 1

Note 6. ***All welds forming part of the primary and auxiliary containment including nozzle attachment welds shall be subjected to 100% volumetric examination.*** 1

Note 7. ***Contents of this document are Dangerous Waste Permit affecting.*** 1

Note 8. ***Deleted*** 1

Note 9. ***All hydrodynamic and overblow loads are for BNI internal use only and are to be disregarded by the seller.*** 1

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	PLANT ITEM No. *24590-PTF-MV-UFP-VSL-00062B*

Equipment Cyclic Data Sheet

Component Plant Item Number:	*PTF-MV-UFP-VSL-00062B*
Component Description	*Ultrafilter Permeate Collection Vessel (Parent Vessel)* 1

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*ASME SA 240 316 with max. carbon of 0.030%*
Design Life	*40 Years*
Component Function and Life Cycle Description	*This vessel collects permeate from the Ultrafiltration modules. The permeate is transferred from this vessel to the Cesium Ion Exchange Process System, vessel CXP-VSL-00001, for further processing. The permeate is also sampled to check for solids in this vessel. The vessel is filled over a period of approximately 32 hours. An operating cycle for this vessel, filled then emptied, is approximately 48 hours.*

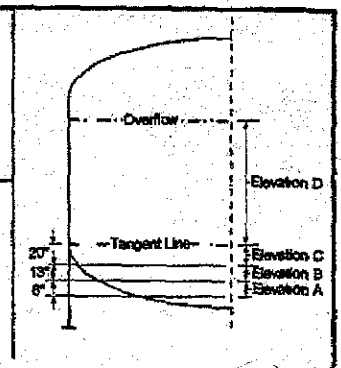
Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*-10.29*	*15*	*10*	*Nominal assumption for testing*
Operating Pressure	psig	*-0.217*	*0.000*	*N/A*	*The vessel will remain under constant pressure depending upon the HVAC plant*
Operating Temp	°F	*68*	*86*	*10,400*	
Contents Specific Gravity		*1.00*	*1.26*	*10,400*	
Contents Level	inch	*27*	*288*	*10,400*	
Localized Features					
Nozzles		*Within 9°F of operating temperature range.*		*As above*	

Notes

- ***Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***
- ***DELETED***

Hydrodynamic Loading 1

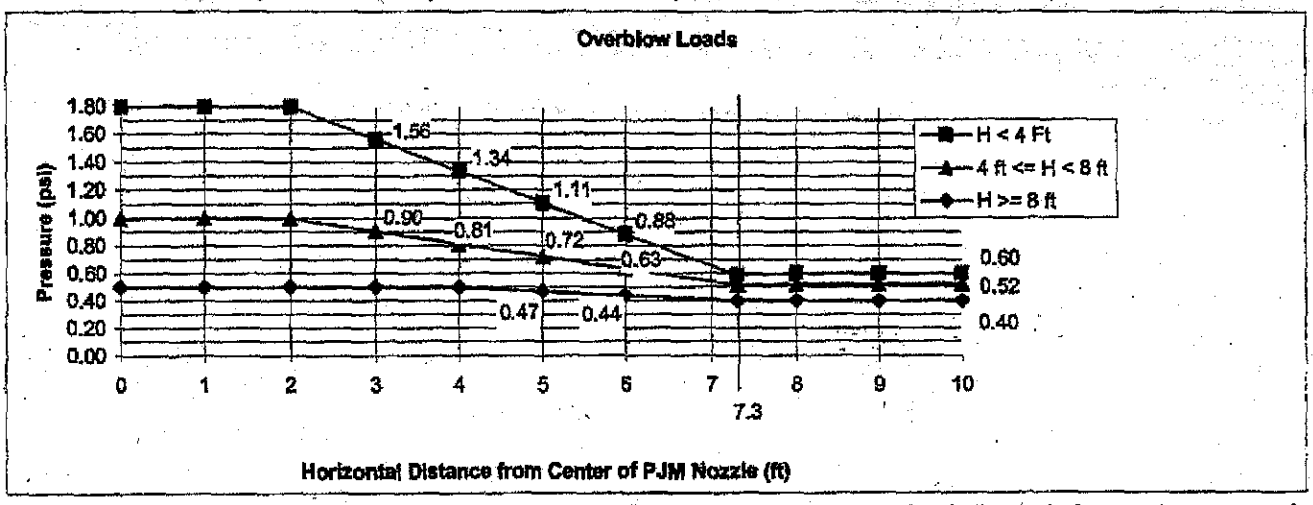
In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overblow loads, and this load combination is also to be assumed to act concurrently with seismic loads.



The following table indicates the normal hydrodynamic pressure at ranges of elevations in the vessel and the number of design cycles for each condition. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Normal Operation Hydrodynamic Pressure Range, psi								Number of Cycles
Elevation A		Elevation B		Elevation C		Elevation D		
Radial	Vertical	Radial	Vertical	Radial	Vertical	Radial	Vertical	
-0.09 to 0.29	-0.74 to 0.48	-0.02 to 0.22	-0.01 to 0.40	-0.05 to 0.12	-0.01 to 0.40	-0.03 to 0.19	-0.01 to 0.40	20.7×10^6

Overblow loads vary as a function of the horizontal distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle up to the overflow level as plotted:



The overblow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Any single pulse jet mixer may overblow 100 cycles. 1

Notes

- *Cycle increase: Increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.* 1

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-PTF-MV-UFP-VSL-00062B***

Equipment Cyclic Data Sheet

Component Plant Item Number:	*PTF-MV-UFP-VSL-00035, PTF-MV-UFP-VSL-00036, PTF-MV-UFP-VSL-00037, PTF-MV-UFP-VSL-00051, PTF-MV-UFP-VSL-00075, PTF-MV-UFP-VSL-00083*
Component Description	*Charge Vessels for the following RFDs UFP-RFD-00031, UFP-RFD-00032, UFP-RFD-00033, UFP-RFD-00034, UFP-RFD-00039, UFP-RFD-00047*

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*ASME SA240 316 with max. Carbon of 0.030%* 1
Design Life	*40 Years*
Component Function and Life Cycle Description	***These charge vessels are cyclically loaded using vacuum to fully fill the charge vessel with process liquid and compressed air to fully empty the charge vessel. The charge vessels are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The charge vessel supports shall be designed to cycle between fully buoyant (charge vessel empty and parent vessel full) and fully loaded (charge vessel full and parent vessel empty).*** 1

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*80*	*10*	*Nominal assumption for testing*
Operating Pressure	psig	*FV*	*72.5*	*10,400*	
Operating Temperature	°F	*68*	*86*	*10,400*	*Parent vessel will be operating normally at a temperature of 77°F*
Contents Specific Gravity		*1.00*	*1.26*	*10,400*	
Contents Level	inch	*Empty*	*Flooded*	*10,400*	
Localized Features					
Nozzles		*Within 9°F of operating temperature range.*		*As above.*	
Supports		*Buoyant*	*Loaded*	*10,400*	

Notes

- ***Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.***
- ***DELETED***

BECHTEL	**MECHANICAL SYSTEMS DATA SHEET: VESSEL**	**PLANT ITEM No.** *24590-PTF-MV-UFP-VSL-00062B*

Equipment Cyclic Data Sheet

Component Plant Item Number:	*UFP-PJM-00039, UFP-PJM-00040, UFP-PJM-00041, UFP-PJM-00042, UFP-PJM-00043, UFP-PJM-00051*
Component Description	*Pulse Jet Mixers*

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	*ASME SA240 316 with max. Carbon of 0.030%* 1
Design Life	*40 Years*
Component Function and Life Cycle Description	*These pulse jet mixers (PJMs) are cyclically loaded using vacuum to fully fill the PJM with process liquid and compressed air to fully empty the PJM. The PJMs are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The PJM supports shall be designed to cycle between fully buoyant (PJM empty and parent vessel full) and fully loaded (PJM full and parent vessel empty) states. Thrust load shall be applied only to the fully buoyant state. Assume the parent vessel is full for 50% of the number of PJM cycles.* 1

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*80*	*10*	*Nominal assumption for testing*
Operating Pressure	psig	*FV*	*72.5*	*2.07×10^7* 1	
Operating Temperature	°F	*68*	*86*	*10,400*	*Parent Vessel will operating normally at a temperature of 77 °F*
Contents Specific Gravity		*1.0*	*1.26*	*2.07×10^7* 1	
Contents Level	inch	*Empty*	*Flooded*	*2.07×10^7* 1	
Thrust 1	lbf	*0*	*330*	*2.07×10^7*	
Localized Features					
Nozzles		*Within 9°F of operating temperature range.*		*As above*	
Supports		*Buoyant*	*Loaded*	*2.07×10^7*	

Notes

- *Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.*
- *DELETED*

[redacted]

Attachment 3

24590-PTF-N1D-UFP-P0008, Rev. 1
Plant Item Material Selection Data Sheet for Pretreatment
Vessels UFP-VSL-00062A, UFP-VSL-00062B, and UFP-VSL-00062C

PLANT ITEM MATERIAL SELECTION DATA SHEET

[redacted]
R10460390

UFP-VSL-00062-A/B/C (PTF)
Ultrafilter Permeate Collection Vessel

- Design Temperature (°F)(max/min): 120/40
- Design Pressure (psig) (max/min): 15/-10.29
- Location: incell
- PJM Discharge Velocity (fps): 40
- Drive Cycle: 17 % (at 40 fps)

Offspring items

UFP-VSL-00023 – 00025, UFP-VSL-00032 – 00037
UFP-VSL-00072 – 00073, UFP-VSL-00082 – 00084
UFP-VSL-00051, UFP-VSL-00069 – 00070, UFP-VSL-00075
UFP-PJM-00018 – 00022, UFP-PJM-00039 – 00043
UFP-PJM-00051 – 00052, UFP-PJM-00076 – 00078
UFP-PJM-00070, UFP-PJM-00073, UFP-PJM-00107
UFP-RFD-00027 – 00028, UFP-RFD-00030 – 00034
UFP-RFD-00037 – 00039, UFP-RFD-00042 – 00049

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on sheets 5 and 6

ISSUED BY
RPP-WTP PDC

No maintenance will be performed.

Operating Modes Considered:

- Normal operating conditions are considered.
- The vessel may be cleaned using 2 N HNO_3 with residual chlorides and fluorides at normal operating temperatures; the condition of high temperature and acid is not examined.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 316 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.04 inch (includes 0.00 inch erosion allowance)

Process & Operations Limitations:

- Develop rinsing/flushing procedure for acid and water

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED PROFESSIONAL ENGINEER
1/25/05
EXPIRES: 12/07/05

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.

This bound document contains a total of 6 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	1/25/05	Issued for Permitting Use			
0	10/15/04	Issued for Permitting Use	DLA	JRD	SWV

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

Permeate collected in these vessels is sampled and then routed to the CXP system for further treatment. Permeate collected from solids washing is routed to PWD-VSL-00015 or PWD-VSL-000016.

a General Corrosion
Hamner (1981) lists a corrosion rate for 304 (and 304L) in NaOH of less than 20 mpy (500 μm/y) at 77°F and over 20 mpy at 122°F. He shows 316 (and 316L) has a rate of less than 2 mpy up to 122°F and 50% NaOH. Sedriks (1996) states that the 300 series stainless steels are acceptable in up to 50% NaOH at temperatures up to about 122°F or slightly above. Work with simulated-radwaste evaporators, six months at 140°F, showed 304L was slightly more resistant to corrosion (<0.2 mpy) than was 316L (<0.6 mpy); Ni 200, pure nickel, was much less resistant (≈7 mpy) probably due to the complexants. The Savannah River evaporator vessels, operating at about 300°F, are made of 304L and have suffered no failures in about 30 years; 304L heat transfer surfaces have failed however after about 10 years. Danielson & Pitman (2000), based on short term studies, suggest a corrosion rate of about 0.5 mpy for 316L in simulated waste at boiling, >212°F.

Davis (1994) states the corrosion rate for 304L in pure NaOH will be less than about 0.1 mpy up to about 212°F though Sedriks (1996) states the corrosion rate data beyond about 122°F are too low. Uhlig (1948) has shown that pure nickel is resistant to corrosion by NaOH. However, the presence of complexing agents may reverse the trend. Agarwal (2000) states that the higher nickel alloys are highly corrosion resistant though specific mention of alkaline media is not made. The general literature mainly discusses cracking problems (see below) rather than uniform corrosion.

The amount of dilution of fluoride during possible acid wash is unknown. It has been shown that in 5% nitric acid with 1000 ppm fluoride at 290°F, the corrosion rate of 304L can be kept as low as 5 mpy by the use of Al^{+++}. Additionally, Sedriks (1996) has noted with 10% (≈2N) nitric acid and 3,000 ppm fluoride at 158°F, the corrosion rate of 304L is over 4,000 mpy. Therefore, there is a concern about excessive corrosion rates during acid cleaning or should acid be from the Ultrafiltration Feed Vessels. Acid wash should only be performed at normal operating temperatures in order to reduce the extent of attack by chloride (pitting and crevice corrosion) and general corrosion due to fluoride. Properly protected by temperature and fluoride complexants such as Al^{+++}, 304L may be suitable. The more resistant 316L is recommended together with thorough flushing before acid is added.

Conclusion: At temperatures less than about 140°F, 304L is expected to be sufficiently resistant to the waste solution with a probable general corrosion rate of less than 1 mpy. During acid cleaning, in the presence of fluoride, a more resistant alloy may have to be considered unless steps are taken to reduce the effect of the fluoride. Assuming a limited time of exposure to acid and thorough washing, 0.04 inch corrosion allowance is recommended.

b Pitting Corrosion
Chloride is known to cause pitting in acid and neutral solutions. It is thought that in alkaline solutions, pH>12, chlorides are likely to promote pitting only in tight crevices. Koch (1995) is of the opinion that fluoride will have little effect in an alkaline media. Further, Revie (2000) and Uhlig (1948) note nitrate inhibits chloride pitting.

Normally the vessel is to operate at 86°F. At the normal temperature, 304L stainless steel would be acceptable in the proposed alkaline conditions. Under acidic or neutral pH conditions, 316L will be more resistant to pitting due to the chloride concentration.

If the vessel were filled with process water and left stagnant, there would be a tendency to pit. The time to initiate would depend on the source of the water, being shorter for filtered river water and longer for DIW. Pitting has been observed in both cases, though much less frequently in DIW. Therefore, controls on washing and rinsing are required.

Conclusion: Localized corrosion, such as pitting, is common but can be mitigated by alloys with higher nickel and molybdenum contents. Based on the expected operating conditions, 304L is expected to be satisfactory. Due to the possibility of acid washes inside the vessels, 316L stainless steel is the minimum recommended.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions.

Conclusion: Possible, but not believed likely in this system.

d Stress Corrosion Cracking
The exact amount of chloride required to cause stress corrosion cracking is unknown. In part this is because the amount varies with temperature, metal sensitization, and the environment. But it is also unknown because chloride tends to concentrate under heat transfer conditions, by evaporation, and electrochemically during a corrosion process. Hence, even as little as 10 ppm can lead to cracking under some conditions. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140°F but this will depend on conditions. Berhardsson et al (1981) suggest that if the chloride concentration is < 50 ppm, temperatures up to 260 are acceptable whereas temperatures should be less than about 75°F if the chloride concentration approaches 1% (10,000 ppm). At the stated temperature and alkaline conditions, either 304L or 316L is expected to be satisfactory.

Conclusion: Because of the normal operating environment as well as that which can occur during off normal conditions, the minimum alloy recommended is a 304L stainless steel.

PLANT ITEM MATERIAL SELECTION DATA SHEET

e Crevice Corrosion
See Pitting.

Conclusion: See Pitting

f Corrosion at Welds
Corrosion at welds is not considered a problem in the proposed environment.

Conclusion: Weld corrosion is not considered a problem for this system.

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are not conducive to microbial growth – the temperature is approximately correct but the pH is either too alkaline or too acid. Further, the system is downstream of the main entry points of microbes.

Conclusion: MIC is not considered a problem.

h Fatigue/Corrosion Fatigue
Under the stated operating conditions, corrosion fatigue is a not expected to be a problem in a properly designed vessel.

Conclusions: Not considered to be a concern.

i Vapor Phase Corrosion
Not expected to be a concern.

Conclusion: Not a concern.

j Erosion
Based on past experiments by Smith & Elmore (1992), the solids are soft and erosion is not expected to be a concern for the vessel wall. Because of the negligible concentration of undissolved solids, no localized protection is necessary for the applicable portions of the bottom head to accommodate PJM discharge velocities of up to 12 m/s for a usage of 100 % operation.

The PJM nozzle requires no additional protection.

Conclusion: The recommended corrosion allowance provides sufficient protection for erosion of the vessel.

k Galling of Moving Surfaces
There are no moving surfaces within the vessels.

Conclusion: Not applicable.

l Fretting/Wear
No contacting surfaces are expected.

Conclusion: Not considered a problem.

m Galvanic Corrosion
No dissimilar metals are present.

Conclusion: Not applicable.

n Cavitation
None expected.

Conclusion: Not believed to be of concern.

o Creep
The temperatures are too low to be a concern.

Conclusion: Not applicable.

p Inadvertent Nitric Acid Addition
Higher chloride contents and higher temperatures usually require higher alloy materials. Nitrate ions inhibit the pitting and crevice corrosion of stainless alloys. Furthermore, nitric acid passivates these alloys; therefore, lower pH values brought about by increases in the nitric acid content of process fluid will not cause higher corrosion rates for these alloys. The upset condition that was most likely to occur is lowering of the pH of the vessel content by inadvertent addition of 0.5 M nitric acid. Lowering of pH may make a chloride-containing solution more likely to cause pitting of stainless alloys. Increasing the nitric acid content of the process fluid adds more of the pitting-inhibiting nitrate ion to the process fluid. In addition, adding the nitric acid solution to the stream will dilute the chloride content of the process fluid.

Conclusion: The recommended materials will be able to withstand a plausible inadvertent addition of 0.5 M nitric acid for a limited period.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. Agarwal, DC, *Nickel and Nickel alloys*, In: Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
2. Berhardsson, S, R Mellstrom, and J Oredsson, 1981, *Properties of Two Highly corrosion Resistant Duplex Stainless Steels*, Paper 124, presented at Corrosion 81, NACE International, Houston, TX 77218
3. Danielson, MJ & SG Pitman, 2000, *Corrosion Tests of 316L and Hastelloy C-22 in Simulated Tank Waste Solutions*, PNWD-3015 (BNFL-RPT-019, Rev 0), Pacific Northwest Laboratory, Richland WA.
4. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
5. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
6. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX 77218
7. Koch, GH, 1995, *Localized Corrosion in Halides Other Than Chlorides*, MTI Pub No. 41, Materials Technology Institute of the Chemical Process Industries, Inc, St Louis, MO 63141
8. Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
9. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
10. Smith, H. D. and M. R. Elmore, 1992, *Corrosion Studies of Carbon Steel under Impinging Jets of Simulated Slurries of Neutralized Current Acid Waste (NCAW) and Neutralized Cladding Removal Waste (NCRW)*, PNL-7816, Pacific Northwest Laboratory, Richland, Washington.
11. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158

Bibliography:

1. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
2. Phull, BS, WL Mathay, & RW Ross, 2000, *Corrosion Resistance of Duplex and 4-6% Mo-Containing Stainless Steels in FGD Scrubber Absorber Slurry Environments*, Presented at Corrosion 2000, Orlando, FL, March 26-31, 2000, NACE International, Houston TX 77218.
3. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

OPERATING CONDITIONS

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Ultrafilter permeate collection vessel (UFP-VSL-00062A/B/C)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	3.15E+01	3.17E+01			
Chloride	g/l	1.21E+01	1.45E+01			
Fluoride	g/l	1.44E+01	1.73E+01			
Iron	g/l	2.31E+00	2.60E+00			
Nitrate	g/l	2.23E+02	2.59E+02			
Nitrite	g/l	6.69E+01	8.01E+01			
Phosphate	g/l	4.83E+01	5.66E+01			
Sulfate	g/l	2.57E+01	3.08E+01			
Mercury	g/l	7.47E-02	1.94E-02			
Carbonate	g/l	9.03E+01	9.93E+01			
Undissolved solids	wt%					
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Note 3
Temperature	°F					Note 2

List of Organic Species:

Notes:

1. Concentrations less than 1x 10^{-4} g/l do not need to be reported; list values to two significant digits max.
2. T normal operation 77 °F to max 86 °F.
3. Alkaline pH approximately 12 to 14.

Assumptions:

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.14.4 Ultrafilter Permeate Collection Vessel (UFP-VSL-00062 A/B/C)

Routine Operations

Permeate collected in the ultrafilter permeate vessels (UFP-VSL-00062A/B/C) is sampled and then routed to the cesium ion exchange process system (CXP) for further treatment. The permeate collected from solids washing is routed to the acidic/alkaline effluent vessels (PWD-VSL-00015/00016). If necessary, the permeate routed to the CXP system may be diluted with process condensate prior to transferring to meet the 5 M sodium design basis requirement (SpG ~1.25).

Non-Routine Operations that Could Affect Corrosion/Erosion

Off-specification permeate (excessive turbidity) can be routed back to either of the ultrafilter feed preparation vessels (UFP-VSL-00001A/B).

Hanford Facility RCRA Permit Modification Notification Forms

Part V

Chapter 16, 1325-N Liquid Waste Disposal Facility
Chapter 17, 1301-N Liquid Waste Disposal Facility

Index

Page 2 of 4: Hanford Facility RCRA Permit, Part V.16

Page 4 of 4: Hanford Facility RCRA Permit, Part V.17

Page 4 of 4: Attachment 41, Chapter 4.0, §4.9

Submitted by Co-Operator:		Reviewed by RL Program Office:	
Michael S. Hu for	3/24/05	488 [signature] for AMRC	3-31-05
Thomas E. Logan	Date	~~Matthew S. McCormick~~ Leif Erickson	Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
1325-N Liquid Waste Disposal Facility	**Part V, Chapter 16**

Description of Modification:

Hanford Facility RCRA Permit, Part V.16:

CHAPTER 16
1325-N Liquid Waste Disposal Facility

The 1325-N Liquid Waste Disposal Facility is an inactive TSD unit that is currently undergoing modified closure activities. This TSD unit was operated as a liquid waste disposal facility for dangerous waste. This Chapter sets forth the modified closure requirements for this TSD unit.

V.16.A. COMPLIANCE WITH APPROVED MODIFIED CLOSURE PLAN

The Permittees shall comply with all requirements set forth in Attachment 41, including all modifications and Amendments specified in Condition V.16.B. Enforceable portions have been incorporated in Attachment 41 and are identified as follows. All subsections, figures, and tables included in these portions are also enforceable, unless stated otherwise:

ATTACHMENT 41:

Chapter 1.0 Part A Dangerous Waste Permit, from Class 1 modification dated August 2004
1325-N Liquid Waste Disposal Facility Revision 7B

Chapter 2.0 Unit Description, from Class 1 modification dated August 2004

Chapter 3.0 Groundwater Monitoring, from Class 1 modification dated August 2004

Chapter 4.0 Closure Activities, from Class 1 modification dated March 31, 2005~~August 2004~~

Chapter 5.0 Postclosure Plan, from Class 1 modification dated August 2004

V.16.B. AMENDMENTS TO THE APPROVED MODIFIED CLOSURE PLAN

V.16.B.1. (Reserved)

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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

1 Class 1 modifications requiring prior Agency approval.
2 If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
1301-N Liquid Waste Disposal Facility	**Part V, Chapter 17**

Description of Modification:

Hanford Facility RCRA Permit, Part V.17:

CHAPTER 17
1301-N Liquid Waste Disposal Facility

The 1301-N Liquid Waste Disposal Facility is an inactive TSD unit that is currently undergoing modified closure activities. This TSD unit was operated as a liquid waste disposal facility for dangerous waste. This Chapter sets forth the modified closure requirements for this TSD unit.

V.17.A COMPLIANCE WITH APPROVED MODIFIED CLOSURE PLAN

The Permittees shall comply with all requirements set forth in Attachment 41, including all modifications and Amendments specified in Condition V.17.B. Enforceable portions have been incorporated in Attachment 41 and are identified as follows. All subsections, figures, and tables included in these portions are also enforceable, unless stated otherwise:

ATTACHMENT 41:

Chapter 1.0 Part A Dangerous Waste Permit, from Class 1 modification dated August 2004
1301-N Liquid Waste Disposal Facility, Revision 7B

Chapter 2.0 Unit Description, from Class 1 modification dated August 2004

Chapter 3.0 Groundwater Monitoring, from Class 1 modification dated August 2004

Chapter 4.0 Closure Activities, from Class 1 modification dated March 31, 2005~~August 2004~~

Chapter 5.0 Postclosure Plan, from Class 1 modification dated August 2004

V.17.B. AMENDMENTS TO THE APPROVED MODIFIED CLOSURE PLAN

V.17.B.1. (Reserved)

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
Enter wording of WAC 173-303-830, Appendix I Modification citation:
A.1. General Permit Provisions, Administrative and informational changes

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

1 Class 1 modifications requiring prior Agency approval.
2 If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
1301-N & 1325-N Liquid Waste Disposal Facilities	**Part V, Chapter 16 & 17**

Description of Modification:

Attachment 41, Chapter 4.0, §4.9:

4.9 CLOSURE SCHEDULE

Closure activities (actual cleanup) for 116-N-3 will begin in July 2000.

At the completion of 116-N-3, closure activities at 116-N-1 will begin. Approximately 600 feet (Permit Attachment 41, Chapter 2.0, Figure 2.1) of piping that is associated with the 116-N-1 TSD Waste Site and the 116-N-2 Facility and support facilities (1322-NA, NB, NC) will be deferred until decontamination and decommissioning (D&D) of these facilities. This deferral is due to safety concerns with remediating the piping and the radiological dose exposure to remedial action workers. Remediation will require excavation of the earthen berm at the 116-N-2 Facility, which provides radiological shielding.

Additionally, approximately 5,600 feet (Permit Attachment 41, Chapter 2.0, Figure 2.2) of piping that is associated with 116-N-1, 105-N and 109-N Facilities (part of the N Reactor Facility Complex) will be deferred until D&D activities of the 105-N Reactor Facility Complex. This deferral is also due to safety concerns with remediating the piping. Remediation will require excavation up to foundation walls of these facilities, thus, jeopardizing the integrity of the facilities. The pipelines intersect and/or follow active underground power lines and potable water lines. Finally, remediation will block the access routes to the ongoing pump-and-treat operations at the 100-N Springs and other active facilities in the 100-N Area.

The approximate duration of completion for both TSD units is ~~5~~6 years, not including for the piping that will be deferred. The D&D of the 116-N-2 Facility and support facilities and removal of the deferred piping is planned for startup in the fiscal year 2004. The deferred piping associated with the 105-N and 109-N Facilities will be remediated as part of D&D of the 105-N Reactor Facility Complex in accordance with Tri-Party Agreement Milestone M-093-20.

The corrective action schedule of compliance for UPR-100-N-31 will be the same as the closure schedule.

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: D.1.b.

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

D.1.b Closure; Changes to closure plan; Changes in the closure schedule for any unit, changes in the final closure schedule for the facility, or extension of the closure period, with prior approval of the director.

Modification Approved: ☐ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	G. P Davis — Date

1 Class 1 modifications requiring prior Agency approval.

2 If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification

List of Attachments, Attachment 4
DOE/RL-94-02, Hanford Emergency Management Plan

Replacement Index

Attachment 4, Appendix C

APPENDIX C

HANFORD FIRE DEPARTMENT EQUIPMENT LIST

EQUIPMENT	DESCRIPTION	*NORMALLY LOCATED
Engines 3 ladders 4 pumpers 1 aerial ladder	Examples of equipment contained on engines: • 1,500-2,000 gal/min (5,678.1-7,570.8 L/min) pump; • 300-500 gal (1,135.6-1,892.7 L) water tank; • 1 – 85' aerial ladder platform; • 3 – telescoping 65' ladder trucks with nozzle; and • Jaws of Life.	1 pumper at each station 1 ladder at Station 91 1 ladder at Station 93 1 ladder at Station 94 Aerial at Station 92
Brush Fire Trucks 6 each	Examples of equipment contained on brush fire trucks: • 500 gal/min (1,892.7 L/min) pump; • 2,500 gal (9463.5 L) water tank; • 6x6 with 2,500 gal (9463.5 L) porti-tank; and • hose, nozzles, fittings, and tools.	1 at Station 91 2 at Station 92 2 at Station 93 1 at Station 94
Water Tenders 1 each	Examples of equipment contained on water tenders: • 1000 gal/min (3785.4 L/min) pump; • 2 - 2,500 gal (9463.5 L) porti-tanks; • 4,500 gal (17,034.3 L) water tank; and • hose, nozzles, fittings, and tools.	Station 92
Grass Fire Units 4 each	Examples of equipment contained on grass fire units: • 100 gal/min (378.5 L/min) pump; • 250 - 400 gal (946.3 – 1514.2 L) water tank; • 4-wheel drive; and • hose, nozzles, fittings, and tools.	1 at each station
Ambulances 6 each	Examples of equipment contained on ambulances: • life support systems; and • medical and emergency response supplies.	1 at Station 91 2 at Station 92 2 at Station 93 1 at Station 94
Command Vehicles 3 each	Contains communications equipment and protective equipment for commander.	Station 92

EQUIPMENT	DESCRIPTION	*NORMALLY LOCATED
Mobile Incident Command Vehicle 1 each	Examples of equipment contained on mobile incident command vehicle: • communications equipment; • radio communications in Tri-County area; • cell phones (including satellite); • 10,000 watt generator; and • copier, fax.	Station 92
Attack Vehicles 1 each	Examples of equipment contained on attack vehicles: • 450 lb (204.1 kg) of purple-K; • 300 gal (1,1335.6 L) aqueous film-forming foam concentrate; • 300 gal (1,135.6 L) of aqueous film-forming foam pre-mix solution; and • hose, nozzles, fittings, and tools.	Station 91
Hazardous Materials Vehicle 2 each	Examples of equipment contained on hazardous materials vehicle: • protective clothing for Hazardous Materials Response Team; • breathing apparatus for Hazardous Materials Response Team; • diking, plugging, and damming equipment; • detection instruments for Hazardous Materials Response Team; • tools for plugging and repairing leaking containers; • overpack containers for leaking containers; • command module with material safety data sheets, software, and portable meteorological station; and • tools and communications devices necessary to provide communications during emergency response activities.	1 at Station 92 1 at Station 93
Metal Fire Response Vehicle 1 each	Examples of equipment contained on metal fire response vehicle: • equipment for response to special metals fire; • 500 lb (226.8 kg) of extinguishing powder; and • 1,000 lb (453.6 kg) of carbon microspheroids.	Station 94
Mobile Air Vehicle 1 each	Examples of equipment contained on mobile air vehicle: • mobile air compressor, recharges self-contained breathing apparatus cylinders; and • tools and fittings for operation of vehicle and spare cylinders.	Station 91

*The Hanford Fire Department Chief has the authority to: 1) direct the placement of equipment as needed to control emergency events; and 2) take proactive action and assign different vehicle locations based on conditions such as fuel moisture content, area fire history, work in progress, or other conditions that could arise.

Hanford Facility RCRA Permit Modification Notification Forms

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Replacement Index

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Attachment 33, Chapter 6.0
Attachment 33, Chapter 8.0
Attachment 33, Chapter 12.0

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2.0 FACILITY DESCRIPTION AND GENERAL PROVISIONS [B AND E]

This chapter describes the Hanford Site and Hanford Facility and addresses general provisions and information. Topics discussed include the following:

- General description
- Topography
- Location information
- Seismic consideration
- Traffic information
- Waste management units.

Provisions included in Standard Conditions (Part I) and General Conditions (Part II) of the Hanford Facility RCRA Permit (Permit) are addressed.

The information contained in this document need not be duplicated in the unit-specific documentation, but will be cross-referenced as appropriate

2.1 GENERAL DESCRIPTION [B-1]

The Hanford Facility is owned by the U.S. Government and operated by the U.S. Department of Energy (DOE), through the Richland Operations Office (DOE-RL) and the Office of River Protection (DOE-ORP). Dangerous waste and mixed waste managed on the Hanford Facility. Waste components are regulated in accordance with the RCRA, the *Hazardous and Solid Waste Amendments* (HSWA) *of 1984*, and/or the *State of Washington Hazardous Waste Management Act of 1976* (as administered through Ecology's *Dangerous Waste Regulations*, WAC 173-303); or the *Atomic Energy Act of 1954*.

The original 1989 Tri-Party Agreement established the permitting framework for the Hanford Facility. The original document addressed the Hanford Facility as a single RCRA facility (EPA/State Identification Number WA7890008967), which consisted of approximately 70 TSD units. Since that time, TSD units have been clean closed or closed pursuant to the Tri-Party Agreement, §6.3.3, reducing the number of TSD units to approximately 50. Approximately 33 percent of these units are, or are anticipated to be, 'final status operating'; approximately 50 percent are 'undergoing closure'; and the balance are anticipated to be, 'dispositioned through other options' under the Tri-Party Agreement.

The Permit became effective in September 1994. The Permit is issued to seven Permittees: DOE-RL and DOE-ORP, as the owner/operator, and to five of its contractors, as co-operators

For purposes of corrective action, the Permittees mean only the U.S. Department of Energy. Except for corrective action, the DOE contractors are identified as 'co-operators' and sign in that capacity (refer to Permit Condition I.A.2). Any identification of these contractors as an 'operator' elsewhere in this document is not meant to conflict with the contractors' designation as co-operators but rather is based on the contractors' contractual status with the DOE-RL and DOE-ORP.

Hanford Facility operating TSD units operate in accordance with interim status until incorporated in the Permit Based on the Tri-Party Agreement and Permit Condition I.A.1. Reference to the Permit in the remainder of this document refers to the most recent revision, unless otherwise specified.

The Permit documentation submitted by the Permittees includes a General Information Portion (DOE/RL-91-28), certain Permit Attachments, and unit-specific documentation. The scope of the unit-specific documentation includes individual, 'final status operating' TSD units for which Permit documentation has been, or is anticipated to be, submitted (refer to DOE/RL-91-28, Chapter 1.0). Documentation for TSD units 'undergoing closure', or for units that are, or are anticipated to be, 'dispositioned through other options', will continue to be submitted by the Permittees in accordance with

the provisions of the Tri-Party Agreement. However, the scope of the General Information Portion includes information that could be used to discuss 'final status operating' units, units 'undergoing closure', or units being 'dispositioned through other options'. Alternatives for addressing Hanford Facility TSD units are identified as follows:

- 'Final status operating' TSD unit (Part B Permit documentation referred to for both TSD units in Part III and TSD units in the process of being incorporated into Part III of the Permit)
- TSD unit 'undergoing closure'
  - Clean closure (closure plan documentation)
  - Background closure (closure plan documentation)
  - Modified closure (closure/postclosure plan and postclosure Permit documentation)
  - Closure as a land disposal unit (closure/postclosure plan and postclosure Permit documentation)
  - Integrated Closure in conjunction with an operable unit (in accordance with Tri-Party Agreement, §5.5 and §6.1).
- TSD unit 'dispositioned through other options'
  - Procedural closure (in accordance with Tri-Party Agreement, §6.3.3 or in response to withdrawal requests submitted in fulfillment of Tri-Party Agreement Milestone M-20-45)
  - Facility decommissioning process (in accordance with Tri-Party Agreement, §8.0)
  - TSD unit subject to the closure work plan/closure plan process in accordance with Tri-Party Agreement, §8.0.

2.1.1 Facility Description [B-1a]

This section includes a general description and/or discussion of the following:

- Hanford Site
- Hanford Facility
- Hanford Facility permitting
- Hanford Site Missions
- Description of dangerous waste management operations and processes
- Other processes regulated under WAC 173-303.

2.1.1.1 Hanford Site

The Hanford Site covers approximately 1,450 square kilometers of semiarid land that is owned by the U.S. Government and managed by the DOE-RL and DOE-ORP. The city of Richland adjoins the southeastern most portion of the Hanford Site boundary and is the nearest population center.

In early 1943, the U.S. Army Corps of Engineers selected the Hanford Site as the location for plutonium production for national defense. For over 20 years, activities were primarily dedicated to the continuation of plutonium production and managing the waste generated. In later years, activities became increasingly diverse, involving research and development for advanced reactors and renewable energy technologies. The end of the Cold War brought the shutdown of most of the Hanford Site's plutonium production and management facilities. Current missions are to safely clean up and manage the legacy waste on the Hanford Site, and to develop and deploy science and technology.

The Hanford Site is divided into numerically designated areas. These areas served as the location for reactor, chemical separation, and related activities for the production and purification of special nuclear materials and other nuclear activities. The reactors are located along the Columbia River in the 100 Areas. The reactor fuel reprocessing units are in the 200 Areas, which are on a plateau approximately 11 kilometers from the Columbia River. The 300 Area, located adjacent to and north of Richland, contains the reactor fuel manufacturing plants, the research and development laboratories, and the

Environmental and Molecular Sciences Laboratory. The 400 Area, 8 kilometers northwest of the 300 Area, contains the Fast Flux Test Facility designed for testing liquid metal reactor systems. The 600 Area covers all locations not specifically given an area designation. In addition to these Hanford Facility locations, DOE manages two main locations off the Hanford Facility. The first location, to and north of Richland, is the Richland Industrial Center (formerly the 1100 Area), which contains offices associated with administration, maintenance, transportation, and materials procurement and distribution. The second location is the 700 Area, which is in downtown Richland, which contains offices.

Where general information for the Hanford Site is discussed in this document, such information also applies to the Hanford Facility, unless otherwise designated.

2.1.1.2 Hanford Facility

The boundary of the Hanford Facility includes the contiguous portion of the Hanford Site that contains dangerous waste TSD units owned by the U.S. Government and operated by the DOE-RL and DOE-ORP. This portion of the Hanford Site is shown in Figure 2.1. A legal description for this portion of the Hanford Site is provided in DOE/RL-91-28, Appendix 2C. The legal description excludes lands north and east of the Columbia River, river islands, lands under the exclusive jurisdiction or control by the Bonneville Power Administration, lands leased to Energy Northwest, and lands owned by or leased to Washington State).

Exclusion of the noted lands is based on the following rationale. The lands north and east of the Columbia River contain no TSD units. These lands are under consideration for non-U.S. DOE use and for ownership transfer (DOE/EIS-0222). In addition, the DOE-RL has no control over Bonneville Power Administration lands or lands that are owned by or leased to Washington State (e.g., US Ecology site). The U.S. Department of Energy lands leased to Energy Northwest are to be covered by a separate dangerous waste permit if necessary and, therefore, are not included in the Permit. The legal description of the Hanford Facility is based on this rationale and is consistent with the facility definition provided to Ecology in 1994, with one exception. This exception covers the addition of land now occupied by the Environmental and Molecular Sciences Laboratory.

Depending on context, the term 'facility', as used in this Permit documentation, also could refer to building nomenclature. In this context, the term 'facility' either remains un-capitalized or as part of the title for various TSD units.

2.1.1.3 Hanford Facility Permitting

This section describes the permitting approach for the Hanford Facility. This approach accommodates requirements established by applicable regulations and authorities, the Tri-Party Agreement, the Permit, and permitting documentation. As noted in the Introduction and Definition Sections of the Permit, the Permit is intended to be consistent with the terms and conditions of the Tri-Party Agreement. Coordination with the Tri-Party Agreement is addressed in Permit Condition I.A.3.

2.1.1.3.1 Applicable Regulations and Authorities

The requirements of RCRA and the *State of Washington Hazardous Waste Management Act* (as administered through WAC 173-303) pertain to all Hanford Facility units that were used to treat, store, and/or dispose of hazardous waste on or after November 19, 1980; State-only dangerous waste on or after March 12, 1982; mixed waste on or after August 19, 1987; and units at which such waste will be treated, stored, and/or disposed in the future, except as provided by WAC 173-303-200 and WAC 173-303-802.

'Dangerous waste' means hazardous, dangerous, or extremely hazardous waste as defined by RCRA and/or WAC 173-303 (refer to Appendix 2B of this document). 'Mixed waste' means waste that contains both dangerous and radioactive components (Appendix 2B). The radioactive component of mixed waste

is interpreted by the U.S. Department of Energy to be regulated under the *Atomic Energy Act*; the nonradioactive dangerous component of mixed waste is interpreted to be regulated under RCRA and WAC 173-303. Please note that source, special nuclear and by-product materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at DOE facilities exclusively by DOE acting pursuant to its AEA authority. These materials are not subject to regulation by the State of Washington. All information contained herein and related to, or describing AEA-regulated materials and processes in any manner may not be used to create conditions or other restrictions set forth in any permit, license, order, or any other enforceable instrument. DOE asserts that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear and by-product materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

'Final status operating' TSD units include, but are not limited to, tank systems, surface impoundments, container storage areas, containment buildings, landfills, and miscellaneous units that were, are, or are anticipated to be, involved in dangerous and/or mixed waste activities. The scope of the unit-specific documentation is limited to individual 'final status operating' TSD units, which Part B Permit documentation has been, or is anticipated to be, submitted. However, the scope of the General Information Portion includes information that could be used to discuss 'final status operating' units, units 'undergoing closure', or units being 'dispositioned through other options'. Unit-specific documentation for TSD units 'undergoing closure', or for units that are, or are anticipated to be, 'dispositioned through other options', will continue to be submitted by the Permittees in accordance with the provisions of the Tri-Party Agreement.

In accordance with the stepwise RCRA permitting process defined for the Hanford Facility in the Tri-Party Agreement and Permit Condition I.A.1, those TSD units that are not yet incorporated into the Permit will continue to operate under interim status. Interim status capacity expansion of the Hanford Facility is in accordance with the provisions of WAC 173-303-281, as applicable, and WAC 173-303-805(7). Construction under final status for new TSD units is also occurring at the Hanford Facility.

Dangerous waste and the dangerous waste component of mixed waste on the Hanford Facility are subject to land disposal restrictions (LDR) (40 CFR 268 and WAC 173-303-140). Ecology has received authorization from the EPA to administer certain LDR provisions of RCRA pursuant to §3006 and those provisions operate in lieu of federal requirements. For other LDR requirements implementation refer to Tri-Party Agreement Action Plan, §6.1.

2.1.1.3.2 Hanford Federal Facility Agreement and Consent Order

The Tri-Party Agreement, as initially established in 1989 and subsequently amended, is a legal document covering Hanford Site environmental compliance and restoration and remediation activities. Reference to the Tri-Party Agreement in this document refers to the most recent amendment of the document, unless specified otherwise. The Tri-Party Agreement is divided into two parts, the Agreement and Consent Order and the Action Plan.

Purposes of the Tri-Party Agreement as related to RCRA permitting include the following:

- To provide a framework for permitting TSD units and to promote an orderly, effective investigation and cleanup of contamination on the Hanford Site
- To ensure compliance with the RCRA and the *State of Washington Hazardous Waste Management Act* for TSD units, including requirements covering permitting, compliance, closure, and postclosure care

- To establish a procedural framework and schedule for developing, prioritizing, implementing, and monitoring appropriate response actions on the Hanford Site in accordance with the CERCLA, the National Contingency Plan, the Superfund guidance and policy, RCRA, and RCRA guidance and policy

- To identify TSD units that require permits; to establish schedules to achieve compliance with interim and final status requirements and to complete Permit documentation for such units in accordance with the Tri-Party Agreement Action Plan; to identify TSD units that will undergo closure; to close such units in accordance with applicable laws and regulations; to require postclosure care where necessary; and to coordinate closure with any inter-connected remedial action on the Hanford Site

- To minimize the duplication of analysis and documentation.

The Tri-Party Agreement Action Plan, an enforceable part of the Tri-Party Agreement, establishes methods, procedures, and plans for (1) compliance, permitting, and closure under the RCRA and the *State of Washington Hazardous Waste Management Act* and (2) cleanup of the Hanford Site under CERCLA and RCRA corrective action provisions. The Tri-Party Agreement Action Plan also specifies which regulatory agency (i.e., either Ecology or EPA) has lead regulatory agency responsibility.

Tri-Party Agreement Action Plan, Appendix B, contains a listing of Hanford Facility TSD units. In accordance with Tri-Party Agreement Action Plan, §5.3, any additional TSD units that are identified are to be added to Tri-Party Agreement Action Plan, Appendix B. Tri-Party Agreement Action Plan, §2.4, and Appendix D include the identification of major milestones established to achieve compliance with RCRA and WAC 173-303 TSD requirements. Such milestones (M) include those for submittal of Part B, closure plan, closure/postclosure plan, and withdrawal request documentation (e.g., M-20-00,M-45-06, M-24-00), and RCRA past-practice site investigations and remedial actions (e.g., M-13, M-15, M-16).

Tri-Party Agreement Action Plan, §6.2, the permitting process for individual TSD units that comprise the Hanford Facility is described. Figure 2.3, was adapted from Tri-Party Agreement Action Plan, §6.2, which depicts the process for dangerous waste permitting documentation for 'final status operating' TSD units by the Permittees. This process applies to existing TSD units, units subject to interim status capacity expansion, and new units (i.e., units that do not have interim status and must have a permit before construction). The process for TSD units 'undergoing closure' is addressed in §2.5. Figure 2.3, was adapted from Tri-Party Agreement Action Plan, §6.3, which depicts a flowchart for processing closure plan documentation.

The review of each submittal to the regulator is to be conducted in accordance with a process supported by the development of working drafts, project manager meetings, and workshops. In accordance with Tri-Party Agreement Action Plan, §4.1, project manager meetings are held to discuss progress, address issues, and review plans pertaining to a specific TSD unit. These meetings are held monthly, unless the project managers for the parties (DOE-RL, Ecology, and/or the EPA) agree that a meeting is not appropriate. Workshops also are held between the Permittees and the regulators, on an as-needed basis, to address and resolve comments associated with the working drafts.

At the end of the review and comment response process, final documentation is readied for a 'final status operating' TSD unit and serves as the basis for incorporation of that unit into part III of the Permit. For example, after the unit-specific documentation is submitted by the Permittees, a final Permit decision will be made by Ecology pursuant to WAC 173-303-840. Ecology will draft unit-specific Permit Conditions for this TSD unit to be incorporated into Part III of the Permit during an agency iniated Permit modification (refer to §2.1.1.3.3). A process flowchart for modification of the Permit is included as Figure 2.4.

A similar documentation finalization process is in place for TSD units 'undergoing closure' (Figure 2.3), and is discussed in more detail in §2.5. A closure/postclosure plan, or postclosure Permit documentation is to be developed for most of these TSD units in accordance with Tri-Party Agreement Action Plan, §2.4, §5.3, §6.3, §8.0, and Appendix D

Procedural closure is used for those units that were classified as being TSD units, but actually were never used to treat, store, or dispose of hazardous waste on or after November 19, 1980; State-only dangerous waste on or after March 12, 1982; and mixed waste on or after August 19, 1987, except as provided by WAC 173-303-200 or WAC 173-303-802. Procedural closure is discussed in more detail in §2.5.1.3.

2.1.1.3.3 Hanford Facility Permit

The Permit is divided as follows:

Part I: Standard Conditions. Part I contains Permit Conditions that are similar to those appearing in other dangerous waste permits issued by Ecology.

Part II: General Facility Conditions. Part II combines typical dangerous waste Permit Conditions with those conditions intended to address issues specific to the Hanford Facility. Where appropriate, the General Facility Permit Conditions apply to all final status dangerous waste management activities on the Hanford Facility. Certain General Facility Permit Conditions address dangerous waste management activities associated with areas between TSD units identified in Permit Attachment 3, Permit Applicability matrix, Category D (e.g., training, contingency planning).

Part III: Unit-Specific Permit Conditions for Final Status Operations. Part III contains those Permit requirements that apply to each individual TSD unit operating under final status. Permit Conditions for each TSD unit are found in a Permit chapter dedicated to that TSD unit. These unit-specific Permit chapters contain references to Standard and General Facility Permit Conditions (Parts I and II), as well as additional requirements that are intended to ensure that each TSD unit is operated in an efficient and environmentally protective manner. The Permittees submit the unit-specific documentation that serves as the basis for Part III chapters of the Permit.

Part IV: Corrective Actions for Past-Practices Activities. Part IV of the Permit contains those requirements that apply to corrective action of solid waste management units (SWMUs) on the Hanford Facility, and for conducting investigations and remediations at such SWMUs. Further discussion of SWMUs is contained in §2.5. In addition, Permit Condition II.Y contains conditions on corrective action. Permit Conditions for solid waste management units are found in a Permit chapter dedicated to solid waste management unit(s) or an operable unit.

Part V: Unit-Specific Permit Conditions for TSD Units Undergoing Closure. Part V contains those requirements that apply to specific TSD units undergoing closure. Requirements for each TSD unit undergoing closure are found in a Permit chapter dedicated to that TSD unit or multiple TSD units. These unit-specific Permit chapters could contain references to Standard Permit Conditions (Part I) and General Facility Permit Conditions (Part II), and additional requirements that are intended to ensure that each TSD unit is closed in an efficient and environmentally protective manner. Further discussion of the permitting process for TSD units 'undergoing closure' is contained in §2.5.

Part VI: Unit-Specific Permit Conditions for Units in Postclosure. Part VI contains requirements that apply to those specific TSD units that have completed closure requirements (refer to DOE/RL-91-28, §11.1.1) and need to meet postclosure standards. As set out in Tri-Party Agreement Action Plan, §5.3, certain TSD units will be permitted for postclosure care pursuant to WAC 173-303. Requirements for each TSD unit or a combination of TSD units undergoing postclosure care are found in a Permit chapter, within Part VI, dedicated to that unit(s). These unit-specific Permit chapters could contain references to

Standard Permit Conditions (Part I) and General Permit Conditions (Part II), as well as the unit-specific Permit Conditions.

The Permit Conditions are applied to the Hanford Facility as defined by Attachment 3, Permit Applicability Matrix referenced in Permit Condition I.A.1.b.

The Permit is organized to allow a stepwise permitting process as defined in the Tri-Party Agreement. As TSD unit-specific documentation, is finalized by the Permittees, and approved by Ecology, additional unit-specific Permit Conditions are incorporated into the Permit through the Permit modification process.

After unit-specific actions contained in Parts III through VI have been completed and accepted by Ecology, the Permittees will submit a Class 1 Permit modification requesting that the Permit chapter and any associated attachments be retired. Once retired, the unit-specific documentation will be found in the Administrative Record.

The permit modification process is outlined in Figure 2.4. A Permit modification does not affect the 10-year term of the Permit (Permit Condition I.C.1), unless the Permit is revoked and reissued under WAC 173-303-830(3), or terminated under WAC 173-303-830(5), or continued in accordance with WAC 173-303-806(7). In accordance with the stepwise permitting process, only those portions of the Permit newly proposed for incorporation would be open to public comment. Revocation and reissuance means the existing Permit is revoked and an entirely new Permit is issued, to include all TSD units permitted as of that date. In this case, all Permit Conditions to be reissued would be open to public comment and a new term would be specified for the reissued Permit.

2.1.1.3.4 Hanford Facility Permit

The Permit documentation submitted by the Permittees includes a General Information Portion (DOE/RL-91-28), certain Permit Attachments, and unit-specific documentation. The scope of the unit-specific documentation includes individual, 'final status operating' TSD units for which Permit documentation has been, or is anticipated to be, submitted (refer to Chapter 1.0). Documentation for TSD units 'undergoing closure', or for units that are, or are anticipated to be, 'dispositioned through other options', will continue to be submitted by the Permittees in accordance with the provisions of the Tri-Party Agreement. However, the scope of the General Information Portion includes information that could be used to discuss 'final status operating' units, units 'undergoing closure', or units being 'dispositioned through other options'.

Both the General Information Portion and Part III unit-specific documentation of the Permit address the contents of the documentation requirements prepared by Ecology (Ecology 1996). Both the General Information Portion and the TSD units in Part III are organized as follows:

- Foreword
- Contents
- Chapter 1.0: Part A [A]
- Chapter 2.0: Facility Description and General Provisions [B and E]
- Chapter 3.0: Waste Analysis [C]
- Chapter 4.0: Process Information [D-1 through D-8]
- Chapter 5.0: Groundwater Monitoring[D-10]
- Chapter 6.0: Procedures to Prevent Hazards [F]
- Chapter 7.0: Contingency Plan [G]
- Chapter 8.0: Personnel Training [H]
- Chapter 9.0: Exposure Information Report
- Chapter 10.0: Waste Minimization [D-9]
- Chapter 11.0: Closure and Financial Assurance [I]
- Chapter 12.0: Reporting and Recordkeeping

- Chapter 13.0: Other Federal and State Laws [J]
- Chapter 14.0: Part B Certification [K]
- Chapter 15.0: References
- Appendices as necessary to support individual chapters.

Documentation contained in the General Information Portion is broader in nature and generally applies to multiple TSD units included in the unit-specific documentation. Where appropriate, the unit-specific documentation makes cross-reference to the General Information Portion, rather than duplicating text. The regulators could use the General Information Portion as a source for both unit-specific and General Permit Conditions. However, only portions of the General Information Portion (DOE/RL-91-28) are enforceable, as noted in the Permit, List of Attachments, *[O]nly 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 Condition I.C.3.* The intent of the General Information Portion is: (1) to provide an overview of the Hanford Facility; and (2) to assist in streamlining efforts associated with TSD unit-specific documentation, and the Permit modification process.

2.1.1.4 Description of Dangerous Waste Management Operations and Processes

A brief description of dangerous waste management operations and processes for Hanford Facility TSD units is contained in §2.5 (for units 'undergoing closure' or being 'dispositioned through other options') and in DOE/RL-91-28, §4.1 (for 'final status operating' units). Additional detail for 'operating' TSD units is contained in the unit-specific documentation.

2.1.1.5 Other Processes Regulated Under the Dangerous Waste Regulations

Other Hanford Site processes or activities regulated under Ecology's *Dangerous Waste Regulations* include recycling (e.g., WAC 173-303-017, -120, -500), generator activities [e.g., WAC 173-303-170), treatment-by-generator (WAC 173-303-170(3)(b)], transport (e.g., WAC 173-303-240), permits by rule (e.g., WAC 173-303-802), and research, development, and demonstration (RD&D) permits (WAC 173-303-809). The activities in this section are not included within the scope of this documentation or of the Permit, except where specific language has been included in the Permit.

2.1.2 Construction Schedule [B-1b]

This section addresses the scheduling of construction of new TSD units, or the remodeling of existing units, and the timing of associated permitting activities. Discussions in this section are general, and are based primarily on information contained in WAC 173-303-335, the Tri-Party Agreement, and in U.S. DOE Orders addressing design and construction processes.

Existing provisions of the Tri-Party Agreement serve as a means for the timely dissemination to the regulators of construction and associated permitting information that can be used for scheduling purposes. Articles XL and XLVIII of the Tri-Party Agreement outline provisions for DOE to provide cost, schedule, and scope planning and reporting information to Ecology and the EPA. Such information identifies construction activities and schedules related to existing or planned TSD units. In some cases, as outlined in Tri-Party Agreement Action Plan, §2.0, §11.0, and Appendix D, construction commitments are associated with Tri-Party Agreement milestones and are tracked as part of milestone activities. Project manager meetings also are used to discuss planned construction, permitting activities, and required timeframes.

Several U.S. DOE Orders establish requirements for the planning and scheduling of construction activities. Requirements to be addressed depend on several factors, including the cost and function of a proposed project. Figure 2.5 provides a generic project schedule keyed to the project process outlined in U.S. DOE Orders. This schedule also illustrates general timeframes for associated permitting documentation. Figure 2.5 illustrates that detailed design information, sufficient to fulfill Part B

documentation needs, might not be available until 1 to 2 years before the start of construction. In general, the final status permitting process for a TSD unit of moderate complexity takes at least 3 years. Thus, if a final status permit is required before the initiation of construction, construction delays could be incurred. If such construction is associated with TSD units that are not yet incorporated into the Permit, delays could be avoided by proceeding with construction under interim status or interim status capacity expansion (WAC 173-303-281, -805; refer to §2.1.1.3.1). The granting of interim status capacity expansion will be considered on a case-by-case basis, in accordance with WAC 173-303-281, as applicable, and WAC 173-303-805(7). Otherwise, the TSD units will be incorporated into the Permit with available information and construction will occur under final status requirements.

The generic project schedule shown in Figure 2.5 might not be applicable to TSD units on the Hanford Facility subject to privatization.

2.2 TOPOGRAPHIC MAP [B-2]

This section addresses general topographic map requirements for the Hanford Facility and additional requirements for land disposal facilities.

2.2.1 General Requirements [B-2a]

Topographic map requirements in WAC 173-303 are as follows:

- Part A Permit Application [WAC 173-303-803(3)(l)]
- General Topographic map [WAC 173-303-806(4)(a)(xviii)]
- Regulated Unit Groundwater [WAC 173-303-806(4)(a)(xx)(C) and (4)(a)(xx)(D)(I)]
- Solid Waste Management Units [WAC 173-303-806(4)(a)(xxiii)(A)(I)]
- Known releases [WAC 173-303-806(4)(a)(xxiv)(A)(I)]

Due to the complexity of the Hanford Facility, topographic map requirements are met through the combination of the Hanford Facility topographic map (§2.2.1.1), 'final status operating' TSD unit topographic maps (§2.2.1.2, and §2.2.2), TSD unit illustrations and figures (§2.2.1.2 and §2.2.2), and other information used in conjunction with the topographic maps (§2.2.1.3 through §2.2.1.7). Because of the size of the Hanford Facility, DOE/RL-91-28, Appendix 2A uses a scale of 1-inch equals 1,000 feet (1cm equals 120 meters).

2.2.1.1 Hanford Facility

Drawings in DOE/RL-91-28, Appendix 2A provide a general overview of the Hanford Site and surrounding area. The drawing illustrates the following:

- Boundary of the Hanford Site (for area shown)
- Contours sufficient to show surface water flow
- Fire control services
- Intake and discharge structures
- Access roads, internal roads, railroads, perimeter gates, and barricades
- The location of all surface water bodies
- The location of all industrial related activity

Injection well locations are found outside of Permit documentation. In compliance with WAC 173-218, the location of all injection wells on the Hanford Site has been registered with Ecology. The location of more than 200 active Class V underground injection wells have been identified and incorporated in the State of Washington UIC database. There are currently over 400 Class V underground injection wells (active and inactive) registered with Ecology.

2.2.1.2 Treatment, Storage, and Disposal Units

Specific location maps or figures for Hanford Facility TSD units have been incorporated into Parts III through VI of the Permit. As a result, the following information has been incorporated into the Permit in one or more maps or figures for each of these units:

- Map scale and date (where appropriate, Part III units only)
- Map orientation
- Location of the unit
- Access road location(where appropriate, Part III units only)
- Access control(where appropriate, Part III units only)
- Loading and unloading areas (Part III units only)
- Buildings and the location of all operational facilities within the TSD boundaries (Part III units only)
- Other Structures (e.g., sewers, loading and unloading areas) within the TSD boundaries (Part III units only).
- Groundwater information for regulated units (Refer to §2.2.2).

Injection well locations are found outside of Permit documentation in accordance with §2.2.1.1.

2.2.1.3 Prevailing Wind Directions

Prevailing wind directions across the Hanford Site are presented in Figure 2.6. Prevailing wind directions in the 200 East and 200 West Areas (located approximately in the center of the Hanford Site) are from the northwest in all months of the year. Secondary maxima occur for southwesterly winds.

Monthly average wind speeds are lowest during the winter months, averaging 9.7 to 11.3 kilometers per hour and highest during the summer, averaging 14.5 to 16.1 kilometers per hour. Wind speeds that are well above average usually are associated with southwesterly winds. However, the summertime drainage winds generally are northwesterly and frequently reach 50 kilometers per hour. Information on the likelihood and frequency of strong winds and tornados in the region has been summarized in a final environmental impact statement (DOE/EIS-0113).

2.2.1.4 Floodplain Area

Three sources of potential flooding of the Hanford Facility are considered: (1) the Columbia River, (2) the Yakima River, and (3) storm-induced run-off in ephemeral streams draining the Hanford Facility. No perennial streams occur in the central part of the Hanford Facility. However, Cold Creek is an intermittent or ephermal stream that exists along Highway 240 during periods of extreme precipitation.

The Federal Emergency Management Agency has not prepared floodplain maps for the Columbia River through the Hanford Site. The flow of the Columbia River is largely controlled by several upstream dams that are designed to reduce major flood flows. Based on a U.S. Army Corps of Engineers study of the flooding potential of the Columbia River that considered historic data and water storage capacity of the dams on the Columbia River (COE 1969), the U.S. DOE (RLO-76-4) has estimated the probable maximum flood (Figure 2.7). The estimated probable maximum flood would have a larger floodplain than either the 100- or the 500-year floods.

The 100-year floodplain for the Yakima River, as determined by the Federal Emergency Management Agency (FEMA 1980), is shown in Figure 2.8.

The only other potential source of flooding of the Hanford Facility is run-off from a large precipitation event in the Cold Creek watershed. This event could result in flooding of the ephemeral Cold Creek. PNNL (PNL-4219) has given an estimate of the probable maximum flood using conservative values of precipitation, infiltration, surface roughness, and topographic features. The 100-year flood is less than the

probable maximum flood as shown in Figures 2.7 and 2.8.

The location of individual 'operating' TSD units with respect to the identified floodplains is addressed in the unit-specific portion.

2.2.1.5 Surrounding Land Use

A figure showing the surrounding land use is provided as Figure 2.10. In support of surrounding land use, no public water supplies including public drinking water wells were found to be located within 1/4 mile of the Hanford Facility Boundary shown in Figure 2.1. The land surrounding the Hanford Facility is designated agricultural with the exception of the land adjacent to the Hammer Facility, which is designated industrial. Other than public drinking water wells, injection wells, and regulated unit groundwater monitoring wells, wells and springs within a ¼ mile of the Hanford Facility boundary will be evaluated on a case-by-case basis for individual TSD units.

2.2.1.6 Solid Waste Management Units and Known Releases

Information on Solid Waste Management Units and Known Spills is provided in DOE/RL-91-28, Appendix 2D.

2.2.1.7 Other Buildings and Structures

In addition to the location of buildings and structures on the unit-specific topography maps identified in Part III of the Permit, the location of other prominent buildings and structures is provided in the series of area maps found in DOE/RL-91-28, Appendix 2A.

2.2.2 Additional Requirements for Land Disposal Facilities [B-2b]

In addition to the unit-specific information discussed in §2.2.1.2, for regulated units, the following information will be incorporated into the 'final status operating' unit-specific topographic map, illustrations, or other suitable maps or figures (contingent upon scale)

- A delineation of the waste management area if the waste management area is different from the TSD unit(s) boundary
- Proposed point of compliance for groundwater monitoring networks
- Proposed groundwater monitoring well locations.
- Unit-specific contaminant plumes and extent of the plume. Regional contaminant plumes are generally mapped in Hanford's annual Groundwater Monitoring reports (e.g., PNNL-14187), but unit-specific contaminant plumes are provided in the unit-specific groundwater documentation for the regulated unit.
- In addition, the following required information for regulated units is provided in DOE/RL-91-28, Chapter 5.0. Locations of the uppermost aquifer and the discussion on aquifers hydraulically interconnected beneath the unit (including flow direction and rate)
- An overview of the groundwater contamination from dangerous constituents.

2.3 SEISMIC CONSIDERATION [B-3]

The Hanford Facility is located in Zone 2B as identified in the *Uniform Building Code* (ICBO 1991). For a proposed TSD unit or an expansion of an existing unit, a demonstration that the unit is designed to withstand the maximum horizontal acceleration of the "design earthquake" for Zone 2B will be made in the unit-specific portion.

No active faults, or evidence of a fault that has had displacement during Holocene times, have been found on the Hanford Facility (DOE/RE-0164). The youngest faults recognized on the Hanford Facility occur on Gable Mountain, approximately 1.6 kilometers north of the 200 East Area, and 7.2 kilometers northeast of the 200 West Area. These faults are of Quaternary age and are considered 'capable' by the U.S. Nuclear Regulatory Commission (NUREG-0892).

2.4 TRAFFIC INFORMATION [B-4]

The regional public highway network traversing the Hanford Site (Washington State Highways 24 and 240), nonrestricted access roadways (Route 10, and portions of Route 4S located south of the Wye Barricade), and restricted access roadways are shown in Figure 2.9.

Roadways east of the Yakima Barricade and north of the Wye Barricade, and within the 300 and 400 Areas, are restricted to authorized personnel only. Other U.S. DOE roadways are subject to such restrictions or closure as the U.S. DOE might require.

2.4.1 Hanford Site Roadways

Figure 2.9 shows the major roads throughout the Hanford Site. These roads are classified as either primary or secondary routes. The primary routes include Routes 4S, 10, 2S, 3, 6, and 11A, as well as various avenues within each area. The primary routes are constructed of bituminous asphalt (usually 5-centimeters thick, but the thickness of the asphalt layer will vary with each road) with an underlying aggregate base in accordance with U.S. Department of Transportation requirements. The secondary routes are constructed of layers of an oil and rock mixture with an underlying aggregate base. The aggregate base consists of various types and sizes of rock found onsite. The present load-bearing capacities of these roads are unknown; however, loads as large as 9.8 kilograms per square centimeter have been transported without observable damage to road surfaces. All roads originally were constructed to meet the requirements for the American Association of State Highway and Transportation Officials HS-20-44 load rating (AASHTO 1983). An HS-20-44 loading represents a two-axle tractor (front axle loading of 3,630 kilograms and rear axle loading of 14,500 kilograms) plus a single-axle trailer with a 14,500-kilogram axle loading.

2.4.2 Traffic Control Signs, Signals, and Procedures

Standard traffic control signs are used throughout the Hanford Site (e.g., octagonal stop signs, triangular yield signs). Speed limits are posted throughout the Hanford Site, and the maximum-posted speed is 88 kilometers per hour on major thoroughfares. Inside the various areas, posted speeds are reduced to a maximum of 56 kilometers per hour and held to speeds as low as 24 kilometers per hour.

2.5 WASTE MANAGEMENT UNITS

The Tri-Party Agreement classifies and outlines the approach for addressing over 2,000 waste management units on the Hanford Site. The classification of Hanford Site waste management units is illustrated in Figure 2.11 and includes the following:

- Solid waste management units
  - ' Final status operating' TSD units
  - TSD units 'undergoing closure'
    - Non-land disposal TSD units
    - Land disposal TSD units
  - Past-practice units
    - RCRA past-practice
    - CERCLA past-practice
  - Other Solid Waste Management Units (SWMUs)

- Other waste management units
  - Facilities subject to decommissioning
  - Miscellaneous waste management units.

The remainder of this section briefly addresses these classes of waste management units, with the exception of ' final status operating' TSD units. 'Final status operating' TSD units are addressed in DOE/RL-91-28, §4.1.

2.5.1 Solid Waste Management Units [E]

A SWMU is any discernable location at a facility, as defined for the purposes of corrective action, where solid wastes have been placed at any time, irrespective of whether the location was intended for the management of solid or dangerous waste. Such locations include any area at a facility that has routinely and systematically released solid wastes, including spills. Such units include regulated units as defined by chapter 173-303 WAC. The requirements to address corrective action have been incorporated into the Permit. The Hanford Site contains over 1,100 SWMUs. The remainder of this section, as well as DOE/RL-91-28, Appendix 2D, provides an overview of Hanford Site SWMUs, with the exception of 'final status operating' TSD units.

The Tri-Party Agreement Action Plan defines a TSD as:

A RCRA term referring to the treatment, storage, or [and/or] disposal of hazardous waste. Under RCRA, TSD activity can occur only at units which received or stored hazardous waste after November 19, 1980, the effective date of the RCRA regulations (refer to §2.1.1.3.1).

Furthermore, the Tri-Party Agreement Action Plan defines a TSD unit as:

"a unit used for treatment, storage, or [and/or] disposal of hazardous waste and is required to be permitted and/or closed pursuant to RCRA requirements as determined in this Action Plan."

Figure 2.3 depicts a flowchart for processing closure documentation. In accordance with Tri-Party Agreement Action Plan, §5.3, all TSD units that undergo closure, irrespective of permit status, will be closed in accordance with WAC 173-303-610. Permit Conditions for TSD units undergoing closure are contained in Parts V of the Permit. Refer to DOE/RL-91-28, Chapter 11.0 for a discussion of closure options at the Hanford Facility. Where applicable, postclosure Permit documentation will contain a description of modified closure institutional controls, a description of the landfill final cover, cover maintenance and inspection, groundwater monitoring, and corrective actions if required, that could occur during the postclosure period.

Where applicable, postclosure Permit documentation will contain a description of modified closure institutional controls, a description of the landfill final cover, cover maintenance and inspection, groundwater monitoring, and corrective actions if required, that could occur during the postclosure period.

2.5.1.1 Past-Practice Units

Tri-Party Agreement Action Plan, §3.3, defines a 'past-practice unit' as a waste management unit where waste or substances (intentionally or unintentionally) have been disposed and that is not subject to regulation as a TSD unit. Because of the relatively large number of past-practice units on the Hanford Site, a process has been established for organizing these units into groups called 'operable units'. The concept of operable units is to group the numerous units (primarily by type, geographic area, and/or by process) into manageable components for investigation and remedial action and to prioritize the cleanup work to be done on the Hanford Site. Each of the operable units is to be subject to an investigation in the form of either a CERCLA or a RCRA past-practice process as described in Tri-Party Agreement Action Plan, §7.3 and §7.4, respectively.

As noted in Article III, Article IV, Article XXIV, and Article XXXII of the Tri-Party Agreement, and Tri-Party Agreement Action Plan, §3.3, §5.5, and §6.1, some TSD units 'undergoing closure', primarily land disposal units, will be investigated and managed in conjunction with past-practice units; these units have been assigned to appropriate operable units. Those TSD units not assigned to an operable unit are typically treatment or storage units that are likely to be 'clean closed' rather than closed as a land disposal unit (refer to DOE/RL-91-28, §2.5.1.1 and DOE/RL-91-28, Chapter 11.0). The Tri-Party Agreement encourages to the maximum extent possible that RCRA and CERCLA cleanup strategies be integrated. To this end, land disposal TSD units, e.g., ponds, cribs, trenches, retention basins, that are to be closed were identified as potential waste sites, in Tri-Party Agreement Action Plan, Appendix C, and assigned to operable unit for investigation and eventual remediation. The associated closure actions could be performed in conjunction with the remedial actions planned for the remaining waste sites in the operable unit.

This process to achieve integration of TSD unit closures and waste site remedial actions has been documented in DOE/RL-98-28, *200 Areas Remedial Investigation/Feasibility Study Implementation Plan–Environmental Restoration Program*. Closure information required for the TSD unit will be incorporated into the CERCLA response action documentation. A table can be provided showing the location of closure documentation or can be included as a separate attachment to a feasibility study or an engineering study/cost analysis.

Once the public review and comment period has been completed for the CERCLA documentation, then the closure information will be used to prepare a Part V Permit chapter and associated unit-specific Permit Attachment with the closure plan information. Since public review and comment has already been completed, the new Part V Permit chapter and appendix will be added to the Permit via a Class I modification.

Coordination of the remediation of past-practice operable units with TSD closures will enable RCRA TSD units located within past-practice operable units to have the same cleanup standards. This coordination will minimize the possibility of having different cleanup standards for coincident or adjacent parcels of land.

Permit Condition II.K, Soil and Groundwater Performance Standards also support the coordination approach spelled out in the Tri-Party Agreement Action Plan. Permit Condition II.K.7, specifies that, when agreed to by Ecology, integration of other statutorily or regulatory mandated cleanups could be accommodated by the Permit. Results from other cleanup investigation activities could be used whenever possible to supplement and/or replace TSD unit closure investigation activities. All, or appropriate parts of, multipurpose cleanup and closure documents could be incorporated into the Permit through the Permit modification process. Cleanup and closures conducted under any statutory authority with oversight by either Ecology or EPA, which meets the equivalent of the technical requirements of Permit Condition II.K, could be considered as satisfying the requirements of the Permit. Further discussion of Permit Condition II.K is contained in DOE/RL-91-28, Chapters 5.0 and 11.0.

2.5.1.2 Other Solid Waste Management Units

In accordance with the Permit, any SWMUs located on DOE-RL and DOE-ORP managed property are, or will be, included in the Tri-Party Agreement and assigned to operable units. The processes and procedures to be followed, and the schedules of compliance for investigation and subsequent remediation, will be contained in the Tri-Party Agreement. An example of a type of 'other SWMU' is inactive miscellaneous underground storage tanks.

The SWMUs not located on DOE-RL and DOE-ORP managed property will undergo investigations and remediations, as necessary, in accordance with the requirements and schedules identified in the Permit. Additional information on Hanford Site SWMUs is contained in DOE/RL-91-28, Appendix 2D.

2.5.2 Other Waste Management Units

Of the approximately 1,600 Hanford Site waste management units, approximately 470 are classified as 'other waste management units', rather than SWMUs (DOE/RL-88-30). These 'other waste management units' are comprised mainly of one-time spills to the environment, sanitary waste disposal facilities (i.e., septic tanks), and facilities managed or addressed by the Fluor Hanford or environmental restoration projects.

2.5.2.1 Facilities Subject to Decommissioning

This section addresses waste management units that could be handled under Tri-Party Agreement Action Plan, §8.0, Facility Decommissioning Process, or under the Permit. Tri-Party Agreement Action Plan, §8.0 defines an additional process for the identification and decommissioning of key Hanford facilities (e.g., PUREX Plant, Plutonium Finishing Plant, B Plant Complex, and Fast Flux Test Facility). Facilities that are fully dispositioned under the TSD unit closure process, or dispositioned in conjunction with an operable unit cleanup, are not addressed under Tri-Party Agreement Action Plan, §8.0. The TSD units subject to Tri-Party Agreement Action Plan, §8.0 have physical closure actions that need to be done in conjunction with the physical disposition actions in the facility (e.g., removal of structural components).

Tri-Party Agreement Action Plan, §8.0, enables DOE-RL, DOE-ORP, and the regulators to enter into negotiations for transition or disposition of key facilities within three months of a shutdown notice or decision to proceed with disposition, respectively. Provisions of this section enable the conduct of regulated and nonregulated work in an orderly sequence to ensure coordination with other cleanup actions. Within the Tri-Party Agreement Action Plan, §8.0, the processes, and key planning documents associated with the decommissioning phases of transition, surveillance and maintenance, and disposition are defined.

The nature of the decommissioning process has led DOE-RL, DOE-ORP, and the regulators to evaluate the timing of RCRA closure at key facilities. The phased decommissioning process, combined with other requirements, often makes completion of RCRA closure activities during the transition or surveillance and maintenance phases impracticable. In cases where timely completion of TSD unit closure is practicable, a complete closure plan will be prepared for implementation during the transition phase. In cases where physical conditions and/or unknowns prevent timely completion of closure, a preclosure work plan will be prepared for implementation during the transition phase. The preclosure work plan can detail actions to be completed during the transition phase to facilitate full RCRA closure in the future.

2.5.2.2 Miscellaneous Waste Management Units

Examples of miscellaneous waste management units are one-time spills to the environment and sanitary waste disposal facilities (i.e., septic tanks). The term 'miscellaneous waste management unit' used in this context is different from that defined in WAC 173-303-040 for a 'miscellaneous TSD unit'.

Figure 2.1. Hanford Facility Boundary
(DOE/RL-91-28. Appendix 2C, Legal Description

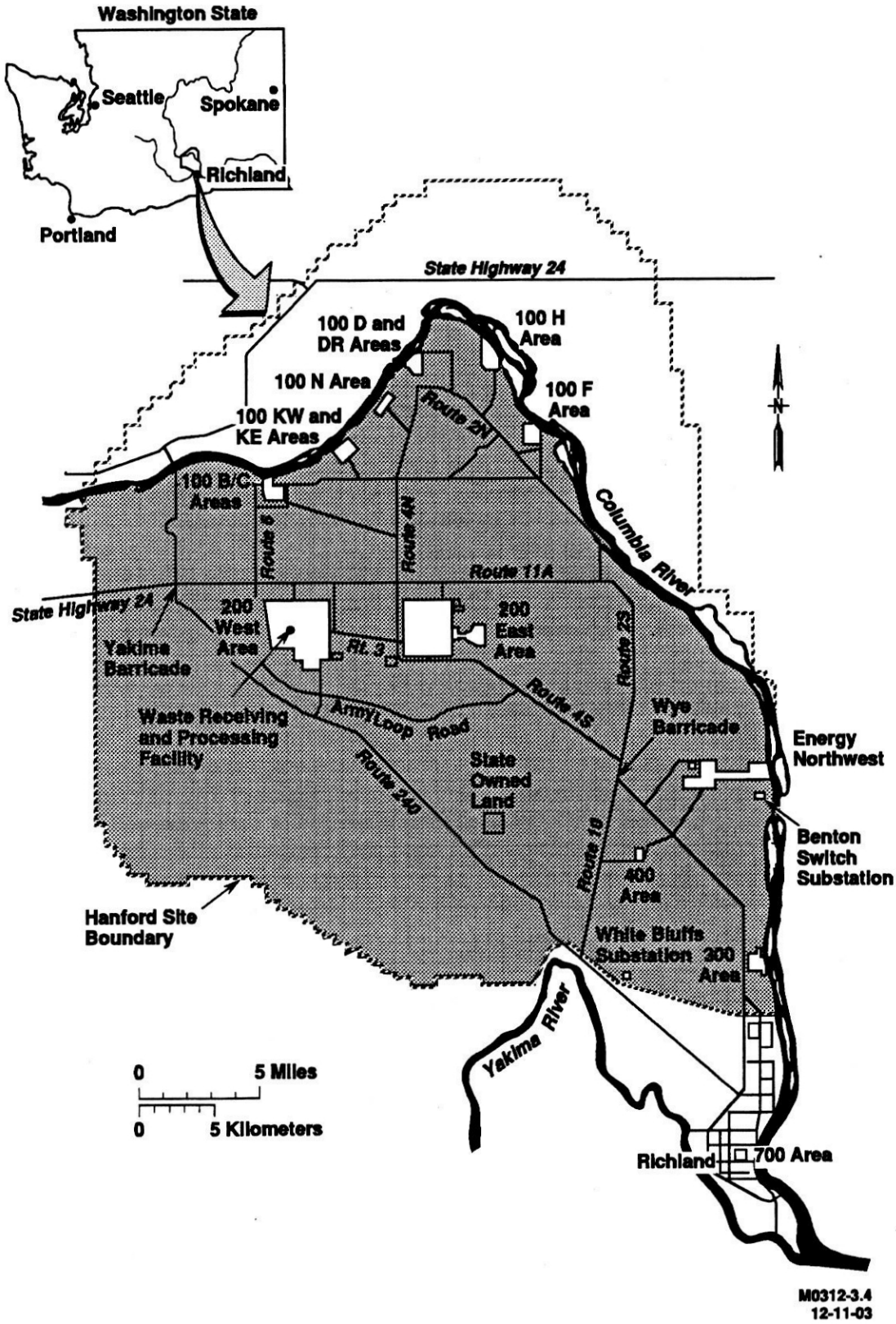


Figure 2.2. Permitting Process Flowchart
(Adapted from Tri-Party Agreement).

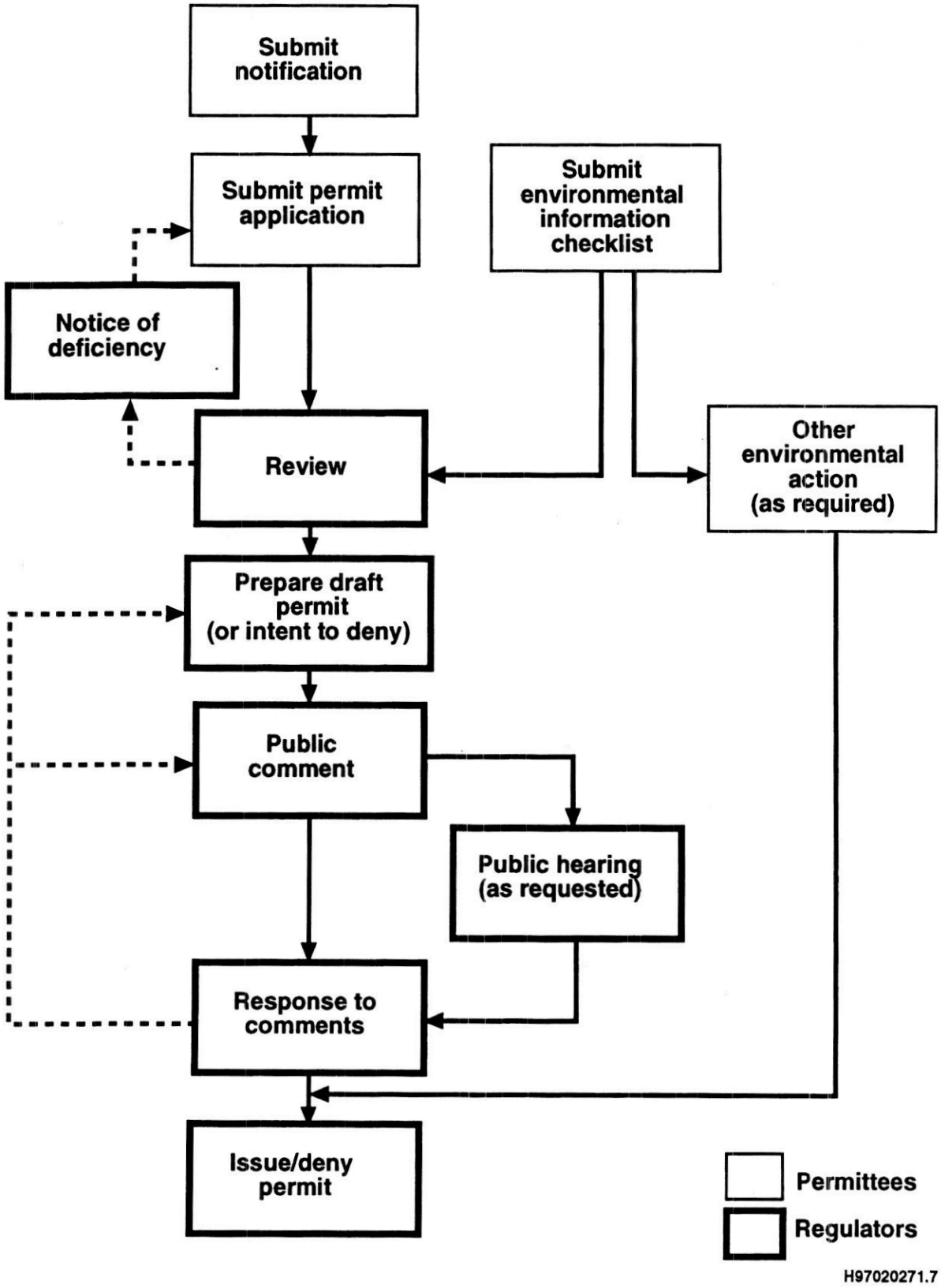


Figure 2.3. Closure Process Flowchart
(Adapted from Tri-Party Agreement)

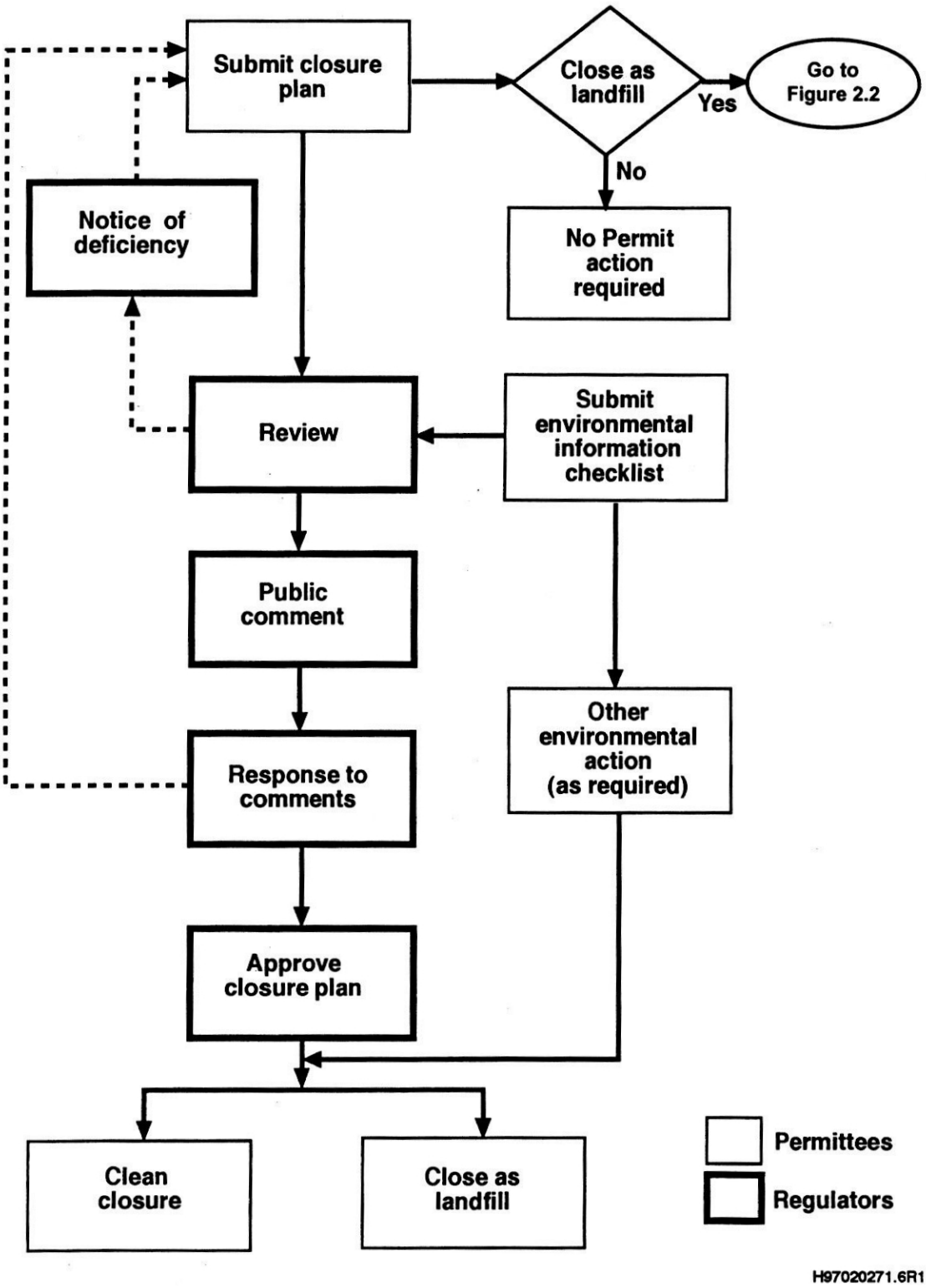
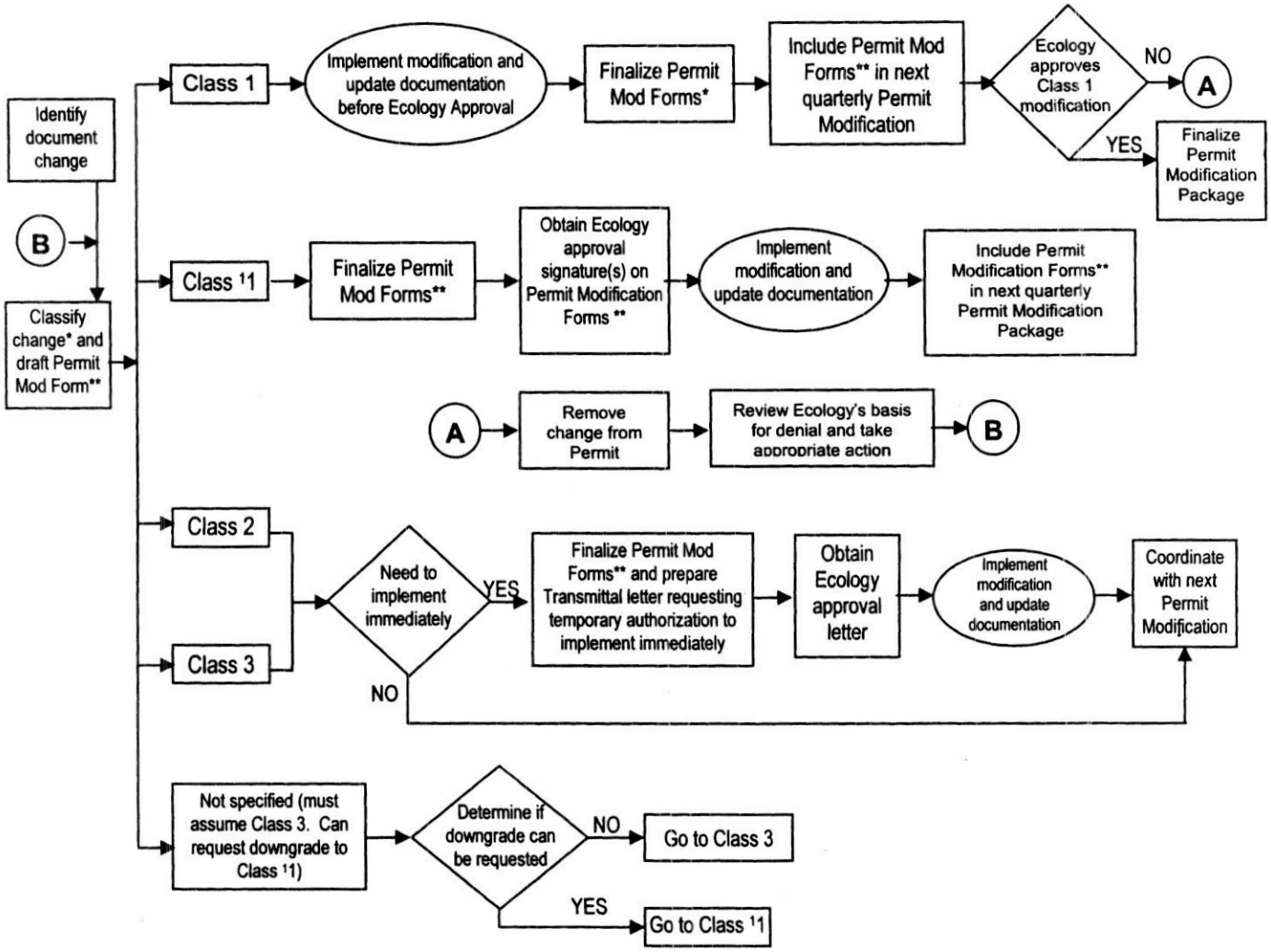


Figure 2.4. Permit Modification Process
[WAC 173-303-830(4) and Appendix I]



* = Approach Ecology for concurrence on questionable classifications
** = Permit Modification Notification Form

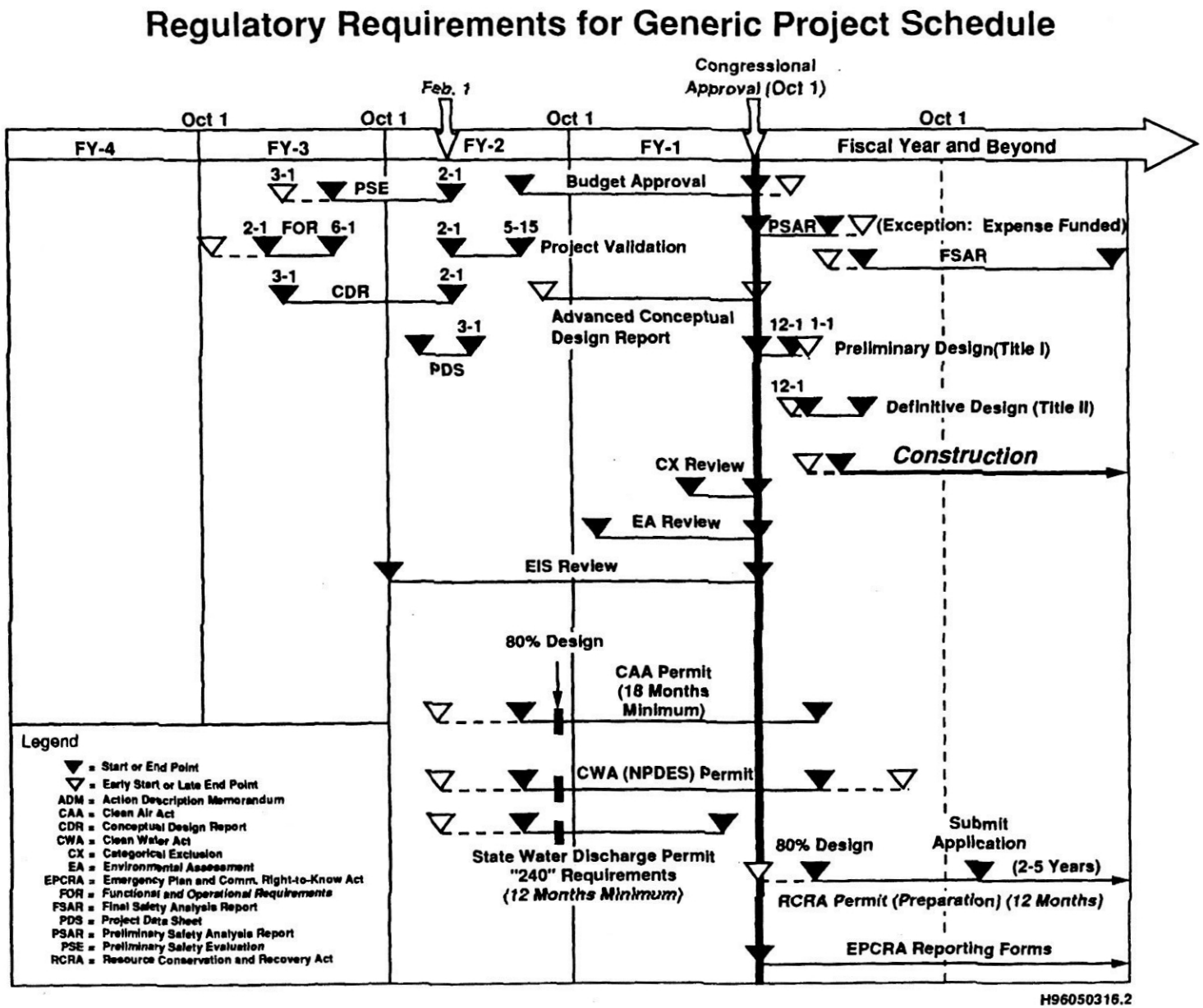


Figure 2.5. Generic Project Schedule.

Figure 2.6. Prevailing Wind Direction for the Hanford Site
(Adapted from PNNL-14242).

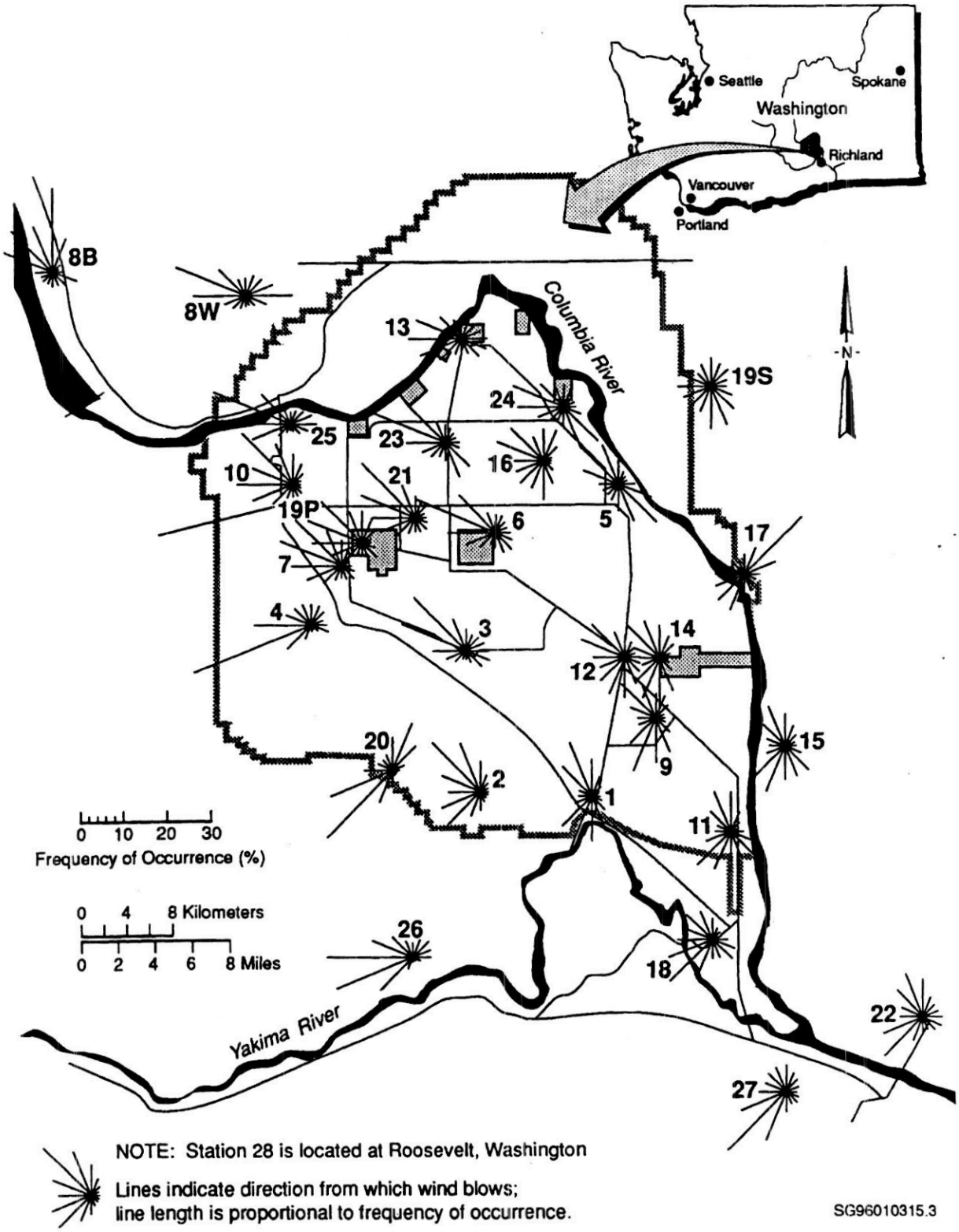


Figure 2.7. Columbia River Floodplain
(Probable maximum flood, adapted from DOE/EIS-0222)

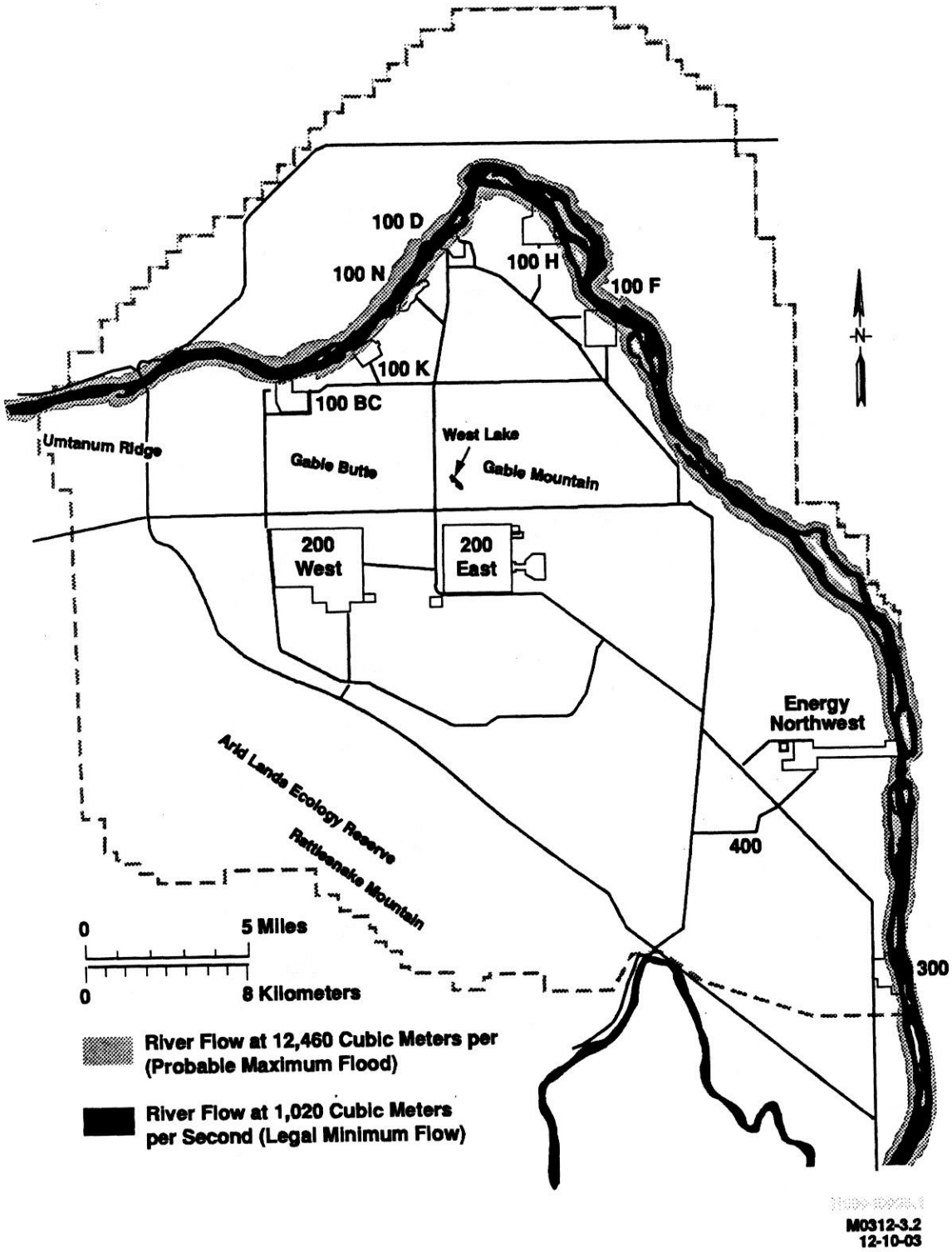


Figure 2.8. 100-Year Floodplain of the Columbia River and Yakima River and the Cold Creek Probable Maximum Flood (Adapted from DOE/EIS-0222).

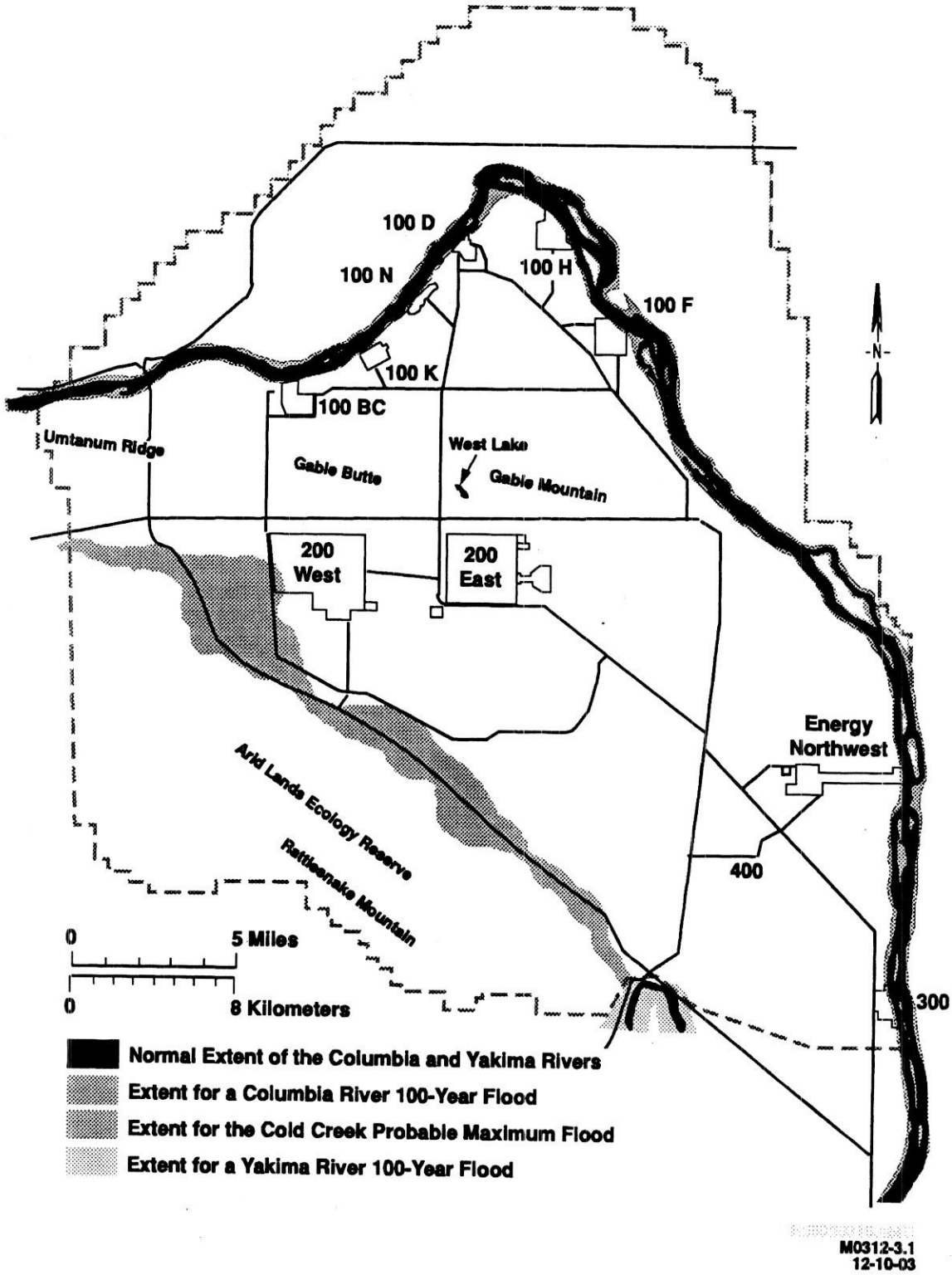


Figure 2.9. Hanford Site Roadways
(Adapted from DOE/EIS-0222).

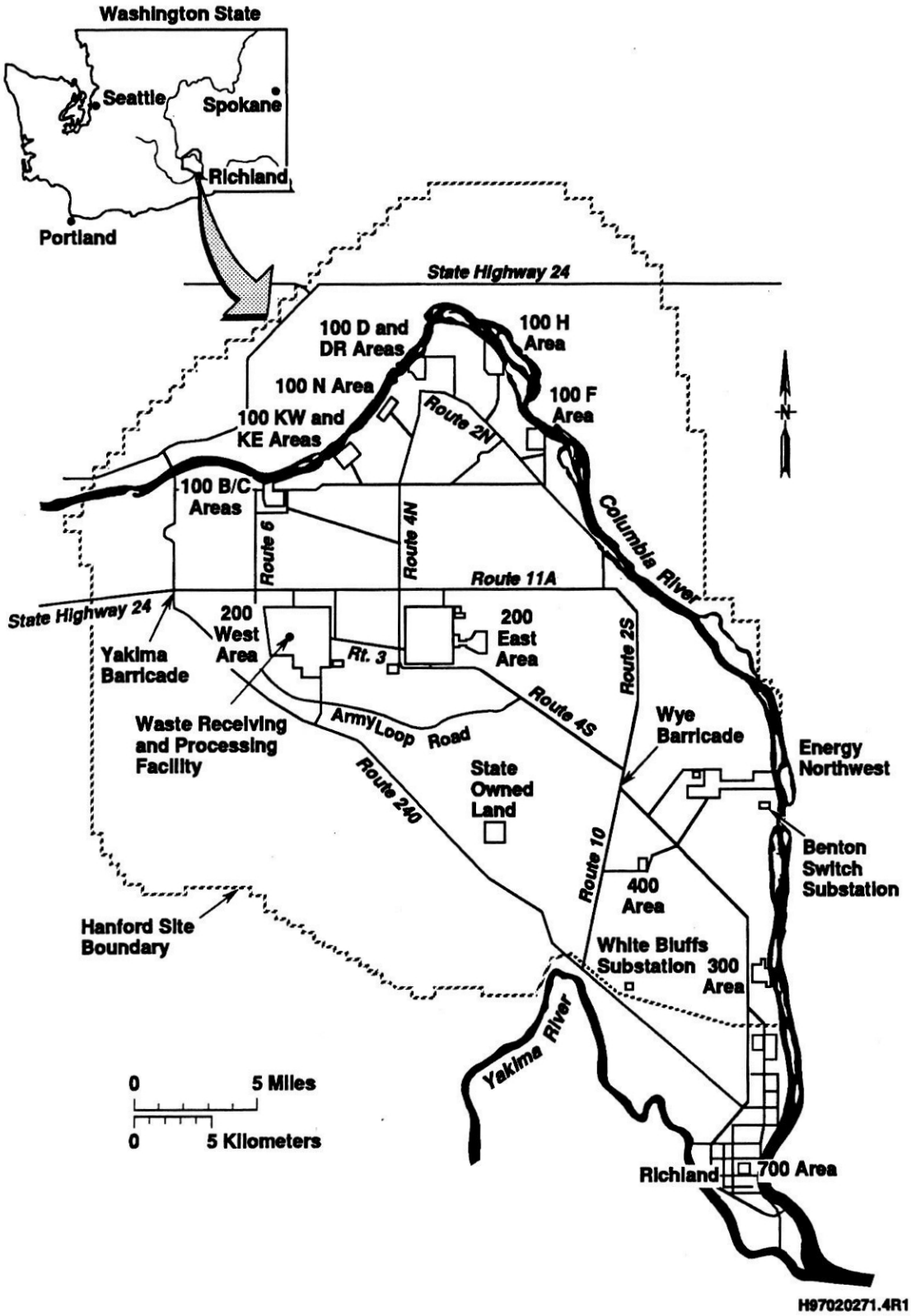


Figure 2.10. Surrounding Land Use

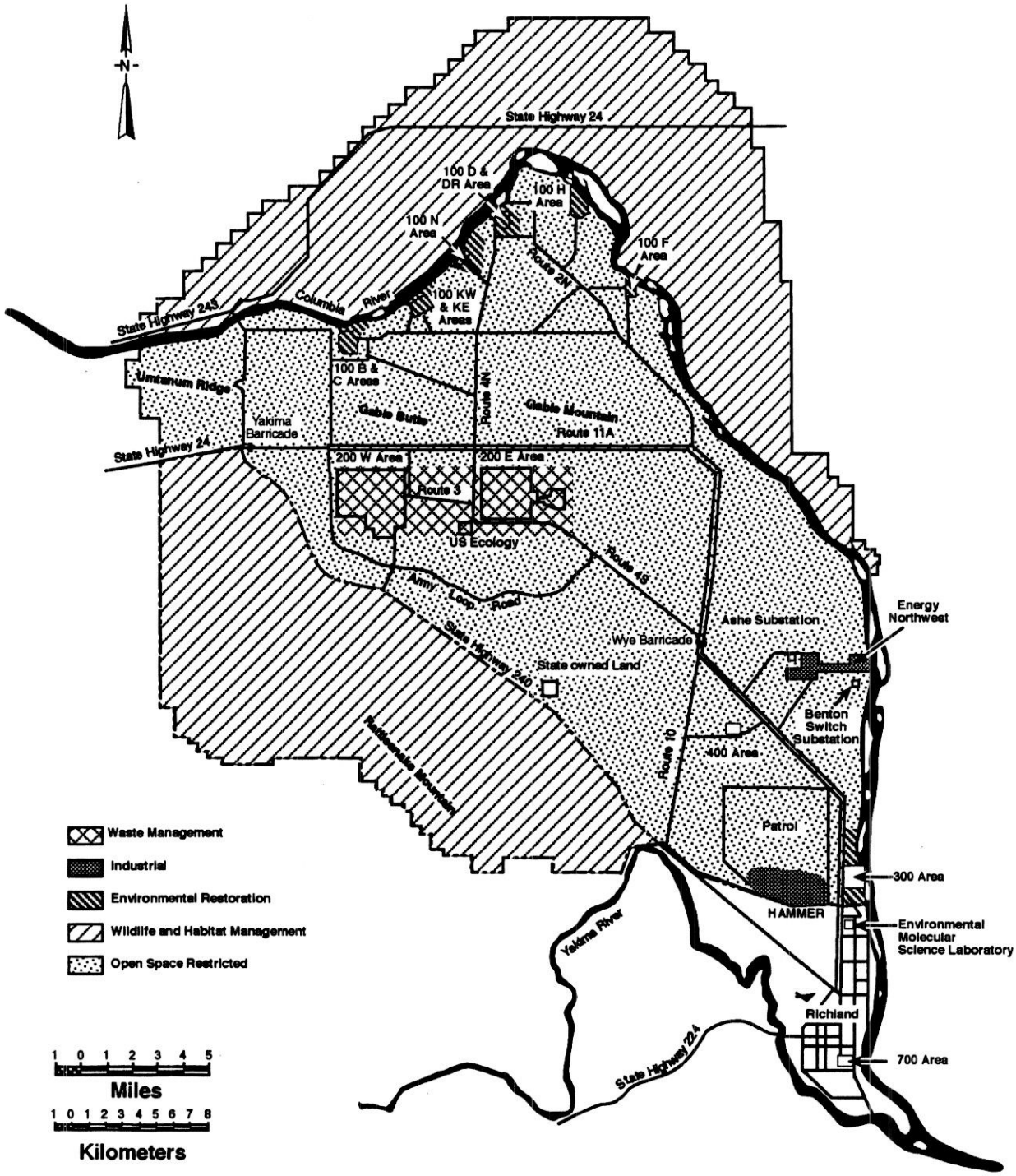
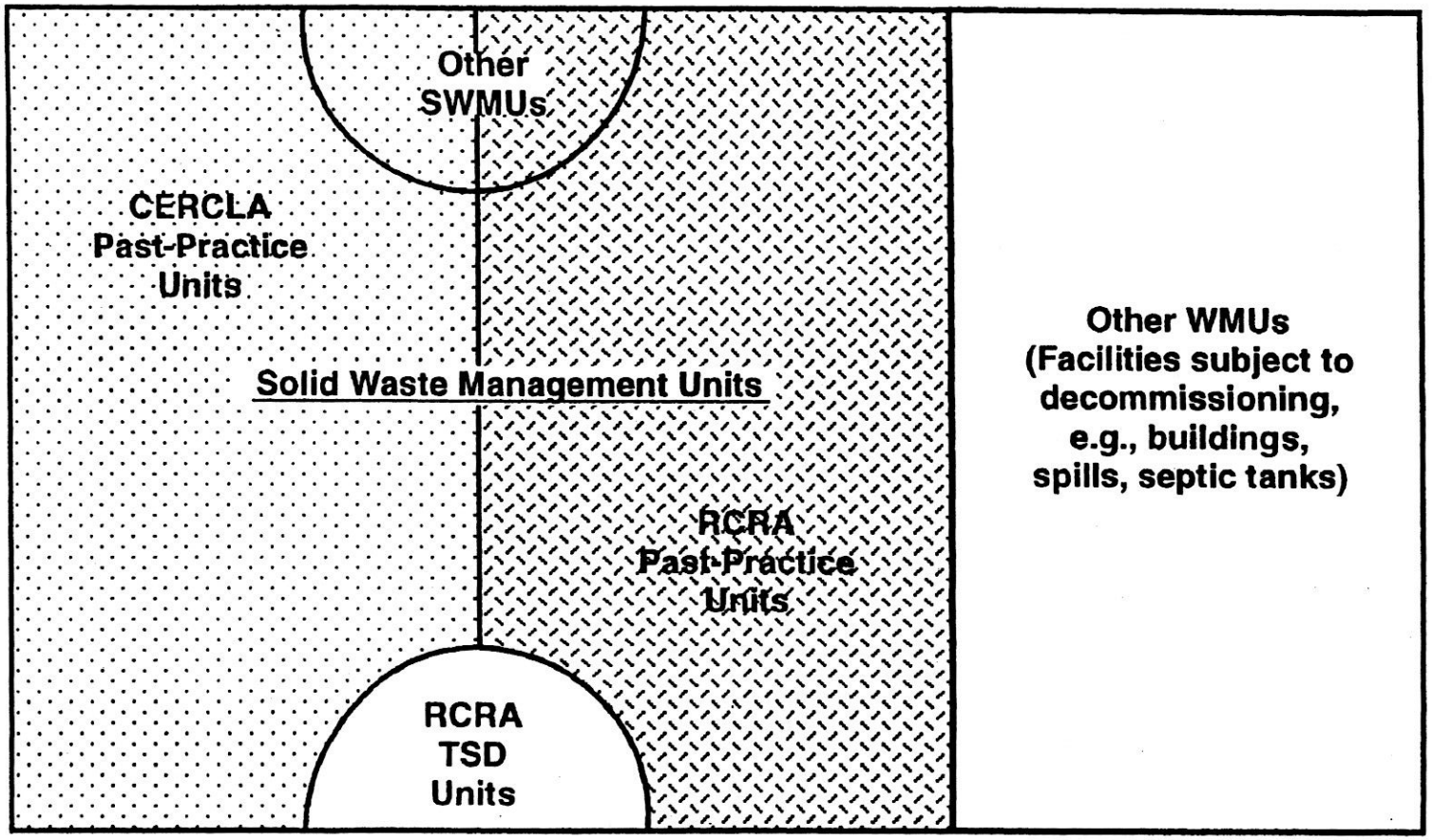


Figure 2.11. Waste Management Units.



(not to scale)

CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act.*
RCRA = *Resource Conservation and Recovery Act.*
TSD = treatment, storage, and /or disposal units either operating, undergoing closure, or being dispositioned through other options.
WMU = waste management unit.

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6.0 PROCEDURES TO PREVENT HAZARDS [F]

This chapter addresses the provisions of Section F of Ecology's permit application guidance (Ecology 1996), and includes the following topics:

- Security
- Inspection schedule
- Preparedness and prevention requirements
- Preventive procedures, structures, and equipment
- Prevention of reaction of ignitable, reactive, and/or incompatible wastes.

Also addressed are provisions contained in Hanford Facility RCRA Permit (Permit) Conditions II.M, Security and II.O, General Inspection Requirements. Procedures to prevent hazards for individual TSD units are included in the unit-specific documentation.

6.1 SECURITY [F-1]

The following sections describe the security measures, equipment, and warning signs used to control entry to the Hanford Facility and to meet Permit Condition II.M. Security information for individual TSD units is provided in the unit-specific documentation.

6.1.1 Security Procedures and Equipment [F-1a]

This section describes the 24-hour surveillance system, warning signs, and barriers used to provide security and control access to the Hanford Facility. WAC 173-303-310(2)(b), a 24-hour surveillance system, or WAC 173-303-310(2)(c), artificial or natural barriers, are met at the Hanford Facility level and are not the responsibility of the TSD unit. Operating TSD units contained in Part III of the Permit may be required to comply with requirements in WAC 173-303-310(2)(c) based on established Part III Permit Conditions. A 24-hour surveillance system, warning signs, and artificial and natural barriers are used to provide security and control access to the Hanford Facility. The entire Hanford Facility is a controlled access area. The Hanford Facility maintains around-the-clock surveillance for protection of government property, classified information, and special nuclear materials. The Hanford Patrol maintains a continuous presence of protective force personnel to provide additional security.

The majority of TSD units are located within, or near, the 200 Areas (refer to Hanford Facility Part A, DOE/RL-88-21). Vehicular access to roads leading to these areas is through controlled access points at the Yakima, Wye, and Rattlesnake Barricades (refer to DOE/RL-91-28, Chapter 2.0, Figure 2.9 and Appendix 2A, Location Maps), which are posted with restrictive signage. Perimeter fences, restrictive signage, and random protective force patrols are used to control access to the 300 Area. All personnel accessing locations on the Hanford Site (except for publicly accessible locations) must possess and display a U.S. DOE issued security identification badge indicating the appropriate authorization. All personnel entering or exiting the Hanford Site are subject to random security badge inspections by protective force personnel to validate access authorization. All vehicles and hand-carried items entering or exiting the Hanford Site are subject to random security badge inspections and searches by protective force personnel to validate access authorization and preclude the unauthorized introduction of prohibited/controlled articles, or the unauthorized removal of government or contractor assets. Additional means to bar entry or control access (e.g., fences, locked entry doors) are discussed in the unit-specific portion.

Operating TSD units in Part III of the Permit must comply with the requirements found in WAC 173-303-310(2)(a) regarding the placement of signs. Security information for operating TSD units regarding the placement of signs is provided in the unit-specific portion. Security information for non-operating TSD units incorporated into Part III, Part V, or Part VI of the Permit regarding the placement of

signs is determined on a case-by-case basis. Security information for non-operating TSD units may be documented in the unit-specific portion as appropriate.

Signs are, or will be, posted at area boundaries within the Hanford Site stating *NO TRESPASSING. SECURITY BADGES REQUIRED BEYOND THIS POINT. AUTHORIZED VEHICLES ONLY. PUBLIC ACCESS PROHIBITED* (or an equivalent legend). In addition, warning signs stating *DANGER--UNAUTHORIZED PERSONNEL KEEP OUT* (or an equivalent legend) are, or will be, posted at operating TSD units or at active portions of operating TSD units within the Hanford Facility. These signs are, or will be, written in English, legible from a distance of 7.6 meters, and visible from all angles of approach.

6.1.2 Waiver [F-1b]

Waivers of the security procedures and equipment requirements for the Hanford Facility currently are not requested.

6.2 INSPECTION SCHEDULE [F-2]

This section addresses the general inspection requirements for the Hanford Facility. The TSD unit-specific inspection activities are addressed in the unit-specific documentation.

6.2.1 General Inspection Requirements [F-2a]

General inspection requirements for the Hanford Facility are specified in Permit Condition II.O. This condition requires the following:

- Facility inspections to be conducted in accordance with the provisions of WAC 173-303-320(2)
- Inspections of the 100, 200 East, 200 West, 300, and 400 Areas to be conducted annually
- Inspection of the banks of the Columbia River, contained within the Hanford Facility boundary, to be conducted two times per year (i.e., one at the low water mark of the year, and one at a time chosen by the Permittees)
- Visual inspection for malfunctions, deterioration, operator errors, and discharges that might cause or lead to the release of dangerous waste constituents to the environment or that threaten human health
- Notification to Ecology at least 7 days before conducting these inspections to allow Ecology representatives to be present during the inspection
- Remedial action to be taken, if required, in accordance with a schedule agreed to by Ecology.

6.2.2 Inspection Log [F-2b]

Documentation of the inspections conducted in accordance with Permit Condition II.O is placed in the Hanford Facility Operating Record, General Information File (refer to §12.1.30).

6.2.3 Schedule for Remedial Action for Problems Revealed [F-2c]

In accordance with Permit Condition II.O, remedial action schedules will be developed for any problems discovered during a Hanford Facility inspection. These schedules will be agreed to by Ecology.

6.2.4 Specific Process or Waste Type Inspection Requirements [F-2d]

As noted in the Hanford Facility Part A (DOE/RL-88-21), the Hanford Facility includes TSD units with container handling capabilities, tank systems, surface impoundments, containment buildings, landfills, waste piles, and miscellaneous units. Inspections requirements for each of the TSD units are addressed in the unit-specific documentation.

6.3 PREPAREDNESS AND PREVENTION REQUIREMENTS [F-3]

The emergency preparedness and prevention measures taken for the Hanford Facility are described in this section. Most of the Hanford Facility 'final status operating' TSD units are equipped with internal communication systems to relay emergency or other information to unit personnel. The internal communication systems include telephones, various alarm systems, and hand-held or vehicle two-way radios. Alarm systems exist at various locations throughout the Hanford Facility to allow personnel to respond appropriately to various emergencies, including the following: building evacuations, take-cover events, and fire and/or explosion. Telephones are located throughout the Hanford Facility and provide both internal and external communication. In addition, the following external communication systems are available for notifying persons assigned to emergency response organizations:

- Fire alarm pull boxes and fire sprinkler flow monitoring devices – connected to a system monitored around the clock by the Hanford Fire Department
- Emergency telephone numbers 911 (or 375-2400 for PNNL facilities) – on notification, the Hanford Patrol Operations Center notifies and/or dispatches required emergency responders
- Crash alarm telephone system – consists of selected telephones that are disassociated from the regular system and are connected automatically to control stations
- Two-way radio system – consists of hand-held or vehicle radios; the system accesses the Hanford Facility emergency network and can summon the Hanford Fire Department, Hanford Patrol, and/or any other assistance needed to deal with emergencies.

6.3.1 Equipment Requirements [F-3a]

Equipment requirements are listed in Permit Attachment 4. Unit-specific equipment requirements are listed in the unit-specific documentation.

6.3.2 Aisle Space Requirement [F-3b]

Aisle space requirements for 'final status operating' TSD units are addressed in the unit-specific documentation.

6.4 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT [F-4]

Preventive procedures are in place to ensure that unloading activities are conducted in a safe manner and that run-off of liquid, if spilled during waste unloading operations, is contained and disposed of properly. In those areas of TSD units where significant risk of exposure to dangerous and/or mixed waste exists, personnel are required to wear protective suits and/or respiratory devices, depending on the specific hazard. Provisions are in place at specific TSD units to ensure that backup power is provided for equipment critical to operations. Preventive measures information specific to TSD units is contained in the unit-specific documentation.

Description of actions designed to control and mitigate effects to human health and the environment for any spill or release between TSD unit boundaries (i.e., onsite transportation) are described in Permit Attachment 4, and where appropriate in the unit-specific documentation.

6.5 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND/OR INCOMPATIBLE WASTES [F-5]

Procedures and precautions to prevent the reaction of ignitable and reactive waste, and the management of incompatible waste, at final status operating TSD units are described in the unit-specific documentation.

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8.0 PERSONNEL TRAINING [H]

This chapter addresses the provisions identified in Section H of Ecology's permit application guidance (Ecology 1996). This chapter focuses on a description of the training programs implemented to meet the requirements of Hanford Facility RCRA Permit (Permit) Condition II.C (Personnel Training).

This chapter discusses personnel training requirements based on WAC 173-303 and the Permit. In accordance with WAC 173-303-806(4)(a)(xii), Part B Permit Applications must contain two items: (1) *an outline of both the introductory and continuing training programs by owners or operators to prepare persons to operate or maintain the TSD facility in a safe manner as required to demonstrate compliance with WAC 173-303-330* and (2) *a brief description of how training will be designed to meet actual job tasks in accordance with the requirements in WAC 173-303-330(1)(d)*. Permit Condition II.C (Personnel Training) contains training requirements applicable to Hanford Facility personnel and non-Facility personnel.

The general facility training information contained in this chapter need not be duplicated in the unit-specific portion, but could be cross-referenced, as appropriate. Pertinent information also can be cross-referenced, if appropriate, in the unit-specific portion. In other cases, unit-specific training documentation could be contained in the Hanford Facility operating record or not required at all based on the appropriateness of such requirements at units 'undergoing closure', or units being 'dispositioned through other options'.

8.1 OUTLINE OF INTRODUCTORY AND CONTINUING TRAINING PROGRAMS

The introductory and continuing training programs are designed to prepare personnel to manage and maintain the TSD unit in a safe, effective, and environmentally sound manner. In addition to preparing personnel to manage and maintain TSD units under normal conditions, the training programs ensure that personnel are prepared to respond in a prompt and effective manner should abnormal or emergency conditions occur. Emergency response training is consistent with the description of actions contained in DOE/RL-91-28, Chapter 7.0, Contingency Plan. The introductory and continuing training programs contain the following objectives:

- Teach Hanford Facility personnel to perform their duties in a way that ensures the Hanford Facility's compliance with WAC 173-303
- Teach Hanford Facility personnel dangerous waste management procedures (including implementation of the contingency plan) relevant to the job titles/positions in which they are employed, and
- Ensure Hanford Facility personnel can respond effectively to emergencies.

8.1.1 Introductory Training

Introductory training includes general Hanford Facility training and TSD unit-specific training. General Hanford Facility training is described in DOE/RL-91-28, §8.1, and is provided in accordance with Permit Condition II.C.2. TSD unit-specific training is provided to Hanford Facility personnel allowing those personnel to work unescorted, and in some cases, is required for escorted access. Hanford Facility personnel cannot perform a task for which they are not properly trained, except to gain required experience while under the direct supervision of a supervisor or coworker who is properly trained. Hanford Facility personnel must be trained within 6 months after their employment at or assignment to the Hanford Facility, or to a new job title/position at the Hanford Facility, whichever is later.

General Hanford Facility Training: Permit Condition II.C.2, requires Hanford Facility personnel to receive general facility training within 6 months of hire. This training provides an orientation on dangerous waste management activities being conducted on the Hanford Facility and includes the following:

- Description of emergency signals and appropriate personnel response
- Identification of contacts for information regarding dangerous waste management activities
- Introduction to waste minimization concepts
- Identification of contact(s) for emergencies involving dangerous waste
- Familiarization with the applicable portions of the *Hanford Emergency Management Plan* (Permit Attachment 4).

Each Permittee has access to a general facility training module that meets the requirements listed for Permit Condition II.C.2.

Permit Condition II.C.4, requires the Permittees to provide the necessary training to non-Facility personnel (i.e., visitors, subcontractors) as appropriate for the locations and activities undertaken. At a minimum, this training describes dangerous waste management hazards on the Hanford Facility.

Contingency Plan training: Hanford Facility personnel receive training on applicable portions of the *Hanford Emergency Management Plan* (Permit Attachment 4) in general Hanford Facility training. In addition, Hanford Facility personnel receive training on content of the description of actions contained in contingency plan documentation in DOE/RL-91-28, Chapter 7.0 and applicable unit-specific documentation to be able to effectively respond to emergencies.

Emergency Coordinator training: Hanford Facility personnel who perform emergency coordinator duties in WAC 173-303-360 (e.g., Building Emergency Director) in the Hanford Incident Command System receive training on implementation of the contingency plan and fulfilling the position within the Hanford Incident Command System. These Hanford Facility personnel must also become thoroughly familiar with applicable contingency plan documentation, operations, activities, location, and properties of all waste handled, location of all records, and the unit/building layout.

Operations training: Dangerous waste management operations training (e.g., waste designation training, shippers training) is determined on a unit-by-unit basis and shall consider the type of waste management unit (e.g., container management unit) and the type of activities performed at the waste management unit (e.g., sampling). For example, training provided for management of dangerous waste in containers is different than the training provided for management of dangerous waste in a tank system. Common training required for compliance within similar waste management units can be provided in general training and supplemented at the TSD unit. Training provided for TSD unit-specific operations is identified in the training plan documentation based on: (1) whether a general training course exists, (2) the training needs to ensure waste management unit compliance with WAC 173-303, and (3) training commitments agreed to with Ecology.

8.1.2 Continuing Training

Continuing training meets the requirements for WAC 173-303-330(1)(b) and includes general Hanford Facility training and TSD unit-specific training.

General Hanford Facility training: Annual refresher training is provided for general Hanford Facility training. Refer to description above in §8.1.1.

Contingency plan training: Annual refresher training is provided for contingency plan training. Refer to description above in §8.1.1.

Emergency coordinator training: Annual refresher training is provided for emergency coordinator training. Refer to description above in §8.1.1.

Operations training: Refresher training occurs on many frequencies (i.e., annual, every other year, and every three years) for operations training. When justified, some training will not contain a refresher course and will be identified as a one-time only training course. The TSD unit-specific training plan documentation will specify the frequency for each training course. Refer to description above in§8.1.1.

8.2 DESCRIPTION OF TRAINING DESIGN

Proper design of a training program ensures personnel who perform duties on the Hanford Facility related to WAC 173-303-330(1)(d) are trained to perform their duties in compliance with WAC 173 303. Actual job tasks, referred to as duties, are used to determine training requirements. The first step taken to ensure Hanford Facility personnel have received the proper training is to determine and document the waste management duties by job title/position. The second step compares waste management duties to general waste management unit training curriculum. If general waste management unit training curriculum does not address the waste management duties, the training curriculum is supplemented and/or on-the-job training is provided. The third step summarizes the content of a training course necessary to ensure that the training provided to each job title/position addresses associated waste management duties. The last step is to assign training curriculum to Hanford Facility personnel based on the previous evaluation. The training plan documentation contains this process.

Waste management duties include those specified in §8.1 as well as those contained in WAC 173-303-330(1)(d). Training elements of WAC 173-303-330(1)(d) applicable to TSD unit operations will be specified in the unit-specific documentation.

Hanford Facility personnel who perform these duties receive training pertaining to their duties. The training plan documentation described in the unit-specific documentation contains specific information regarding the types of training Hanford Facility personnel receive based on the outline in §8.1.

8.3 TREATMENT, STORAGE, AND/OR DISPOSAL UNIT-SPECIFIC TRAINING

In accordance with Permit Condition II.C.3, the unit-specific documentation, if appropriate, contains a description of the training plan. The training plan ensures that personnel training is conducted as required by WAC 173-303-330, as specified in Permit Condition II.C.1. The training plan contributes to the assurance that TSD units are operated and maintained in accordance with requirements of the EPA, Ecology, and DOE-RL.

Training plan documentation is maintained outside of the Permit. Therefore, changes made to the training plan documentation are not subject to the Permit modification process. However, the training plan documentation is prepared to comply with WAC 173-303-330(2).

Documentation prepared to meet the training plan consists of hard copy and/or electronic media as provided by Permit Condition II.C.1. The training plan documentation consists of one or more documents and/or a training database with all the components identified in the core document.

The Hanford Site contractors are responsible for developing and administering the courses required by the training programs, and for establishing formal retraining dates for these courses. The TSD unit management is responsible for identifying TSD unit- and job-specific training requirements for TSD unit personnel and for ensuring personnel complete the appropriate training.

In administering certain training courses, a retraining date could be set by TSD unit management. The formal retraining date is a date (day/month/year) counting from the most recent initial training date or another baseline date established for the training. The formal retraining date remains the same each year regardless of when retraining is completed. Retraining is to occur within 30 days of the formal retraining date. While it is preferable to complete retraining within the 30 days before the formal retraining date, managers have the ability to authorize personnel for 30 days beyond the formal retraining date, thus allowing a 60-day window in which to satisfy the retraining requirements.

8.4 TRAINING RECORDS

As specified in Permit Condition II.C.1, each Hanford Facility Permittee maintains documentation in accordance with WAC 173-303-330(2) and (3). Training records could be maintained in hard copy form or by using electronic data storage. At a minimum, training records will consist of course attendance rosters correlating the training received with the personnel who were in attendance. Training records are maintained in accordance with the requirements of the *Privacy Act of 1974*. Training records for personnel are available for inspection purposes through 59 FR 17091, which gives federal, state, and local government officers 'routine use' access to training records where a regulatory program being implemented is applicable to a DOE or contractor program.

8.5 TRAINING DIRECTOR

One person does not function as the training director on the Hanford Facility. A TSD unit manager has overall responsibility for all training required by WAC 173-303-330 and Permit Condition II.C at the TSD unit under this manager's control. To meet requirements of a training director in WAC 173-303-330(1)(a), the position is shared among TSD unit personnel, central training organization personnel, and other support organization personnel. A TSD unit manager can access training resources and experts from many different areas on a variety of subject matters rather than relying on the knowledge of a limited number of persons. This shared responsibility ensures the identification of the appropriate training requirements and that the Hanford Facility dangerous waste training programs for each Permittee meet all applicable dangerous waste management requirements.

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12.0 REPORTING AND RECORDKEEPING

This chapter discusses reporting and recordkeeping requirements as detailed in the Hanford Facility RCRA Permit (Permit), Condition II.I (Facility Operating Record) and other Permit Conditions. Much of this discussion focuses on the organization and content of the Hanford Facility Operating Record and describes how records are managed and maintained. Certification and immediate reporting requirements also are discussed.

For purposes of maintaining records designated for the "Hanford Facility", both off-site and on-site locations are used to maintain compliance. In accordance with Standard Condition I.H, the following off-site locations are used to maintain Hanford Facility records: (1) 700 Area, (2) Locations within the City of Richland under control of one or more of the Permittees, (3) Administrative Record locations within the Stevens Center complex, (4) Consolidated Information Center at Washington State University, Tri-Cities. (5) Archived records at the National Archives and Records Administration (NARA), Pacific Alaska Region, 6125 Sand Point Way NE, Seattle, Washington, 98115-7999 Records located on the Hanford Facility, and stored at government archive centers, can be accessed by contacting the Environmental Data Management Center (509) 376-1418. The current approach is to retain records until 10 years after clean closure; postclosure or corrective action is complete and certified for the Hanford Facility, whichever is later (Permit Condition I.E.10.b and I.E.10.c). As specified in the Permit, records can be kept in an electronic format (Permit Conditions I.E.10.b, I.E.10.c, II.C.1, and II.I.1).

12.1 DESCRIPTION OF RECORDS AND REPORTS

Records and reports required by the Permit and associated WAC 173-303 and Title 40, Code of Federal Regulations are summarized briefly in this section. Table 12.1 identifies the records and reports maintained pursuant to this Permit, designates which records and/or reports are contained in the General Information and/or Unit-Specific files, and how reports are submitted to Ecology. Table 12.1, lists Permit Conditions and the associated records and/or reports, location of records and/or reports, and the mechanisms by which these records and/or reports are submitted to the regulators. For implementation of any of the record and/or report conditions summarized in this section, the actual wording of the Permit should be referred to, rather than the summaries.

Permit Condition II.I contains specific discussion of the contents of the Facility Operating Record, including direction for the inclusion of all other reports, as required by the Permit Condition II.I.1.t. The Hanford Facility Operating Record consists of two files, a General Information file and a Unit-Specific File. The 'Record Contact' for the General Information file can be accessed by calling (509) 372-0958. Unit-Specific File records are maintained by the individual TSD units and can be accessed by contacting the TSD unit 'Records Contact'. Unit-Specific File records could be maintained at locations other than the TSD unit.

12.1.1 Permit Modifications

Permit Condition I.C.3, pertains to Permit modifications not otherwise addressed in the Permit. WAC 173-303-830(4) contains Class 1 modifications, Class 2 modifications, Class 3 modifications, other modifications, and temporary authorizations associated with Class 2 or 3 modifications. Condition I.C.3, allows for Class 1 modifications to be entered into the Hanford Facility Operating Record and submitted to Ecology quarterly. Any Class 1 modifications made during a quarter are consolidated and submitted in a report within 10 days after the end of that quarter. Quarters end on December 31, March 31, June 30, and September 30. The notification required by WAC 173-303-830(4)(a)(i)(B) for Class 1 modifications will be met by publication of a notice, in the next regular edition following submittal, of the newsletter described in the Tri-Party Agreement, §10.3.

Class 2 and Class 3 modifications are submitted at the request of the Permittees as required based upon WAC 173-303-830(4)(b) and (c) respectively. Other modifications identified in WAC 173-303-830(4)(d) are submitted when the proposed modification is not explicitly identified in WAC 173-303-830 Appendix I. Following submittal of Class 2 and 3 Permit modifications, notice of the modification request will be sent to the Hanford Facility mailing list in the next regular edition of the newsletter described in §10.3 of the Tri-Party Agreement. The Permittees will publish the newspaper notice in the Tri-City Herald within 7-days of submittal of the Permit modification request.

Other modifications are described in WAC 173-303-830(4)(d) and are used when a permit modification is not explicitly listed in WAC 173-303-830 Appendix I. In this case, the permit modification will be submitted as a Class 3 modification or will be submitted with a request for Ecology to review and approve as a Class 1 or Class 2 modification.

Temporary authorizations are submitted when the Permittees can meet the criteria in WAC 173-303-830(4)(e). Public notification of temporary authorizations will be sent to persons on the Hanford Facility mailing list in the next regular edition of the newsletter described in the Tri-Party Agreement, §10.3 for public involvement in lieu of the 7-day requirement in WAC 173-303-830(4)(e)(c).

12.1.2 Monitoring and Records

Permit Condition I.E.10.b, pertains to records of monitoring information are to be kept for TSD units. The monitoring information includes calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of reports and records required by the Permit, and records of data used to complete the application for the Permit.

Permit Condition I.E.10, pertains to the keeping of records not associated with a particular TSD unit. These records include copies of reports and records required by the Permit, and records of data used to complete the application for the Permit.

Permit Condition II.I.1.n, also addresses monitoring records.

Records specific to groundwater monitoring are discussed in §12.1.26.

12.1.3 Reporting Planned Changes

Permit Condition I.E.11, pertains to notifying Ecology as soon as possible of any planned physical alterations or additions to the Hanford Facility that have an impact on TSD units or non-TSD unit areas subject to the Permit.

12.1.4 Certification of Construction or Modifications

Permit Condition I.E.12, pertains to notifying Ecology for construction or modification of a TSD unit has been accomplished in compliance with the Permit Conditions. This notification is to be made by a letter signed by the Permittees and a registered professional engineer.

12.1.5 Anticipated Noncompliance

Permit Condition I.E.13, pertains to notifying Ecology at least 30 days in advance of any planned changes or activities that could result in a noncompliance with the Permit. If the 30-day advance notice is not possible, the Permittees are to supply notice immediately after becoming aware of the anticipated noncompliance.

12.1.6 Transfer of Permits

Permit Condition I.E.14, pertains to notifying Ecology before transferring ownership or operation of the Hanford Facility during its operating life. The Permittees are to notify the new owner or operator in writing of the requirements of WAC 173-303-600, WAC 173-303-806 Changes in co-operator for individual TSD units will be accomplished by filing a revised Part A, for that TSD unit.

12.1.7 Immediate Reporting

Permit Condition I.E.15.a, pertains to immediate reporting to Ecology any release of dangerous waste or hazardous substances, or any noncompliance with the Permit that could endanger human health or the environment.

Permit Condition I.E.15.c, pertains to immediate reporting to Ecology any information on the release or unpermitted discharge of dangerous waste or hazardous substances that could cause an endangerment to drinking water supplies or ground or surface waters, or of a release or discharge of dangerous waste or hazardous substances, or of a fire or explosion at the Facility that could threaten human health or the environment.

12.1.8 Release or Noncompliance Not Requiring Immediate Reporting

Permit Condition I.E.15.d, pertains to any release or noncompliance not required to be reported immediately, a brief account must be entered within 2 days into the Hanford Facility Operating Record, Unit-Specific File for TSD units, or into the Hanford Facility Operating Record, General file, inspection log or separate spill log, for non-TSD units.

12.1.9 Written Reporting

Permit Condition I.E.16, pertains to a written report within 15 days of awareness of the circumstances of any noncompliance with the Permit that could endanger human health or the environment.

12.1.10 Manifest Discrepancy Report

Permit Condition I.E.17.a, pertains to reporting associated with discovery of a 'significant discrepancy' (Permit, Definition 'r.')) in a manifest for dangerous waste received from outside the Hanford Facility. If not reconciled within 15 days of discovery, the Permittees are to submit a letter report to Ecology in accordance with WAC 173-303-370(4), including a copy of the applicable manifest or shipping paper.

12.1.11 Waste Tracking Form Discrepancy Report

Permit Condition I.E.17.b, pertains to reporting associated with discovery of a 'significant discrepancy' (Permit, Definition 'r.') in waste tracking forms for dangerous waste transported within the Hanford Facility. If not reconciled within 15 days of discovery, the Permittees are to note the discrepancy in the receiving TSD unit's operating record.

12.1.12 Other Information

Permit Condition I.E.20, pertains to situations where the Permittees become aware that they have failed to submit any relevant facts in a permit application, closure plan, or postclosure plan, or submitted incorrect information in a permit application, closure plan, or postclosure plan, or in any report to Ecology. In accordance with this condition, the Permittees are to promptly submit such facts or corrected information.

12.1.13 Permit-Related Documentation

Permit Condition I.H, pertains to records of the Permit-related documentation are to be kept and maintained for 10 years after postclosure care or corrective action of the Hanford Site has been certified as complete, whichever is later. The following documents, and amendments, revisions, and modifications to these documents, are to be retained at the facility or some other location approved by Ecology: documents and amendments, revisions, and modifications to the Permit and all Attachments; Facility Operating Record. All dangerous waste Part B permit applications, post closure permit applications, and closure plan applications are maintained in the Administrative Record located at 2440 Stevens, Room 1101, Richland, WA. These documents shall be maintained for ten (10) years after post-closure care or corrective action for the Facility, whichever is later, has been completed and certified as complete

12.1.14 Notification of Permit-Related Information

Permit Condition II.E.4, pertains to the provision of a notification of availability to Ecology of data obtained pursuant to the Permit within 30 days of receipt by the Permittees, or after completion of quality assurance/quality control activities, if applicable. If data are obtained routinely, the Permittees only need to provide notification of data availability within 30 days of first availability along with a statement as to expected frequency of future data. If routine data are not acquired at the stated expected frequency, the Permittees are to notify Ecology within 30 days with an explanation and revision, if applicable.

12.1.15 Waste Location

Permit Condition II.I.1.a, pertains to systems to identify and map the locations of solid waste management units (SWMUs) are documented and maintained within the Hanford Facility Operating Record, Permit Attachment 3, Applicability Matrix. These systems include the Hanford Geographic Information System (HGIS) database and the WIDS database. A list identifying applicable active 90-day waste storage areas and dangerous waste satellite accumulation areas and their locations on the Hanford Facility also are maintained by each co-operator. In addition, records required by WAC 173-303-380(1) and (2) regarding waste location and methods of waste management are maintained in the Hanford Facility Operating Record, Unit-Specific File for dangerous waste managed in the TSD unit.

12.1.16 Waste Analysis

Permit Condition II.D, pertains to the generation of waste analysis and other waste designation records for each TSD unit accepting waste; and Permit Condition II.I.1.b, pertains to the maintenance. These records include waste analysis and/or other waste designation for waste resulting from an unidentifiable spill or leak, or waste generated at a TSD unit during decontamination or maintenance activities if required.

12.1.17 Occurrence Reports

Permit Condition II.I.1.c, pertains to identification of a system to generate occurrence reports is described in operating practices documentation maintained by the Permittees. The occurrence notification center is staffed 24 hours a day and conforms to this requirement.

12.1.18 Unmanifested Waste Reports

Permit Condition I.E.18, pertains to receipt of any dangerous waste shipment from offsite. The Hanford Facility uses waste manifests for tracking offsite waste shipments. The completed waste manifests are the source of two possible reports, the manifest discrepancy report and the unmanifested waste report. Permit Condition I.E.18, addresses the reporting of unmanifested dangerous waste shipments received from offsite sources within 15 days to Ecology. Records documenting unmanifested waste shipments are retained by the receiving TSD unit in accordance with Permit Condition II.I.1.d.

12.1.19 Contingency Plan and Incident Records

Permit Conditions II.A and II.I.1.e, pertains to records documenting the details of any incidents requiring the implementation of the contingency plan be maintained in the Hanford Facility Operating Record. Records documenting the details of incidents on the Hanford Facility between TSD unit boundaries (i.e., transportation incidents) are maintained in the Hanford Facility Operating Record, General Information File. Records documenting the details of incidents on the Hanford Facility within TSD unit boundaries are maintained in the Hanford Facility Operating Record, Unit-Specific File. Occurrence reports also are generated to document incidents judged too minor to require the implementation of the contingency plan (e.g., incidents identified as offnormal occurrences, or unusual occurrences).

12.1.20 Personnel Training Records

Permit Conditions II.C and II.I.1.f, pertains to training records be kept by the individual TSD units. Typically, each contractor maintains official training records in a centralized location. These records could be maintained in a hard copy form or by using electronic data storage. At a minimum, training records will consist of course attendance rosters correlating the training received with personnel who were in attendance. Training records are maintained in accordance with the requirements of the *Privacy Act*. The training records of personnel are available for inspection purposes through 59 FR 17091, which gives federal, state, and local government officers 'routine use' access to training records where a regulatory program being implemented is applicable to the DOE-RL or contractor program.

12.1.21 Preparedness and Prevention Arrangements

Permit Condition II.B.4, pertains to arrangements with local authorities. Permit Attachment 4, Table 3-1, "Memorandum of Understanding", details the preparedness and prevention arrangements made with other agencies and governing entities.

12.1.22 Projections of Anticipated Costs for Closure and Postclosure and Postclosure Monitoring and Maintenance

Permit Conditions II.H.1 and II.I.1.i, requires a cost estimate for facility closure. The Permittees prepare an annual report of projections of anticipated costs for closure for TSD units included in Parts III and V of the Permit. An annual report of projections of anticipated costs for postclosure monitoring and maintenance for TSD units incorporated into Parts III, V, and VI of the Permit is prepared, and submitted to Ecology on October 31 of each year, with information updated as of September 30.

12.1.23 Onsite Transportation Documentation

Permit Condition II.Q, requires documentation to accompany any onsite dangerous waste that is transported to or from any TSD unit subject to the Permit through or within the 600 Area unless the roadway is closed to general public access at the time of shipment. Waste transported by rail or by pipeline is exempt from this condition. Documentation is maintained in the receiving TSD unit's Hanford Facility Operating Record, Unit-Specific File to satisfy Permit Condition II.Q.

12.1.24 Cross-Reference of Waste Location to Waste Manifest Numbers

Permit Condition II.I.1.k, pertains to cross-referencing waste locations to specific manifest document numbers. A solid waste information and tracking system is used, which contains information concerning containerized waste, including the waste location, quantity, and other manifest data. The solid waste information and tracking system provides on-line access and reporting capabilities for waste generators and waste services personnel to identify and characterize a waste container for shipment to a TSD facility. This includes identification of the designation results for the waste container: applicable waste regulations, applicable waste codes and Land Disposal Restrictions (LDR). The system also supports the

solid waste operations, and warehouse, transportation and packaging organizations in the shipment, acceptance and storage of waste at TSD facilities.

12.1.25 Required Annual Reports

Permit Conditions I.E.19 and I.E.22, pertain to annual reports generated and submitted to Ecology. Permit Condition II.I.1.m, annual report information is maintained in the Hanford Facility Operating Record, General Information file. The individual TSD units maintain their respective annual report information within the Unit-Specific File. Reports include the following:

- Annual noncompliance report

  Permit Condition I.E.19, pertains to the annual noncompliance report. The report is a compilation of all instances of noncompliance not otherwise required to be reported elsewhere, and is submitted at the time the annual dangerous waste report is submitted. The report is submitted yearly by March 1.

- Annual dangerous waste report

  Permit Condition I.E.22, pertains to annual reporting requirements, pursuant to WAC 173-303-390, which requires an overall annual report for each facility that holds an active EPA/State identification number. The report is due to Ecology on March 1 of each year and is referred to as the 'annual dangerous waste report'. The contents of the annual dangerous waste report include the following:

  The Washington State report forms in the *Dangerous Waste Annual Report, Book 1, Forms and Instructions for Treatment, Storage, Disposal, and Recycling Facilities* are completed for this report.

  - The EPA/State identification number
  - Name and address of the Hanford Facility
  - Calendar year covered by the report
  - Description and quantity of waste managed
  - TSD methods
  - Certification statement signed by an authorized representative.

- Annual report of projections of anticipated costs for closure and postclosure and postclosure monitoring and maintenance (§12.1.22).

- Annual update of the TSD Pipeline Mapping and Marking DOE-RL submits an annual report identifying any changes to the underground pipeline network.

12.1.26 Groundwater Monitoring Records

Permit Condition II.F, and DOE/RL-91-28, §5.0 contain requirements that pertain to groundwater monitoring records. Groundwater monitoring records are maintained in the Hanford Facility Operating Record, Unit-Specific File for TSD units defined as regulated units in Parts III, V, and VI of the Permit. Facility-wide elements will be identified in the unit-specific file for these TSD units. As discussed throughout DOE/RL-91-28, §5.0, the following elements summarize the universe of groundwater monitoring records: unit-specific documentation related to groundwater monitoring, reports submitted to Ecology, groundwater sample records, Hanford Environmental Information System data, well construction records in the Hanford Well Information System (HWIS) database, and well maintenance records in the HWIS database.

Permit Condition II.F.2.a, pertains to inspections of active resource protection wells subject to the Permit are to be conducted at least once every 5 years in accordance with WAC 173-160-030. Inspection records and the maintenance schedule are included in the well maintenance records as described in Attachment 6 to the Permit.

Permit Condition II.F.2.b, pertains to evaluating resource protection wells for use as qualified RCRA groundwater monitoring wells. As a result of this evaluation, wells will be abandoned or remediated in coordination with II.F.2.d.

Permit Condition II.F.2.c, pertains to a written notice furnished to Ecology at least 72 hours in advance of remediation (excluding maintenance activities) or abandonment of any well subject to the Permit. This notice is maintained as part of the well construction records.

12.1.27 Groundwater Corrective Action

Permit Condition II.I.1.p, pertains to summaries of all records of groundwater corrective action required by WAC 173-303-645. Groundwater corrective action is identified in WAC 173-303-645(11). Part IV of the Permit addresses corrective action for past-practice units where a TSD unit might be implementing a corrective action program. This information is included in the Semiannual corrective action reports are provided to Ecology and maintained in the Tri-Party Agreement Administrative Record

12.1.28 Permit Condition Compliance Evaluation System

Permit Condition II.I.1.q, pertains to compliance with the Standard and General Permit Conditions. Several tools are used to track compliance with the Standard and General Facility Permit Conditions. Each TSD unit incorporated into Parts III, V, or VI of the Permit is responsible for compliance and to describe the compliance evaluation system in use.

12.1.29 Deed Notifications

Permit Condition II.I.1.r, pertains to TSD units that cannot be clean closed, a notice in deed must be filed with the county auditor in. The DOE-RL will certify to Ecology that the information has been duly recorded and will provide Ecology with a copy of the document in which the record was placed.

12.1.30 Inspection Records

Permit Condition II.O, pertains to general facility inspections are conducted according to the provisions in WAC 173-303-320(2) and as described in DOE/RL-91-28, §6.2.1. Notification is made to Ecology at least 7 days prior to conducting these inspections. A copy of each annual inspection report is maintained in the Hanford Facility Operating Record, General Information file.

Permit Condition II.I.1.s, pertains to records of TSD unit-specific inspections that are maintained for a period of at least 5 years from the inspection date as part of the Hanford Facility Operating Record, Unit-Specific File.

12.1.31 Closure Certification

Permit Condition II.J.1, pertains to documentation of closure of TSD units is to be accomplished by providing either certifications of closure or certifications of completion of postclosure care. Final closure of the Hanford Facility will be achieved when documentation indicates completion of closure activities for all TSD units.

12.1.32 Notification of, or Request for, a Permit Modification

Permit Condition II.J.3, pertains to written notification of, or request for, a permit modification is to be submitted whenever there is a change in operating plans, facility design, or the approved closure plan. A copy of the amended closure plan is to accompany the notification request.

12.1.33 Closure Plan Deviation

Permit Condition II.K.6, pertains to deviations from a TSD unit closure plan required by unforeseen circumstances encountered during closure activities are to be documented in the Facility Operating Record, Unit-Specific File and made available to Ecology upon request or during the course of an inspection. These deviations are limited to those that do not impact the overall closure strategy but provide equivalent results.

12.1.34 Engineering Change Notices and Nonconformance Reports

Permit modifications that could affect specifically designated critical systems are submitted in accordance with Permit Conditions II.L.2.b and II.L.2.c. All other modifications will be available for inspection.

12.1.35 As-Built Drawings

Permit Condition II.L.2.d, pertains to as-built drawings incorporating design and construction modifications for a construction project subject to the Permit is to be placed into the Facility Operating Record, Unit-Specific File within 12 months of construction completion, or within an alternate approved time period.

12.1.36 Receipt of Wastes Generated Offsite

Permit Condition II.N.2, pertains to notification of receipt of waste generated outside the United States is to be supplied annually and in writing at least 4 weeks in advance of the first shipment. A copy of this written notice is to be a part of the Facility Operating Record, Unit-Specific File.

Permit Condition II.N.3, pertains to Permittees notifying the generator of offsite-generated waste in writing (except where the owner or operator is also the generator) that they have the appropriate permits for, and will accept, the waste received from offsite sources. A copy of this written notice is to be a part of the Facility Operating Record, Unit-Specific File.

12.1.37 Equivalent Materials

Permit Condition II.R, establishes general requirements for the substitution of an equivalent or superior product for any equipment or materials specified in Parts III and V. This condition also requires substitution documentation to be placed in the Hanford Facility Operating Record, Unit-Specific File.

12.1.38 Land Disposal Restrictions Records

Permit Condition II.S, addresses LDR. Onsite waste tracking documents the transfer of waste subject to LDR. Other applicable LDR recordkeeping requirements are identified in WAC 173-303-380 and 40 CFR 268.

12.1.39 Mapping Methodology Report and Underground Pipeline Maps

Permit Condition II.U, pertains to mapping methodology report submitted in fulfillment of Permit Condition II.U.1, the methodology report, underground pipeline maps, and the annual update report will be located in the Hanford Facility Operating Record, General Information file.

12.1.40 Schedule Extensions

Permit Condition II.X.1, pertains to written notification of any deviations or expected deviations from Permit-related schedules to be supplied to Ecology as soon as possible. The notification is to include all supporting information that 'best efforts' have been made to meet the required schedules. Copies of all

correspondence regarding schedule extensions are to be kept in the Facility Operating Record, Unit-Specific File.

12.1.41 Corrective Action

Permit Conditions II.Y.2.a.iv and II.Y.2.b.iv, pertain to the maintenance of information on corrective action for CERCLA Past Practice operable units in accordance with §9.0 and §10.0 of the Tri-Party Agreement Action Plan. The Permittees must maintain all reports and other information developed in whole, or in part, to meet Permit Condition II.Y.2.a and II.Y.2.b, respectively. The information is maintained in the Hanford Facility Operating Record, Unit-Specific File for the CERCLA Past Practice Operable units by reference to the Administrative Record.

12.1.42 Solid Waste Management Unit Notification

Permit Condition II.Y.3.b, pertains to written and/or verbal notification to Ecology of newly-identified solid waste management units and newly identified areas of concern at the Hanford Facility. Written notification is accomplished once a year for those solid waste management units and newly identified areas of concern which do not constitute an imminent and substantial endangerment. If a unit or area does pose an imminent or substantial endangerment, notification to Ecology within 5-days is required. The information is maintained in Waste Information Data System for these solid waste management units and newly identified areas of concern.

12.1.43 Waste Minimization/Pollution Prevention

Onsite TSD units must include a certification in the Hanford Facility Operating Record, Unit-Specific File not less than annually, that a waste minimization/pollution prevention program is in place, to meet requirements of 40 CFR 264.73(b)(9).

12.2 TYPE OF SUBMITTAL

Table 12.1 denotes the protocol for submitting reports. Three options exist: immediate verbal reporting; information submitted via transmittal letters signed by Permittee representatives; and packages certified by the Permittees in accordance with WAC 173-303-810(12) and (13) and/or by a registered professional engineer [e.g., in accordance with WAC 173-303-810(14)(a)(i)].

Table 12.1. Reports and Records.

Permit Condition[1]	Records and/or Reports (Chapter 12.0, Section containing description)		Hanford Facility Operating Record		Type of submittal		
			General Information File	Unit-Specific File	Verbal[2]	Transmittal letter (not certified)	Certified package
I.C.3	Quarterly Notification of Class 1 Modification notification (12.1.1)	Unit		✓		✓	
		Facility	✓				
	Class 2 modifications with or without temporary authorization (12.1.1)	Unit		✓		✓	
		Facility	✓				
	Class 3 modifications with or without temporary authorization (12.1.1)	Unit		✓		✓	
		Facility	✓				
I.E.10.b I.E.10.c II.I.1.n	Monitoring and records (12.1.2)	Unit		✓			
		Facility	✓				
I.E.11	Reporting planned changes (12.1.3)	Unit		✓	✓		
		Facility	✓				
I.E.12.i	Certification of construction or modifications (12.1.4)	Unit		✓			✓[3]
I.E.13	Anticipated noncompliance (12.1.5)	Unit		✓	✓	✓	
		Facility	✓				
I.E.14	Transfer of permits (12.1.6)	Facility	✓			✓	
I.E.15.a I.E.15.c	Immediate reporting (12.1.7)	Unit		✓	✓		
		Facility	✓				
I.E.15.d	Release or noncompliance not requiring immediate reporting (12.1.8)	Unit		✓			
		Facility	✓				
I.E.16	Written reporting (12.1.9)	Unit		✓		✓	
		Facility	✓				
I.E.17.a	Manifest discrepancy report (12.1.10)	Unit		✓		✓	
		Facility	✓				
I.E.17.b	Waste tracking form discrepancy report (12.1.11)	Unit		✓			
I.E.20	Other information (12.1.12)	Unit		✓	✓	✓	
		Facility	✓				
I.H	Permit-related documentation: Permit and all attachments and modifications (12.1.13)	Facility	✓				
	Permit-related documentation: Part B permit application, closure plan, closure/postclosure plan, postclosure permit application documentation (12.1.13)	Unit		✓			
II.E.4	Notification of Permit-related information (12.1.14)	Unit		✓		✓	
		Facility	✓				
II.I.1.a	Waste location (12.1.15)	Unit		✓			
		Facility	✓				
II.I.1.b II.D	Waste analysis (12.1.16)	Unit		✓			
		Facility	✓				
II.I.1.c	Occurrence reports (12.1.17, 12.1.19)	Unit		✓			
		Facility	✓				
II.I.1.d I.E.18	Unmanifested waste reports (12.1.18)	Unit		✓		✓[4]	
		Facility	✓				
II.I.1.e II.A (all)	Hanford Emergency Management Plan and incident records (12.1.19)	Unit		✓	✓	✓	
		Facility	✓				

Table 12.1. Reports and Records.

Permit Condition[1]	Records and/or Reports (Chapter 12.0, Section containing description)		Hanford Facility Operating Record		Type of submittal		
			General Information File	Unit-Specific File	Verbal[2]	Transmittal letter (not certified)	Certified package
II.I.1.f II.C	Personnel training records (12.1.20)	Unit		✓			
		Facility	✓				
II.I.1.g II.B.4	Preparedness and prevention arrangements (12.1.21)	Facility	✓				
II.I.1.i II.H	Projections of anticipated costs for closure and postclosure and postclosure monitoring and maintenance (12.1.22, 12.1.25)	Unit		✓		✓	
		Facility	✓				
II.I.1.j	Onsite transportation documentation (12.1.23)	Unit		✓			
II.I.1.k	Cross-reference of waste location to waste manifest numbers (12.1.24)	Unit		✓			
		Facility	✓				
II.I.1.m	Annual reports (12.1.25)	Facility	✓				
I.E.19	Annual Noncompliance Report (12.1.25)	Facility	✓			✓	
I.E.22	Annual Dangerous Waste Report (12.1.25)	Facility	✓				✓[5]
II.F.2	Groundwater monitoring records (12.1.26)	Unit		✓		✓	
		Facility	✓				
II.I.1.p	Groundwater corrective action (12.1.27)	Unit		✓			
		Facility	✓				
II.I.1.q	Permit condition compliance evaluation system (12.1.28)	Unit		✓			
		Facility	✓				
II.I.1.r	Deed notification (reference only) (12.1.29)	Unit		✓			✓[6]
II.I.1.s II.O	Inspection records (12.1.30)	Unit		✓		✓	
		Facility	✓				
II.J.1	Closure certification (12.1.31)	Unit		✓			✓[6]
II.J.3	Notification of, or request for, a permit modification (12.1.32)	Unit		✓		✓	
		Facility	✓				
II.K.6	Closure plan deviation (12.1.33)	Unit		✓			
II.I.1.t II.L.2.b II.L.2.c	Engineering change notices and nonconformance reports (12.1.34)	Unit		✓		✓	
II.L.2.d	As-built drawings (12.1.35)	Unit		✓			
II.N.2 II.N.3	Receipt of wastes generated offsite (12.1.36)	Unit		✓		✓	
II.R	Equivalent materials (12.1.37)	Unit		✓			
II.S	Land disposal restrictions records (12.1.38)	Unit		✓		✓	
II.U	Mapping methodology report and underground pipeline maps (12.1.39)	Facility	✓			✓	
II.X.1	Schedule extensions (12.1.40)	Unit		✓		✓	
		Facility	✓				
II.Y.2.a.iv II.Y.2.b.iv	Corrective Action (12.1.41)	Unit		✓			
II.Y.3.b	Solid Waste Management Unit notification (12.1.42)	Unit		✓	✓	✓	
40 CFR 264.73(B)(9)	Waste minimization/pollution prevention (12.1.43)	Unit		✓			

[1] Permit Condition, unless otherwise noted.
[2] Verbal reporting in accordance with time frames noted in the specified conditions.
[3] Certified by a registered professional engineer in accordance with WAC 173-303-810(14)(a)(i).
[4] Certification in accordance with preprinted Ecology TSD Facility Unmanifested Dangerous Waste Report, Form 6.
[5] Certified by Permittees in accordance with WAC 173-303-810(12).
[6] Certified in accordance with WAC 173-303-610.

Hanford Facility RCRA Permit Modification Notification Forms

Part V

Chapter 16, 1325-N Liquid Waste Disposal Facility

Chapter 17, 1301-N Liquid Waste Disposal Facility

Replacement Index

Attachment 41, Chapter 4.0

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4.0 CLOSURE ACTIVITIES

The physical activities required to close 1301-N and 1325-N Liquid Waste Disposal Facilities in accordance with WAC 173-303-610 and the Permit will be integrated with the ROD for DOE/RL 96-39, Rev. 1A. The ROD and the remedial design for the selected alternative will specify further the closure activities that will be required for CERCLA remedial action. Closure activities necessary to comply with dangerous waste regulations and the Permit will need to be consistent with CERCLA activities. CERCLA activities will be required to include elements necessary for closure of a dangerous waste unit. The Closure Plan presents the physical remedial activities and the sampling and analysis required to comply with WAC 173-303-610 and the Permit for each of the remedial alternatives presented in Attachment 41, Chapter 2.0, §2.2.

The closure activities are discussed in this section to highlight the site-specific elements of removal or characterization as clean of structures and piping for the 1301-N and 1325-N Liquid Waste Disposal Facilities. The other closure activities are not well defined for these sites at present but will be developed during the remedial design phase. Additional details about the alternatives can be found in DOE/RL-96-39, Rev. 1A, Section 5.2.

4.1 REMOVAL OF STRUCTURES

The structures in 1301-N and 1325-N Liquid Waste Disposal Facilities include concrete structures and earthen basins, trenches, fencing and signage surrounding the units, and ancillary surface structures such as valve houses associated with piping. The 1301-N and 1325-N Liquid Waste Disposal Facilities structures are discussed in Permit Attachment 41, Chapter 2.0

4.1.1 Earthen Structures

The contaminated soil in the earthen structures will be excavated by conventional earthmoving techniques. Removal technologies are described in DOE/RL-96-39, Rev. 1A, Section 5.1.3. Differing amounts of contaminated soils will be generated depending upon the remedial alternative selected for 1301 N and 1325 N. Alternatives that include soil removal are described in DOE/RL-96-39, Rev. 1A, Sections 5.2.1.5 through 5.2.1.8 for a residential exposure scenario and in DOE/RL-96-39, Rev. 1A, Sections 5.2.2.5 through 5.2.2.8 for a modified CRCIA ranger/industrial exposure scenario. After loading into containers, contaminated soils will be treated if necessary and/or disposed in an approved disposal facility on the Hanford Site. Particular attention will be given to the protection of workers and the environment from exposure to airborne contaminants during excavation and container loading. Dust mitigating measures, such as water sprays and chemical fixatives, may be employed to control fugitive dust emissions. The as low as reasonably achievable review will consider the use of shielding and/or remote handling techniques to reduce worker exposures from direct ionizing radiation.

The 1301-N Liquid Waste Disposal Facility demolition waste volumes are discussed in DOE/RL-96-39, Rev. 1A, Sections 4.5.1.1 and 4.5.1.2 for the earthen crib structure and DOE/RL-96-39, Rev. 1A, Sections 4.5.2.1 and 4.5.2.2 for the trench. The 1325-N unit demolition volumes are presented in DOE/RL-96-39, Rev. 1A, Sections 4.5.3.1 and 4.5.3.2 for the crib, and in Sections 4.5.4.1 and 4.5.4.2 for the trench. Waste volume tabulations are provided in DOE/RL-96-39, Rev. 1A, Appendix D.

4.1.2 Concrete Structures

Alternatives that include removal of concrete structures are described in the DOE/RL-96-39, Rev. 1A, Sections 5.2.1.3 through 5.2.1.8, for a residential exposure scenario, and in Sections 5.2.2.3 through 5.2.2.8 for a modified CRCIA ranger/industrial exposure scenario. The concrete weir box in the 1301-N Crib will be removed as contaminated waste. Demolition of the structure may be necessary or advantageous prior to removal. Dust controls will be employed to control fugitive emissions during any demolition. The demolition waste volume of the weir box is discussed in DOE/RL-96-39, Rev. 1A, Section 4.5.1.3.

The concrete cover support beams and cover panels over the 1301-N Trench and 1325-N Crib and trench will be removed as intact components, if possible. Demolition activities, if required, will be minimized to maintain control of airborne releases and to simplify soil excavation in the trench. As with the earthen structure removal, particular attention will be given to the control of fugitive dusts and worker exposures to direct ionizing radiation. The demolition waste volume of the cover system is discussed in DOE/RL-96-39, Rev. 1A, Section 4.5.2.3for 1301-N Liquid Waste Disposal Facility, and in DOE/RL-96-39, Rev. 1A, Section 4.5.4.3 for 1325 N. Waste volume tabulations are provided in DOE/RL-96-39, Rev. 1A, Appendix D.

Demolition debris and solid wastes in the cribs and trenches potentially include demolished concrete, wooden poles, and netting. These materials will be removed during crib and trench excavation operations and disposed with the contaminated soils.

4.2 PIPING REMOVAL OR CHARACTERIZATION AS CLEAN

The remediation of 1301-N and 1325-N Liquid Waste Disposal Facilities includes the excavation and removal of the contaminated piping systems that have not been characterized and determined to be clean (i.e., contain no dangerous waste constituents above residential MTCA B concentrations) between N Reactor and the cribs. Alternatives that include removal of piping are described in DOE/RL-96-39, Rev. 1A, Sections 5.2.1.3 through 5.2.1.8, for a residential exposure scenario, and in DOE/RL-96-39, Rev. 1A, Sections 5.2.2.3 through 5.2.2.8 for a modified CRCIA ranger/industrial exposure scenario. Two figures illustrate the potential extent of piping removal. Permit Attachment 41, Chapter 2.0, Figure 2.1 shows the pipelines to be removed between the 1722-N Building and 1301-N and between 1310-N and 1301-N. Permit Attachment 41, Chapter 2.0, Figure 2.2 shows the piping between the 1301-N Crib and the 1325-N Crib. Pipe lengths and map references are provided in DOE/RL-96-39, Rev. 1A, Appendix D.

The buried pipelines will be unearthed by conventional excavation equipment. The exposed piping may be segmented for removal manually or by remote methods, depending on contact radiation exposures. Contamination controls will focus on the drainage of residual fluids in the piping prior to, and during, segmentation and on the control of airborne contamination during cutting and pipe handling operations. After the piping has been removed, the pipe bedding soil will be surveyed for residual contamination, excavated, and disposed as necessary.

4.3 SAMPLING AND ANALYSIS ACTIVITIES

4.3.1 Past Soil Characterization Data

Data used to characterize the vadose zone soils were obtained from six boreholes drilled and sampled to support the 1301-N and 1325-N Liquid Waste Disposal Facilities limited field investigation (DOE/RL-96-39, Rev. 1A). DOE/RL-96-39, Rev. 1A, Figure 2-32 shows the locations of these boreholes. Two of the boreholes are adjacent to 1301-N Liquid Waste Disposal Facility (199-N-107A and 199-N-108A), one is next to 1325-N Liquid Waste Disposal Facility (199-N-109A), and three are located northwest of 1301-N Liquid Waste Disposal Facility (199-N-75, 199-N-76, and 199-N-80) between that facility and the river. Samples were obtained from near the surface to a depth of up to 30.2 m (99 ft). All of these data are presented in the limited field investigation.

In addition to the boreholes, sediment samples were collected from the 116-N-1 Crib. Data from these samples were not used in this evaluation because of insufficient QC associated with the sample collection process. Other soil samples have been collected from this vicinity, but most have only been analyzed for radionuclides.

Data from the characterization samples are summarized in Appendix A of the 1301-N and 1325-N limited field investigation. These data indicate that chromium is the only metal of concern in vadose zone soils at 1301-N Liquid Waste Disposal Facility below 3.0/4.6 m (10/15 ft). Chromium exceeded background

concentrations in data associated with 1301-N Liquid Waste Disposal Facility. Mercury is the only other metal that is included in the contaminants of concern (COCs), but no data from the boreholes at 1301-N and 1325-N Liquid Waste Disposal Facilities are available to evaluate the presence or absence of this analyte in vadose zone soils. Therefore, it is retained as a COC in surface soils (0 to 3.0/4.6 m [10/15 ft]). In DOE/RL-96-39, Rev. 1A, Appendix G, mercury will not reach groundwater in 1,000 years. Therefore is not considered to be a constituent of concern for groundwater protection below 3.0/4.6 m (10/15 ft). Evaluation of nitrate concentrations in the soil is similarly limited because of a paucity of data, so that substance has been retained as a COC. Nitrate is a mobile constituent, and a nitrate plume exists in the groundwater. Therefore, nitrate is considered a COC for both surface and subsurface soils.

Data from the three boreholes located outside of these facilities indicate that no metals are above background values. One sample from the 150- to 180-cm (5- to 6-ft) interval in borehole 199-N-76 was analyzed for mercury, and its value is well below typical background concentrations. These data indicate that metals deposited in the TSDs did not migrate laterally in the vadose zone any substantial distance.

Sampling during remediation did not detect the presence of methanol in the soil. The Washington State Department of Ecology granted a contained-in determination for methanol in December 2000. The limited field investigation sampling was not analyzed for the presence of methanol, and methanol was not listed as detected in any other sampling efforts. Acetone, however, was detected in three samples collected from boreholes outside of the facilities, at concentrations up to 51 ppb. Organic analytes were not analyzed in samples collected within and adjacent to the TSD units; however, field screening using an organic vapor monitor did not detect any organic compounds. Acetone is a common laboratory contaminant, and most of the data reported by the laboratory either are at detection limit or are associated with a blank that contained detectable amounts of acetone. These circumstances cast doubt on the presence of detectable quantities of acetone in the wells outside the bounds of the TSD unit.

Additional sampling was performed in 1998 and is documented in the *Data Summary Report* (BHI 1999). Characterization of the sites was conducted through sampling in accordance with the *Sampling Analysis Plan for the 100-NR-1 Treatment, Storage, and Disposal Units During Remediation Closeout* (DOE 2000a).

4.3.2 Characterization Activities to Determine Closure Option

A *sampling and analysis plan* (DOE 2000a) has been developed to support site closure. As presented in Section 4.3 and in DOE/RL-96-39, Rev. 1A, Table 4-17, dangerous waste constituents are retained as constituents of concern in both surface soils and subsurface soils. All alternatives (other than the No-Action Alternative) will result in the removal of dangerous waste constituents above 3.0 m (10 ft) bgs for the modified CRCIA ranger/industrial exposure scenario and 4.6 m (15 ft) bgs for the rural-residential scenario. This will result in removal of all soils that could be contaminated at levels that present a direct exposure hazard as defined in MTCA. Verification sampling to determine MTCA direct soil exposure standard compliance will therefore not be required unless some areas around the units are not excavated and removed to the 3.0m and 4.6m level. Verification sampling will be performed on contaminants that may be present below 3.0 m or 4.6 m for the purposes of determining compliance with groundwater protection standards.

The Data Quality Objectives process was used (BHI 2000) to define the extent and type of sampling and analysis required during excavation and closure. This effort will define sampling issues, which may include analytes of interest, sample location, number of samples, number and frequency of field QC samples (i.e., trip blanks, equipment blanks, splits, and duplicates), sampling methodology, analytical methods, laboratory protocols, laboratory validation, data error tolerances, and data evaluation methods. This DQO effort will culminate in an Ecology-approved sampling and analysis plan.

Alternative-specific sampling and analysis activities are as follows:

RRES-6 and MCRIS-6 - The Remove/Treat if Required/Dispose/Backfill (Removal) alternatives will require sampling and analysis at the end of excavation to determine that, at a minimum, a modified closure option has been attained. Dangerous waste constituents must be below MTCA Method C direct soil exposure and groundwater protection standards in order to preclude landfill closure and placement of a cover. Dangerous waste constituents must be below MTCA B direct soil exposure and groundwater protection standards in order to achieve remediation under RRES-6.

MCRIS-7 - The Remove 3.0 m (10 ft) bgs/Treat if Required/Dispose/Backfill/Capping alternative will result in the placement of a WAC 173-303-compliant cover should dangerous waste constituents be left in place above MTCA Method C levels. Concentrations of dangerous waste constituents remaining under the units would be irrelevant to the need for placement of a landfill cover; however, to determine whether other landfill postclosure requirements should be imposed at one or both units, concentrations of constituent would need to be defined. Sampling would be required after excavation and/or prior to backfilling and placement of the cap for this alternative.

MCRIS-8 - Sampling and analysis would be required for the Remove 3.0 m (10 ft) bgs/Treat if Required/Dispose/Vitrify (Vitrification) alternative to define the extent of contamination of the dangerous waste constituents needing treatment. Sampling after vitrification may be required in order to determine the effectiveness of the treatment for dangerous waste constituents.

In addition to the sampling described above, sampling may be performed during excavation to help define extent of contamination, to guide field activities, and for waste characterization to determine ex situ treatment and disposal requirements.

4.3.3 Piping Characterization

Should a determination be made that piping associated with the 1301-N and 1325-N Liquid Waste Disposal Facilities may be able to meet clean closure standards and be left in place, such a determination will be submitted to Ecology for their concurrence. This determination may be based on process knowledge, sampling, or both.

4.4 WASTE MANAGEMENT

Closure of the 1301-N and 1325-N Liquid Waste Disposal Facilities in accordance with the remedial alternatives identified will generate low-level radioactive or mixed waste in the form of contaminated soils and debris. Disposal of these wastes will be performed at the Environmental Restoration Disposal Facility or the W-025 Trench, both located on the 200 Area Plateau of the Hanford Site, in compliance with WAC 173-303 for any dangerous or mixed waste that will be generated. If generated wastes do not meet the acceptance criteria for these units, such as compliance with land disposal restrictions (40 CFR 268), a disposal plan will be developed to determine appropriate treatment or disposal options for these wastes. Waste generated as part of this remediation activity will be managed and disposed of in such a way as to ensure protection of human health and the environment.

Waste generation, management, and disposal will be conducted in accordance with operational procedures and with all State, Federal, and DOE Orders and regulations dealing with waste, including agreements with the public and stakeholders.

4.5 MODIFIED CLOSURE INSTITUTIONAL CONTROL REQUIREMENTS

Should a modified closure option be determined for 1301-N and/or 1325-N Liquid Waste Disposal Facilities, institutional controls in accordance with Permit Condition II.K.3.a and WAC 173-340-440 shall be adhered to. Institutional controls consist of physical measures and administrative and legal mechanisms. Possible methods of controlling access to contaminated sites include placement of signs,

entry control such as locked fencing, artificial or natural barriers, and active surveillance. Measures to be used depend on specific site conditions and degree of hazard associated with contamination left at the end of remediation activities. Because of this, specific institutional controls cannot be detailed until after selection of an alternative and incorporation of design elements during the remedial design phase.

A notice in deed and survey plat will be submitted to the Benton County Auditor as described in Section 4.12.

4.6 FINAL COVER REQUIREMENTS FOR LANDFILL CLOSURE

Should dangerous waste contaminants be left within the soil column above MTCA Method C levels, a landfill cover would need to be designed and constructed over the unit(s). Specific design aspects associated with a landfill cover would require development after the ROD and during the remedial design phase associated with 1301-N and 1325-N Liquid Waste Disposal Facilities.

4.7 PERSONNEL TRAINING

Training will be provided to site personnel in accordance with the 1301-N and 1325-N Liquid Waste Disposal Facilities training plan contained in DOE/RL-96-39, Rev. 1A, Attachment A-4. This training will be effective until the postclosure period. At that point, the personnel training information contained in Attachment 41, Chapter 5.0, §5.4 will supplement training of personnel for postclosure care activities.

4.8 CLOSURE CONTACT

The DOE-RL will be the official contact for 1301-N and 1325-N Liquid Waste Disposal Facilities during the postclosure period at the following address:

Director, Office of Environmental Services *
U.S. Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

*or its equivalent should there be a future reorganization at DOE-RL

4.9 CLOSURE SCHEDULE

Closure activities (actual cleanup) for 116-N-3 will begin in July 2000.

At the completion of 116-N-3, closure activities at 116-N-1 will begin. Approximately 600 feet (Permit Attachment 41, Chapter 2.0, Figure 2.1) of piping that is associated with the 116-N-1 TSD Waste Site and the 116-N-2 Facility and support facilities (1322-NA, NB, NC) will be deferred until decontamination and decommissioning (D&D) of these facilities. This deferral is due to safety concerns with remediating the piping and the radiological dose exposure to remedial action workers. Remediation will require excavation of the earthen berm at the 116-N-2 Facility, which provides radiological shielding.

Additionally, approximately 5,600 feet (Permit Attachment 41, Chapter 2.0, Figure 2.2) of piping that is associated with 116-N-1, 105-N and 109-N Facilities (part of the N Reactor Facility Complex) will be deferred until D&D activities of the 105-N Reactor Facility Complex. This deferral is also due to safety concerns with remediating the piping. Remediation will require excavation up to foundation walls of these facilities, thus, jeopardizing the integrity of the facilities. The pipelines intersect and/or follow active underground power lines and potable water lines. Finally, remediation will block the access routes to the ongoing pump-and-treat operations at the 100-N Springs and other active facilities in the 100-N Area.

The approximate duration of completion for both TSD units is 6 years, not including for the piping that will be deferred. The D&D of the 116-N-2 Facility and support facilities and removal of the deferred

piping is planned for startup in the fiscal year 2004. The deferred piping associated with the 105-N and 109-N Facilities will be remediated as part of D&D of the 105-N Reactor Facility Complex in accordance with Tri-Party Agreement Milestone M-093-20.

The corrective action schedule of compliance for UPR-100-N-31 will be the same as the closure schedule.

4.10 AMENDMENT OF CLOSURE PLAN

The 1301-N and 1325-N Liquid Waste Disposal Facilities closure plan will be amended whenever changes in closure activities or postclosure requirements occur and prior to certification of closure and postclosure, respectively, that would constitute a Class 1, 2, or 3 modification to the Permit (WAC 173-303-830).

4.11 CERTIFICATION OF CLOSURE

In accordance with WAC 173-303-610(6), within 60 days of closure of 1301-N and 1325-N Liquid Waste Disposal Facilities, RL will submit to Ecology a certification of closure signed by both RL and an independent registered professional engineer. The certification will specify that the units have been closed in accordance with specifications contained within the approved closure plan, as amended, and as contained in the Permit.

4.12 SURVEY PLAT AND NOTICE IN DEED

A survey plat will be submitted by RL to the Benton County Planning Department no later than 60 days after certification of closure of each unit in accordance with WAC 173-303-610(10). Also, a notice in deed will be submitted by RL to the Auditor of the Benton County no later than 60 days after certification of closure of each unit in accordance with WAC 173-303-610(10). After submitting this notice, a certification signed by the Permittees will be submitted to Ecology stating that notification has been recorded along with a copy of the notice in deed. The notice in deed will specify the type, location, and quantity of dangerous wastes remaining after closure actions have been completed.

Hanford Facility RCRA Permit Modification Notification

Part III, Chapter 2
305-B Storage Facility

Replacement Index

Attachment 18, Chapter 2.0
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2.0 FACILITY DESCRIPTION AND GENERAL PROVISIONS

This chapter briefly describes the Hanford Site and provides a general overview of the 305-B Storage Facility, including:

- Topography
- Location information
- Traffic information
- Performance standards
- Buffer monitoring zones
- Spills and discharges
- Manifest system.

2.1 THE 305-B STORAGE FACILITY

The 305-B Storage Facility is a dangerous waste and mixed waste storage unit owned and operated by DOE and co-operated by PNNL. The unit is used for the collection, consolidation, packaging, storage, and preparation for transport and disposal of both dangerous waste and mixed waste. It is an integral part of the Hanford Site's waste management system.

The 305-B Storage Facility is a one-story frame and masonry building with basement constructed in the early 1950s, with an attached two-story-high metal and concrete building constructed in January 1978, referred to in this document as the "high bay." The unit is located within the 300 Area, as shown in the Chapter 1.0, and was formerly used for engineering research and development. Unit upgrades were completed in 1988 to meet requirements for storage of dangerous waste and mixed waste. Waste storage under interim status began in March 1989.

Varieties of small volume chemical wastes are generated by PNNL's research laboratory activities under contract to DOE. These wastes are brought to the 305-B Storage Facility and segregated by compatibility for storage in the unit until enough waste is accumulated to fill a labpack or bulking container, usually a 30- to 55-gallon drum. When a sufficient number of shipping containers of waste have accumulated, they are manifested for shipment, generally to permitted off-site recycling, treatment or disposal facilities.

Dangerous wastes are stored in the high bay. The high bay has been equipped with a secondary containment system to facilitate storage of containerized wastes. In addition, four storage "cells" have been constructed within the high bay area for segregated storage of incompatible waste streams. Each of the cells is approximately 14' x 14', enclosed by 4' high concrete block walls; each cell has its own separate secondary containment system. Drum-quantity storage for incompatible wastes has also been provided in separate areas of the high bay. A description of these areas is given in Chapter 4.0, Section 4.1.1.6.

Mixed waste is stored in the basement of the original wing of the building in an area approximately 18' x 32'. The mixed waste area is also equipped with a secondary containment berm to prevent migration of spilled wastes. Flammable mixed waste cannot be stored below grade (per Uniform Fire Code) and is stored in an independent area on the first floor of the original wing in individual secondary containment structures (refer to Chapter 4.0, Section 4.1.1.6.11).

The 305-B Storage Facility is equipped with a heating, ventilation, and air conditioning (HVAC) system to provide relatively constant temperatures during storage of dangerous wastes. The first floor of the older building and the high bay are served by a dual-compressor heat pump system for both heating and

air conditioning. The basement area is served by a separate electric heating and evaporative cooling combined system. These systems are adequate to maintain interior temperatures in the range of 50-85°F during normal ambient temperatures of 10-110°F.

In addition, the unit utilizes a local exhaust system for "bulking" as described in Chapter 4.0, Section 4.1.1.2. This system is located in the flammable liquid bulking module. Local exhaust is provided during bulking operations. Another, smaller ventilation system, referred to as the "elephant trunk ventilation system," is located in the high bay storage cell areas for occasional bulking of solids or nonflammable liquids not requiring use of the flammable liquid bulking module. A smaller, laboratory-style fume hood has also been installed on the south wall of the high bay for compatibility testing and small-volume waste work.

A simplified building layout is shown in Chapter 4.0, Figure 4.7. Individual storage cells are described in Chapter 4.0, Section 4.1.

2.2 TOPOGRAPHIC MAP

Refer to Chapter 1.0, for map information

2.3 PERFORMANCE STANDARD

The 305-B Storage Facility was designed to minimize the exposure of personnel to dangerous wastes and hazardous substances and to prevent dangerous wastes and hazardous substances from reaching the environment.

In addition, measures are taken to ensure that 305-B Storage Facility is maintained and operated, to the maximum extent practicable given the limits of technology, in a manner that prevents:

- Degradation of groundwater quality
- Degradation of air quality by open burning or other activities
- Degradation of surface water quality
- Destruction or impairment of flora or fauna outside of the facility
- Excessive noise
- Negative aesthetic impacts
- Unstable hillsides or soils
- Use of processes that do not treat, detoxify, recycle, reclaim, and recover waste material to the extent economically feasible
- Endangerment to the health of employees or the public near the facility.

The measures taken to prevent each of the above negative effects from occurring are described in the following sections.

2.3.1 Measures to Prevent Degradation of Groundwater Quality

Degradation of groundwater quality is prevented by storing waste containers within an enclosed building with a sealed concrete floor. All drains and sumps in areas where wastes are stored are blocked to prevent release of spilled material to the environment. The 305-B Storage Facility accepts only those packages meeting applicable DOT requirements. Opening of containers is done only in areas with spill containment. Design and administrative controls significantly reduce the possibility of release of dangerous waste to the environment through soil or groundwater contamination.

2.3.2 Measures to Prevent Degradation of Air Quality by Open Burning or Other Activities

No open burning occurs at 305-B Storage Facility. There is no vegetation around 305-B Storage Facility and the area around the facility is paved or graveled, thereby reducing the risk of fire or wind erosion. Combustible and flammable waste is packaged in a manner that reduces the potential for fire.

2.3.3 Measures to Prevent Degradation of Surface Water Quality

The potential for degradation of surface water quality is extremely low, due to the manner in which the facility is designed and operated. All waste handling activities (i.e., loading/unloading, container opening, waste transfer) presenting the opportunity for spills are conducted inside the unit. All exits from storage areas of 305-B Storage Facility are equipped with spill collection sumps to prevent spilled material from escaping.

2.3.4 Measures to Prevent Destruction of Impairment of Flora or Fauna Outside of the Facility

305-B Storage Facility is located within the 300 Area. The 300 Area is highly developed and areas not occupied by buildings are generally paved or graveled. As a result, flora or fauna are generally absent within the 300 Area except for several grassed areas. Measures to prevent destruction or impairment of flora or fauna outside the 300 Area are the same as those to prevent releases from the unit (i.e., all waste handling is performed within an enclosed area having spill collection sumps).

2.3.5 Measures to Prevent Excessive Noise

During normal operations at 305-B Storage Facility excessive noise is not generated. The major sources of noise are waste transport and handling equipment (i.e., forklifts, light vehicles). The noise generated at 305-B Storage Facility is compatible with the types of activities generated at neighboring facilities in the 300 Area.

2.3.6 Measures to Prevent Negative Aesthetic Impacts

305-B Storage Facility does not injure or destroy the surrounding flora and fauna. The facility stores waste in approved DOT containers within the confines of the structure. The building's appearance is similar to neighboring facilities. For these reasons, the facility presents no negative aesthetic impacts.

2.3.7 Measures to Prevent Unstable Hillsides or Soils

There are no naturally unstable hillsides near 305-B Storage Facility. The soil beneath and around the facility was compacted prior to construction.

2.3.8 Measures to Prevent the Use of Processes That Do Not Treat, Detoxify, Recycle, Reclaim, and Recover Waste Material to the Extent Economically Feasible

The 305-B Storage Facility was established, in part, to enhance DOE's and PNNL's efforts to eliminate or minimize dangerous waste generation, and to treat, detoxify, recycle, reclaim and recover waste materials.

Offsite waste management options for dangerous wastes being shipped from the 305-B Storage Facility are evaluated according to the following order of preference:

1. Recycling, including solvent reprocessing, oil recycling, metals recovery, burning for energy recovery, etc.
2. Treatment, including incineration, volume and/or toxicity reduction, chemical destruction, etc.

3. Land disposal is viewed as least favored option and is generally only used for treatment residues, spill cleanup residues, or when treatment is not feasible.

When permitted by law and/or contractual obligations, 305-B Storage Facility staff tries to use this hierarchy without regard to minor variations in cost, e.g., if recycling is available but slightly more expensive than land disposal, recycling is utilized.

2.3.9 Measures to Prevent Endangerment to the Health of Employees or the Public Near the Facility

305-B Storage Facility is within the 300 Area, which is located approximately 1 mile north of the corporate limits of the City of Richland. Public entry to the 300 Area is not allowed; members of the public, therefore, cannot enter 305-B Storage Facility. Exposure of members of the public or employees to dangerous and mixed waste constituents is prevented through administrative controls over the designation, packaging, loading, transporting, and storing of the wastes received at 305-B Storage Facility. In addition, physical controls exist (i.e., spill collection sumps) to prevent release of wastes or waste constituents in the event of a spill.

Employees are trained to handle and store waste packages (Chapter 8.0). The training includes dangerous waste awareness, emergency response, and workplace safety. Protective equipment, safety data, and hazardous materials information are supplied by operations management and are readily available for employee use.

A contingency plan, including emergency response procedures, is in place and is implemented for spill prevention, containment, and countermeasures to reduce safety and health hazards to employees, the environment, and the public. The contingency plan is described in Chapter 7.0.

2.4 BUFFER MONITORING ZONES

Buffer and monitoring zones around 305-B Storage Facility are described in the following sections.

2.4.1 Ignitable or Reactive Waste Buffer Zone

Ignitable and reactive wastes are stored in 305-B Storage Facility in compliance with the requirements of the 1988 Uniform Fire Code, Article 79, Division II (International Conference of Building Officials 1991). Quantity limits for storage are established to comply with requirements for Class B occupancy. Structures surrounding 305-B Storage Facility are laboratory and office buildings, which are occupied during normal working hours. The nearest adjacent facility is the 314 Building, which is approximately 30 ft south of 305-B Storage Facility. The closest 300 Area boundary is the western boundary, which is approximately 250 ft west of 305-B Storage Facility.

2.4.2 Reactive Waste Buffer Zone

Storage of certain reactive wastes listed in WAC 173-303-630(8)(a) is done at 305-B Storage Facility. These wastes have special storage requirements more stringent than those shown in Section 2.4.1. They are stored in accordance with this section and with the Uniform Building Code's Table 77.201, latest edition. The 1988 edition requires buffer zones in Class B occupancies of 44 inches for storage of such wastes, and the storage locations in 305-B Storage Facility reflecting appropriate buffer zones are noted in Chapter 4.0, Figure 4.1. These wastes are only occasionally stored at the unit depending on generation by individual research projects.

The occupancy storage limitations imposed by UBC for class B occupancy are as follows:

- Explosives: 1 lb
- Organic Peroxide, unclassified, detonatable: 1 lb
- Pyrophoric: 4 lbs
- Unstable (reactive), Class 4: 1 lb

These limits are allowed to be doubled when stored in flammable storage cabinets, as is done at 305-B Storage Facility; hence, the practical storage limits at 305-B Storage Facility are double those shown here.

2.4.3 Travel Time

Operation of 305-B Storage Facility does not involve the placement of waste in dangerous waste surface impoundments, piles, landfarms, or landfills. Therefore, the requirement that the travel time from the active portion of the unit to the nearest downstream well or surface water used for drinking purposes be at least three years for dangerous waste and 10 years for extremely hazardous waste does not apply.

2.4.4 Dangerous Waste Monitoring Zone

Operation of 305-B Storage Facility does not involve the placement of waste in dangerous waste surface impoundments, waste piles, land treatment, or landfill areas. Therefore, a dangerous waste monitoring zone is not required.

2.4.5 Extremely Hazardous Waste Monitoring Zone

Operation of the 305-B Storage Facility does not involve the placement of waste in dangerous waste surface impoundments, waste piles, land treatment, or landfill areas. Therefore, an extremely hazardous waste monitoring zone is not required.

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3.0 WASTE ANALYSIS

The purpose of this Waste Analysis Plan (WAP) is to document the waste acceptance process, sampling methodologies, analytical techniques, and processes that are undertaken for sampling and analysis of dangerous and or mixed waste managed in the 305-B Storage Facility.

This chapter also provides information on the chemical, biological, and physical characteristics of the waste stored at the 305-B Storage Facility.

3.1 CHEMICAL, BIOLOGICAL, AND PHYSICAL ANALYSIS

The dangerous waste and mixed waste stored at 305-B Storage Facility can be categorized as originating from five basic sources:

- Listed Waste from specific and nonspecific sources
- Discarded commercial chemical products
- Mixed Waste from Research Activities
- Waste from chemicals synthesized or created in research laboratories
- Discarded commercial products exhibiting dangerous waste characteristics and/or criteria.

Each of these waste categories is discussed below, including waste descriptions, hazard characteristics, and bases for hazard designations. This information includes that which must be known to treat, store, or dispose of the waste, as required under WAC 173-303-806(4)(a)(ii).

Listed Waste from Specific and Nonspecific Sources. Wastes from specific and nonspecific sources consist of those listed wastes identified in WAC 173-303-9904. Chapter 1.0 identifies the waste from this category with their estimated annual management quantities.

Halogenated and nonhalogenated solvents are in the form of spent solvents. Degreasing solvents (F001), as well as spent halogenated solvents (F002), are used primarily in research although some commercial applications do exist (e.g., printing, duplicating). Spent non-halogenated solvents (F003, F004, and F005) also come primarily from research laboratories, although some is generated through maintenance applications. Manufacturing activities are not performed at Hanford; therefore, dangerous waste from specific sources (WAC 173-303-9904 "K" Waste) typically is not generated at PNNL. However, small quantities of K-listed waste have been generated from treatability studies and sample characterization activities at PNNL from time to time and could be stored at 305-B Storage Facility. W001 state source waste (PCB electrical equipment waste) has been generated in limited amounts in the past and could be stored at 305-B Storage Facility if other generation activities occur.

F-listed waste is designated based on process knowledge (i.e., information from container labels or material safety data sheets), or by sampling. Sampling is performed if the generating unit does not have sufficient information to document the composition and characteristics of the waste. The waste generator is responsible for specifying the characteristics of the waste based on knowledge of the chemical products used (i.e., information supplied by the manufacturer) and the process generating the waste. These listed wastes are all designated as based on the criteria given in WAC 173-303-070. These wastes are also subject to LDR regulations under 40 CFR 268, including disposal prohibitions and treatment standards.

Discarded Chemical Products. Discarded chemical products consist of those products described in WAC 173-303-081. Chapter 1.0, for 305-B Storage Facility identifies all of the discarded chemical products listed in WAC 173-303-9903 and specifies an estimated maximum annual management quantity,

based on prior experience. Chapter 1.0 lists all of these waste codes, however, because the wide variety of research activities conducted at Hanford presents the potential to generate any of these wastes.

These wastes (P waste and U waste) are typically received at 305-B Storage Facility in the manufacturer's original container. These containers typically consist of glass and polyethylene jars or bottles and metal cans that have a volume equal to or less than 4 liters.

Wastes in this category are designated based on the generator's knowledge. As these waste are usually in original containers, information on the container label is verified by generator knowledge (i.e., knowledge that material is in its original container) and is used to identify contents. Waste in 'as procured' containers (i.e., original container with intact label) are not sampled. These listed wastes contain those designated as DW as well as those designated as EHW. These wastes are also subject to LDR regulations under 40 CFR 268, including disposal prohibitions and treatment standards.

Mixed Waste from Research Activities. Dangerous or mixed wastes can be generated by research and analytical activities. These wastes are generated in laboratories performing chemical and physical research. These wastes are designated based on the generator's knowledge or based on sampling and analysis. The generator's knowledge is used if the generator has kept accurate records of the identities and concentrations of constituents present in the waste. For example, many generating units keep log sheets for accumulation containers in satellite areas to keep a record of waste constituents. If information available from the generator is inadequate for waste designation, the wastes are sampled and the results of the analysis are used for designation. These wastes include those designated as state only dangerous waste under WAC 173-303-100 and those designated as characteristic dangerous waste under WAC 173-303-090. Chapter 1.0 includes all categories of toxic, and persistent, waste (i.e., both DW and EHW). The wide variety of research activities conducted at Hanford presents the potential that these wastes could be generated and requires subsequent management at 305-B Storage Facility. Similarly, Chapter 1.0, includes the characteristic dangerous waste categories D001 through D043 (i.e., ignitable, corrosive, reactive, and TCLP toxic due to metals or organics content).

Flammables (i.e., flash point less than 140° Fahrenheit) will not be stored in the below-grade mixed waste cell; however, ignitables (D001 due to oxidizer content) will be stored in this cell. Flammable mixed waste is not stored below grade due to Fire Code restrictions. These wastes are stored above the mixed waste cell in a flammable storage module. The flammable mixed waste module is equipped with secondary containment to provide greater than 100 percent secondary containment volume.

The waste in this category includes those designated as either DW or EHW. The waste could also be federal LDR waste regulated under 40 CFR 268 as well as state LDR waste regulated under WAC 173-303-140 (e.g., organic/carbonaceous waste).

Waste from Chemicals Synthesized or Created in Research Laboratories. Waste from chemicals synthesized or created in research laboratories typically consist of organics in quantities of 100 g or less, received in small containers.

These wastes are designated based on the generator's knowledge or based on sampling and analysis. The generator's knowledge is used if the generating unit has kept accurate records of the identities and concentrations of constituents present in the waste (e.g., log sheets for accumulation containers). If information available from the generating unit is inadequate for waste designation, the waste is sampled and the results of the analysis are used for designation. These wastes include those designated as state only dangerous waste under WAC 173-303-100 and those designated as characteristic dangerous waste under WAC 173-303-090. Chapter 1.0, for 305-B Storage Facility includes all categories of toxic and persistent waste (i.e., both DW and EHW). The wide variety of research activities conducted at Hanford

presents the potential that these wastes could be generated and requires subsequent management at 305-B Storage Facility.

The waste in this category includes those designated as either DW or EHW. These wastes could also be federal LDR wastes regulated under 40 CFR 268 as well as state LDR wastes regulated under WAC 173-303-140 (e.g., organic/carbonaceous wastes).

Discarded Chemical Products Exhibiting Dangerous Waste Characteristics and/or Criteria. Many discarded chemical products handled in 305-B Storage Facility are not listed in WAC 173-303-9903 and are still considered dangerous waste since they exhibit at least one dangerous waste characteristic and/or criterion (WAC 173-303-090 and WAC 173-303-100). These wastes are included with those listed in the Chapter 1.0, under waste codes D001 through D043, WT01, WT02, WP01, WP02, and WP03.

Waste in this category is designated based on the generator's knowledge. As these wastes are usually in their original containers, information on the container label is verified by the generator's knowledge and is used to identify the contents. These wastes contain those designated as DW as well as those designated as EHW. These wastes could also be federal LDR waste regulated under 40 CFR 268 as well as state LDR waste regulated under WAC 173-303-140 (e.g., organic/carbonaceous waste).

3.1.1 Containerized Waste

The container storage areas at 305-B Storage Facility meet the containment system requirements of WAC 173-303-630(7)(c). Testing or documentation that the dangerous waste stored at 305-B Storage Facility does not contain free liquids is not required.

3.1.2 Waste in Tank Systems

This section does not apply to the 305-B Storage Facility because wastes are not stored in tanks.

3.1.3 Waste in Piles

This section does not apply to the 305-B Storage Facility because wastes are not stored in piles.

3.1.4 Landfill Waste

This section does not apply to the 305-B Storage Facility because wastes are not placed in landfills.

3.1.5 Waste Incinerated and Waste Used in Performance Tests

This section does not apply to the 305-B Storage Facility because wastes are not incinerated.

3.1.6 Waste to be Land Treated

This section does not apply to the 305-B Storage Facility because waste does not undergo land treatment.

3.2 WASTE ANALYSIS PLAN

This section describes the processes used to obtain the information necessary to manage waste in accordance with the requirements of WAC 173-303.

3.2.1 Facility Description

The 305-B Storage Facility is a dangerous waste and mixed waste storage unit owned and operated by the Department of Energy and co-operated by Pacific Northwest National Laboratory (PNNL). The unit is used for the collection, consolidation, packaging, storage, and preparation for transport and disposal of both dangerous waste and mixed waste. It is an integral part of the Hanford Site's waste management system.

The 305-B Storage Facility is a one-story frame and masonry building with basement constructed in the early 1950s, with an attached two-story-high metal and concrete building constructed in January 1978, referred to in this document as the "high bay". The unit is located within the 300 Area, and was formerly used for engineering research and development. Unit upgrades were completed in 1988 to meet requirements for storage of dangerous waste and mixed waste. Waste storage under interim status began in March 1989.

3.2.2 Description of Facility Processes and Activities

Varieties of small volume chemical wastes are generated by PNNL's research laboratory activities. These wastes are brought to the 305-B Storage Facility and segregated by compatibility for storage in the unit until enough waste is accumulated to fill a labpack or bulking container, usually a 30 – 55-gallon drum. When a sufficient number of shipping containers of waste have accumulated, they are manifested for shipment, generally to permitted off-site recycling, treatment or disposal facilities.

Dangerous wastes are stored in the high bay. The high bay has been equipped with a secondary containment system to facilitate storage of containerized waste. In addition, four storage "cells" have been constructed within the high bay area for segregated storage of incompatible waste streams. Each of the cells is approximately 14' x 14', enclosed by 4' high concrete block walls; each cell has its own separate secondary containment system. Drum-quantity storage for incompatible waste is allowed in these cells and in separated areas of the high bay.

Mixed waste is stored in the basement of the original wing of the building in an area approximately 18' x 32'. Flammable mixed waste cannot be stored below grade (per Uniform Fire Code) and is stored in an independent area on the first floor of the original wing in the mixed waste flammable storage module. Knowledge from the generator is generally sufficient to meet the requirements for a "detailed chemical, physical, and/or biological analysis" of wastes accepted at the 305-B Storage Facility for the following reasons:

- Wastes stored at 305-B Storage Facility are generated on the Hanford Site and/or by PNNL research programs; effective administrative control can be maintained over individual waste generating units (i.e., the same organization generates the waste and operates the storage unit)
- Wastes stored at 305-B Storage Facility may be discarded chemical products for which knowledge of waste characteristics is available without further analysis
- Most of the waste stored at 305-B Storage Facility is a result from research activities that are carefully controlled and documented; this documentation includes information on chemical constituents.
- To confirm the sufficiency and reliability of the knowledge provided by generators, onsite visits of the generating unit's areas are performed to familiarize waste management staff with the generator's processes. Data provided by the operations generating the waste is reviewed to identify any special requirements for safe management of the waste. Other methods for confirmation noted in WAC 173-303-300(2)(a) may be used instead of or in conjunction with onsite visits and data review in conjunction with onsite visits and data review in special situations.

Because of the importance of administrative controls for the purposes of waste analysis, processes for management of wastes from the time of generation through storage at 305-B Storage Facility are described below. These processes demonstrate how sufficient knowledge is obtained from generating units to manage properly dangerous and mixed waste at 305-B Storage Facility. In the event that such knowledge is not available, sampling and analysis is required by 305-B Storage Facility prior to shipment to the storage unit.

The 305-B Storage Facility personnel shall collect from the generating unit(s) the information pursuant to 40 CFR 268.7(a) regarding LDR wastes, the appropriate treatment standards, whether the waste meets the treatment standards, and the certification that the waste meets the treatment standards, if necessary, as well as any waste analysis data that supports the generator's determinations. If this information is not supplied by the generating unit, then the 305-B Storage Facility personnel shall be responsible for completion and transmittal of all subsequent information regarding LDR wastes, pursuant to 40 CFR 268.7(b). All waste streams must be reevaluated when the generating unit and/or the 305-B Storage Facility personnel have reason to believe the waste stream has changed, to determine compliance with LDR requirements in 40 CFR 268.

Volumetric Description of Waste. A wide range of waste volumes is collected from research and support activities. The largest unit container collected is a DOT container <0.46 m^3, while the smallest is a trace amount in a small vial.

Large volume containers (greater than 4 L) (commonly contain chemicals such as those listed in WAC 173-303-9903 and -9904 and in 40 CFR 261.33), or commercial products which exhibit one or more of the dangerous waste characteristics or criteria. Greater than 99 percent of the containers generally contain chemicals for which information is easily accessible to determine dangerous designation. This information is generally obtained from the container label, for those waste in original containers, or from the material safety data sheet (MSDS) for the product.

Notification for Storing of Waste: The waste analysis process begins when the waste management organization is notified of the presence of a chemical or mixed waste. This notification is accomplished by the generating unit completing and transmitting an electronic Disposal Request. The form describes the volume and chemical composition of waste in each waste container for disposal. Hazard and compatibility information are obtained for each item on the disposal request form to ensure the safety of the waste management organization staff that collect and transport the waste and to ensure safe and appropriate storage in 305-B Storage Facility.

The compatibility and hazard class are determined using reference material that may include, Condensed Chemical Dictionary, Merck Index, 49 CFR, NIOSH, Sigma-Aldrich or any other reference material that is applicable. The priority of hazard designation for those substances with multiple hazards or for mixtures is the same used by the DOT in 49 CFR 173.2.a.

Disposal Requests and other information used for determining waste designations and compatibility must meet four distinct needs of the dangerous waste manager and sample collector. They must enable each to:

- Identify those wastes which are designated dangerous in accordance with WAC 173-303 and whether those wastes are DW or EHW
- Determine whether the waste is restricted from land disposal under 40 CFR 268 or WAC 173-303-140 and, as whether it, complies with applicable treatment standards under 40 CFR 268 or WAC 173-303-140
- Identify and verify specific morphological characteristics of waste in solid or solution form
- Outline how to safely handle, transport, analyze, store, and dispose of the waste product or sample.

Physical Analysis. Visual validation as a physical analysis activity strongly relied upon to confirm the nature of a waste collected or sampled, and to determine the accuracy of the disposal request information received from the generating unit. It is impractical for the waste management organization to analyze chemically each container or vial of waste accepted for storage in 305-B Storage Facility since the amount handled can exceed 10,000 containers per year. A more realistic approach to reducing risks to safety and the environment, and one implemented at 305-B Storage Facility, includes trained and experienced personnel performing a visual inspection of the waste and direct inquiry of the generating unit's personnel. The waste is inspected to verify that it matches the description on the disposal request. If the waste is a discarded product, the contents of the container are inspected to verify that they match the description of the product. For other waste, e.g., spent solvents, waste descriptions are compared with the products in use at the generating unit. Generating unit personnel are queried concerning the source of the waste and the materials used in the process generating the waste. This information is compared to the description of the waste on the disposal request. If, after visual inspection of the waste and interrogation of the generating unit personnel, any doubt remains as to the true identity of the waste, the waste is sampled and analyzed by the generating unit as described in Section 3.5.

Waste Collection at the Generating Unit. When satisfactory information has been obtained from the Disposal Request Form, waste management organization staff visits the generating unit site and make a final inspection of the waste containers to determine whether the disposal request form and contents label information match completely. If the information on the disposal request matches with the container labeling and visual inspection, the waste is approved for storage. If discrepancies are found, the generating unit is required to resubmit the disposal request with accurate information. Unknown or unidentified materials are sampled by generating unit staff for identification of constituents and remain at the generating unit until the composition has been determined.

Labeling and Marking. After inspection of the waste at the generating unit, the approved waste is assigned a unique computer identification number, cell location, and hazard classification. Waste meeting Washington dangerous waste criteria under WAC 173-303-090 or 173-303-100 are marked "Toxic" (for waste designated WT01 or WT02), and/or "Persistent" (for waste designated WP01, WP02, or WP03), in accordance with WAC 173-303-630(3). In addition, each waste container is labeled with a list of constituents and major risk(s). This computerized information helps the waste handlers ensure safe handling, storage, retrieval, and transportation of dangerous waste.

Transportation. The labeled containers are transported to 305-B Storage Facility by PNNL staff trained in applicable DOT requirements and emergency response. Waste is transported using a truck or light utility vehicle. For transport on roads accessible to the public, the vehicles are placarded in compliance with DOT regulations and documented in compliance with WAC 173-303-180, Hanford Facility Permit Conditions II.P, and/or II.Q as applicable.

Waste Handling, Storage, and Tracking at 305-B Storage Facility. Waste received at 305-B Storage Facility is put into 14 separate hazard classifications based on building and fire code restrictions for that type of facility:

1. Non-flammable mixed waste
2. Oxidizers
3. Acids, (organic and inorganic)
4. Poison
5. Caustics
6. Flammable Solids
7. Non-Regulated
8. Miscellaneous
9. Washington State only waste (e.g., sodium chloride, sodium bicarbonate)
10. Flammable and combustible liquids

11. Flammable and combustible mixed waste
12. Compressed gases and aerosols
13. Special Case waste (organic peroxides, explosives, etc.)
14. Recycle

Each hazard class has designated and clearly identified locations within 305-B Storage Facility. Containers of dangerous wastes (10 gallons or less) are stored in a specific storage cabinet or shelf designed for that hazard class. The cabinets are located inside the appropriate storage cell (i.e., acid storage cabinet in acid cell). DOT-approved containers (typically 10 gallons and larger but less than 0.46m3) are segregated by hazard class and can be stored in an appropriate storage cell or on the main high bay floor in 305-B Storage Facility.

Only sealed containers of nonflammable mixed waste are received in the below-grade mixed waste storage area located in the basement of 305-B Storage Facility. Containers of flammable mixed waste are stored above grade in a flammable storage module adjacent to the high bay area. All chemical storage is in accordance with fire protection requirements of the 1988 Uniform Fire Code (International Conference of Building Officials 1988).

Storage limits for all chemicals are listed in Table 4-1, (Uniform Building Code Table numbers 9-A and 9-B). This table is incorporated into this section by reference.

Recordkeeping and Inventory Control. A computer tracking system has been developed to ensure that complete records of current inventory, packaging, and shipping data are maintained. Records of the initial waste disposal request, waste analysis result-if required, waste designation, and shipping manifests are maintained. As wastes are received for disposal, the containers are labeled with the information described in the Labeling and Marking section above, including a unique computer identification number.

The endpoint of the process for most waste is proper packaging and transport of the waste to an approved recycler or treatment/disposal facility. Some commercial chemical products, however, are redistributed to other Hanford Site contractors. Final computer verification of the history and ultimate disposal of each waste container is entered when the material is shipped from the 305-B Storage Facility.

Current waste quantities in inventory are periodically verified and reported to the Unit Operations Supervisor. The inventory is checked by hazard class, and provides a measure of current inventory versus established limits.

If it is determined that 305-B Storage Facility inventory is within 5 percent of the limit for a given hazard classification, additional waste of that hazard class is not accepted into 305-B Storage Facility until the inventory has been reduced. The unit-operating supervisor must approve exceptions.

Unknown Waste and Waste Constituent Verification. Containers with unknown waste compositions are not accepted at 305-B Storage Facility. In the event that 305-B Storage Facility staff is required to respond to a critical need of a generating unit in the future and pick up an unknown waste, it will be sampled and analyzed as described in Sections 3.4.

If, for any reason, 305-B Storage Facility personnel believe that more stringent analysis of non-reagent grade chemical waste is needed (i.e., flash cans and mixtures), they will request that the generating unit have the waste analyzed by an approved analytical laboratory. Reasons for this request may be questionable appearance of the waste, periodic confirmation of waste composition, or historically unreliable information from a particular generating unit. There is no established frequency for this sampling and analysis; it is conducted on an as-needed basis. This analysis must be performed in

accordance with EPA SW-846 procedures (EPA 1986). Analytical laboratories in the area with these capabilities include commercial, Hanford Site and Battelle operated laboratories. The generating unit must also provide the laboratory analysis confirming the waste composition when the waste management organization picks up the waste. This analysis will become part of the 305-B Storage Facility Operating Record.

3.2.3 Identification/EPA Classification and Quantities of Hazardous Wastes Managed within the 305-B Storage Facility

Refer to Section 3.1 for a description of the types and quantities of wastes managed at 305-B Storage Facility.

3.2.4 Description of Hazardous Waste Management Units

The 305-B Storage Facility Waste Management Units are described in Chapter 4.0.

3.3 SELECTING WASTE ANALYSIS PARAMETERS

State and federal regulations [WAC 173-303-300(2) and (5)(a); WAC 173-303-140; 40 CFR 268.7(a)] require that information be obtained, documented, and/or reported on wastes received by a TSD unit. These requirements include ensuring that only waste which meets 305-B Storage Facility unit-specific permit requirements are accepted, and reporting the information required by WAC 173-303-380. In addition to providing a general description of the waste, the focus of the information collected for regulatory purposes is to ensure that the 305-B Storage Facility is permitted to accept and store the waste.

The 305-B Storage Facility only accepts wastes that have been characterized properly. Before receipt or acceptance of waste at the 305-B Storage Facility, generators must supply adequate information to characterize and manage wastes properly.

One of the most important aspects of operating the 305-B Storage Facility in a safe manner is to ensure that incompatible wastes are not mixed together. For the purposes of this document, waste is considered compatible if when mixed, waste does not: (1) generate extreme heat or pressure, fire, or explosion, or violent reaction; (2) produce uncontrolled toxic mists, dusts, or gases in sufficient quantities to threaten human health; (3) produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions; (4) damage the structural integrity of the device or facility containing the waste; or (5) through other like means threaten human health or the environment.

Sampling and laboratory analysis could be required to verify or establish waste characteristics for waste that is stored at the 305-B Storage Facility. The following are instances where sampling and laboratory analysis is required:

- inadequate information on PNNL-generated waste
- 5 percent waste verification for PNNL-generated waste
- 10 percent waste verification for non-PNNL-generated waste
- identification and characterization for unknown waste and spills within the unit.

3.3.1 Parameter Selection Process

The selection of analytical parameters is based on the State of Washington's *Dangerous Waste Regulations*, WAC 173-303-300 and *EPA Waste Analysis at Facilities That Generate, Treat, Store, and Dispose of Hazardous Wastes, A Guidance Manual* (EPA 1994).

At least five percent of the waste containers received at 305-B during a federal fiscal year (October 1 through September 30) will undergo confirmation of designation pursuant to Sections 3.2.2 and 3.2.3. The number of containers needed to meet the five percent requirement is five percent of the average of containers for the previous three months. For example if 200 containers are received in January, 180 in February, and 220 in March, then 10 containers of received waste must undergo confirmation of designation in April. All non-PNNL Hanford Site generating units, which ship more than 20 containers through 305-B Storage Facility in a fiscal year, will have at least one container sampled and analyzed. Containers, for which there is insufficient process knowledge, or analytical information to designate without sampling and analysis, may not be counted as part of the five percent requirement unless there is additional confirmation of designation independent of the generator designation. The generating unit's staff shall not select the waste containers to be sampled and analyzed other than identifying containers for which insufficient information is available to designate.

Containers of the following are exempt from the confirmation calculation above: Laboratory reagents or other unused products such as paint, lubricants, solvent, or cleaning products, whether received for redistribution, recycling, or as waste. To qualify for this exemption, such materials must be received at 305-B Storage Facility in their original containers.

Prior to acceptance of wastes at 305-B Storage Facility, confirmation of designation may be required as noted above. Wastes that shall undergo confirmation of designation may be divided into two groups; those that easily yield a representative sample (Category I), and those that do not (Category II). The steps for each type are outlined below along with a description of which wastes fall into each category:

Category I. If a waste, which easily yields a representative sample, is received, a representative sample will be taken from the waste containers selected. If more than one phase is present, each phase must be tested individually. The following field tests will be performed as appropriate for the waste stream:

- Reactivity - oxidizer, cyanide, and sulfide tests. These tests will not be performed on materials known to be organic peroxides, ethers, and/or water reactive compounds.
- Flashpoint/explosivity - explosive atmosphere meter[1], or a closed cup flashpoint measurement instrument[1].
- pH - by pH meter[1] or pH paper (SW-846-9041)[2]. This test will not be performed on non- aqueous materials.
- Halogenated organic compounds.
- Volatile organic compounds - by photo or flame ionization tester[1], by gas chromatography with or without mass spectrometry, or by melting point and/or boiling point determination.

If the sample data observed meets the parameters specified in its documentation, confirmation of designation is complete and the waste may be accepted. If not, the waste is rejected and returned to the generating unit for additional characterization. The waste will be required to be resubmitted with a revised Disposal Request following the additional characterization activity.

When mathematically possible, the Permittees shall perform confirmation on an equal number of Category I and Category II containers.

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[1] These instruments are field calibrated or checked for accuracy daily when in use.

[2] The pH paper must have a distinct color change every 0.5-pH units and each batch of paper must be calibrated against certified pH buffers, or by comparison with a pH meter calibrated with certified pH buffers.

Category II. If a representative sample is not easily obtained (for example, discarded machinery or shop rags), or if the waste is a labpack or discarded laboratory reagent container, the following steps will be performed:

a. Visually verify the waste. Examine each selected container to ensure that it matches the data provided on the Disposal Request form(s) provided to document the waste. Labpacks and combination packages that are accepted from non-PNNL generators must be removed from the outer container. If the waste matches the description specified in its documentation, confirmation of designation is complete and the waste may be accepted. If not, the waste is rejected and returned to the generating unit, and the generating unit revises and resubmits the documentation to reflect the actual contents. If necessary, the waste shall be re-designated utilizing the designation methods identified in WAC 173-303-070 through 173-303-100."

3.3.2 Criteria and Rational for Parameter Selection

Waste-testing methods, parameters and the rationale for these parameters are summarized in Table 3-1. Waste testing methods and references to these methods are as specified in WAC 173-303-110(3) or approved by Ecology in accordance with WAC 173-303-110(5). These methods are summarized in Table 3-1. All methods are specified in *Chemical Testing Methods*, WDOE 83-13 (Ecology 1983) and/or *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA SW-846 (EPA 1986).

Testing parameters for each type of waste were selected to obtain data sufficient to designate the waste properly under WAC 173-303-070, meet requirements for Land Disposal Restrictions, and to manage the waste properly. If information on the source of the waste is available, then all parameters might not be required, e.g., exclusion of testing for pesticides from a metal-machining operation.

Some of the parameters that are considered for waste received at the 305-B Storage Facility are as follows.

- Physical description – used to determine the general characteristics of the waste. This facilitates subjective comparison of the sampled waste with previous waste descriptions or samples. A physical description is also used to verify the observational presence or absence of free liquids.
- pH – used to identify the pH and corrosive nature of an aqueous or solid waste, to aid in establishing compatibility strategies, and to indicate if the waste is acceptable for treatment and/or storage in the 325 Hazardous Waste Treatment Units (HWTUs).
- Cyanide – used to indicate whether the waste produces hydrogen cyanide upon acidification below pH 2.
- Sulfide screen – used to indicate if the waste produces hydrogen sulfide upon acidification below pH 2.
- Halogenated hydrocarbon content screen – used to indicate whether chlorinated hydrocarbons or polychlorinated biphenyls (PCBs) are present in waste and to determine if the waste needs to be managed in accordance with the regulations prescribed in the *Toxic Substance Control Act of 1976*.
- Ignitability – used to identify waste that must be managed and protected from sources of ignition or open flame.
- Testing kits – used to determine waste characteristics and verify generator knowledge. The testing procedures for each test are included in the appropriate test kit.

3.3.3 Special Parameter Selection Requirements

The 305-B Storage Facility does not have any process vents that manage hazardous waste with organic concentrations of at least 10 part per million by weight percent, or pumps, or compressors used more than 300 hours per year that come into contact with hazardous waste with an organic concentration of at least 10 percent by weight.

A variety of small volume chemical wastes is generated by PNNL's research laboratory activities. These containers typically range in sizes from 10 ml to 20 gallon. These wastes are brought to the 305-B Storage Facility and segregated by compatibility for storage in the unit until enough waste is accumulated to fill a labpack or bulking container, usually a 30- to 55-gallon drum. All containers having a design capacity greater than 0.1 m3 to less than or equal to 0.46 m3 are equipped with a cover and complies with all applicable Department of Transportation regulations on packaging hazardous waste for transport under 49 CFR part 178.

DOT approved intermediate bulk packaging may be utilized for some solid wastes. These containers range in size from 0.1 cu yard (27 cu ft) to 1.6 cu yard (43 cu ft) and are approved for solid waste only.

3.4 SELECTING SAMPLING PROCEDURES

3.4.1 Sampling Strategies and Equipment

Sample collection methods conform to the representative sample methods referenced in WAC 173-303-110(2). The summary of test parameters, rationales, and testing methods are identified in Table 3.1.

Representative samples of liquid waste from containers (vertical 'core sections') are typically obtained using a composite liquid waste sampler (COLIWASA) or tubing, as appropriate. The sampler is long enough to reach the bottom of the container in order to provide a representative sample of all phases of the containerized liquid waste. If a liquid waste has more than one phase, each phase is separated for individual testing depending on the waste management pathways of the phases.

Other waste types that might require sampling are sludge's, powders, and granules. In general, non-viscous sludge's are sampled using a COLIWASA. Highly viscous sludge's and cohesive solids are sampled using a trier, as specified in SW-846. Dry powders and granules are sampled using a thief, also as specified in SW-846.

Samplers are constructed of material compatible with the waste. In general, aqueous liquids are sampled using polyethylene samplers, organic liquids using glass samplers, and solids using polyethylene samplers. Disposable samplers are used whenever possible to eliminate the potential for cross-contamination. If non-disposable sampling equipment is used, it is decontaminated between samples.

Representative sampling may be requested by unit staff to ensure proper waste identification. Sampling may be performed by unit personnel or the generating unit producing the waste. The number of grab samples collected from a container depends on the amount of waste present and on the homogeneity of the waste as determined by observation. In some cases, there will be only one container of waste present. In such cases, only one vertical composite sample will be collected (e.g., COLIWASA). If more than one container is present, a random number of samples will be collected and analyzed statistically using the procedures specified in Section 9.2 of SW-846 (EPA 1986).

In all instances, sampling methods will conform to the representative sample method referenced in WAC 173-303-110(2), i.e., ASTM standards for solids and SW-846 for liquids. The specific sampling methods and equipment used varies with the chemical and physical nature of the waste material and the sampling circumstances.

3.4.2 Sampling Preservation and Storage

All sample containers, preservation techniques, and hold times follow SW-846 protocol. Many samples are analyzed at the 305-B Storage Facility utilizing prepackaged test kits and are not preserved.

3.4.3 Sampling QA/QC Procedures

Pacific Northwest National Laboratory is committed to maintaining a high standard of quality for all of its activities. A crucial element in maintaining that standard is a quality-assurance program that provides management controls for conducting activities in a planned and controlled manner and enabling the verification of those activities.

The QA/QC objective of the 305-B Storage Facility is to control and characterize errors associated with collected data, and to illustrate that waste testing has been performed according to specification in this waste analysis plan.

The 305-B Storage Facility will ensure that precision and accuracy are maintained throughout the waste analysis process. For analysis using SW-846 methods, the program will follow the QA/QC guidance set forth in SW-846 at a minimum. Good laboratory practices which encompasses sampling, sampling handling, housekeeping, and safety are followed throughout the process. There are many elements of QA/QC associated with the sampling processes at the 305-B Storage Facility. These practices ensure that all data and the decisions based on that data are technically sound, statistically valid, and properly documented.

Activities pertaining to waste analysis include, but are not limited to, the preparation, review, and control of procedures and the selection of analytical laboratories. The Laboratory's QA standards-based management system subject area has administrative procedures that establish requirements and provide guidance for the preparation of analytical and technical (i.e., sampling, chain-of-custody, work processes) procedures, as well as other administrative procedures. Procedures undergo a review cycle and, once issued, are controlled to ensure that only current copies are used.

The primary purpose of waste testing is to ensure that the waste is properly characterized in lieu of process-knowledge data, in compliance with RCRA requirements for general waste analysis [WAC 173-303-300(2); 40 CFR 264.13]. Waste testing also is performed to ensure the safe management of waste being stored, proper disposition of residuals from incidents that might occur, and control of the acceptance of waste for storage. The specific objectives of the waste-sampling and analysis program at the 305-B Storage Facility are as follows:

- Identify the presence of waste that is substantially different from waste currently stored.
- Provide a detailed chemical and physical analysis of a representative sample of the waste, before the waste is accepted at or transferred from the 305-B Storage Facility to an offsite TSD facility, to ensure proper management and disposal.
- Provide an analysis that is accurate and up-to-date to ensure that waste is properly treated and disposed of.
- Ensure safe management of waste undergoing storage at the 305-B Storage Facility.

- Ensure proper disposal of residuals.
- Ensure compliance with LDR's.
- Identify and reject waste that does not meet the 305-B Storage Facility's acceptance requirements (e.g., incomplete information).
- Identify and reject waste that does not meet specifications for the 305-B Storage Facility (i.e., Chapter 1.0, listing, restricted from storage at the 305-B Storage Facility).

QA/QC Objectives

Analysis of samples pursuant to this WAP is performed on parameters selected in accordance with the protocols in Section 3.3. The objective of the QA/QC program is to control and characterize any errors associated with the collected data. Quality-assurance activities, such as the use of standard methods for locating and collecting samples, are intended to limit the introduction of error. Quality-control activities, such as the collection of duplicate samples and the inclusion of blanks in sample sets, are intended to provide the information required to characterize any errors in the data. Other QC activities, such as planning the QC program and auditing ongoing and completed activities, ensure that the specified methods are followed and that the QA information needed for characterizing error is obtained.

- Field inspections – performed and documented by 305-B Storage Facility staff or designee, depending on the activity. The inspections primarily are visual examinations but might include measurements of materials and equipment used, techniques employed, and the final products. The purpose of these inspections is to verify that a specific guideline, specification, or procedure for the activity is completed successfully.
- Field testing – performed onsite by 305-B Storage Facility staff (or designee) according to manufacturer's specified instructions for field equipment and/or field test kits.
- Laboratory analyses – performed by onsite or offsite laboratories on samples of waste. The purpose of the laboratory analyses is to determine constituents or characteristics present and the concentration or level.

Sampling Objectives

The data-quality objectives (DQO) for the waste sampling and data analyses are as follows:

- Determine if waste samples are representative of the contents of the containers at the time the samples were taken.
- Determine if waste samples are representative of long-term operations affecting the 305-B Storage Facility.
- Determine if waste accepted for storage is within the RCRA permit documentation limitations.
- Determine if waste accepted for storage meets the requirements of the 305-B Storage Facility waste-acceptance criteria.
- Determine if waste accepted for storage meets the information provided by the generator.

Data Collection/Sampling Objectives

The acquired data need to be scientifically sound, of known quality, and thoroughly documented. The DQOs for the data assessment will be used to determine compliance with national quality standards, which are as follows:

- Precision – The precision will be the agreement between the collected samples (duplicates) for the same parameters, at the same location, and from the same collection vessel.

- Representativeness – The representativeness will address the degree to which the data accurately and precisely represent a real characterization of the population, parameter variation at a sampling point, sampling conditions, and the environmental condition at the time of sampling. The issue of representativeness will be addressed for the following points:
- Based on the generating process, the waste stream, and its volume, an adequate number of sampling locations are selected

The representativeness of selected media has been defined accurately

- The sampling and analytical methodologies are appropriate.
- The environmental conditions at the time of sampling are documented.
- Completeness – The completeness will be defined as the capability of the sampling and analytical methodologies to measure the contaminants present in the waste accurately.
- Comparability – The comparability of the data generated will be defined as the data that are gathered using standardized sampling methods, standardized analyses methods, and quality-controlled data-reduction and validation methods.

Analytical Objectives

Analytical data will be communicated clearly and documented to verify that laboratory data-quality objects are achieved.

Field Quality Assurance and Quality Control

Internal QA/QC checks will be established by submitting QA and QC samples to the analytical laboratory. The number of field QA samples will be approximately 5 percent of the total number of field samples taken. The 5 percent criterion commonly is accepted for a minimum number of QA/QC samples. The types and frequency of collection for field QA samples are as follows:

- Field Blanks – A sample of analyte-free media taken from the laboratory to the sampling site and returned to the laboratory unopened. Field blanks are prepared and preserved using sample containers from the same lot as the other samples collected that day. A sample blank is used to document contamination attributable to shipping and field-handling procedures. This type of blank is useful in documenting contamination of volatile organics samples.
- Field Duplicates – defined as independent samples collected in such a manner that the samples are equally representative of the variables of interest at a given point in space and time. The laboratory will use the field duplicate as laboratory duplicate and/or matrix spikes. Thus, for the duplicate sample, there will be the normal sample analysis, the field duplicate, and the laboratory duplicates (inorganic analysis). Duplicate samples will provide an estimate of sampling precision.

Laboratory Quality Assurance and Quality Control

All analytical work, whether performed by independent laboratories, is defined and controlled by a Statement of Work, prepared in accordance with administrative procedures. The daily quality of analytical data generated in the analytical laboratories will be controlled by the implementation of an analytical laboratory QA plan. At a minimum, the plan will document the following:

- sample custody and management practices
- requirements for sample preparation and analytical procedures
- instrument maintenance and calibration requirements
- internal QA/QC measures, including the use of method blanks
- required sample preservation protocols
- analysis capabilities.

The types of internal quality-control checks are as follows:

- Method Blanks – Method blanks usually consist of laboratory reagent-grade water treated in the same manner as the sample (i.e., digested, extracted, distilled) that is analyzed and reported as a standard sample would be reported.
- Method Blank Spike – A method blank spike is a sample of laboratory reagent-grade water fortified (spiked) with the analytes of interest, which is prepared and analyzed with the associated sample batch.
- Laboratory Control Sample – A QC sample introduced into a process to monitor the performance of the system.
- Matrix Spikes – An aliquot of sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. Matrix spikes will be performed on 5 percent of the samples (1 in 20) or one per batch of samples.
- Laboratory Duplicate Samples – Duplicate samples are obtained by splitting a field sample into two separate aliquots and performing two separate analyses on the aliquots. The analyses of laboratory duplicates monitor the precision of the analytical method for the sample matrix; however, the analyses might be affected by nonhomogeneity of the sample, in particular, by nonaqueous samples. Duplicates are performed only in association with selected protocols. Duplicates are performed only in association with selected protocols. Laboratory duplicates are performed on 5 percent of the samples (1 in 20) or one per batch of samples. If the precision value exceeds the control limit, then the sample set must be reanalyzed for the parameter in question.
- Known QC Check Sample – This is a reference QC sample as denoted by SW-846 of known concentration, obtained from the EPA, the National Institute of Standards and Technology, or an EPA-approved commercial source. This QC sample is taken to check the accuracy of an analytical procedure. The QC sample is particularly applicable when a minor revision or adjustment has been made to an analytical procedure or instrument. The results of a QC-check- standard analysis are compared with the true values, and the percent recovery of the check standard is calculated.

<u>PNNL Analytical Chemistry Laboratory QA/QC</u>

PNNL's analytical chemistry laboratory may need to be used to analyze samples of high-activity dangerous waste. It has a rigorous QA plan that ensures that data produced are defensible, scientifically valid, and of known precision and accuracy, and meets the requirements of its clients.

Offsite Laboratory QA/QC

When it is necessary to send samples to an independent laboratory, contracts are not awarded until a pre-award evaluation of the prospective laboratory has been performed. The pre-award evaluation process involves the submittal of its QA plan to PNNL QA staff and the unit-operating supervisor. It also may involve a site visit by QA personnel and a technical expert, or may consist of a review of the prospective laboratories' QA/QC documents and records of surveillances/inspections, audits, non-conformances, and corrective actions maintained by PNNL or other Hanford Facility contractors.

Recordkeeping

Records associated with the waste-analysis plan and waste-verification program are maintained by the waste-management organization. A copy of the Disposal Request for each waste stream accepted at the 305-B Storage Facility is maintained as part of the operating record. Generators maintain their sampling and analysis records. The waste-analysis plan will be revised whenever regulation changes affect the waste-analysis plan.

Staff of the 305-B Storage Facility has a goal of continuous improvement by ensuring that all analytical data produced is of known accuracy and precision, exceeds all industry standards, and is scientifically valid. Using the above practices and following the appropriate 305-B Storage Facility operating procedures staff can monitor and ensure that progress is being made in the quality of the data produced.

3.4.4 Health and Safety Protocols

During all sampling activities, precautions will be taken to ensure that waste containers do not expel gases and/or pressurized liquids. All personnel will be properly trained in safety and handling techniques.

3.5 SELECTING A LABORATORY, AND LABORATORY TESTING AND ANALYTICAL METHODS

3.5.1 Selecting a Laboratory

Laboratory selection is limited; only a few laboratories are equipped to handle mixed waste because of special equipment and procedures that must be used to minimize personnel exposure. Preference will be given to any PNNL facility or other laboratories on the Hanford Facility that exhibit demonstrated experience and capabilities in three major areas:

- comprehensive written QA/QC program based on DOE-RL requirements specifically for that laboratory
- audited for effective implementation of QA/QC program
- participate in performance-evaluation samples to demonstrate analytical proficiency.

All laboratories (onsite or offsite) are required to have the following QA/QC documentation:

- Daily analytical data generated in the contracted analytical laboratories is controlled by the implementation of an analytical laboratory QA plan.
- Before commencement of the contract for analytical work, the laboratory will, have their QA plan available for review. At a minimum, the QA plan will document the following:
- sample custody and management practices
- requirements for sample preparation and analytical procedures
- instrument maintenance and calibration requirements
- internal QA/QC measures, including the use of method blanks
- required sample preservation protocols
- analysis capabilities.

3.5.2 Selecting Testing and Analytical Methods

PNNL waste generators may need to conduct analyses to provide information to fill out a Disposal Request form, and to determine compatibility, safety, and operating information. As needed, 305-B Storage Facility staff also will conduct analyses to determine completeness of information and if the waste meets the acceptance criteria for disposal, treatment or storage at one of the Hanford Facility-permitted treatment/storage/disposal areas or that of one of the offsite TSD facilities. Testing and analytical methods will depend on the type of analysis sought and the reason for needing the information.

Chemists and/or appropriate personnel working under approved QA guidelines perform all testing. Analytical methods will be selected from those that are described in Section 3.3.1.

3.6 SELECTING WASTE RE-EVALUATION FREQUENCIES

Some analysis will be needed to verify that waste streams received by the 305-B Storage Facility conform to the information on the Disposal Request and or the waste analysis sheet supplied by the generator. If discrepancies are found between information on the Disposal Request, hazardous-waste manifest, shipping papers, waste- analysis documentation and verification analysis, then the discrepancy will be resolved by:

- Returning waste to the generator, or sample and analyze the materials in accordance with WAC 173-303-110; and/or
- Reassessing and re-designating the waste, repackaging and labeling as necessary or return to the generator.

Periodic re-evaluation provides verification that the results from the initial verification are still valid. Periodic re-evaluation also checks for changes in the waste stream.

Exceptions to physical screening for verification are:

Analysis and characterization, as required by WAC 173-303-300(2), are performed on each waste before acceptance at the 305-B Storage Facility to determine waste designation and characteristics. The characterization of the waste, based on this information, is reviewed each time a waste is accepted. The generator must update the information when the waste stream changes or if the following occurs.

- The 305-B Storage Facility personnel have reason to suspect a change in the waste, based on inconsistencies in packaging, labeling, or visual inspection of the waste.
- The information submitted previously does not match the characteristics of the waste submitted.

Sampling and laboratory analysis could be required to verify or establish waste characteristics for waste that is stored at the 305-B Storage Facility. The following are instances where sampling and laboratory analysis are required:

- Inadequate information on PNNL-generated waste
- Waste streams generated onsite will be verified at 5 percent of each waste stream
- Inadequate information before waste was shipped or discrepancy discovered
- Waste streams received from offsite generators will be verified at 10 percent of each waste stream applied per generator, per shipment
- Identification and characterization for unknown waste and spills.

3.7 SPECIAL PROCEDURAL REQUIREMENTS

3.7.1 Procedures for Receiving Waste From off-site Generators

Most of the waste stored at 305-B Storage Facility is generated on the Hanford Site and/or by PNNL research programs within the 300 Area. Additional requirements for waste generated outside the 300 Area include proper manifesting (if appropriate) to 305-B Storage Facility and proper packaging for transport over public roadways. Although PNNL waste generated outside of the 300 Area is considered to be generated offsite since it may be transported to 305-B Storage Facility on roads accessible to the

public, it is under the same administrative controls as wastes that are generated onsite (i.e., in the 300 Area).

The generator is responsible for identifying waste composition accurately and PNNL waste operations will arrange for the transport of the waste. The 305-B Storage Facility maintains a copy of any pertinent operating record in accordance with WAC 173-303 and the time frames described in DOE/RL-91-28, Chapter 12.0, Table 12.1. The waste-tracking methods are as follows.

- **Inspection of Shipping Papers/Documentation** – The necessary shipment papers for the entire shipment are verified (i.e., signatures are dated, all waste containers included in the shipment are accounted for and correctly indicated on the shipment documentation, there is consistency throughout the different shipment documentation, and the documentation matches the labels on the containers).
- **Inspection of Waste Containers** – The condition of waste containers is checked to verify that the containers are in good condition (i.e., free of holes and punctures).
- **Inspection of Container Labeling** – Shipment documentation is used to verify that the containers are labeled with the appropriate "Hazardous/Dangerous Waste" labeling and associated markings according to the contents of the waste container.
- **Acceptance of Waste Containers** – The 305-B Storage Facility personnel sign the Shipment documents and retain a copy.

If Shipment will be received from or destined offsite, then a uniform hazardous waste manifest will be prepared identifying the 305-B Storage Facility as the receiving unit (Hanford Facility Permit, Condition II.P. The 305-B Storage Facility operations staff will sign and date the manifest to certify that the dangerous waste covered by the manifest was received. The transporter will be given at least one copy of the signed manifest. A copy of the manifest will be returned to the generator within 30 days of receipt at the 305-B Storage Facility. A copy of the manifest also will be retained in the 305-B Storage Facility operating record.

For onsite waste transfers subject to Hanford RCRA Permit, Dangerous Waste Portion, Condition II.Q.1, documentation meeting that requirement will be prepared and accompany the shipment. The documentation will be maintained in the Operating Record.

RESPONSE TO SIGNIFICANT DISCREPANCIES

The primary concern during acceptance of containers for storage is improper packaging or manifest discrepancies. Containers with such discrepancies are not accepted at the 305-B Storage Facility until the discrepancy has been resolved. Depending on the nature of the condition, such discrepancies can be resolved using one or more of the following alternatives.

- Incorrect or incomplete entries on the uniform hazardous waste manifest can be corrected or completed with concurrence of the onsite generator or offsite generator. Corrections are made by drawing a single line through the incorrect entry. Corrected entries are initialed and dated by the individual making the correction.
- The waste packages can be held and the onsite generator or offsite waste generator requested to provide written instructions for use in correcting the condition before the waste is accepted.
- Waste packages can be returned as unacceptable.
- If a noncompliant dangerous waste package is received from an offsite waste generator, the waste package is non-returnable because of condition, packaging, etc., and if an agreement cannot be reached, among the involved parties to resolve the noncompliant condition, then the issue will be

referred to DOE-RL and Ecology for resolution. Ecology will be notified in writing if a discrepancy is not resolved within 15 days after receiving a noncompliant shipment. Pending resolution, such waste packages, although not accepted, might be placed in the 305-B Storage Facility. The package(s) will be segregated from other waste and an entry will be made into the 305-B Storage Facility logbook describing the actions that were taken to store the packages in a safe manor until a resolution has been reached.

ACTIVATION OF CONTINGENCY PLAN FOR DAMAGED SHIPMENT

If waste shipments arrive at the 305-B Storage Facility in a condition that presents a hazard to public health or the environment, the Building Emergency Procedure is implemented as described in Chapter 7.0 for the 305-B Storage Facility.

3.7.2 Procedures for Ignitable, Reactive, and Incompatible Wastes

Ignitable, reactive, and incompatible wastes are stored in compliance with Uniform Fire Code Division II regulations for Container and Portable Tank Storage Inside Buildings (International Conference of Building Officials 1988). Containers of ignitable, reactive, and incompatible wastes are stored in individual flammable material storage cabinets within the storage cells.

Section 6.5.2 describes procedures used at 305-B Storage Facility to determine the compatibility of dangerous wastes so that incompatible wastes are not stored together. Chemical wastes stored in 305-B Storage Facility are separated by chemical makeup and hazard class and stored in areas having appropriate secondary containment, as described in Section 4.1.1.6.

As shown in Figures 4.1 through 4.10, each storage area has individual storage configurations; secondary containment structures are provided to assure that incompatible materials will not commingle if spilled. Further segregation is provided by chemical storage cabinets located throughout the facility in various areas as shown in Figures 4.1 through 4.10. Cabinet types are noted in those figures and capacities described in Table 4.2. Incompatible wastes are never placed in the same container, or in unwashed containers that previously held incompatible waste.

Compliance with WAC 173-303-395(1)(b) is assured by utilizing this system, and the procedure for handling ignitable or reactive waste and mixing of incompatible waste, as described in Section 6.5.2.

3.7.3 Procedures to Ensure Compliance with LDR Requirements

LDR Waste-Analysis Requirements

The *Hazardous and Solid Waste Amendments of 1984* prohibit the land disposal of certain types of wastes that are subject to RCRA. Most of the waste types stored at the 305-B Storage Facility falls within the purview of these land-disposal restrictions (LDRs). Information presented below describes how generators and 305-B Storage Facility personnel characterize, document, and certify waste subject to LDR requirements.

Waste must be analyzed using the Toxicity Characteristic Leaching Procedure (TCLP) in accordance with Appendix II of 40 CFR 261, as amended, in order to provide sufficient information for proper management and for decisions regarding LDR pursuant to 40 CFR 268.

Waste Characterization

Before being received at the 305-B Storage Facility, the RCRA waste characteristics, the level of toxicity characteristics, and the presence of listed wastes are determined during the physical and chemical analyses process. This information allows waste-management personnel to make all LDR determinations accurately and complete appropriate notifications and certifications.

Sampling and Analytical Procedures

The LDR characterization and analysis is generally performed as part of the waste-characterization and analysis process. If waste is sampled and analyzed for LDR characterization, then only EPA or equivalent methods are used to provide sufficient information for proper management and for decisions regarding LDRs pursuant to 40 CFR 268.

Frequency of Analysis

Before acceptance and during the waste-characterization and analysis process, all LDR characterizations and designations are made. The characterization and analysis process is performed when a Disposal Request is submitted for waste pick-up, unless there is insufficient data, or if the waste stream has changed. Instances where sampling and laboratory analysis may be required to determine accurate LDR determinations include the following:

- when waste-management personnel have reason to suspect a change in the waste based on inconsistencies on the Disposal Request, packaging, or labeling of the waste
- when the information submitted previously by a generator does not match the characteristics of the waste that was submitted
- when the offsite TSD facility rejects the waste because the fingerprint samples are inconsistent with the waste profile provided by the 305-B Storage Facility that was established using generator information.

Dangerous waste types listed in Table 3-1 are sampled as needed on an individual container or batch basis before they are collected from the point of generation or prior to shipment offsite. After the dangerous constituents have been characterized, these waste streams will not be analyzed again until process or raw material changes occur.

Documentation and Certification

The 305-B Storage Facility has and will continue to receive and store LDR waste. Because 305-B Storage Facility personnel determine designations and characterization, including LDR determinations, all notifications and certifications, as required by 40 CFR 268, are prepared by qualified staff for PNNL-generated waste. The 305-B Storage Facility staff collects from the generator(s) the information pursuant to 40 CFR 268 regarding LDR waste. The notifications and certifications are submitted to onsite and offsite TSD units during the waste-shipment process. Additionally, any necessary LDR variances are prepared and submitted by PNNL qualified staff.

The 305-B Storage Facility staff requires applicable LDR information/notifications from non-PNNL generators.

Where an LDR waste does not meet the applicable treatment standards set forth in 40 CFR 268, Subpart D, or exceeds the prohibition levels set forth in 40 CFR 268.32 or Section 3004(d) of RCRA, the 305-B Storage Facility provides to the onsite and offsite TSD a written notice that includes the following information:

- EPA hazardous-waste number
- the corresponding treatment standards and all applicable prohibitions set forth in WAC 173-303, 40 CFR 268.32, or RCRA Section 3004(d)
- the manifest number associated with the waste
- all available waste-characterization data.
- identification of underlying hazardous constituents.

In instances where 305-B Storage Facility staff determines that a restricted waste is being managed that can be land-disposed without further treatment, 305-B Storage Facility staff submits a written notice and certification to the onsite or offsite TSD where the waste is being shipped, stating that the waste meets applicable treatment standards set forth in WAC 173-303-140 (40 CFR 268, Subpart D), and the applicable prohibition levels set forth in 40 CFR 268.32 or RCRA Section 3004(d). The notice includes the following information:

- EPA hazardous-waste number
- corresponding treatment standards and applicable prohibitions
- waste-tracking number associated with the waste
- all available waste-characterization data
- identification of underlying hazardous constituents.

The certification accompanying any of the previously described notices is signed by an authorized representative of the generator and states the following:

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d). I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Copies of all notices and certifications described are retained at the TSD unit for at least five years from the date that the waste was last sent to an onsite or offsite TSD unit. After that time, the notices and certifications are sent to Records Storage.

3.8 MANIFEST SYSTEM

The Hanford Site has one EPA/state identification number, as required by WAC 173-303-060, and all TSD units on the Hanford Site (such as 305-B Storage Facility) are considered part of one dangerous waste facility. Therefore, onsite shipments of dangerous or mixed waste are not subject to the manifesting requirements specified in WAC 173-303-370 and -180. 305-B Storage Facility has an onsite waste tracking system akin to a manifest system, which is voluntarily used for transporting waste on the Hanford Facility.

A uniform hazardous waste manifest is used for all off-site shipments of dangerous waste and mixed waste received at 305-B Storage Facility, as well as for all off-site shipments of dangerous waste and mixed waste from 305-B Storage Facility. In addition to the uniform hazardous waste manifest, wastes

subject to land disposal restrictions which are shipped from 305-B Storage Facility to off-site treatment, storage, or disposal facilities are accompanied by the applicable notifications and certifications required under 40 CFR 268.

The following sections provide information on receiving shipments, response to manifest discrepancies, and provisions for nonacceptance of shipments.

3.8.1 Procedures for Receiving Shipments

The following are procedures used prior to transport of wastes to the 305-B Storage Facility. First, the generator must submit a chemical disposal/recycle request form to the Waste Management Section. This request form is then reviewed and either approved or rejected. Typical causes of rejection include missing or insufficient information in any of the data fields, or lack of specific information on waste composition. Upon approval, the Waste Management Section reviews the form to determine the dangerous waste designation, waste compatibility class for storage, and containerization and labeling requirements.

The waste is then inspected at the generating unit by the Waste Management Section to verify the information contained on the request form, such as number, sizes, and types of containers, location of waste, etc., and to check for proper containerization of waste. If discrepancies are noted during the inspection, the Waste Management Section will not pick up the waste. Typical discrepancies include waste not as described on request form or lack of supporting data to verify waste characteristics. In such cases, deficiencies will be explained to the generating unit responsible person, who will then be responsible for correcting them.

If the waste is found to be acceptable for transport, Waste Management staff will check to ensure required labels are in place, and transport (or arrange for transport of) the waste to 305-B Storage Facility. If transport will be over public roadways or highways, a uniform hazardous waste manifest will be prepared identifying PNNL as the transporter and 305-B Storage Facility as the receiving TSD unit. A copy of all such manifests is returned to the generating unit within 30 days of receipt at 305-B Storage Facility. A copy of the manifest is also retained at 305-B Storage Facility.

3.8.2 Response to Significant Discrepancies

Waste shipments received at the 305-B Storage Facility containing manifest discrepancies are not accepted unless the discrepancy or discrepancies can be resolved with the generating unit at the time the shipment is received. Manifest discrepancies requiring such resolution include:

- Variations exceeding 10 percent in weight for bulk shipments such as tank trucks or tank cars (generally not applicable to 305-B Storage Facility since most shipments are in drums or other containers);
- Any inaccuracy in piece counts in containerized shipments (underages or overages);
- Type mismatches (i.e., the waste is not as described on the request form; obvious inaccuracies such as waste acid substituted for waste solvent).

Manifest information will also be considered incorrect if the written description of wastes does not agree with visual observations, or if observed weights or volumes differ by more than 10 percent from those described on the manifest.

If a discrepancy is noted, the generating unit will be contacted immediately. The waste will not be accepted for storage until the discrepancy is resolved. The generating unit will be asked to identify the

source of the discrepancy (e.g., error in estimating volume or weight, incorrect identification of waste, etc.) Once the cause of the discrepancy is identified, and the generating unit and the waste management organization have concurred as to resolution of the discrepancy, the manifest will be corrected. Corrections will be made by drawing a single line through the incorrect entry and entering the correct information. Corrected entries will be initialed and dated by the individual making the correction. Once the manifest has been corrected, the discrepancy will be considered resolved.

Certain manifest discrepancies may be discovered after receipt, such as analytical data indicating incorrect designation, which may result in incorrect naming of the shipment on the manifest. Such discrepancies will be managed as noted above; if, however, the discrepancy cannot be resolved within 15 days of receipt of the shipment, the 305-B Storage Facility will file the report required by WAC 173-303-370(4)(b) as described in Chapter 12.0, Section 12.4.1.1.1.

3.8.3 Provisions for Nonacceptance of Shipment

Provisions for nonacceptance of shipments are discussed in the following sections.

3.8.3.1 Nonacceptance of Undamaged Shipment

All wastes are inspected by staff from the waste management organization prior to shipment and are transported to 305-B Storage Facility by waste management organization staff. This procedure is designed to prevent receipt of nonacceptable wastes. Waste management organization staff will refuse to accept or transport wastes, which are nonacceptable at 305-B Storage Facility.

3.8.3.2 Activation of BEP/Contingency Plan for Damaged Shipment

All wastes are inspected by staff from the waste management organization prior to shipment and are primarily transported to 305-B Storage Facility by waste management organization staff. Damaged containers will not be accepted from the generator and will not be transported. The only opportunity for receipt of damaged containers, therefore, would be if containers were damaged during transportation. If a shipment of waste is damaged during transportation, and arrives in a condition that presents a hazard to public health or to the environment, the facility BEP/contingency plan will be implemented as described in Chapter 7.0.

3.8.4 Unmanifested Waste

Waste generated within the Hanford Site is not transported over public highways and is not subject to manifest requirements under WAC 173-303. Such waste may be received at the 305-B Storage Facility without a manifest. However, a completed and approved disposal request form must accompany all wastes (including unmanifested waste).

If transport is by public roadways or highways, a manifest must be used. Shipments requiring a manifest and not having one will either be rejected or, at the sole discretion of the unit operator, the unit will accept the waste and file an unmanifested waste report as described in WAC 173-303-390(1) and detailed in Chapter 12.0.

1 Table 3.1. Summary of Test Parameters, Rationales, and Methods

Parameter[a]	Method[b]	Rationale for Selection
Physical Screening		
Visual inspection	Field method - observe phases, presence of solids in waste	Confirm that waste matches that described on waste acceptance documentation; identify waste prohibited by LDR requirements related to downstream TSD unit acceptance criteria
Chemical Screening		
Water miscibility/separable organics [c]	Water mix screen ASTM Method D5232-92	Confirm that waste matches that described on waste acceptance documentation; identify separable organics; identify waste prohibited by LDR requirements related to downstream TSD unit acceptance criteria
Oxidizer	Oxidizer Screen	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
pH	pH screen SW-846 Method 9041	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Cyanides	Cyanide screen	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Sulfides	Sulfide screen	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Flashpoint	Flashpoint measurement instrument	Confirm that waste matches that described on waste acceptance documentation
Halogenated/Volatile Organic Compounds	Photoionizer or Flame Ionizer, or Clor-D-Tect © Kits	Confirm that waste matches that described on waste acceptance documentation
Pre-Shipment Review		
Mercury (total)	Generator knowledge or SW-846 Method 7470/7471	Identify waste prohibited by LDR requirements related to downstream TSD unit acceptance criteria.
Toxicity characteristic organic compounds	Generator knowledge or SW-846 Methods 1311 and 8260 (volatile organic compounds) and 8270 (semivolatile organic compounds)	Identify waste not identified in Chapter 1.0, Part A
Polycyclic aromatic hydrocarbons	Generator knowledge or SW-846 Method 8270 or 8100	Identify waste not identified in Chapter 1.0, Part A, (for waste with >1% solids and for which WP03 could apply)

[a] Addition parameters can be used on current waste acceptance criteria of the downstream TSD unit. Operation limits transfer/shipments are based on current waste acceptance criteria.
[b] Procedures based on EPA SW-846, unless otherwise noted. When regulations require a specific method, the method shall be followed.
[c] These test will not be performed on materials known to be organic peroxides, ether, and/or water reactive compounds.

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