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

06-ESD-0040

JAN 10 2006

Enclosure 2 contains OUO information.

When separated from transmittal, handle this document as non-sensitive information.

Ms. Greta P. Davis
Nuclear Waste Program
State of Washington
Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

Dear Ms. Davis:

CLASS 1 MODIFICATIONS TO THE HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY ACT PERMIT (QUARTER ENDING DECEMBER 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 December 31, 2005. These modifications update information in Part II, Part III, and Part V of the Permit. Part I Class 1 modifications pertain to Permit Conditions II.AA, II.BB, and II.CC. Part III Class 1 modifications pertain to the PUREX Storage Tunnels, 242-A Evaporator, and Waste Treatment and Immobilization Plant. The Part V Class 1 modifications pertain to the 1325-N Liquid Waste Disposal Facility, 1324-N Surface Impoundment, and 1324-N Surface Impoundment. 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.

Per agreement between DOE and Ecology, Enclosure 2 is designated as "Official Use Only" and should be withheld from public inspection and copying.

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

cc w/encls:
Administrative Record, HF RCRA Permit, H6-08
Environmental Portal, LMSI
Ecology NWP Library
HF Operating Record (S. A. Thompson, FHI)

cc w/o encls:
M. Y. Anderson-Moore, Ecology
K. A. Conaway, Ecology
L. J. Cusack, Ecology
S. L. Dahl-Crumpler, Ecology
L. L. Fritz, FHI
S. Harris, CTUIR
J. P. Henschel, BNI
A. K. Ikenberry, PNNL
R. Jim, YN
R. J. Landon, WCH
P. Sobotta, NPT
J. A. Vanni, Ecology
J. J. Wallace, Ecology
M. A. Wilson, Ecology

Document Received: 06-ESD-0040

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

Received by: Sheila P. Davis 1/10/2006

Washington State Department of Ecology Date

Enclosure 1

Hanford Facility RCRA Permit Modification Notification Forms

General Permit Conditions

Index

Submitted by Co-Operator:

Lori L. Fritz — 12-09-5 (Date)

Reviewed by RL Program Office:

Briant L Charboneau — 12-9-05 (Date)

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **General**	Permit Part & Chapter: **Permit Condition II.AA.**

Description of Modification:

Permit Condition II.AA:

II.AA. AIR EMISSION STANDARDS FOR PROCESS VENTS

The Permittees shall comply with applicable requirements of WAC 173-303-690 (40 CFR 264, Subpart AA) for process vents associated with Part III units performing specific separations processes unless exempted by WAC 173-303-690(1)(d). Threshold limits applied to process vents potentially requiring emission controls subject to WAC 173-303-690 are evaluated based on the summation of applicable emission sources for the entire Hanford Facility. When the summed emissions fall below threshold limits in 40 CFR 264.1032(a)(1), no emission control devices are required. If threshold limits in 40 CFR 264.1032(a)(1) are predicted to be exceeded, the Permittees shall notify Ecology to determine the appropriate course of action. Unit-specific information is contained in Part III of the Permit for applicable units.

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.1.a

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

B.1.a. General Facility Standards, Changes to waste sampling or analysis methods: To conform with agency guidance or regulations

Modification Approved: ☐ Yes ☐ No (state reason for denial)	Reviewed by Ecology:
Reason for denial:	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: **General**	Permit Part & Chapter: **Permit Condition II.BB.**

Description of Modification:

Permit Condition II.BB:

II.BB. AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

The Permittees shall comply with applicable requirements of WAC 173-303-691 (40 CFR 264, Subpart BB) for certain equipment leaks associated with Part III units unless exempted by WAC 173-303-691(1)(e) or (f) and identified in accordance with 40 CFR264.1064(g)(5) or (6). Air emission standards apply to equipment that contacts or contains hazardous wastes with organic concentrations of at least 10 percent by weight. Unit-specific information is contained in Part III of the Permit for applicable units.

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.1.a

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

B.1.a. General Facility Standards, Changes to waste sampling or analysis methods: To conform with agency guidance or regulations

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.CC.**

Description of Modification:

Permit Condition II.CC:

II.CC. AIR EMISSION STANDARDS FOR TANKS, SURFACE IMPOUNDMENTS, AND CONTAINERS

The Permittees shall comply with applicable requirements of WAC 173-303-692 (40 CFR264, Subpart CC) for containers, tanks, and surface impoundment areas associated with Part III units unless exempted by WAC 173-303-692(1)(b). Unit-specific information is contained in Part III of the Permit for applicable units.

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: B.1.a

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

B.1.a. General Facility Standards, Changes to waste sampling or analysis methods: To conform with agency guidance or regulations

Modification Approved: ☐ Yes ☐ No (state reason for denial)	Reviewed by Ecology:
Reason for denial:	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 Forms

Part III, Chapter 3
PUREX Storage Tunnels

Index

Submitted by Co-Operator:

Michael B. Lackey 12/9/05 Date

Reviewed by RL Program Office:

Matthew S. McCormick 12/9/05 Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **PUREX Storage Tunnels**	Permit Part & Chapter: **Part III, Chapter 3**

Description of Modification:

Hanford Facility RCRA Permit, Part III.3:

CHAPTER 3

PUREX Storage Tunnels

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

III.3.A COMPLIANCE WITH APPROVED PERMIT APPLICATION

The Permittees shall comply with all requirements set forth in Attachment 28, including all Class 1 modifications, and the Amendments specified in Condition III.3.B, if any exist. All subsections, figures, and tables included in these portions are enforceable.

ATTACHMENT 28:

Chapter 1.0	Part A Dangerous Waste Permit, Revision 6, from Class 1 modification dated May 2005
Chapter 2.0	Unit Description, from Class 1 modification dated May 2005
Chapter 3.0	Waste Analysis Plan, from Class 1 modification dated September 30, 2004
Chapter 4.0	Process Information, from Class 1 modification dated August 2004
Chapter 6.0	Procedures to Prevent Hazards, from Class 1 modification dated August 2004
Chapter 7.0	Contingency Plan, dated May 1998, from Class 1 modification dated December 2005 ~~August 2004~~
Chapter 8.0	Personnel Training, from Class 1 modification dated September 30, 2002
Chapter 10.0	Waste Minimization, from Class 1 modification dated September 30, 2002
Chapter 11.0	Closure and Financial Assurance, from Class 1 modification dated August 2004
Chapter 12.0	Reporting and Recordkeeping, from Class 1 modification dated August 2004
Chapter 13.0	Other Federal and State Laws, from Class 1 modification dated August 2004

III.3.B AMENDMENTS TO THE APPROVED PERMIT APPLICATION
(None Required)

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

Reviewed by Ecology:
L. P. Davis 12-7-05
G. P Davis Date

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

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
PUREX Storage Tunnels	**Part III, Chapter 3**

Description of Modification:

Remove and replace Chapter 7.0 with the attached Chapter 7.0 dated December 31, 2005.
Chapter 7.0, §7.2:

7.2 EMERGENCY COORDINATORS/BUILDING EMERGENCY DIRECTOR

Table Error! No text of specified style in document..**1. Emergency Coordinator/Building Emergency Director** [a]

Designation	Job title	Work location	Work phone
Primary	Operations Manager	MO-294	373-3663~~376-6857~~
Alternate	Field Work Supervisor ~~Operations Specialist~~	MO-294	373-5376
~~Alternate~~	~~Operations Specialist~~	~~3763~~	~~373-4257~~

[a] The names and home phone numbers of all Emergency Coordinators/Building Emergency Director (EC/BED) are maintained at the single point-of-contact (the Hanford Patrol Operations Center) telephone number 373-3800 in accordance with the Hanford Facility RCRA Permit, Dangerous Waste Portion, General Condition II.A.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: [X] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 12-7-05
G. P Davis Date

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

Hanford Facility RCRA Permit Modification Notification Forms

Part III, Chapter 5 and Attachment 35
242-A Evaporator

Index

Submitted by Co-Operator:

Edward S. Aromi, Jr — Date: 12/19/05

Reviewed by ORP Program Office:

Roy J. Schepens — Date: 10/26/05

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:
Hanford Facility RCRA Permit, III.5:

CHAPTER 5
242-A Evaporator

The 242-A Evaporator is a mixed waste treatment and storage unit consisting of a conventional forced-circulation, vacuum evaporation system to concentrate mixed-waste solutions. This Chapter sets forth the operating Conditions for this TSD unit.

III.5.A. COMPLIANCE WITH APPROVED PERMIT APPLICATION

The Permittees shall comply with all requirements set forth in Attachment 35, including all Class 1 modification, and the Amendments specified in Condition III.5.B, if any exist. All subsections, figures, and tables included in these portions are enforceable):

ATTACHMENT 35:

Chapter 1.0	Part A Dangerous Waste Permit, Revision9, from Class 1 modification dated May 2005
Chapter 2.0	Unit Description, from Class 1 modification dated August 2004
Chapter 3.0	Waste Analysis Plan, from Class 1 modification dated December 31, 2005~~December 31, 2003~~
Chapter 4.0	Process Information, f from Class 1 modification dated December 31, 2005~~December 31, 2003~~
Chapter 6.0	Procedures to Prevent Hazards, from Class 1 modification dated December 31, 2005 ~~December 31, 2003~~
Chapter 7.0	Contingency Plan, from Class 1 modification dated June 30, 2004
Chapter 8.0	Personnel Training, from Class 1 modification dated December 31, 2002
Chapter 11.0	Closure and Financial Assurance, from Class 1 modification dated December 31, 2005 ~~December 31, 2003~~
Chapter 12.0	Reporting and Recordkeeping, from Class 1 modification dated August 2004
Chapter 13.0	Other Federal and State Laws, from Class 1 modification dated August 2004
Appendix 4B	The 242-A Evaporator/Crystallizer Tank System Integrity Assessment Report, from Class 1 modification dated December 31, 2002
III.5.B	AMENDMENTS TO THE APPROVED PERMIT APPLICATION
III.5.B.1	Portions of DOE/RL-94-02 that are not made enforceable by inclusion in the applicability matrix for that document, are not made enforceable by reference in this document

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

Reviewed by Ecology:
G. P Davis 11-29-05
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 downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, Glossary:

GLOSSARY

...

HDPE	high-density polyethylene
HFFACO	Hanford Federal Facility Agreement and Consent Order
IC_T	total inorganic carbon
IR	infared
LDR	land disposal restriction
LERF	Liquid Effluent Retention Facility
MS	mass spectrometry
N/A	not applicable
QA	quality assurance
QC	quality control
RCRA	*Resource Conservation and Recovery Act of 1976*
RPD	relative percent difference
TEDF	Treated Effluent Disposal 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: [X] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:

G. P Davis 11-29-05
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 downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **242-A Evaporator**	Permit Part & Chapter: **Part III, Chapter 5 and Attachment 35**

Description of Modification:

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

3.1 INTRODUCTION

This waste analysis plan (WAP) addresses analysis necessary to manage the waste at the 242-A Evaporator according to *Resource Conservation and Recovery Act* (RCRA) requirements included in the *Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste* (Ecology and EPA 1994), *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement, Ecology et., al. 2003, Washington Administrative Code (WAC), Chapter 173-303, and Part 264 of the Code of Federal Regulations.

Modifications of the WAP require modifications of the permit. Permit modifications are discussed in Section I.C of the Hanford Facility RCRA Permit and WAC 173-303-830.

Where information regarding treatment, management, and disposal of the radioactive source byproduct material and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954 as amended) has been incorporated into this document, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit or chapter 70.105 RCW and its implementing regulations but is provided for information purposes only.

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: KAC Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
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 downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, 3.3:

3.3 SCOPE

This WAP discusses RCRA sampling and analysis of the waste in selected Double-Shell Tank (DST) System tanks to determine the acceptability of the waste for processing at the 242-A Evaporator. Sampling and analysis of DST System waste for other reasons, such as preparation for tank-to-tank transfers, is included in the waste analysis plan for the DST System.

RCRA sampling of the process condensate transferred to the Liquid Effluent Retention Facility (LERF) can be performed either at the 242-A Evaporator or at LERF. A discussion of process condensate sampling at the 242-A Evaporator is included in this WAP, while discussion of process condensate sampling at LERF is included in the *Hanford Facility RCRA Permit, Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility, Waste Analysis Plan.*

Samples of other 242-A Evaporator waste streams, such as steam condensate, cooling water, and 242-A-81 back flush water, are taken as required for process control but are excluded from this plan because these streams have been previously characterized and determined to be nondangerous waste streams.

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

Reviewed by Ecology:
G. P. Davis 11-29-05
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 downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.5.3:

3.5.3 Dangerous Waste Numbers

Waste transferred to the 242-A Evaporator could be assigned any of the dangerous waste numbers found in Chapter 1.0, Part A, Form (latest Revision)~~3~~. These numbers are identical to the ones in the Part A, Form (latest Revision)~~3~~ for the DST System. ~~Because of blending that occurs within the DST System, waste transferred to the 242-A Evaporator usually does not display all the characteristics found in the Part A, Form 3s, for these TSD units.~~

Process knowledge and historical data indicate that the slurry stream returning to the DST System contains the same dangerous waste constituents as the waste feed, so the same dangerous waste numbers are applicable to the feed and slurry.

Table 3.1 lists the dangerous waste numbers assigned to the process condensate. The process condensate is designated with the dangerous waste numbers F001 to F005 because the process condensate is derived from treatment of DST System waste assigned these numbers.

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

Reviewed by Ecology:
G. P. Davis 11-29-05
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 downgraded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.6:

3.6 WASTE ACCEPTANCE PROCESS

This section describes the actions performed before every campaign to determine if the waste in the DST System tanks is acceptable for treatment at the 242-A Evaporator. This section also describes the procedures and processes ~~actions~~ for sampling the process condensate stream at the 242-A Evaporator, if required by the waste acceptance criteria ~~necessary, to determine if the process condensate is acceptable~~ for treatment at the 200 Area Effluent Treatment Facility (ETF).

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: [KK] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
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 downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.6.1:

3.6.1 Candidate Feed Waste Acceptance Process

Candidate feed tank sampling performed for this WAP is done in the DST System before transfer of the waste to the 242-A Evaporator. Certain DST System tanks are selected as 'candidates' for waste to be processed in the 242-A Evaporator. This section describes the method for determining if the waste in a candidate feed tank is acceptable for processing.

The following activities are performed to determine if candidate waste feed will meet the evaporator waste acceptance criteria.

- Estimate concentrations of the eight Critical analytes to determine the minimum number of feed tank samples needed for compliance with the waste acceptance criteria. The eight Critical analytes are Ammonia, Nitrite, Nitrate, Hydroxide, Acetone, Pu-239/240, Cs-137, and Sr-90. The evaporator DQO also specifies that a boil down study be performed to evaluate the impacts of solid formation.
- Evaluate Potential for Energetics/Uncontrolled Chemical Reactions: The 242-A Evaporator Waste Analysis Plan (WAP, Ecology 2003) requires that no exothermic reaction occur below 168°C and the ratio of exotherm-to-endotherm energy be less than 1.
- Evaluate Potential for Separable Organic Phase: Prior to operation of the evaporator, the absence of separable organics in the feed must be verified.
- Evaluate Feed Ammonia Concentration: The concentration of ammonia in the feed stream is limited to 6800 mg/L and must be confirmed.
- Calculate Process Condensate Ammonia and Organic Concentrations: Radionuclide, ammonia, and volatile organic concentrations are needed for the LERF waste profile sheet (refer to *Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan*[LERF/200 Area ETF WAP.)
- Calculate Vessel Vent Ammonia Emissions: Ammonia monitoring is required by the Hanford Facility Dangerous Waste Permit (Ecology 2003) to determine that the ammonia emissions do not exceed 100 lbs per 24 hours.

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: [KAC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
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 downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.6.1.1:

3.6.1.1 Selecting Candidate Feed Tanks

For each 242-A Evaporator campaign, DST System tanks are selected as candidate feed tanks based on process knowledge of chemical properties with respect to waste acceptance criteria (Section 3.6.1). After a candidate tank is selected, the waste in the tank is sampled and analyzed and the data evaluated to confirm waste acceptability. Every candidate feed tank is sampled and analyzed to confirm waste acceptability.

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: KAG Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
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 downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.6.1.2:

3.6.1.2 Determining the Number of Candidate Feed Tank Samples

The method for determining the number of feed tank samples is specified in the data quality objectives (DQO) (Banning et al. 2005) and this WAP, and uses power analysis software supplied by the U.S. Environmental Protection Agency (EPA) (EPA 2001). Estimated concentrations of eight critical analytes (Section 3.6.1) are used to determine the minimum number of samples, accounting for the desired confidence level and how close the estimated concentrations are to the waste acceptance limits a random number generator is then used to determine the sample locations in the tank, using constraints given in the WAP.

~~Once a candidate feed tank is selected, the number of tank samples to be taken is determined by statistical analysis using existing tank data or data from similar waste in other tanks.~~ Figure 3.2 illustrates the decision logic used to determine the number of samples to be taken. Preliminary concentrations of critical analytes are compared to the waste acceptability limits statistically to determine the number of samples necessary to verify the composition of the waste. The statistical analysis accounts for how close the concentrations of critical analytes are to the limits and the desired confidence level. The closer the concentrations are to the limits, or the greater the desired confidence level, the more samples must be taken. For regulatory compliance, acetone is used as the critical analyte because it is often present at elevated levels. A 95% confidence level is specified for acetone. Critical analytes for process control are also assessed. Acetone analysis is usually not available from preliminary data, so process control analytes (such as nitrate and hydroxide) are often used. The statistical analysis includes the generation of power curve calculations using *Data Quality Objectives Decision Error Feasibility Trials* (EPA 2001 or current revision) software developed by the EPA. This software requires input of minimum and maximum expected values, action levels, mean sample results, standard deviations of sample results, and upper and lower confidence levels. The software outputs the minimum number of samples required. In general, three samples are taken as a minimum because taking two samples would require resampling if one sample should be lost or contaminated in the laboratory. A maximum of five samples generally is applied to minimize exposure to sampling personnel.

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

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

[1] Class I 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 downgraded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.6.1.3:

3.6.1.3 Assessing Candidate Feed Tank Analysis

When results of the sample analysis are available (and before the waste is processed), a second statistical analysis, similar to the first, is performed with the new analyte data to verify a sufficient number of samples were taken (Figure 3.3).

Candidate feed tank sampling and analysis, in conjunction with the waste acceptance criteria in Section 3.6.1, are used to assess whether established limits (limits are defined in the 242 Evaporator DQO, Banning 2004 and *Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan)* would be exceeded. Based on the results, ~~three~~ four possible options are implemented:

- The waste is acceptable for processing at the 242-A Evaporator without further actions.
- The waste is unacceptable for processing as a single batch, but is acceptable if blended with other waste to be processed.
- The waste is unacceptable for processing.
- Perform further evaluation to determine if action limit can be protected through mid-campaign monitoring/sampling and/or process adjustments.

If the waste is suitable for evaporation, it will be transferred to the feed tank (241-AW-102) for processing.

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

Reviewed by Ecology:

G. P Davis 11-29-05
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 downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **242-A Evaporator**	Permit Part & Chapter: **Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.6.2:

3.6.2 Process Condensate Waste Sampling Process

RCRA sampling of process condensate is completed per the ~~LERF/ETF WAP (HNF-SD-ENV-WAP-008)~~ *Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan* before treatment at the ETF. Depending on programmatic needs, this sampling can be performed at the 242-A Evaporator during a campaign or at LERF after the campaign is completed.

Before the start of a 242-A Evaporator campaign, the decision whether process condensate sampling will be performed at the 242-A Evaporator or at LERF is documented in the operating record. Planning for process condensate sampling at the 242-A Evaporator (i.e., number of samples, when samples are taken, etc.) is completed before starting the campaign.

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: [VAC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

[1] Class 1 Modifications requiring prior Agency Approval.
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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.6.2.2:

3.6.2.2 Assessing Process Condensate Analysis

The process condensate sample results are assessed against the requirement in the *Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan* ~~LERF/ETF WAP (HNF-SD-ENV-WAP-008)~~. The discussion of the waste management decision process for process condensate sampling, including the reevaluation process, is also included in the ~~LERF/ETF WAP~~ *Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan*.

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: [KAC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.7.1.2:

3.7.1.2 Compatibility

WAC 173-303-395 requires waste handling be conducted to prevent an uncontrolled reaction that could damage the tank system structural integrity or threaten human health or the environment. To verify there will be no adverse affects because of mixing the contents of different waste tanks in the feed tank and evaporator vessel, a compatibility evaluation is performed on waste in the candidate feed tanks. As samples from each of the planned waste sources are mixed, observations are made to note any changes in color, temperature, clarity, or any other visually determinable characteristic. This would indicate an unexpected chemical reaction that might have an impact on 242-A Evaporator operations. If such visible changes are observed when mixing samples, the waste would not be processed in the 242-A Evaporator without further technical evaluation.

Organic Constituents

The 242-A Evaporator performs distillation of waste containing organic concentrations greater than 10 parts per million by weight; therefore, organic air emissions are subject to WAC 173-303-690 (which incorporates 40 CFR 264, Subpart AA, by reference). Organic emissions from TSD units on the Hanford Site subject to 40 CFR 264, Subpart AA are controlled to ensure emissions to do not exceed 1.4 kilograms per hour and 2,800 kilograms per year. To ensure these requirements are met, the levels of volatile organics in the 242-A Evaporator feed must be limited to prevent excessive organic emissions during processing. Engineering calculations were used to determine the feed limits given in Table 3.2. The limits include a modifier "(R-1)/R", which adjusts the limits based on the campaign's planned boiloff rate. R is the ratio of feed flow rate to slurry flow rate. Typically, R is ~~equal~~ between 1 to 2, making the range of (R-1)/R ~~equal~~ 0 to 0.5.

In addition, analysis of the individual components in Table 3.2, total carbon (C_T) and total inorganic carbon (IC_T) analysis are performed as a screening tool to account for other organic species that might be present in the waste. The value of C_T minus IC_T represents the total organic concentration in the waste. If the C_T minus IC_T limit is exceeded, additional volatile organic species might be present and a more detailed evaluation will be conducted to determine organic emissions out of the vessel vent. The limit for evaluation is 174.4 milligrams per liter, based on the conservative assumption that all organic species present in the waste are as volatile as acetone. Acetone was chosen because of its relatively high volatility and low percentage of carbon.

The level of volatile organics in the feed must also be limited to ensure organic constituents that transfer to the process condensate are compatible with the LERF liner. The high-density polyethylene (HDPE) liner used at the LERF is exposed to process condensate that could contain trace quantities of chemicals that could cause degradation of the liner material. Based on the liner manufacturer's compatibility data, the concentration limits in Table 3.3 are imposed on those classes of constituents that could potentially degrade the liner. To ensure that these limits are not exceeded in the process condensate, the concentration limits are applied to the candidate feed tanks as well, with the modifier "(R-1)/R". A C_T minus IC_T analysis, similar to the one described previously, is also applied to the LERF liner limits. The strictest limit for organic species in Table 3.3 is 2,000 milligrams per liter. Assuming the organic is acetone (with its low percentage of carbon); this converts to a carbon value of 1,240 milligrams per liter.

The calculations in Tables 3.2 and 3.3 require use of the 'sum of the fractions' technique. A calculation is performed where the analysis of each constituent is divided by its associated limit to produce a fraction of the limit. If the sum of these fractions is less than 1, the waste meets the requirements in the tables.

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

Reason for denial:

Reviewed by Ecology:

G. P Davis 11-29-05

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 downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.7.2:

3.7.2 Process Condensate Acceptance Criteria

The waste acceptance criteria for process condensate sampling, including treatability, LERF liner compatibility, compatibility with other waste, etc., is given in the *Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan*~~LERF/ETF WAP (HNF-SD-ENV-WAP-008)~~.

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: [KAC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:

G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, Table 3.2:

Table 3.2. Candidate Feed Tank Limits for Vessel Vent Organic Discharge[a]

Feed constituent	Limit (milligrams per liter) [b, c]
Acetone	174.4 ([R-1]/R)
1-Butanol	452 ([R-1]/R)
2-Butoxyethanol	190.4 ([R-1]/R)
2-Butanone	116 ([R-1]/R)
Tri-butyl phosphate	2.03E+4 ([R-1]/R)
Total carbon and Total inorganic carbon	(CT-ICT) < 174.4 ([R-1]/R) (as acetone)

[a] Limits are based on a maximum continuous operating time equivalent to 6 months per year. If total operating time is expected to exceed 6 months per year, the limits must be re-evaluated.

$$\sum_{n=1}^{i}\left(\frac{Conc_n}{LIMIT_n}\right) \le 1$$

[b] The limits are applied using the sum of the fractions technique: where i is the number of organic constituents detected in analysis of the waste feed tank. Total carbon and total inorganic carbon analysis are not part of the summation.

[c] R is the ratio of feed flow rate to slurry flow rate (typically R = between 1 and 2).

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: [KMC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, Table 3.3:

Table 3.3. Candidate Feed Tank Limits for LERF Liner Compatibility [a]

Chemical family/parameter [a]	Current target compounds	Limit (milligrams per liter) [b,c]
Alcohol/glycol	1-Butanol	500,000 ([R-1]/R)
Alkanone [d]	Sum of acetone, 2-butanone	200,000 ([R-1]/R)
Alkenone [e]	None targeted	2,000 ([R-1]/R)
Aromatic/cyclic hydrocarbon	None targeted	2,000 ([R-1]/R)
Halogenated hydrocarbon	None targeted	2,000 ([R-1]/R)
Aliphatic hydrocarbon	None targeted	500,000 ([R-1]/R)
Ether	2-Butoxyethanol	2,000 ([R-1]/R)
Other hydrocarbons	Tri-butyl phosphate	2,000 ([R-1]/R)
Oxidizers	None targeted	1,000 ([R-1]/R)
Acids, bases, and salts	Ammonia	100,000 ([R-1]/R)
Total carbon and total inorganic carbon	Not applicable	$(C_T\text{-}IC_T) < 1{,}240$ ([R-1]/R) (as acetone)

[a] If a chemical fits in more than one chemical family, the more restrictive limit applies.

[b] The limits are applied using the sum of the fractions technique: where i is the number of constituents detected in analysis of the waste feed tank. Total carbon and total inorganic carbon analysis are not part of the summation.

$$\sum_{n=1}^{i}\left(\frac{Conc_n}{LIMIT_n}\right) \le 1$$

[c] R is the ratio of feed flow rate to slurry flow rate (typically R = between 1 and 2).

[d] Ketone containing only saturated alkyl group(s)

[e] Ketone containing unsaturated alkyl group(s)

This table is used to ensure process condensate generated from candidate feed tank treatment is within LERF liner compatibility limits

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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Reason for denial:

Reviewed by Ecology:

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G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.8.1.2:

3.8.1.2 Candidate Feed Tank Sampling Quality Assurance and Quality Control

For each candidate feed tank sample, a sample solution is drawn from the sample riser using one or more sample bottles. All sample bottles are precleaned, amber-colored glass bottles sealed with Teflon* caps or septum caps and lined septums; however, the sample bottle for VOA must be sealed with septum cap and lined septum.

For candidate feed tank sampling quality control, one field blank, consisting of one or more sample bottles, is taken during the sample event. Field blanks are inserted ~~approximately~~ at least 1-foot into the headspace through any one of the sample risers used during the sample event. One trip blank, also consisting of one or more sample bottles, is taken during each sample event. Trip blanks are analyzed as independent samples for VOA. Field and trip blanks use the same types of sample bottles as the actual samples and are filled with reagent-grade water before shipment to the field.

Preservatives are not used with candidate feed tank samples because of concerns with high radiation exposure that would result from additional handling of sample solutions. It is not practical to refrigerate the bulky, shielded sample pigs and shipping containers. Biological activity, generally the largest problem in environmental samples, is unlikely in candidate feed tank samples because of the high salt content, pH, and radioactivity.

The chain of custody is documented on a data sheet that includes a unique sample number, date and time sample was taken, custody seal number, and signature of the sampler. When possession of the sample is transferred to other persons, such as the shipper or laboratory, the signature of the relinquisher and receiver are recorded, along with date and time of the transfer. The receiver at the laboratory also documents on the data sheet that the sample seal number is correct and the seal is intact. The chain-of-custody data sheets are included in the operating record.

*Teflon is a trademark of E.I. DuPont de Nemours & Company

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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Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.8.1.3

3.8.1.3 Deviations from Specified Sampling Practices

The WAP requires ASTM E 300 'bottle on a string procedure' for sampling (ASTM E300-86). Due to high radiation fields, some deviations to the standard have been necessary to implement safely the sampling practices in the field. These deviations are documented below.

- Requirement: The sampling apparatus be filled and allowed to drain before drawing the sample.

  Deviation: Sampling personnel lowers the sampling apparatus to the specified level and collects the sample. To pour the contents out and resample would encourage the spread of radiological contamination and additional whole body and extremity radiation exposure.
- Requirement: Bottles and jars may be made of clear or brown glass or polyethylene with necks shaped to receive glass stopper or a screw cap made of metal or plastic material.

  Deviation: Sampling personnel uses clear or amber glass with necks shaped to receive rubber stoppers. Glass stoppers were used at one time but resulted in broken sample bottles during the removal of the glass stoppers from the glass bottles.
- Requirement: Stopper and label bottles immediately after taking the samples and deliver them to the laboratory.

  Deviation: Sampling personnel screws on the bottle cap after the sample has been collected. Because of the alkalinity of the tank waste sample labels will not stay on bottles after samples are collected. Therefore, sample bottles are etched with the sample numbers before the samples are collected. The samples are shipped to the laboratory as soon as resources are available, within three days of sample collection.
- Requirement: Select wiping cloths so that lint is not introduced, contaminating the samples.

  Deviation: Sampling personnel uses damp cotton towels to wipe down sample bottles after the sample bottles have been capped. The intent is to remove any waste that may have been deposited on the bottle during the sampling event to minimize contamination and personnel exposure.
- Requirement: To prevent the loss of the liquid during shipment and to protect against moisture and dust, cover the closure of the glass bottle with plastic caps, which have been swelled in water, wiped dry, placed over the top of the stoppered bottle, and allowed to shrink tightly in place. Screw-top bottles are recommended. The cap should be lined with material inert to the sample. The screw caps should be secured by use of adhesive tape or similar material.

  Deviation: Sampling personnel uses screw caps and 4-mil plastic bags. The cap is Teflon-lined which is inert to the sample. The sample bottle is placed inside a plastic bag, which is placed inside a steel pig (or sample pig). The steel pig is placed inside a shipping pig. The screw cap is not secured with adhesive tape. Securing the sample bottle caps with tape would present the laboratory with difficulty of removing the caps remotely (in the hot cell). If the sample leaks from the sample bottle, it is trapped in the plastic bag. The custody seal is placed on the shipping pig per procedure.
- Requirement: All sampling apparatus and closures shall be clean, dry, free of contaminants, and constructed of materials that are inert to the product to be sampled.

  Deviation: The weldments are wiped down at the fabrication shop but are stored in open bins inside the warehouse. The stoppers are received in bags and are inspected for dirt and wiped down. By training, visual inspection is made of the sampling equipment to verify that the equipment does not contain any gross contamination. If any is found, the equipment is either replaced or wiped down. The bottles with screw caps are washed and certified and are not opened until at the time of the sampling event. The bottles are opened when the last sample is completed so that only one bottle is opened at the time of sampling to insert the rubber stopper from the sample holder. The weldments, stopper, and bottles are constructed from materials that are inert to the product to be sampled.

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 11-29-05

G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.8.1.4:

3.8.1.4 Process Condensate Sample Collection

Process condensate samples, when performed at 242-A Evaporator instead of LERF, are taken from the process condensate transfer line in the condenser room of the 242-A Building. Grab sampling is performed during the campaign ~~on the transfer line downstream of the ion exchange column~~ at the SAMP-RC3-2 sampler or other sample port. Samples of process condensate are collected in a manner consistent with SW-846 procedures (EPA 1986) as documented in sampling procedures, which are maintained and implemented by unit personnel.

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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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.8.1.5

3.8.1.5 Process Condensate Sampling Quality Assurance and Quality Control

For information on process condensate sample collection, including the number and types of sample bottles, sampling QA/QC, etc., refer to the *Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan*~~/ETF WAP (HNF-SD-ENV-WAP-008)~~.

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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242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

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

3.8.2 Analyte Selection and Rationale

The DQO analysis for the 242-A Evaporator examined the data needs for sampling the candidate feed tanks and determined that the analyses in Table 3.5 should be conducted to satisfy WAC 173-303-300 requirements. Table 3.5 also contains the rationale for these parameters being selected. Section 3.6 provides additional detail on the rationale.

For information on process condensate sample analyte selection and rationale, refer to the *Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan* ~~LERF/ETF WAP (HNF-SD-ENV-WAP-008)~~.

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: [KAC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
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 downgraded to a Class 1, if appropriate.

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Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.9:

3.9 ANALYTICAL METHODS AND QUALITY ASSURANCE AND QUALITY CONTROL

This section provides information on the analytical methods and QA/QC for candidate feed tank samples, including discussions concerning laboratory selection and analytical methods. For information on process condensate analytical methods and QA/QC, refer to the *Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan* ~~LERF/ETF WAP (HNF-SD-ENV-WAP-008)~~.

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class [1]1	Class 2	Class 3
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242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, Table 3.7:

Table 3.7 Quality Assurance Requirements for Candidate Feed Tank Stream Analytes

...

Reserved.
In deriving the action levels, the ratio of feed flow rate to slurry flow rate (R) is assumed to be 2.
For organic species limits, sum of the fractions rule apply (refer Tables 3.2 and 3.3). Total carbon and total inorganic carbon are not included in the summation of organics.
Precision for this method is evaluated by the deviation between sample (unspiked) and sample replicate. Accuracy for DSC is evaluated by using the laboratory control standard.

RPD - relative percent difference C_T - total ~~inorganic~~ carbon IC_T - total inorganic carbon
Mg/L - milligram per liter $\mu g/L$ - microgram per liter

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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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242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 3.0 with the attached Chapter 3.0 dated December 31, 2005.
Chapter 3.0, §3.10

3.10 REFERENCES

...

Banning D.L., 2005, *242-A Evaporator Data Quality Objectives (DQO)*, SD-WM-DQO-014 (most current revision), CH2M HILL Hanford Group, Richland Washington.

DOE/RL, 1988, *Hanford Facility Dangerous Waste Part A Permit Application*, DOE/RL-88-21, U.S. Department of Energy Richland Field Office, Richland, Washington, updated periodically.

~~DOE/RL-97-03, *Hanford Facility Dangerous Waste Permit Application, Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility*, Revision 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.~~

Ecology, ~~and EPA, 1994~~2004, *Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste*, Permit Number WA7890008967, Washington State Department of Ecology, Olympia, Washington and U.S. Environmental Protection Agency Region 10, Seattle Washington.

Ecology, 2004, *Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste, Permit Number WA7890008967, Part III, Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility*, Washington State Department of Ecology, Olympia, Washington and U.S. Environmental Protection Agency Region 10, Seattle Washington.

...

EPA, ~~1994b~~2001, *Data Quality Objectives Decision Error Feasibility Trials*, EPA QA/G-4D, Version 4.0, U.S. Environmental Protection Agency, Washington D.C.

Knight M. A., 2004, *Tank Farm waste Compatibility Program*, HNF-SD-WM-OCD-015 (most current revision) CH2M HILL Hanford Group, Richland Washington.

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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242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.0

4.0 PROCESS INFORMATION

Where information regarding treatment, management, and disposal of the radioactive source byproduct material and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954 as amended) has been incorporated into this document, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit or chapter 70.105 RCW and its implementing regulations but is provided for information purposes only.

...

After a brief residence time in the vapor-liquid separator, the slurry exits from the bottom through the lower portion of the recirculation line and is recirculated by the recirculation pump (P-B-1). The pump discharges the slurry back to the reboiler via the upper portion of the recirculation line, thus completing the recirculation loop.

The specific gravity of the waste liquid is monitored closely to ensure that the target density, established before the beginning of the campaign, is not exceeded. A portion of the slurry is removed from the ~~upper~~ upper portion of the recirculation line using the slurry pump (P-B-2) and transferred through an encased underground pipeline (pipe-within-a-pipe) to a designated slurry receiver tank in the DST System.

The vapors are drawn from the vapor-liquid separator, through a 42-inch diameter vapor line and enter a series of three condensers, where the vapors are condensed using raw water. The condensed vapors, called process condensate, are collected in tank C-100. Steam jets are used to create a vacuum on the vapor-liquid separator drawing the process vapors into and through the condensers. Noncondensable vapors are drawn from the condensers, ~~through~~then through a series of particulate filters and vented to the atmosphere. The air discharges are monitored continuously when the 242-A Evaporator is operating to verify that standards for radionuclide and ammonia emissions standards are met.

...

During a campaign, the evaporation process is continuous with typical feed flow rates of 260 to 450 liters per minute, process condensate flow rates of 150 to 230 liters per minute, and slurry flow rates of 110 to 230 liters per minute. The evaporator process is shutdown when the desired endpoint concentration of the slurry is met. Endpoints are established at the beginning of the campaign, based on the target specific gravity of the waste, or allowable waste volume reduction (WVR) and defined operating limits. If the evaporation rate cannot achieve the desired endpoint, slurry in the DST System serving as the slurry receiver is transferred to the feed tank for one or ~~additional~~ more passes through the 242-A Evaporator. At the end of each campaign, the 242-A Evaporator process equipment is shutdown, emptied, flushed with raw water, and placed in a safe standby mode.

Other discharges during 242-A Evaporator processing include condensate from the steam used to heat the waste and cooling water used to condense the vapors. The 242-A Evaporator is designed to prevent contamination of these streams. The fluids on the uncontaminated side of the heat exchangers are maintained at a higher pressure than the waste stream so that uncontaminated fluid migrates toward the contaminated waste if a leak were to occur. The steam condensate ~~is discharged to the TEDF. T~~and the cooling water ~~is monitored~~are monitored continuously for radiation, pH, conductivity, and discharged to TEDF as long as ~~the discharge radiation~~none of the discharge limits are ~~not~~ exceeded. The steam condensate and cooling water streams were assessed in the stream specific reports (WHC 1990a and WHC 1990b) and are not dangerous waste in accordance with WAC 173-303.

The 242-A Evaporator process is controlled by the MCS. The MCS computer monitors ~~all~~ process parameters and controls the parameters where required. Once the configuration parameters and other process control inputs are set, the MCS ~~functions independently of the operator, maintaining~~ maintains the process parameters within specified ranges by sending output signals that operate specific pieces of

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242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

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Chapter 4.0, §4.1.2:

4.1.2 PC-5000 Transfer line

~~Aqueous waste from the 242-A Evaporator is transferred to the Liquid Effluent Retention Facility (LERF) through the PC-5000 waste transfer line. The below grade transfer line, is a 3-inch carrier pipe within a 6-inch outer containment pipeline, approximately 1,500 meters long. This permit includes the portion of the PC-5000 line leaving the 242-A Evaporator facility to the fence line of LERF.~~

Process condensate from the 242-A Evaporator is transferred to the LERF using a pump located in the 242-A Evaporator and approximately 1,500 meters of pipe, consisting of a 3-inch carrier pipe within a 6-inch outer containment pipeline. Flow through the pump is controlled through a valve at flow rates from 150 to 300 liters per minute.

The encased fiberglass transfer line (PC-5000) exits the 242-A Evaporator below grade and remains below grade at a minimum 1.2-meter depth for freeze protection, until the pipeline emerges at the LERF catch basin, at the corner of each basin. All piping at the catch basin that is less than 1.2 meters below grade is wrapped with electric heat tracing tape and insulated for protection from freezing. Additional detail including information on secondary containment, leak detection and integrity assessment for this line is provided in § 4.1.6.3.3 and §4.1.4.1.

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

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Unit: **242-A Evaporator**	Permit Part & Chapter: **Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.3:

4.1.3 Vapor-Liquid Separator (C-A-1) and Ancillary Equipment

The following sections describe the vapor-liquid separator (C-A-1) and ancillary equipment.

Waste Feed System. Feed to the 242-A Evaporator is supplied via a pump located in the 241-AW-102 feed tank. The feed pump transfers the waste to the 242-A Evaporator through a 3-inch diameter carbon steel transfer pipeline encased in a 6-inch diameter carbon steel pipe to provide secondary containment. The feed pipeline is equipped with a leak detection system.

Samples can be taken from the waste feed when needed. The feed sampler (SAMP-F-1) is located in a sample enclosure located in the ~~load out and~~ hot equipment storage room.

...

~~Pressure~~ Operating parameters in the vapor-liquid separator ~~is~~ are monitored to provide an indication of process problems such as slurry foaming, deentrainer flooding, or excessive vapor temperatures. Instrumentation also is available to monitor the liquid levels in the vapor-liquid separator. Interlocks are activated when high pressures or high- or low-liquid levels are detected, shutting down the evaporation process and placing the facility in a safe configuration.

The vapor-liquid separator and recirculation loop can be flushed to remove any residual solids from the system and/or to reduce radiation levels. The most common flush solution is water, but dilute nitric or citric acid solutions could be used. All acidic flush solutions are chemically adjusted to meet DST acceptance criteria before transfer to the DST System. ~~The capability also exists to add an a~~Antifoam solution is added (at very low flow rates - approximately 0.04 to 0.4 liters per minute) to the vessel to prevent foaming. The antifoam solution is a noncorrosive, nonregulated silicone-based solution that is compatible with the evaporator components.

...

- Excessive pressure is detected in the slurry lines to 241-AW Tank Farm
- A leak is detected in the slurry transfer lines secondary containment ~~or cleanout boxes (COB) (COB-AW-1 and COB-AW-2) located on the slurry transfer lines~~
- A leak is detected in the 241-AW Tank Farm process pits where the transfer lines enter the DST System.

...

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242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.3.1:

4.1.3.1 Condensate Collection Tank (C-100) and Ancillary Equipment

The following section discusses the condensate collection tank (C-100) and ancillary equipment. This equipment collects process condensate via the condensers in the vacuum condenser system, filters the condensate, ~~removes additional radionuclides, if necessary,~~ and pumps the process condensate to LERF. Figure 4.4 provides a simplified process flow diagram showing the major components of the process condensate system. The following major components make up the process condensate system:

- Vacuum condenser system
- Condensate collection tank (C-100)
- Process condensate pump (P-C-100)
- Condensate filters (F-C-1, F-C-2, and F-C-3)

~~•D-1~~

- Process condensate r~~R~~adiation monitoring ~~and~~, sampling and diversion system (RC-3)
- Seal pot
- Process c~~C~~ondensate r~~R~~ecycle s~~S~~ystem.
- Vessel Vent System

...

Primary Condenser (E-C-1). Vapors drawn from the vapor-liquid separator flow through the 42-inch (3.5 feet) -vapor line, into the E-C-1 condenser where the majority of the condensation takes place. Noncondensed vapors exit to the intercondenser (E-C-2) while the condensed vapors (process condensate) drain to the condensate collection tank (C-100). Cooling water passes through the cooling tubes and exits to TEDF.

The carbon steel condenser shell measures approximately 5.3 meters (17.4 feet) long and has a 2.2-meter (7.2 feet) inside diameter. The condenser consists of 2,950 equally spaced carbon steel tubes that are 3.6 meters (11.8 feet) -long with a 1.9-centimeter (0.75 inches) outside diameter.

Intercondenser (E-C-2). Noncondensed vapors from E-C-1 enter the intercondenser. The vapor stream contacts the cooling tubes in the condenser where cooling water provides additional condensation. The condensate drains to the condensate collection tank (C-100). Noncondensed vapors and used cooling water are routed to the aftercondenser.

The carbon steel intercondenser measures 2.2 meters (7.2 feet) long with a 0.39 meter (1.3 feet) inside diameter. This heat exchanger contains 144 tubes that are 1.7 meters (5.6 feet) long with a 1.9-centimeter (0.75 inches) outside diameter.

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

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242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.3.1:

4.1.3.1 Condensate Collection Tank (C-100) and Ancillary Equipment

...

Aftercondenser (E-C-3). Vapor discharged from the intercondenser enters the aftercondenser. Cooling is supplied to the aftercondenser by the cooling water from the intercondenser. Condensate is routed to the condensate collection tank (C-100), while the noncondensed vapors are filtered, monitored, and discharged to the atmosphere through the vessel ventilation system. The cooling water is discharged to TEDF.

The carbon steel aftercondenser measures 2.3 meters (7.5 feet) long and has a 0.20-meter (0.66 feet) inside diameter. This heat exchanger contains 45 tubes that are 1.8 meters (5.9 feet) long with a 1.9-centimeter (0.75 inches) outside diameter.

Steam Jet Ejectors. The vacuum that draws the vapors from C-A-1 into the condensers is created by a two-stage steam jet ejector system. The first-stage jet ejector (J-EC1-1) maintains a vacuum on the primary condenser, which in turn creates a vacuum on the vapor-liquid separator. The ejector consists of a steam jet, pressure controller, and air bleed-in valve. Steam and noncondensed vapors from the primary condenser are ejected from J-EC1-1 into the intercondenser. The desired vacuum is obtained by controlling steam pressure and bleeding ambient air as necessary into the vapor header through an air intake filter. The second-stage jet ejector (J-EC2-1) creates the vacuum that moves vapors from the intercondenser through the aftercondenser.

Condensate Collection Tank (C-100). Process condensate from the primary condenser, intercondenser, aftercondenser, and the vessel ventilation system drain to the condensate collection tank (C-100). The tank is 4.3 meters in diameter, 5.8 meters high, and is constructed of 0.79-centimeter (0.31 inches)-thick stainless steel. The tank has a maximum design capacity of 67,400 liters (17,805 gallons). Normal operating volume is approximately 50 percent of the tank capacity. A carbon steel base supports the tank. An agitator is installed but not used. ~~while pumping process condensate to LERF.~~

In the event of a tank overflow, the solution is routed through an overflow line to the drain system, which returns waste to the feed tank (241-AW-102). Overflow occurs when the volume exceeds about 60,600 liters. The overflow line is equipped with a liquid filled trap to isolate the drain system from the tank.

...

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242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

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Chapter 4.0, §4.1.3.1:

4.1.3.1 Condensate Collection Tank (C-100) and Ancillary Equipment

...

~~The potential exists for~~ Process feed samples are evaluated for the presence of a separate organic layer and process controls are used to reduce the risk of the condensate collection tank to receive small amounts of immiscible organics with the condensed waste. ~~There is instrumentation installed on the condensate collection tank to detect a separate organic phase based on interface density at the surface of the waste in the tank.~~ If detected, the organic layer is removed by overflowing tank C-100 back to the feed tank 241-AW-102. ~~In addition,~~ ~~t~~The liquid level in the tank is controlled well above the discharge pump intake point and a controlled overflow is conducted upon completion of each processing cycle (campaign) to ensure that an organic layer does not accumulate and cannot be pumped to LERF.

Process Condensate Pump. A pump (P-C-100) moves the process condensate from tank C-100 through the condensate filter to LERF. The process condensate pump is a centrifugal pump constructed of 316 stainless steel.

Condensate Filters. After leaving the condensate collection tank, the process condensate is filtered to remove solids. The primary condensate filter (F-C-1) has a welded steel housing. A second filter system (F-C-3), installed ~~downstream is~~downstream is also used to filter the process condensate. This system has duplex in-line filters in a cast iron housing. ~~Only one of the filters is used at a time.~~ Both filters employ a filter material that is compatible with the process condensate.

Process Condensate ~~Radiation Monitoring~~ Radiation Monitoring, ~~and~~ Sampling and Diversion System. The process condensate transferred to LERF is monitored continuously for radiation. If radiation levels exceed established limits, an alarm is received and interlocks immediately divert the stream back to the condensate collection tank (or the feed tank) and shut off the process condensate pump. This ensures process condensate containing excessive radionuclides due to an accidental carryover from the vapor-liquid separator is not transferred to LERF.

Seal Pot. The condensate collection tank receives condensed liquids from the vessel ventilation system. A seal pot collects the drainage before discharge into the condensate collection tank and isolates the tank from the vessel ventilation system.

Condensate Recycle System. For waste minimization, a portion of the process condensate from tank C-100 is recycled for use as decontamination solution for the deentrainment pad sprays and seal water for the recirculation pump (P-B-1) and slurry pump (P-B-2). Use of process condensate instead of raw water results in approximately 10 percent reduction in waste volume generated during continuous operation of the 242-A Evaporator. Filtered ~~r~~Raw water also is available as a backup for sprays and seal water. A 2-inch (5.1 centimeters) diameter carbon steel line, stainless steel centrifugal pump (P-C106), and filters (F-C-5 and F-C-6) supply process condensate from tank C-100 to the pad sprays and pump seals. The filters are disposable cartridge filters in carbon steel housings arranged in parallel with one filter in service while the other is in standby.

...

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Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.4:

4.1.4 Integrity Assessments

The integrity assessment report (Appendix 4B, Integrity Assessment Report) discusses:

- The standards used during design and construction of the 242-A Evaporator and the adequacy of those standards
- The characteristics of the DST waste processed
- The adequacy of the materials of construction to provide corrosion protection from the waste processed
- The age of the tanks and the affect of age on tank integrity
- The results of the leak tests, visual inspections, and tank wall thickness inspections
- The frequency and scope of future integrity assessment
- Deficiencies in secondary containment design. These deficiencies are discussed in ~~Section 4.1.5~~ the integrity assessment report.

An independent, qualified, registered professional engineer certified the integrity assessment.

The inspections, tests, and analyses performed provide assurance that the 242-A Evaporator tank system has adequate design, sufficient structural strength, and sufficient compatibility with the waste to not collapse, rupture, or fail during operation. No evidence of degradation was noted during the visual test, ultrasonic test, or leak test. Both condensate collection tank C-100 and the vapor-liquid separator/reboiler loop passed leak tests. The frequency of subsequent integrity assessments ~~will~~ has been established at every 10 years. T~~ba~~his frequency is base~~d~~ on the results of the ~~last~~ 1998 integrity assessment.

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Enter wording of WAC 173-303-830, Appendix I Modification citation:
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Modification Approved: [X] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
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 downgraded to a Class '1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.4.1:

4.1.4.1 PC-5000

An integrity assessment for PC-5000 was performed, including a hydrostatic leak/pressure test at 10.5 kilograms per square centimeter gauge (150 pounds per square inch). A statement by an independent, qualified, registered professional engineer attesting to the integrity of the piping system is included in *Integrity Assessment Report for the 242-A Evaporator/LERF Waste Transfer Piping, Project W105* (WHC 1993), along with the results of the leak/pressure test.

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: [KMC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.5:

4.1.5 Additional Requirements for Existing Tanks

Refer to information in Section 4.1.2 and the integrity assessment report, which includes measuring tank wall thicknesses, evaluating corrosion protection, and performing leak tests~~, have been discussed in~~.

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: [KAC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:

G. P Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.6.1:

4.1.6.1 Requirements for All Tank Systems

The Construction Specification for 242-A Evaporator-Crystallizer Facilities Project B-100 (Vitro 1974) was used during preparation, design, and construction of the tank and secondary containment systems. The integrity assessment report details how the construction specification relates to the national codes and standards.

Constructing the building and vessels per this specification ensures that foundations are capable of supporting tank and secondary containment systems and that uneven settling and failures from pressure gradients do not occur. The integrity assessment report (Appendix 4B) states that the 242-A Evaporator has adequate design, sufficient structural strength, and sufficient compatibility with the wastes to not collapse, rupture, or fail during service loads associated with normal operations and that the building structure was designed and constructed to withstand a design basis earthquake".

~~Section 2.2.7 of t~~The integrity assessment report (Appendix 4B) describes the building and secondary containment system. This system is designed to ensure any release is detected within 24 hours. The secondary containment system also is designed to contain 100 percent of the maximum operating capacity of the vapor-liquid separator/reboiler loop, and the drain systems are sloped to allow collection of solution and have sufficient capacity to drain this volume in less than the required 24 hours.

~~Section 2.2.7 of t~~The integrity assessment report describes the protective coating material and sealant used to protect concrete and joints from attack by leaks to the secondary containment. The materials of construction for the sump and drain lines are also compatible with the waste processed at the 242-A Evaporator.

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: [KAC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.6.2:

4.1.6.2 242-A Building Secondary Containment

The 242-A Building serves as a secondary containment vault for the vapor-liquid separator (C-A-1), condensate collection tank (C-100), and ancillary equipment used for transferring mixed waste at the 242-A Evaporator. The concrete for the operating area was poured to form a monolithic structure. Where needed, joints in the concrete were fabricated with preformed filler conforming to the standards of the American Society of Testing and Materials. Joint filler is sealed with a polysulfide sealant per the requirements of the construction specifications (Vitro 1974).

Before restart in 1994, a new acrylic special protective coating was applied to the concrete in the pump, evaporator, and condenser rooms. The coating meets the requirements of the construction specifications (Vitro 1974), including resistance to very high radiations doses, temperatures of 77° C, and spills of 25 percent caustic solution.

The following ~~five~~ six rooms contain equipment used to process or store*mixed waste:

- Pump room
- Evaporator room
- Condenser room
- Ion exchange room
- Load out room* (used for temporary storage of mixed waste)
- ~~and h~~Hot equipment storage room.

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

Reason for denial:

Reviewed by Ecology:

G. P Davis 11-29-05

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.6.2.1:

4.1.6.2.1 Pump Room

The pump room secondary containment walls are 0.38- to 0.56-meter (1.25 to 1.84-feet)- thick reinforced concrete. The secondary containment floor is 0.51-meter-thick reinforced concrete. The pump room floor is lined with 0.64-centimeter (0.25-inch) stainless steel and the concrete walls and ceiling cover blocks are painted with a special protective coating. The pump room contains pipe jumpers used to transport feed and slurry solutions between the vapor-liquid separator and the DST System, and the process recirculation loop, recirculation pump (P-B-1), and slurry pump (P-B-2).

Leaks in the pump room collect in the pump room sump, a 1.5-meter (4.9-feet ~~by~~) by 1.5-meter (4.9-feet) by 1.8-meter (5.9 feet) deep sump with a 0.64-centimeter (0.25-inch) stainless steel liner. The pump room sump collects spills from various sources for transfer to the feed tank, 241-AW-102. Figure 4.6 provides a simplified process flow schematic of sources, which drain to the pump room sump. Drainage to the sump includes:

- Leaks to the pump room floor from equipment in the pump room
- Evaporator room floor drain
- ~~Load out and h~~Hot equipment storage room floor drain
- Load~~ing~~out room floor drain
- ~~Decontamination room sump drains (including feed and slurry sampler drains)~~
- Raw water backflow preventer drain.

Solution in the pump room sump is transferred to the feed tank (241-AW-102) using a steam jet. A 10-inch secondary containment overflow line is provided for draining large volumes of solution should a catastrophic tank failure occur. Because the overflow line provides a direct path between the air space of tank 241-AW-102 and the pump room, a minimum level of water must be maintained in the sump to prevent cross ventilation. A leak into the pump room sump would be detected by a rise in the sump level. Instrumentation provided alarms on high sump level.

The recirculation and slurry pumps in the pump room are equipped with mechanical seals having pressurized water introduced between the seals. The seal water is maintained at a pressure that exceeds the process pressure at the seal to ensure water leaks into the process solution, but waste solution does not leak out. Water from seal leakage is collected in funnels in the pump room and routed to feed tank 241-AW-102 via the 10-inch overflow line described previously.

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 11-29-05

G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.6.2.2:

4.1.6.2.2 Evaporator Room

The evaporator room secondary containment walls are 0.56-meter-thick reinforced concrete. The secondary containment floor is 0.51-meter-thick reinforced concrete. The evaporator room contains the vapor-liquid separator vessel (C-A-1), part of the recirculation loop, the reboiler, the 42-inch vapor line, and line used to empty the vapor-liquid separator to feed tank 241-AW-102.

Leaks in the evaporator room flow to a floor drain that routes through a 3-inch line to the pump room sump described in Section 4.1.6.2.1 ~~4.1.4.2.1~~. A leak in the evaporator room would be detected by a rise in the pump room sump level. The floor of the evaporator room and a portion of the pump room floor are 3.0 meters below grade to contain the entire contents of the vapor-liquid separator, reboiler, and recirculation loop in the event of a catastrophic failure. The floor and walls of the evaporator room up to an elevation of 1.8 meters are painted with a special protective coating.

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: [KC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form	
Unit: **242-A Evaporator**	Permit Part & Chapter: **Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.6.2.3:

4.1.6.2.3 Condenser Room

The condenser room secondary containment walls are 0.36- to 0.56-meter-thick reinforced concrete. The secondary containment floor is 0.51-meter-thick reinforced concrete. The condenser room contains all the components of the process condensate system described in Section 4.1.~~1.2~~3.1 (refer Figure 4.4), including tank C-100.

Leaks in the condenser room flow to two floor drains that join and route through a 6-inch line to feed tank 241-AW-102. Leaks in the condenser room are detected by the following:

- Unexpected changes in liquid level in tank C-100. Instrumentation is provided to monitor liquid level in the tank, including high- and low-level alarms.
- Daily visual inspections of process condensate system components and piping.

The floor and walls of the condenser room up to an elevation of 1.2 meters are painted with a special protective coating.

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:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.6.2.4:

4.1.6.2.4 Load out and Hot Equipment Storage Rooms

The load out and hot equipment storage rooms secondary containment walls are 0.30- to 0.56-meter (0.98- to 1.84-feet)- thick reinforced concrete. The secondary containment floors ~~is~~are 0.15-meter (0.49-feet)- thick reinforced concrete. The room contains two recirculation lines and samplers used to sample the feed and slurry streams. The lines and samplers are located in a shielded enclosure adjacent to the pump room wall.

The load out and hot equipment storage room contains two sumps: the drain sump and decontamination sump. The sumps are 0.91 meter in diameter, about 1.2 meters deep, and lined with stainless steel. Both sumps drain via a 3-inch drain line to the pump room sump described in Section 4.1.6.2.1~~4.1.4.2.1~~. The sumps, floor, and walls of the load out and hot equipment storage room up to an elevation of 3.8 meters are painted with a special protective coating.

Leaks in the sampler piping, flow into two drains in the sample enclosure, which drain via a 2-inch line to the decontamination sump, which drains to the pump room sump (described in 4.1.6.2.1~~4.1.4.2.1~~). Leak detectors in the sampler enclosures or a rise in the pump room sump level detects leaks in the sampler piping.

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:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.6.2.5:

4.1.6.2.5 242-A Building Drain Lines

Figure 4.6 provides a simplified process flow schematic of sources routed to the 242-A Building drain lines. The 242-A TSD unit boundary includes these lines up until they exit the 242-A Building. At this point, the lines are considered DST system components. ~~Three~~ Four lines serve to drain the 242-A Building and equipment to feed tank 241-AW-102:

- Pump room sump drain line (DR-334): a 10-inch carbon steel line that transfers process condensate overflow/diverted liquids and empty-out of the pump room sump to the feed tank
- Vapor-liquid separator vessel drain line (DR-335): a 10-inch carbon steel line that allows gravity drain of the vessel to the feed tank
- Condenser room drain line (DR-343): a 6-inch carbon steel line that drains potential leakage from the condenser room.
- Diverted process condensate drain line (DR-338): process condensate liquid drains through DR-338 into sump drain line (DR-334) which drains to 241-AW-102.

~~The three~~The four lines are sloped to drain about 170 meters to feed tank 241-AW-102 via the drain pit (241-AW-02D). Although WAC 173-303-640(1)(c) exempts systems that serve as secondary containment from requiring secondary containment, drain lines DR-334, DR-335, and DR-338 have outer encasement piping.

The drain lines are connected to a cathodic protection system to prevent external corrosion from contact with the soil. The cathodic protection system consists of:

- A rectifier that converts supplied alternating current voltage to an adjustable direct current voltage
- Numerous anodes buried near the underground piping and connected to the rectifier.
- Return wiring that connects the piping to the rectifier, completing the circuit.

The rectifiers are inspected to component degradation has not occurred. Test stations along the system are checked annually to verify 0.85 volt is maintained on the system, as required by the National Association of Corrosion Engineers.

Further detail regarding design and construction of DR-334,-335,-338 and -343 is provided in DOE/RL-90-39 (Hanford Facility Dangerous Waste Permit Application Double-Shell Tank System). Further detail regarding the design, operation, maintenance, and inspection of the cathodic protect system for these lines are also provided in DOE/RL-90-39. ~~These inspections are discussed in Attachment 35, Chapter 6.0.~~

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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Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.6.3:

4.1.6.3 Transfer Line Containment

This section describes the design and operation of secondary containment and leak detection systems for transfer lines between the DST System and the 242-A Evaporator, and from 242-A to LERF (one line only, PC-5000). The 242-A TSD boundary for lines running between 242A and the DST System ends at exterior wall of 242-A building. At this point, these lines (e.g., feed and slurry line piping) are DST System components. For further detail regarding SN-269, SN-270, SL-167, and SL-168 refer to DOE/RL-90-39.

~~The transfer line~~The PC-5000 transfer line transfers ~~for~~ process condensate (Section 4.1.2) from the 242-A building to LERF. The 242-A TSD unit boundary includes PC-5000 up to the LERF fence line (Chapter 1.0, topographic map, and Section 4.1.2, for the TSD unit boundary) ~~also has secondary containment and a leak detection system. The transfer lines are protected with the same cathodic protection system described in Section 4.1.4.2.6.~~

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	
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Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.6.3.2:

4.1.6.3.2 Slurry Line Piping

The slurry pump (P-B-2) transfers solution through one of two transfer lines: SL-167, for transfer to valve pit 241-AW-B (standard configuration), or SL-168 for transfer to valve pit 241-AW-A (alternate configuration, presently out of service). Slurry solution can be routed via double-encased piping from these valve pits to any designated DST slurry receiver. Both slurry transfer lines consist of 2-inch transfer piping within a 4-inch secondary containment encasement piping. Both the transfer and encasement pipes are constructed of Schedule 40 carbon steel. The lines run below grade about 73 meters between the 242-A Building and the valve pits.

These slurry lines contain leak detector risers and conductivity probes similar to the feed line piping described in Section 4.1.6.3.1~~4.1.4.3.1~~.

~~Each slurry line has four COBs located along their length. The COBs were installed to allow the introduction of a 'water snake' to dislodge plugs in the slurry line. Because of difficulties encountered in there use and the low frequency with which plugging occurs, the COBs are no longer used; however, the COBs still form part of the primary containment for the slurry transfer lines. Each COB has three 1-inch carbon steel lines. Two lines are connected to the slurry line for cleanout, while a third line, connects via a 2-inch encasement pipe to the feed transfer line for drainage. The three lines extend to sealed flanges at ground level.~~

~~Secondary containment for each COB is provided by a 0.63-centimeter-thick carbon steel plate caisson (measuring 0.6 meter in diameter and 0.6 meter high) mounted on a 0.3-meter diameter carbon steel riser. Each caisson has a flange cover and vent line to prevent pressure buildup in the secondary confinement air space.~~

~~To drain liquids that might collect in the COB secondary containment, a 1-inch diameter floor drain line and valve are provided. When the drain valve is opened, solution in the COB drains to the slurry line secondary containment encasement piping. Leaks are detected by a conductivity probe mounted to the floor of the COB, which annunciates in the 242-A Evaporator control room.~~

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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242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.6.3.3:

4.1.6.3.3 PC-5000

The process condensate transfer line (PC-5000) from the 242-A Evaporator is centrifugally cast, fiberglass-reinforced epoxy thermoset resin pressure pipe fabricated to meet the requirements of ASME D2997 (ASME 1984). The 3-inch (7.6-cm) carrier piping is centered and supported within 6-inch (15.2-cm) containment piping. Pipe supports are fabricated of the same material as the pipe, and meet the strength requirements of ANSI B31.3 (ANSI 1987) for dead weight, thermal, and seismic loads.

Drawing H-2-79604 provides details of the piping from the 242-A Evaporator to LERF.

This permit includes the portion of the PC-5000 line leaving the 242-A Evaporator facility to the fence line of LERF (Chapter 1.0 and topographic maps for unit boundary).

Single-point electronic leak detection elements are installed along the transfer line at 305-meter (1000 foot) intervals. The leak detection elements are located in the bottom of specially designed test risers. Each sensor element employs a conductivity sensor, which is connected to a cable leading back to the 242-A Evaporator control room. If a leak develops in the carrier pipe, fluid will travel down the exterior surface of the carrier pipe or the interior of the containment pipe. As moisture contacts a sensor unit, the alarm sounds in the 242-A Evaporator and/or the ETF control room and the zone of the leak is indicated on the digital display. The pump located in the 242-A Evaporator is shut down, stopping the flow of aqueous waste through the transfer line. A low-volume air purge of the annulus between the carrier pipe and the containment pipe is provided to prevent condensation buildup and minimize false alarms by the leak detection elements.

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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242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.6.4.1:

4.1.6.4.1 Vault Systems

The 242-A Building is a vault constructed partially below ground, providing secondary containment for the tank systems. The DST System waste processed at the 242-A Evaporator is designated ignitable and reactive because of the presence of nitrite and nitrate salts, which are considered oxidizers per 49 CFR 173. Because of their low volatility, these compounds are unlikely to be present in the vapor phase of the tank systems at the 242-A Evaporator. However, to prevent the spread of contamination, the vapor-liquid separator (C-A-1) is ventilated and maintained at lower air pressure than the building air space. This ensures air leakage is from uncontaminated building air space into the tank vapor space. Vapors from the vapor-liquid separator flow to the vacuum condenser system described in Section 4.0 ~~4.1.1.2~~.

The condensate collection tank (C-100), collects process condensate that is not designated ignitable or reactive.

The tank systems and ancillary equipment are located within the 242-A Building, which is completely enclosed to prevent run-on and infiltration of precipitation into the secondary containment system.

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

Reviewed by Ecology:
G. P Davis 11-29-05
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 downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.7:

4.1.7 Variances from Secondary Containment Requirements

~~Section 7.2 of t~~The integrity assessment report (Appendix 4B) discusses the following three deficiencies associated with the secondary containment system:

Pump Room Sump. The pump room sump does not comply with secondary containment requirements because liquid must be kept in the sump to provide a seal to prevent airflow between the pump room and feed tank 241-AW-102. Although the sump has a 0.63-centimeter (0.25-inch)-thick stainless steel liner to prevent corrosion of the concrete floor, the sump does not have secondary containment.

Routine Discharges through Secondary Containment. The configuration of the 242-A Evaporator process requires routine, batch discharges of dangerous waste through secondary containment drain lines. These routine discharges include the following.

- Steam condensate, cooling water, and process condensate sample stations drain to the feed tank, 241-AW-102, through drain line DR-343. Total discharge is about 38 liters (10 gallons) per month during operation.
- Sample bottle water sprays down in the feed and slurry sample stations drain to the decontamination sump in the load out and hot equipment storage room. The decontamination sump then drains to the pump room sump. Total discharge is about 76 liters per month during operation.

Transfer Piping Wall Penetrations. Three dangerous waste transfer line piping sections passing through the 242-A Building wall are single-walled, i.e., no secondary confinement in the wall (about 56-centimeter-thick reinforced concrete).

These deficiencies were identified to Ecology, October 28, 1993.Ecology's response stated, "No physical revision of the pipe wall penetrations or the floor drains in the evaporator pump room will be required prior to evaporator restart." The response required the following.

- If at any time leakage is seen or detected from these installations, or if for any reason these installations are repaired or rebuilt, they will be rebuilt or repaired in accordance with regulations.

Should a spill occur in the evaporator pump room, the sump and the piping shall be rinsed three times as required in WAC 173-303-160, as appropriate. 'Appropriate' in this case means that the original regulation was written for a free container, not a sump, so that judgment will have to be used in the application of the regulation. The rinsate shall be transferred to the double-shell tanks.

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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Hanford Facility RCRA Permit Modification Notification Form	
Unit: **242-A Evaporator**	Permit Part & Chapter: **Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, §4.1.8:

4.1.8 Tank Management Practices

All waste to be processed at the 242-A Evaporator must be sampled to determine if the waste is compatible with the materials of construction at the 242-A Evaporator. Before each campaign, candidate feed tanks are sampled per the requirements of the waste analysis plan (Chapter 3.0). Based on the results, three possible options are implemented.

- The waste is acceptable for processing without further actions.
- The waste is unacceptable for processing as a single batch, but is acceptable if blended with other waste that is going to be processed.
- The waste is unacceptable for processing.

The 242-A Evaporator process is controlled by the MCS. The MCS computer monitors liquid levels in the vapor-liquid separator (C-A-1) and condensate collection tank (C-100). The MCS system manages liquid levels in the C-A-1 using an auto-cascade function that controls feed delivery to the C-A-1 vessel. The MCS system also manages liquid levels in the C-100 using an auto-cascade function to maintain the tank level at approximately 50-percent. The MCS ~~and~~ has alarms that annunciate on high-liquid levels for both C-A-1 and C-~~to~~100 to notify operators that actions must be taken to prevent overfilling of these vessels.

An interlock is activated when high-liquid level in the vapor-liquid separator (C-A-1) is detected, automatically shutting down the feed transfer pump at feed tank 241-AW-102, thereby preventing overfilling of the vessel and carryover of slurry into the process condensate system. The condensate collection tank (C-100) has an overflow line that routes solution to feed tank 241-AW-102 in case of overfilling.

Process and instrumentation drawings are listed in Section 4.3.

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: [KAC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, Table 4.1:

Table 4.1. Process and Instrumentation Diagrams

System	Drawing Number	Drawing Title
Vapor-Liquid Separator	H-2-98988 Sheet 1	P & ID Evaporator Recirc System
Reboiler/Recirculation Line	H-2-98988 Sheet 2	P & ID Evaporator Recirc System
Slurry System	H-2-98989 Sheet 1	P & ID Slurry System
Condensate Collection Tank	H-2-98990 Sheet 1	P & ID Process Condensate System
Secondary Containment Drain System	H-2-98995 Sheet 1	P & ID Drain System
Secondary Containment Drain System	H-2-98995 Sheet 2	P & ID Drain System
Condensers	H-2-98999 Sheet 1	P & ID Vacuum Condenser System
Pump Room Sump	H-2-99002 Sheet 1	P & ID Jet Gang Valve System
Condensate Recycle System	H-2-99003 Sheet 1	P & ID Filtered Raw Water System
Process Condensate Line PC-5000	H-2-79604	Piping Plot for PC-5000 between 242 A and the LERF fence line

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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Reason for denial:

Reviewed by Ecology:
G. P Davis 11-29-05
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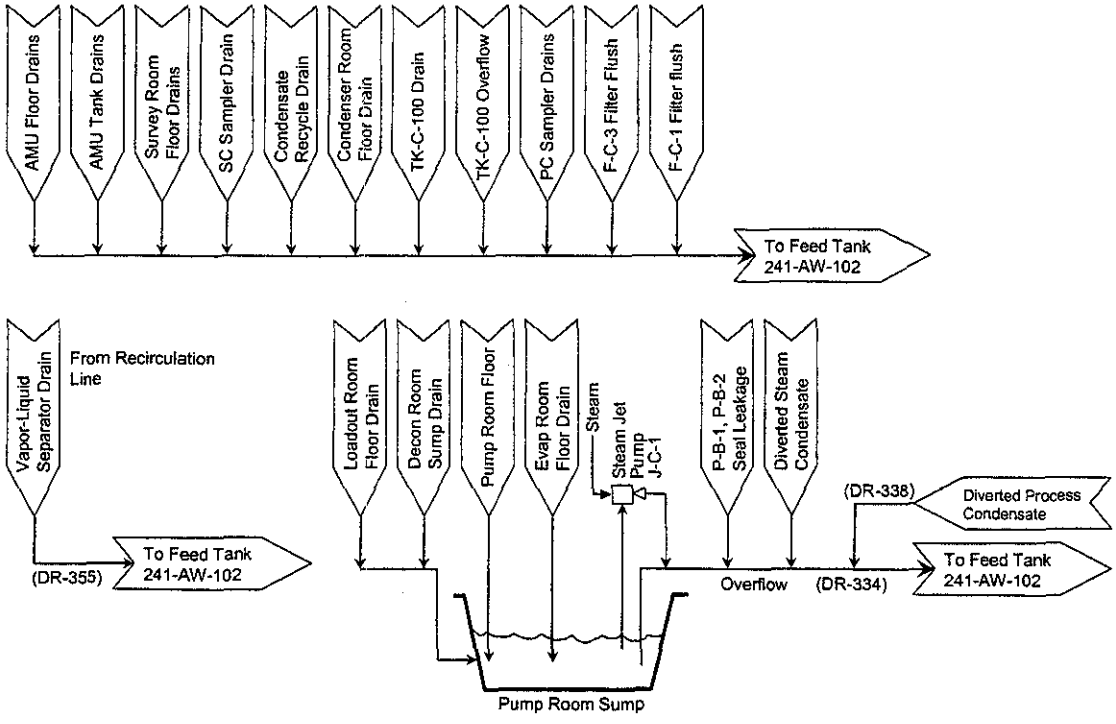
Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 4.0 with the attached Chapter 4.0 dated December 31, 2005.
Chapter 4.0, Figure 4.6:

Figure4.6. 242-A Evaporator Drain System



CHG0508-15

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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G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

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

6.0 PROCEDURES TO PREVENT HAZARDS

This chapter discusses security, inspection schedules, preparedness and prevention requirements, preventive procedures, structures, and equipment, and prevention of reaction of ignitable, reactive, and incompatible waste for the 242-A Evaporator.

Where information regarding treatment, management, and disposal of the radioactive source byproduct material and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954 as amended) has been incorporated into this document, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit or chapter 70.105 RCW and its implementing regulations but is provided for information purposes only.

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: [KA] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, §6.1 and §6.1.1.1:

6.1 SECURITY

The following sections describe the security measures, equipment, and warning signs used to control entry to the 242-A Evaporator. Hanford Facility security measures are discussed in the ~~Attachment 33, Chapter 6.0, §6.1~~*General Information Portion* (DOE/RL-91-28).

6.1.1 Security Procedures and Equipment

The following sections describe the 24-hour surveillance system, barriers, and warning signs used to provide security and control access to the 242-A Evaporator.

6.1.1.1 24-hour Surveillance System

The entire Hanford Facility Site is a controlled-access area with around-the-clock access control. For surveillance information, refer to ~~Attachment 33, Chapter 6.0, §6.1.1~~ the, *General Information Portion* (DOE/RL-91-28).

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: KAC Yes ☐ No (state reason for denial)
Reason for denial:

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G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, §6.1.1.2:

6.1.1.2 Barrier and Means to Control Entry

All 242-A Evaporator mixed waste tanks and equipment is located within the 242-A Building, which is protected by the building structure and secured entrances. The main entrances, ~~on the east side of the building, and the office entrances, on the south side of the building, are~~ are open during normal day shift hours. All other external entrances, including external entrances to areas containing mixed waste, are secured. Visitors are required to check in at the control room and must be escorted when entering areas of the 242-A Evaporator where they might be exposed to mixed waste. All entrances are secured when the building is not staffed. Security lighting is provided around the outside of the building.

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: [KMC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

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Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, §6.2.1:

6.2.1 General Inspection Requirements

This section provides an overview of inspections performed at the 242-A Evaporator. A copy of the inspection plan is kept in the 242-A Evaporator control room. There are three general classes of inspections at the 242-A Evaporator:

- ~~Continuous m~~Monitoring of remote instrumentations and alarms are performed by operating personnel in the 242-A Evaporator control room using the MCS computer.
- Visual inspections of tanks and equipment are performed by operating personnel. Some inspections of fire protection equipment, such as sprinkler system inspections, are performed by the Hanford Fire Department.
- Preventive maintenance of equipment and calibration of instruments are performed by maintenance personnel. A computerized tracking system is used to identify and schedule preventive maintenance and calibration activities.

Preventive maintenance and instrument calibrations on certain equipment might not be possible when the 242-A Evaporator is operating. Because of the limited duration of 242-A Evaporator campaigns, these activities are scheduled during outages between campaigns to avoid interference with operating activities.

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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Reason for denial:

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G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, §6.2.1.2:

6.2.1.2 Frequency of Inspections

The frequency of inspections is based on the significance of a failure of the equipment and on regulatory requirements, Hanford Site and industry standards, and past experience of the nature and frequency of equipment failures.

The frequency of inspections for the 242-A Evaporator is given in Tables 6.1 through 6.4. Examples of frequencies include:

- Daily (at least every 24 hours) - visual inspections of tanks, piping and secondary containment.
- Weekly (at least every 7 days) - visual inspections of personal protective equipment, exterior lighting, and posted warning signs.
- Monthly (at least every 31 days) - inspections of emergency sirens, fire extinguishers, safety showers, emergency lighting and the spill control kit.

~~•Bimonthly (at least every 62 days) - inspection of cathodic protection system rectifiers.~~

- Annually (at least every 365 days) - instrumentation calibrations, cathodic protection system testing, fire inspections.

Leak detectors are functionally checked within 92 days of the start of a campaign and every 92 days thereafter until the campaign is over. The frequency of some alarm monitoring is continuous. This means an operator must be present in the control room to monitor alarm instruments that continuously check for conditions such as leaks and high sump levels. Continuous monitoring is only required when the ~~system~~ 242-A Evaporator is processing waste~~operating.~~

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: [KAC] Yes [ ] No (state reason for denial)
Reason for denial:

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, §6.2.2.2:

6.2.2.2 Visual Inspections

Visual inspections of tanks and secondary containments are performed to check for leaks, signs of corrosion or damage, and malfunctioning equipment. Inspections also include housekeeping checks to ensure aisle space requirements are met. The following rooms containing dangerous waste are inspected:

- Condenser room
- Pump room
- ~~Loadout and h~~Hot equipment storage room
- ~~Loading~~ Load out room

In addition, the AMU room is inspected when hazardous materials are present in the room.

The vapor-liquid separator is located in the evaporator room, with a portion of the recirculation loop located in the pump room. Because of the high radiation dose in the evaporator room, visual inspections cannot be performed. Leaks in the evaporator room drain to the pump room sump; monitoring of the pump room sump instrumentation is performed to determine if leaks have occurred. Visual inspection of the portion of the recirculation loop located in the pump room is performed through the shielding window on the AMU mezzanine.

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: [KAD] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

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Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, §6.2.2.4:

6.2.2.4 Cathodic Protection

Cathodic protection is not required for the equipment within the 242-A facility boundaries. The only portion of the system, which is underground is the PC-5000 transfer line. The PC-5000 line is constructed of fiberglass.

~~An active cathodic protection system is installed in the 200 East Area Tank Farms to protect underground piping, including the feed transfer, slurry, and drain lines, from galvanic corrosion. The system consists of rectifiers providing direct current to buried anodes that direct the current to the soil. Test stations are located along the system to determine operability by taking readings on the system. The installation is according to the recommended practices of NACE.~~

~~Rectifiers are checked for signs of damage or component degradation at least every 2 months for cathodic protection systems. Operability testing of the cathodic protection system is performed annually.~~

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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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, §6.2.2.5:

6.2.2.5 Tank Assessments

The IAR was issued in ~~1993~~1998. The frequency and nature of these assessments are discussed in the IAR.

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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242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, §6.2.5:

6.2.5 Inspection Logs

Visual inspections (refer to Tables 6.1-6.4) are performed using inspection log sheets (also called round sheets) that outline frequency, the components to ~~inspect,~~inspect, operating conditions and ranges, and types of problems. Log sheets are kept in the 242-A Evaporator control room. Inspectors record the following information:

- Date and time of the visual inspection
- Printed name and signature of the person performing the inspection
- Notations of the observations made, including space for writing comments
- An account of spills or discharges in accordance with WAC 173-303-145.

Completed log sheets are reviewed and approved by the shift supervisor, collected, and stored for at least 5 years.

Maintenance inspections are performed as part of the maintenance job control system. After completion, the maintenance documentation is reviewed and signed.

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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242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, §6.3.2.3:

6.3.2.3 Water for Fire Control

Water for fire protection is supplied from the 200 East Area raw water system. Columbia River water is supplied to the fire control system from the 282-E Water Supply Reservoir. The water distribution system is sized to provide adequate volume and pressure to supply fire fighting needs under normal and emergency conditions. A fire hydrant is located approximately 10 meters (32.8 feet)east of the main entrance on the east side of the 242-A Building.

In the event that the sprinkler system at the 242-A Evaporator does not put out a fire, or the sprinkler system is damaged during an accident, each Hanford Fire Department fire station normally has a fire engine, equipped with a hydraulically operated aerial ladder, available to fight the fire. A pumper (fire engine without a boom) is used if the aerial ladder fire engine is inoperable. Fire engines have a pumping capacity of at least 5,600 liters of water per minute.

WAC 173-303-830 Modification Class [1] [2]	Class 1	Class '1	Class 2	Class 3
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Modification Approved: [KAC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P Davis 11-29-05
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 downgraded to a Class '1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, §6.4.2:

6.4.2 Run-Off

~~All l~~Liquid waste handling at the 242-A Evaporator occurs within tank systems with secondary containment. ~~All r~~Rooms containing mixed waste have drains that route to either the pump room sump or the feed tank, 241-AW-102. The pump room sump overflows to the feed tank as well. Therefore, run-off from a major leak, such as a break in a large water line within the 242-A Building, would be contained within the facility or drained to the feed tank (refer to Chapter 4.0, §4.1.4 for information on secondary containment and drain systems).

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: [KAC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, §6.4.4:

6.4.4 Equipment and Power Failures

~~Standby~~ Backup power is provided by a diesel generator located southeast of the 242-A Building. The diesel motor starts automatically on loss of electrical power and has sufficient fuel to operate the generator to safely shut down the evaporator process. An uninterruptible power supply system also is provided to allow continued operation of the MCS computer to ensure uninterrupted monitoring until the emergency generator is fully on line.

The 242-A Evaporator is designed to mitigate the effects of failure of a major piece of equipment. In general, the evaporator process can be shut down and the vapor-liquid separator gravity-drained to the feed tank, 241-AW-102, in the event of equipment failure. The process condensate tank, TK-C-100, is designed to overflow to feed tank 241-AW-102. This mitigates failure of the process condensate pump used to transfer the process condensate to LERF.

Response to equipment and power failures are discussed in more detail in Chapter 7.0, Contingency Plan.

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 11-29-05

G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, §6.5.1:

6.5.1 Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste

Administrative procedures are designed to prevent the ignition or reaction of waste at the 242-A Evaporator. The precautions include the following.

- Analysis is performed on candidate waste in the DST System to check that there are no exothermic reactions when the waste is heated and that there will be no adverse affects due to mixing the contents of different waste tanks in the feed tank and evaporator vessel (refer to Chapter 3.0, for details on waste analysis).
- Sample analysis of the candidate waste in the DST System includes a surface sample to identify the presence of a separable organic phase that might be ignitable. If a separate organic phase is detected, the waste solution level in the feed tank is maintained above 2.54 meters to prevent transfer of the organic phase to the 242-A Evaporator.
- The condensate tank, C-100, is equipped with instrumentation to detect the presence of a separable organic phase. If a separate organic phase is detected, the tank is allowed to overflow, transferring the organic phase to the feed tank, 241-AW-102.
- The condensate tank, C-100 is overflowed to the DST System following each campaign to prevent the possibility of accumulating immiscible organics in the condensate waste tank.
- ~~No smoking is allowed anywhere in the 242-A Building.~~
- The vapor-liquid separator and the condensate tank are drained and flushed before any welding is performed.
- Administrative safety controls have been established to control the use and quantities of combustibles materials, fuels, and gases. Hot work activities such as cutting, welding, and brazing are administratively controlled as part of the industrial safety program.

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: [KAC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, Table 6.1:

Table 6.1 Visual Inspection Schedule for Tanks, Piping, and Rooms

Item	Inspection	Frequency[1]	Responsible organization	Comments
...	...	...	...	...
IX column[2] room	• Inspect piping for leaks, corrosion, or wear. • Inspect floor for spills or damage.	Daily	Operations	Surveillance is required only when mixed waste is present in the piping.

[1] Continuously: an operator must be present in the control room to respond to alarms when processing waste
Daily: at least every 24 hours
Weekly: at least every 7 days
~~Bimonthly: at least every 62 days~~Monthly: at least every 31 days
Biannually: at least every 184 days
Annually: at least every 365 days

[2] IX column was removed in 2003

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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Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, Table 6.2:

Table 6.2. Inspection Schedule of Safety, Security, and Emergency Equipment.

Item	Inspection	Frequency[1]	Responsible organization	Comments
...	...	...	...	...

[1] Continuously: an operator must be present in the control room to respond to alarms
Monthly: at least every 31 days.
~~Bimonthly: at least every 62 days~~
Daily: at least every 24 hours
Biannually: at least every 184 days
Weekly: at least every 7 days
Annually: at least every 365 days

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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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, Table 6.3:

Table 6.3. Inspection Schedule for Alarm Monitoring.

Item	Inspection	Frequency[1]	Responsible organization	Comments
Overfill Protection				
Vapor-liquid separator: WFSH-CA11 WFSH-CA12	Monitor for vapor-liquid separator high level.	Continuously	Operations	Surveillance required only when solution is in the vapor-liquid separator.
Leak Detection				
~~Feed transfer line: LDS-SN269 LDS-SN270~~	~~Monitor feed transfer line for leaks.~~	~~Continuously~~	~~Operations~~	~~Surveillance required only during feed line transfers.~~
~~Slurry transfer line: LDS-AW-SL~~	~~Monitor slurry transfer line for leaks.~~	~~Continuously~~	~~Operations~~	~~Surveillance required only during slurry line transfers.~~
~~Cleanout boxes: LDS-COBAW~~	~~Monitor cleanout boxes for leaks.~~	~~Continuously~~	~~Operations~~	~~Surveillance required only during slurry or drain line transfers.~~
~~Drain lines: LDS-AW-DR~~	~~Monitor drain lines for leaks.~~	~~Continuously~~	~~Operations~~	~~Surveillance required only during drain line transfers.~~
Sampler lines: LDS-SMPL1 LDS-SMPL2	Monitor feed and slurry sampler lines for leaks.	Continuously	Operations	Surveillance required only during feed or slurry sampling.
Pump room sump: WFI-SUMP1	Monitor for leaks in the evaporator room, pump room, load out and hot equipment storage room and loading room. These rooms drain to the pump room sump.	Continuously	Operations	Surveillance required only when waste solution is present in the rooms listed.

Monthly: at least every 31 days.
~~Bimonthly: at least every 62 days.~~
Daily: at least every 24 hours.
Biannually: at least every 184 days.
Weekly: at least every 7 days.
Annually: at least every 365 days.
IAR = initial integrity assessment.
NACE = National Association of Corrosion Engineers.

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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Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 6.0 with the attached Chapter 6.0 dated December 31, 2005.
Chapter 6.0, Table 6.4:

Table 6.4. Inspection Schedule for Maintenance and Other Inspections.

Item	Inspection	Frequency[1]	Responsible organization	Comments
...				
~~Cathodic Protection~~				
~~Rectifiers~~	~~Check rectifiers for leaks, murky oil, signs of damage, or component degradation.~~	~~Bimonthly (62 days)~~	~~Maintenance~~	
~~System operation~~	~~Verify operation meets NACE requirements.~~	~~Annually~~	~~Maintenance~~	
...				
Other Inspections				
Integrity assessment	Check integrity of vapor-liquid separator and condensate tank per IAR.	Refer to comment	Operations	~~The requirements and~~ Based on the 1998 IA report frequencies for integrity testing ~~are given in the IAR.~~ is every 10 years, unless otherwise required for system repairs and upgrades.

[1] Continuously: an operator must be present in the control room to respond to alarms.
Monthly: at least every 31 days.
~~Bimonthly: at least every 62 days.~~
Daily: at least every 24 hours.
Biannually: at least every 184 days.
Weekly: at least every 7 days.
Annually: at least every 365 days.
IAR = initial integrity assessment.
NACE = National Association of Corrosion Engineers.

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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Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated December 31, 2005.
Chapter 11.0, §11.0:

11.0 CLOSURE AND FINANCIAL ASSURANCE

This chapter describes the planned activities and performance standards for closing the 242-A Evaporator. Final closure will begin when the 242-A Evaporator is no longer needed.

Where information regarding treatment, management, and disposal of the radioactive source byproduct material and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954 as amended) has been incorporated into this document, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit or chapter 70.105 RCW and its implementing regulations but is provided for information purposes only.

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

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Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated December 31, 2005.
Chapter 11.0, §11.1:

11.1 CLOSURE PLAN/FINANCIAL ASSURANCE FOR CLOSURE

The 242-A Evaporator will be clean closed with respect to dangerous waste contamination that resulted from operation as a TSD unit. To facilitate closure, the 242-A Evaporator is being viewed as consisting of six components: tanks, ancillary equipment, piping, concrete floors/liners, structures, and underlying soil. Only areas that have treated, stored, or handled dangerous waste will undergo closure activities. Remedial actions with respect to contamination that was not a result of use of these areas for treatment, storage, or handling of dangerous waste are outside the scope of this closure plan.

Contaminated equipment, tanks, and piping removed from the 242-A Evaporator will be considered "debris" and transported to an appropriate permitted treatment, storage, or disposal unit for final disposition. Uncontaminated structures will be left for future use or disassembled, dismantled, and removed for disposal. Uncontaminated equipment and structures could include aqueous makeup, HVAC and piping, steam condensate and cooling water piping, ~~and~~ the control room, change rooms and administrative/office areas.

The pipes located west and north of the 242-A Evaporator, which connect to A Farm and AW Farm, are in the same bundles with pipes used for transfers between tanks in the DST System. To minimize radiation exposure during closure, these pipes will be closed at the same time the piping for the DST System is closed. Closure of these pipes will be performed per Double-Shell Tank System Dangerous Waste Permit Application (DOE/RL-90-39). ~~The pipelines between the 242-A Evaporator and the 207-A pump pit, and in the 207-A pump pit, used for transfer of process condensate, will be closed per this closure plan.~~

Clean closure requires decontamination or removal and disposal of all dangerous waste, waste residues, contaminated equipment, soil, or other material established in accordance with the clean closure performance standards of WAC 173-303-610(2). This and future closure plan revisions will provide for compliance with these performance standards. All work will be performed ALARA with respect to worker exposure to dangerous and/or any other workplace hazards. Activities that are planned to achieve clean closure are presented in the following sections.

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

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Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated December 31, 2005.
Chapter 11.0, §11.2.3:

11.2.3 Closure Standards for Internal and/or External Piping

The internal and/or external piping of 242-A Evaporator will be flushed and drained as part of closure. ~~The rinsate will be sampled, and analyzed. Results less than designation limits, for the constituents of concern will be accepted as indicating that the piping is clean with respect to dangerous waste or dangerous waste residues.~~For piping where the contaminated surfaces can be inspected, an inspection will be performed to see if the piping meets the clean debris surface standard in 40 CFR 268.45 incorporated by reference and can be declared non-dangerous in accordance with WAC 173-303-071(3)(qq). If it is not possible to inspect the contaminated surfaces or meet the clean debris surface performance standard, the particular piping of concern will be removed, designated, and disposed of accordingly.

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

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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242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated December 31, 2005.
Chapter 11.0, §11.3.1:

11.3.1 General Closure Activities

~~The approach to~~ Closure of the 242-A Evaporator ~~closure is to dispose of~~ will include removal of accumulated liquid waste (i.e., liquid remaining from evaporator campaigns) by transferring the waste to the DST System and/or LERF. After the waste has been removed, clean closure of the tanks, process equipment, the piping, concrete/liners, and the structures will be accomplished by decontaminating the components, ~~as necessary,~~ if required and demonstrating that clean closure performance standards are met in accordance with WAC 173-303-610. Clean closure of the soil will be accomplished by demonstrating that the concrete and liners kept the contaminants from reaching the soil. If it is determined that soil contamination is possible, investigation and cleanup of the soils will also be managed ~~appropriately~~ in accordance with WAC 173-303-610(2)(b). ~~All work will be performed ALARA with respect to worker exposure to dangerous and/or mixed waste, radioactivity, hazardous chemicals, or any other workplace hazards. Contamination, if present, will be managed in compliance with regulatory requirements.~~

Equipment or materials (personnel protective equipment, steam cleaners, etc.) used in performing closure activities will be decontaminated or disposed at a permitted TSD facility as appropriate.

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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242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated December 31, 2005.
Chapter 11.0, §11.3.4.1:

11.3.4.1 Tanks

In accordance with WAC 173-303-640 (8) at closure ~~After~~ all pumpable waste will be~~has been~~ removed from~~the tanks,~~ the interior of the tanks, including the internal components such as the process condensate agitator~~s~~. Both interior and exterior tanks surfaces ~~either~~ will be ~~flushed and~~ decontaminated by flushing ~~adding~~ or spraying with steam, a water-soluble cleaner, or other approved method, or removed as debris and disposed appropriately.

If the tanks are decontaminated, the tanks will be inspected visually for compliance with the clean debris surface standard (40 CFR 268.45, Table 1, Extraction Technologies)~~performance standard. Because of possible radiation exposure ALARA concerns, visual inspection of the vapor-liquid separator will be made remotely using a camera or other device that allows verification of meeting the standard~~. If any areas are found not to meet the clean debris surface performance standard, these areas will be decontaminated in-place. Per the debris rule, only removal of contaminants from the surface layer is necessary for metal surfaces. Contamination will be removed as specified in 40 CFR 268.45, Table 1, Extraction Technologies and/or other Ecology approved methods~~from the surface layer using either high-pressure water blasting (a physical extraction method) or by hand or remote wiping, washing, brushing, or scrubbing using an approved cleaner, and rinsing with water or by other appropriate methods~~.

If the decontamination option is used, the outside of the tanks also will be inspected for compliance to the ~~performance~~ clean debris surface standard. Any areas found not to meet this performance standard will be decontaminated in-place. Contamination will be removed from the surface layer using any of the methods described for internal tank decontamination as specified in *Alternate Treatment Standards for Hazardous Debris* (40 CFR 268.45, Table 1, Extraction Technologies and/or other Ecology approved methods~~, or another appropriate method~~. Before using decontamination solutions on the outside of the tanks, the floor will be inspected for cracks or other openings that could provide a pathway to soil. This inspection will be performed as described in Section 11.2.1 of this chapter in conjunction with mapping of potential through-thickness cracks. Any such cracks will be mapped. The cracks will be sealed before beginning treatment or other engineered containment devices (e.g., collection basins) will be used to collect and contain solutions.

Decontamination ~~residues~~ waste will be generated as a result of decontamination activities. Decontamination waste may include but not be limited to the following: contaminated rags, and decontamination residue (liquids and solvents used in the decontamination process). This waste will be collected, designated, and managed in accordance with WAC 173-303. If it is not possible to meet the closure by removal or decontamination (clean closure) performance standard, contaminated portions of the tanks could be removed, designated, and disposed of ~~accordingly~~ in accordance with 40 CFR 268, incorporated by reference by WAC 173-303-140 as appropriate. The inspections for a clean debris surface will be documented on an inspection record.

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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Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
G. P Davis Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated December 31, 2005.
Chapter 11.0, §11.3.4.2:

11.3.4.2 Internal and/or External Piping and Ancillary Equipment

~~The initial closure activity for the piping that is associated with the areas undergoing closure will be to identify the lines that might have carried dangerous waste. Only piping that might have carried dangerous waste will undergo closure activities.~~

~~The piping that will undergo closure will be rinsed and the rinsate will be sampled and analyzed for the constituents of concern. The constituents of concern will be based on knowledge of what constituents were in the dangerous waste carried through the particular piping. The flushing, sampling, and analysis will be repeated until the rinsate no longer designates as dangerous waste. If the rinsate does not designate based on the concentrations of the constituents of concern, the piping will be considered clean with respect to this closure. If necessary, the piping will be rinsed with a decontamination solution before sampling and analyses. If it is not possible to meet the clean closure standard, portions of the piping will be removed, designated, and disposed of accordingly. The ancillary equipment will be removed, designated, and disposed of accordingly.~~

~~The 207-A pump pit, located east of the 242-A Evaporator, will be closed using the performance standards for pipes and concrete. A visual inspection will be performed. If the interior surfaces meet the performance standards, the 207-A pump pit will be considered clean closed. If the performance standards are not met, the interior surfaces will be cleaned using an appropriate decontamination method and the method repeated until the surfaces meet the clean closure performance standard.~~

The internal piping and ancillary equipment for the 242A Evaporator will be flushed and drained as part of closure. For piping where the contaminated surfaces can be inspected, an inspection will be performed to see if the piping meets the clean debris surface standard in 40 CFR 268.45 and can be declared non-dangerous. If it is not possible to meet the clean debris surface standard or the piping cannot be inspected, portions of the internal piping will be removed, designated, and disposed of accordingly.

External piping (transfer lines) and ancillary equipment between 242A and LERF consists of below grade and above grade piping. Below grade piping will be dispositioned at closure either by removal, designation and disposal in accordance with WAC 173-303-610(5) and 40 CFR 268 or closed in accordance with another Ecology approved process. For above grade piping, it will be dispositioned consistent with the provisions for internal piping.

Rinsate from the external piping and internal piping will be processed through ETF. Details regarding the process for rinsing any internal and external piping and ancillary equipment will be provided in the closure plan in accordance with WAC 173-303-610(3)(a)(v) upon modification as stated in Section 11.6 Dangerous and/or mixed-waste generated during closure activities will be managed in accordance with WAC 173-303-610(5). Removal of any dangerous wastes or dangerous constituents during partial or final closure will be handled in accordance with applicable requirements of WAC 173-303-610(5).

If the performance standards are not met, the interior surfaces will be cleaned using an appropriate decontamination method and the method repeated until the surfaces meet the clean closure performance standard.

The 207-A pump pit, located east of the 242-A Evaporator, will be closed using the performance standards for pipes and concrete (e.g., WAC 173-303-610(5) and 40 CFR 268 debris rule standards Table 1, Extraction technologies.). A visual inspection will be performed. If the interior surfaces meet the performance standards(clean debris surface), the 207-A pump pit will be considered clean closed.

If the performance standards are not met for any components described above, the interior surfaces will be cleaned using an Ecology approved decontamination method and the method repeated until the surfaces meet the clean closure (clean debris surface) performance standard; or a decision will be made to remove, designate and dispose of piping and equipment in accordance with WAC 173-303.

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 11-29-05

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 downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated December 31, 2005.
Chapter 11.0, §11.3.4.5:

11.3.4.5 Underlying Soils

Clean closure of soil under the 242-A Evaporator will be accomplished by demonstrating that the coated concrete floor and stainless steel liners kept contaminants from reaching the soil. The coated concrete floor provided secondary containment for all the tanks, process piping, and ancillary equipment. Unless inspections identify potential through-thickness cracks indicating containment failure and a subsequent potential for soil contamination from TSD unit operations, the soil will be considered clean closed. However, if inspections identify such cracks, and there have been documented spills in the vicinity, potential soil contamination will be investigated.

Where it is possible to visually inspect directly beneath the tanks, a visual inspection will be performed. Where it is not possible to visually inspect beneath the tanks, an evaluation of the tank integrity will be made. The condition of the tank will be evaluated to determine if there was any potential for leakage. If no cracks, severe corrosion, or evidence of leaks is observed, it will be reasoned that mixed or dangerous waste solutions could not have penetrated to the soil directly below the tank.

~~External piping between the 242-A Evaporator and the 207-A pump pit is double-lined with a leak detection system. If records indicate that no leaks from the primary piping occurred, the soil will be considered clean with respect to RCRA closure.~~

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: KAC Yes ☐ No (state reason for denial)
Reason for denial:

Reviewed by Ecology:
G. P. Davis 11-29-05
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 downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
242-A Evaporator	**Part III, Chapter 5 and Attachment 35**

Description of Modification:

Remove and replace Chapter 11.0 with the attached Chapter 11.0 dated December 31, 2005.
Chapter 11.0, §11.6:

11.6 SCHEDULE FOR CLOSURE

Closure of 242-A Evaporator is not anticipated to occur within the next 15 to 20 years. The actual year of closure will depend on the time required for current waste to be processed and what role the 242-A Evaporator will play in processing additional waste generated during future activities in the 200 Areas. Other factors affecting the year of closure include changes in operational requirements, lifetime extension upgrades, and unforeseen factors. When a definite closure date is established, a revised closure plan will be submitted to Ecology. The activities required to complete closure are planned to be accomplished within 180 days in accordance with WAC 173-303-640(4)(c). Should a modified schedule be necessary, a revised schedule will be presented and agreed to before closure in accordance with WAC 173-303-640(4)(b).

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: [KAC] Yes [ ] No (state reason for denial)
Reason for denial:

Reviewed by Ecology:

G. P. Davis 11-29-05
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 downgraded to a Class 1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Forms

Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant (WTP)

Index

Ecology approved PCNs for quarter ending December 31, 2005:

PCN	Ecology Approval Date
24590-PTF-PCN-ENV-05-0001	10-21-2005
24590-PTF-PCN-ENV-05-010	10-21-2005
24590-WTP-PCN-ENV-05-008	10-21-2005
24590-LAW-PCN-ENV-05-003	11-7-2005
24590-HLW-PCN-ENV-05-007	11-7-2005
24590-WTP-PCN-ENV-05-006	11-7-2005
24590-HLW-PCN-ENV-05-008	11-15-2005
24590-WTP-PCN-ENV-05-009	11-15-2005

Quarter Ending 6/30/2005 24590-PTF-PCN-ENV-05-0001

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

Index

Submitted by Co-Operator: Reviewed by ORP Program Office:

For F. Beranek 5/16/05 — 9/23/05

F. Beranek Date R. J. Schepens Date

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 the mechanical systems data sheet, equipment assembly drawing, and plant item material selection data sheet associated with the Pretreatment facility Ultrafiltration Process (UFP) system vessel UFP-VSL-00001A. Changes to these documents are equivalent or superior 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 Sheet:

The mechanical systems data sheet for vessel UFP-VSL-00001A was updated to include hydrodynamic loading for the vessel pulse jet mixers and the appropriate notes. Changes to Design Data for vessel UFP-VSL-00001A 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-P0001, Rev. 0 with 24590-PTF-MVD-UFP-P0001, Rev. 1, Mechanical Systems Data Sheet for Pretreatment Vessel UFP-VSL-00001A

See Attachment 1 of this Modification Notification for the updated mechanical system data sheet.

Equipment Assembly Drawing:

The equipment assembly drawing for vessel UFP-VSL-00001A was updated to include wear plates. In addition, the assembly drawing was also revised to include current drawing conventions (i.e., ghosting of the nozzle schedule, ghosting of nozzle designators). The current assembly drawing (24590-PTF-MV-UFP-P0001, Rev. 0) in Attachment 51, Appendix 8.6 of the permit depicts UFP-VSL-00001A without wear plates. Inclusion of the wear plates causes UFP-VSL-00001A to be equivalent or superior to the as-permitted design, as identified in condition III.10.C.10.a of the permit.

Attachment 51, Appendix 8.6:

> Replace 24590-PTF-MV-UFP-P0001, Rev. 0 with 24590-PTF-MV-UFP-P0001, Rev. 1, Equipment Assembly Ultrafiltration Feed Preparation Vessel UFP-VSL-00001A

See Attachment 2 of this Modification Notification for the updated equipment assembly drawing.

Plant Item Material Selection Data Sheet:

The plant item material selection data sheet for vessel UFP-VSL-00001A 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. 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-00001A are unchanged.

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[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 6/30/2005

Attachment 51, Appendix 8.9:

Replace 24590-PTF-N1D-UFP-P0005, Rev. 0 with 24590-PTF-N1D-UFP-P0005, Rev. 1, Plant Item Material Selection Data Sheet for Pretreatment Vessel UFP-VSL-00001A and UFP-VSL-00001B

See Attachment 3 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."

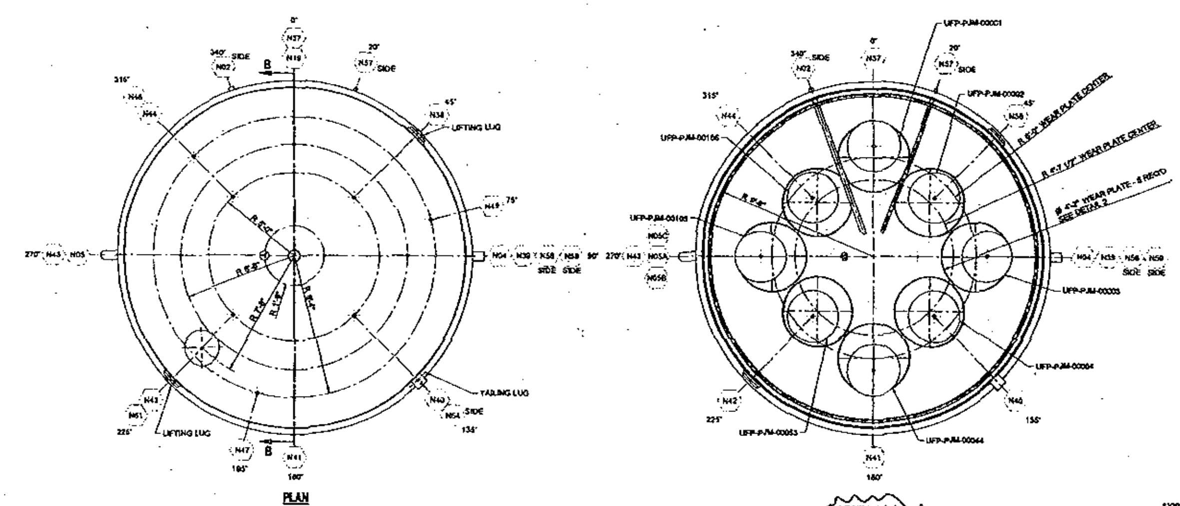
Modification Approved: [X] Yes [ ] No (state reason for denial)

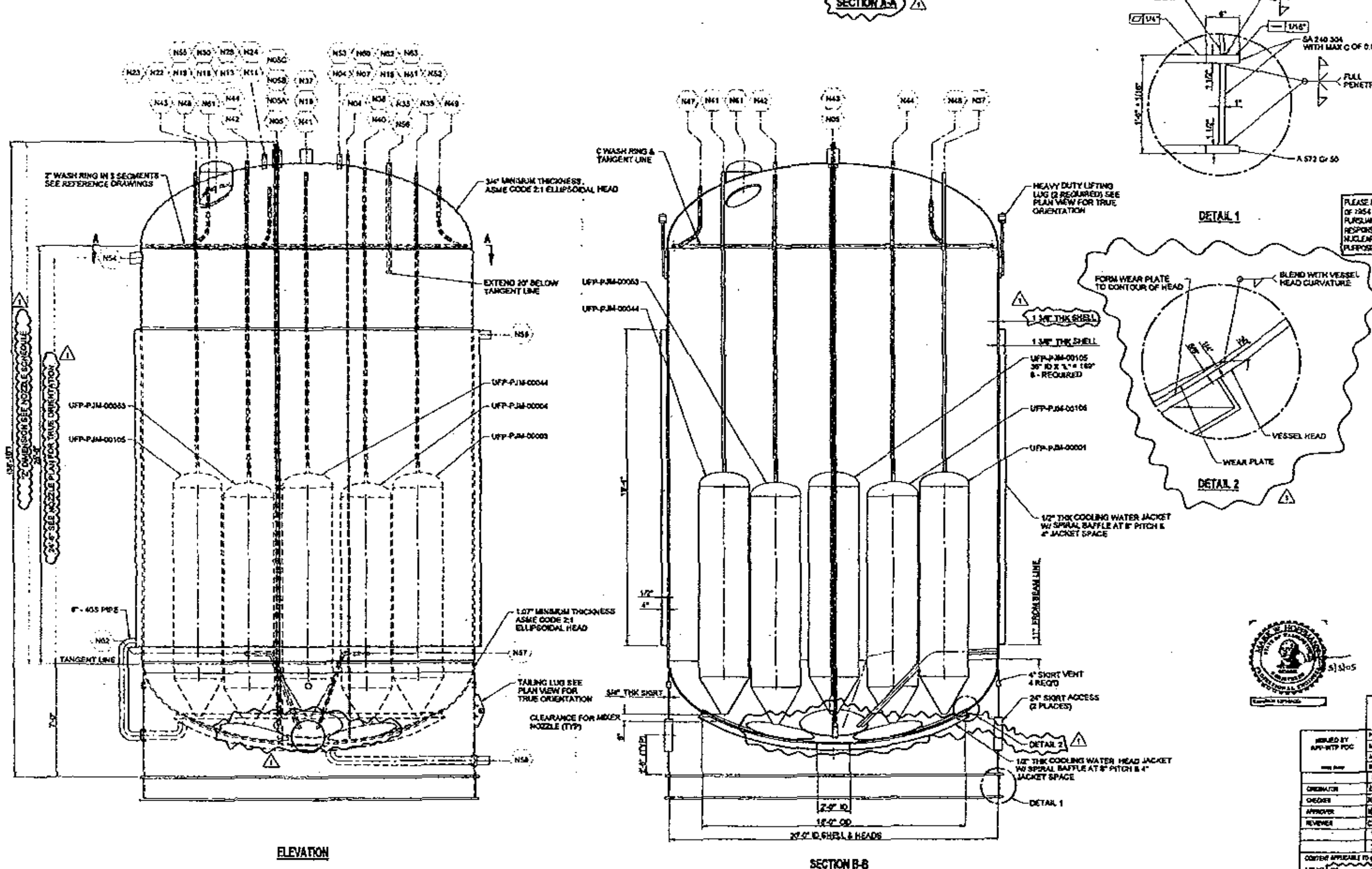
Reason for denial:

Reviewed by Ecology:

G. P Davis — Date 10/21/05

NOZZLE	SIZE	SCHEDULE	SERVICE REMARKS	"Z" DIM	REFERENCE DET	CONNECTION
N03	3"	80S	OUTLET	NA	24590-WTP-MV-M59T-00016001 DET 3	3"-40S
N04	2" OD	160S	TEMPERATURE	31'-2"	24590-WTP-MV-M59T-00007 ASSY 1 DET 1	3/4"-10S
N05	6"	80S	INSTRUMENTATION	31'-2"	24590-WTP-MV-M59T-00016003 DET 26	N/A
N05A	1"	160S	BALANCE	31'-6"	24590-WTP-MV-M59T-00016003 DET 26	1"-40S
N05B	1"	160S	DENSITY	31'-7"	24590-WTP-MV-M59T-00016003 DET 26	1"-40S
N05C	1"	160S	LEVEL	31'-6"	24590-WTP-MV-M59T-00016003 DET 26	1"-40S
N07	4"	80S	INLET	31'-3"	24590-WTP-MV-M59T-00016001 DET 2	4"-40S
N11	3"	80S	INLET	31'-1"	24590-WTP-MV-M59T-00016001 DET 2	3"-40S
N13	3"	80S	INLET	31'-1"	24590-WTP-MV-M59T-00016001 DET 2	3"-40S
N15	3"	80S	INLET AIR PURGE (PASSIVE)	30'-11"	24590-WTP-MV-M59T-00016001 DET 1	3"-40S
N18	3"	80S	SAMPLE RETURN	29'-6"	24590-WTP-MV-M59T-00016001 DET 2	3"-40S
N19	6"	80S	INLET	29'-6"	24590-WTP-MV-M59T-00016001 DET 2	6"-40S
N19	6"	80S	OUTLET/VESSEL VENT	31'-5"	24590-WTP-MV-M59T-00016001 DET 1	6"-10S
N22	1 1/2"	80S	FORCED AIR PURGE	29'-8"	24590-WTP-MV-M59T-00016001 DET 1	1 1/2"-40S
N23	3"	80S	INLET	29'-6"	24590-WTP-MV-M59T-00016001 DET 2	3"-40S
N24	3"	80S	INLET	30'-1"	24590-WTP-MV-M59T-00016001 DET 2	3"-40S
N28	4"	80S	INLET	31'-1"	24590-WTP-MV-M59T-00016001 DET 2	4"-40S
N30	4"	80S	INLET	29'-8"	24590-WTP-MV-M59T-00016001 DET 2	4"-40S
N35	3"	80S	INLET WITH DIP PIPE	30'-7"	24590-WTP-MV-M59T-00016001 DET 3	3"-40S
N37	2"	160S	AIR/VACUUM TO UFP-PJM-00001	30'-0"	24590-WTP-MV-M59T-00016001 DET 3	2"-40S
N38	2"	160S	AIR/VACUUM TO UFP-PJM-00002	30'-7"	24590-WTP-MV-M59T-00016001 DET 3	2"-40S
N39	2"	160S	AIR/VACUUM TO UFP-PJM-00003	30'-0"	24590-WTP-MV-M59T-00016001 DET 3	2"-40S
N40	2"	160S	AIR/VACUUM TO UFP-PJM-00004	30'-7"	24590-WTP-MV-M59T-00016001 DET 3	2"-40S
N41	2"	160S	AIR/VACUUM TO UFP-PJM-00044	30'-0"	24590-WTP-MV-M59T-00016001 DET 3	2"-40S
N42	2"	160S	AIR/VACUUM TO UFP-PJM-00053	30'-7"	24590-WTP-MV-M59T-00016001 DET 3	2"-40S
N43	2"	160S	AIR/VACUUM TO UFP-PJM-00105	30'-0"	24590-WTP-MV-M59T-00016001 DET 3	2"-40S
N44	2"	160S	AIR/VACUUM TO UFP-PJM-00106	30'-7"	24590-WTP-MV-M59T-00016001 DET 3	2"-40S
N47	2"	80S	INLET TO WASH RING	29'-6"	24590-WTP-MV-M59T-00016001 DET 3	2"-40S
N48	2"	80S	INLET TO WASH RING	29'-6"	24590-WTP-MV-M59T-00016001 DET 3	2"-40S
N49	2"	80S	INLET TO WASH RING	29'-6"	24590-WTP-MV-M59T-00016001 DET 3	2"-40S
N51	2"	80S	INLET	30'-1/2"	24590-WTP-MV-M59T-00016001 DET 2	2"-40S
N52	2"	80S	INLET	29'-6"	24590-WTP-MV-M59T-00016001 DET 2	2"-80S
N53	3"	80S	INLET	31'-1"	24590-WTP-MV-M59T-00016001 DET 2	3"-40S
N54	6"	40S	OUTLET/OVERFLOW	NA	24590-WTP-MV-M59T-00016001 DET 1	6"-40S
N55	6"	80S	INLET	29'-6"	24590-WTP-MV-M59T-00016001 DET 2	6"-40S
N56	2"	160S	INLET WITH DIP PIPE	30'-7"	24590-WTP-MV-M59T-00016001 DET 3	2"-80S
N57	2"	160S	OUTLET	NA	24590-WTP-MV-M59T-00016001 DET 3	2"-80S
N58	6"	40S	CHILLED WATER SUPPLY	NA	24590-WTP-MV-M59T-00016001 DET 1	6"-10S
N59	6"	40S	CHILLED WATER RETURN	NA	24590-WTP-MV-M59T-00016001 DET 1	6"-10S
N60	3"	80S	SPARE	30'-11"	24590-WTP-MV-M59T-00016001 DET 2	3"-40S
N61	24"	PLATE	MANWAY	29'-10"	24590-WTP-MV-M59T-00017 DET 1	24"-CAPPED
N62	2"	80S	SPARE	31'-0"	24590-WTP-MV-M59T-00016002 DET 2	CAPPED
N63	2"	80S	INLET	30'-0"	24590-WTP-MV-M59T-00016002 DET 2	2"-40S





GENERAL NOTES:

1. FOR DIP LEGS USE 3" BOTTOM HEAD CLEARANCE.
2. "Z" DIMENSION MEASURED FROM BOTTOM TANGENT LINE TO NOZZLE FACE.
3. BASE PLATE BEAM TO BE SHIPPED AHEAD OF VESSEL TO FIELD CONSTRUCTION FOR INSTALLATION BY OTHERS.
4. THIS IS A BLACK CELL VESSEL.
5. DELETED
6. REFER TO 24590-PTF-M6-UFP-P0001, 24590-PTF-M6-UFP-P0007, 24590-PTF-M6-UFP-P0008 AND 24590-PTF-M6-UFP-P0018 FOR INFORMATION ON THE NOZZLE CONFIGURATION SHOWN IN PHANTOM.
7. REVISED/ADDED/DELETED:
   a) GHOSTING HAS BEEN ADDED ON THIS REVISION. NOZZLE IDENTIFIERS NOT CLOUDED.
   b) ADDED SECTION A-A AND DETAIL 2 TO SHOW WEAR PLATES.
   c) REVISED SHELL THICKNESS FROM 1" TO 1 3/4"
   d) REVISED NOZZLE LIST
   e) REVISED REFERENCE DRAWING LIST

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 DRAWING TO BE READ IN CONJUNCTION WITH MECHANICAL DATA SHEET 24590-PTF-MVD-UFP-P0001

VESSEL COMPONENT QUALITY LEVELS	
COMPONENTS	QUALITY LEVEL
MAIN VESSEL, SKIRT, ALL NOZZLES	QL-1
ALL INTERNAL SUPPORTS	QL-1
PULSE JET MIXERS AND PIPING	QL-1
THERMOWELL	QL-1
INSTRUMENTATION	CM
WASH RING AND PIPING	CM

REFERENCE DRAWINGS		
DWG NO	REV	TITLE
24590-PTF-M6-UFP-P0001		P&ID
24590-PTF-M6-UFP-P0007		P&ID
24590-PTF-M6-UFP-P0008		P&ID
24590-PTF-M6-UFP-P0018		P&ID
24590-WTP-MV-M59T-[illegible]		PRESSURE VESSEL TOLERANCES STANDARD DETAILS
24590-WTP-MV-M59T-[illegible]		PULSE JET MIXERS STANDARD DETAILS
24590-WTP-MV-M59T-00007		THERMOWELL CONNECTION STANDARD DETAILS
24590-WTP-MV-M59T-[illegible]		LIFTING LUG STANDARD DETAILS
24590-WTP-MV-M59T-[illegible]		TAILING LUG STANDARD DETAILS
24590-WTP-MV-M59T-[illegible]		WASH RINGS STANDARD DETAILS
24590-WTP-MV-M59T-00016001		VESSEL CONNECTIONS STANDARD DETAILS SHT 1 OF 3
24590-WTP-MV-M59T-00016002		VESSEL CONNECTIONS STANDARD DETAILS SHT 2 OF 3
24590-WTP-MV-M59T-00016003		VESSEL CONNECTIONS STANDARD DETAILS SHT 3 OF 3
24590-WTP-MV-M59T-00017		VESSEL INSPECTION MANWAY STANDARD DETAILS
24590-WTP-MV-M59T-[illegible]		VESSEL NAMEPLATE STANDARD DETAILS

Q

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	ISSUED FOR PERMITTING USE					5/3/05
0	ISSUED FOR PERMITTING USE	AJ	HK	CS	MH	10/9/03

REVISION HISTORY

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99352

	BY	DATE
ORIGINATOR	A JACKSON	[illegible]
CHECKER	H. KHURANA	[illegible]
APPROVER	M. HOFFMANN	[illegible]
REVIEWER	C. SLATER	[illegible]

EQUIPMENT ASSEMBLY
ULTRAFILTRATION FEED PREPARATION VESSEL
UFP-VSL-00001A

SCALE: NONE

24590-PTF-MV-UFP-P0001 REV 1

Attachment 1 to 24590-WTP-PCN-ENV-05-0001

24590-PTF-MVD-UFP-P0001, Rev. 1
Mechanical Systems Data Sheet for Pretreatment Vessel UFP-VSL-00001A

MECHANICAL SYSTEMS DATA SHEET: VESSEL

PLANT ITEM No. 24590-PTF-MV-UFP-VSL-00001A

Project:	RPP-WTP	P&ID:	24590-PTF-M6-UFP-P0001/P0007/P0008/P0015 /1
Project No:	24590	Process Calculation:	DELETED /1
Project Site:	Hanford	Vessel Drawing	24590-PTF-MV-UFP-P0001
Description:	Ultrafiltration Feed Preparation Vessel		

Reference Data

Charge Vessels (Tag Numbers)	DELETED
Pulsejet Mixers / Agitators (Tag Numbers)	UFP-PJM-00001, UFP-PJM-00002, UFP-PJM-00003, UFP-PJM-00004, UFP-PJM-00044, UFP-PJM-00053, UFP-PJM-00105, UFP-PJM-00106
RFDs/Pumps (Tag Numbers)	DELETED

Design Data

Quality Level		QL-1		Fabrication Specs	24590-WTP-3PS-MV00-TP001		
Seismic Category		SC-1		Design Code	ASME VIII Div 1		
Service/Contents		Radioactive Liquid		Code Stamp	Yes		
Design Specific Gravity		1.32		NB Registration	Yes		
Maximum Operating Volume	gal	64,626		Weights (lbs)	Empty	Operating	Test
Total Volume	gal	75,593		Estimated	184,000	934,000	822,000
Environmental Qualification /1		N/A		Actual *	223,240 /1	970,440 /1	857,140 /1

Inside Diameter	inch	240			Wind Design	Not Required	
Length/Height (TL-TL)	inch	306			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	35	Seismic Base Moment *	ft*lb	
External Pressure	psig	0.217	12 /1 (Note 3,4)	0.0	Postweld Heat Treat	Not Required	
Temperature	°F	122	150	150 /1	Corrosion Allowance	inch	0.040 (Note 12) /1
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
0030932
REGISTERED
PROFESSIONAL ENGINEER
5/1/05

EXPIRES 12/10/06

This Bound Document Contains a total of 4 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
1	5/1/05	Issued for Permitting Use	J. Jackson	H. Khurana	C. Slater	M. Hoffmann
0	10/8/03	Issued for Permitting Use				

ISSUED BY
RPP-WTP PDC

R10554037

	MECHANICAL SYSTEMS DATA SHEET: VESSEL	PLANT ITEM No. 24590-PTF-MV-UFP-VSL-00001A

Materials of Construction

Component	Material		Minimum Thickness / Size	Containment
Top Head	SA 240 316	Note 1	See Drawing	Auxiliary (see Note 8) 1
Shell	SA 240 316	Note 1	See Drawing	Primary (see Note 8) 1
Bottom Head	SA 240 316	Note 1	See Drawing	Primary (see Note 8) 1
Support	SA 240 304	Note 1	See Drawing	N/A
Jacket/Coils/Half-Pipe Jacket	SA 240 316	Note 1	See Drawing	N/A
Internals	SA 240 316	Note 1	See Drawing	Thermowells Primary
Pipe Nozzles	SA 312 TP316	Note 1	See Drawing	Primary (see Note 8) 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
Wear Plates	SA 240 316	Note 1	See Drawing	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
		External Finish	Note 2

Remarks

* To be determined by the vendor.

Note 1. Maximum 0.030% carbon.

Note 2. Welds de-scaled as laid.

Note 3. External design pressure under the jacket shall be rated for the jacket design pressure plus 1 psig internal vacuum in the vessel to account for ventilation fan pressure.

Note 4. The vessel design external pressure is estimated only and shall be confirmed by the Seller's calculations

Note 5. Deleted

Note 6. Vessel volumes are approximate and do not account for the manufacturing tolerances, nozzles, and displacement of internals. 1

Note 7. This vessel is in a Black Cell. 1

Note 8. All welds forming part of the primary and auxiliary containment including nozzle attachment welds shall be subjected to 100% volumetric examination.

Note 9. Contents of this document are Dangerous Waste Permit affecting. 1

Note 10. Deleted 1

Note 11. Deleted. 1

Note 12. BNI shall ensure that an additional 0.087" is available for erosion in the lower 4" of the interior conical surface of the pulse jet mixers. 1

Note 13. Seller shall provide wear plates for erosion control on the bottom head. 1

Note 14. All hydrodynamic and overblow loads are for BNI internal use only and are to be disregarded by the seller. 1

Note 15. Required data for thermal stress analysis for nozzles exposed to higher temperatures. 1

- Cell ambient temperature = 113 °F
- Headspace temperature or Operating temperature = 122 °F
- Ambient and headspace natural convection heat transfer coefficients = 0.703 Btu/hr ft² F
- Inlet fluid transfer frequency and mass flow rate for nozzles N15 and N55.

  Steam max temperature = 212 °F

  Transfer frequency = 1 transfer/9 days for 1.5 hrs.

  Steam mass flow rate = 2885 lb/hr

	MECHANICAL SYSTEMS DATA SHEET: VESSEL	PLANT ITEM No. 24590-PTF-MV-UFP-VSL-00001A

Equipment Cyclic Data Sheet

Component Plant Item Number:	24590-PTF-MV-UFP-UFP-VSL-00001A
Component Description	Ultrafiltration Feed Preparation Vessel

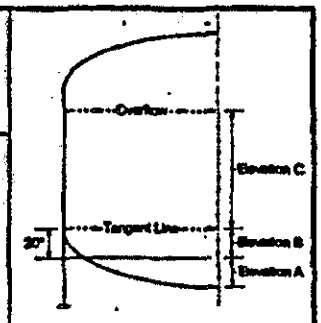
The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	ASME SA240 316 with 0.030 % max. Carbon
Design Life	40 Years
Component Function and Life Cycle Description	The system receives waste feed from the Waste Feed Evaporation Process System (FEP), and HLW Feed Receipt Vessel (HLP). The vessel is filled over a period of approximately in 48 hours. If necessary, the vessel cools the waste prior to ultrafiltration operations. The precipitation of Sr/TRU compounds occurs in this vessel. The main transfer from this vessel occurs through a centrifugal pump to the Ultrafiltration Feed Vessels.

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	-12	15	10	Nominal assumption for testing
Operating Pressure	psig	-0.217	0	N/A	The vessel will remain under constant pressure depending upon the HVAC plant.
Operating Temp	°F	50	122	3650	
Contents Specific Gravity		1.0	1.32	3650	
Contents Level	inch	28	350	3650	
Localized Features					
Nozzles		Within 9°F of operating temperature range.		As above	

Hydrodynamic Loading 1

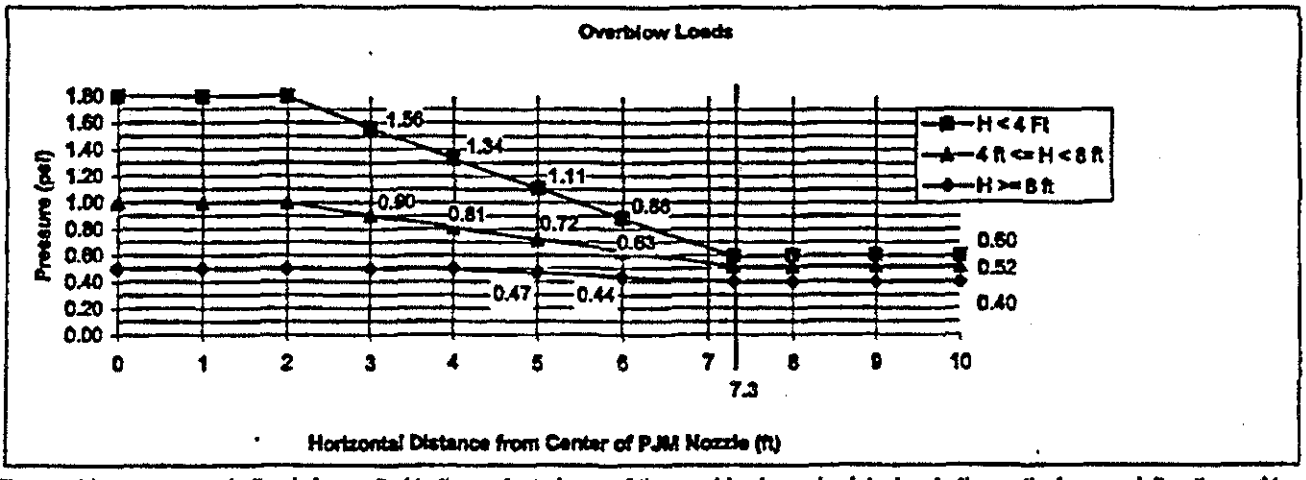
In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overblow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed 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		
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	16.4 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. 1

	MECHANICAL SYSTEMS DATA SHEET: VESSEL	PLANT ITEM No. 24590-PTF-MV-UFP-VSL-00001A

Notes

- *Cycle increase: increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.* 1
- *Nozzles N16 and N55 shall be fatigue assessed/analyzed for 3650 temperature/pressure cycles from 0 psig at 59°F to 15 psig at 212°F, the pressure cycle shall coincide with the temperature cycle. See note 15 on page 2.* 1

Equipment Cyclic Data Sheet

Component Plant Item Number:	*UFP-PJM-00001, UFP-PJM-00002, UFP-PJM-00003, UFP-PJM-00004, UFP-PJM-00044, UFP-PJM-00053, UFP-PJM-00105, UFP-PJM-00106*
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 0.03 % 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.* 1

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*60*	*10*	*Nominal assumption for testing*
Operating Pressure	psig	*FV*	*72.5*	*1.64x10⁷*	
Operating Temperature	°F	*68*	*122*	*3650*	*Parent vessel will be operating normally at a temperature of 77 °F*
Contents Specific Gravity		*1.00*	*1.32*	*3650*	
Contents Level	Inch	*Empty*	*Flooded*	*1.64 X 10⁷*	
Thrust 1	lbf	*0*	*330*	*1.64 X 10⁷*	
Localized Features					
Nozzles		*Within 9°F of operating temperature range.*		*As above*	
Supports		*Buoyant*	*Loaded*	*1.64 X 10⁷*	

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 to 24590-WTP-PCN-ENV-05-0001

24590-PTF-MV-UFP-P0001, Rev. 1
Equipment Assembly Ultrafiltration Feed Preparation Vessel UFP-VSL-00001A

Attachment 3 to 24590-WTP-PCN-ENV-05-0001

24590-PTF-N1D-UFP-P0005, Rev. 1
Plant Item Material Selection Data Sheet for Pretreatment Vessel UFP-VSL-00001A and UFP-VSL-00001B

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10460391

UFP-VSL-00001A/B (PTF)

Ultrafiltration Feed Preparation Vessel

- Design Temperature (°F)(max/min): 150/40
- Design Pressure (psig) (max/min): 15/-12
- Location: Incell
- PJM Discharge Velocity (fps): 40
- Drive Cycle: 17 % (at 40 fps)

Offspring Items –

UFP-VSL-00001A –
UFP-PJM-00001 – UFP-PJM-00004
UFP-PJM-00044, UFP-PJM-00053
UFP-PJM-00105 – UFP-PJM-00106
UFP-VSL-00001B –
UFP-PJM-00045 – UFP-PJM-00050
UFP-PJM-00101 – UFP-PJM-00102

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on sheets 6 and 7

ISSUED BY RPP-WTP PDC

Operating Modes Considered:

- Normal operating conditions
- 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)

Steam Ejector: high temperature components of steam ejector located inside vessel shall be UNS N06022

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

Process & Operations Limitations:

- Develop flushing/rinsing procedure for acid and water.

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
39250
REGISTERED
PROFESSIONAL ENGINEER

1/24/05

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 7 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	1/24/05	Issued for Permitting Use			
0	10/19/03	Issued for Permitting Use	DLA	JRD	SWV

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

Waste is maintained at 77°F by use of a chiller jacket. For Envelope C waste only, contents are heated to a temperature of 122°F necessary for Sr/TRU precipitation. A steam ejector is available to maintain the necessary reaction temperature. Chemical reagent additions are 19M NaOH followed by 1.0 M $Sr(NO_3)_2$ followed by 1M $NaMnO_4$. It is anticipated periodic acid cleaning will be necessary.

a General Corrosion
Harmer (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. The 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 1 mpy up to about 212°F though Sedriks states the corrosion rate data beyond about 122°F are low due to the presence of oxidizing species.

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

There is a concern about excessive corrosion rates during acid cleaning in the presence of the expected levels of fluoride. 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.

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, either 304L or 316L is expected to be satisfactory to 300°F.

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.

Normally the vessel is to operate between 77°F and 122°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. Therefore, controls on washing and rinsing are required.

The high temperature portions of the high pressure steam ejector that are located within the vessel shall be C-22.

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 and the possibility of acid washes inside the vessels, 316L is recommended.

c End Grain Corrosion
End grain corrosion only occurs in metal with exposed end grains and in highly oxidizing acid conditions. Acid cleaning should be performed only at normal operating temperature.

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. 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. Koch (1995) has noted that fluoride exacerbates chloride intergranular stress corrosion cracking. Generally, as seen in Sedriks (1996) and Davis (1987), stress corrosion cracking does not usually occur below about 140°F. With the low operating temperature and alkaline conditions, 304L and 316L are expected to be satisfactory in regards to resistance to chloride cracking. Davis (1987) suggests caustic cracking is a concern above about 212°F. However, other work implies that neither 304L nor 316L will crack in waste.

Conclusion:
Because of the normal operating environment as well as that which can occur during off normal conditions, and possibility of acid washing, 304L is the minimum alloy recommended and 316L may be marginally better.

PLANT ITEM MATERIAL SELECTION DATA SHEET

e Crevice Corrosion
The high solids loading may make deposits more common and, consequently, the vessel more susceptible to crevice formation. See Pitting.

Conclusion:
Lower temperatures and higher pH mitigate the formation of crevice corrosion. See also 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
Corrosion fatigue is a not expected to be a problem.

Conclusions
Not expected to be a concern.

i Vapor Phase Corrosion
The vapor phase portion of the vessel is expected to be contacted with particles of waste from splashing. It is unknown whether this will be sufficiently washed or whether residual acids or solids will be present. Due to the possibility of solid or acids and solids being present, 316L is recommended. In the case of the steam ejector, a high nickel alloy is needed.

Conclusion:
Not expected 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 3.8 wt% and maximum solids concentrations of 27.3 wt% with a usage of 56 % operation. UPF-VSL-00001A/B requires at least 0.129-inch additional protection. The 27.3 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 UFP-VSL-00001A/B is expected to be 3.8 wt%.

The wear of the PJM nozzles can occur from flow for both the discharge and reflood cycles of operation. At least 0.087-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 solids concentrations of 3.8 wt% and a maximum solids concentration of 27.3 wt% with a usage of 56 % 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 significantly dissimilar metals are present.

Conclusion:
Not expected to be a concern.

PLANT ITEM MATERIAL SELECTION DATA SHEET

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. 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. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., New York, NY 10158
7. 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. Jenkins, CF, 1998, *Performance of Evaporators in High Level Radioactive Chemical Waste Service*, Presented at Corrosion 98, NACE International, Houston TX 77084
2. Revie, WW, 2000. *Uhlig's Corrosion Handbook*, 2nd Edition, Wiley-Interscience, New York, NY 10158
3. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158

PLANT ITEM MATERIAL SELECTION DATA SHEET

OPERATING CONDITIONS

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Ultrafiltration feed preparation vessel (UFP-VSL-00001A/B)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Maximum		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	5.88E+01	5.98E+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%	27.0%	27.3%			Note 3
Other (NaMnO4, Pb,...)	g/l					
Other	g/l					
pH	N/A					Note 4
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 122 °F for Envelope A, B, C.
3. Based on HLP12. Other streams entering the vessel will dilute this stream.
4. Mainly alkaline streams with a pH range of approximately 12 to 14.

Assumptions:

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.14.2 Ultrafiltration Feed Preparation Vessel (UFP-VSL-00001A/B)

Routine Operations

Envelope C processing includes solids removal and Sr/TRU precipitation. Therefore, this process is operated separately from the other envelopes (i.e., Envelopes A/D, B/D). Feed during Envelope C processing is received at a target molarity of 6 M sodium. If the feed is received too dilute, the feed may be recycled to the waste feed evaporator feed vessels (FEP-VSL-00017A/B) for further evaporation. Furthermore, if dilution of the feed to 6 M sodium is required, process condensate can be added. Once the vessel level reaches the desired low-level set point for agitation, the pulse jet mixers are activated. The pulse jet mixers run continually until the vessel is emptied below the low level set point.

The precipitation reaction requires a heated solution of 122 °F; therefore, a heating steam ejector is available in the ultrafiltration feed preparation vessel to maintain the necessary reaction temperature. Reagents are added to Envelope C contents in vessels UFP-VSL-00001A or B to commence precipitation. The final concentration of free hydroxide, strontium, and permanganate solutions are 1.0 M OH^-, 0.075 M Sr^{2+}, and 0.05 M MnO_4^-, respectively. The addition also assumes that the initial concentrations are zero in each case. Therefore, the volume of each reagent added is strictly based on the initial liquid level (volume) in the vessel at the beginning of the reaction.

To perform an effective precipitation strike, the reagents are added in the following order. Initially, 19 M NaOH is added, followed by a sufficient amount of 1.0 M $Sr(NO_3)_2$ solution. The resulting solution provides the conditions to precipitate out strontium as $SrCO_3$. Finally, enough 1M $NaMNO_4$ is added to mathematically achieve a 0.05 M MNO_4 solution. The TRU components precipitate out in the floculant. After digestion, the solution is diluted from 6 M to 5 M sodium and to cooled back down to 77 °F through the operation of the chilled water cooling jacket. The cooling and dilution sequences can occur at the same time.

Non-Routine Operations that Could Affect Corrosion/Erosion

None identified.

Attachment 2
05-ED-068

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Tank Waste Treatment and Immobilization Plant - Hanford Facility RCRA Permit Notification Form 24590-PTF-PCN-ENV-05-0001.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel
Project Director

5/24/01
Date

Quarter Ending 09/30/2005 24590-PTF-PCN-ENV-05-010

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:		Reviewed by ORP Program Office:	
Dennis Klein	8/31/05	R J Schepens	9/19/05
D. Klein	Date	R.J. Schepens	Date

Quarter Ending 09/30/2005

24590-PTF-PCN-ENV-05-010

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 plant item material selection data sheet associated with the Pretreatment facility pulse jet ventilation (PJV) system vessel PJV-VSL-00002. Changes to this document include change of design pressure identifier from max/min to internal/external, revisions to corrosion/erosion allowances, and minor administrative revisions. These changes do not affect the form, function, or capacity of the vessel.

Plant Item Material Selection Data Sheet:

Attachment 51, Appendix 8.9:

Replace 24590-PTF-N1D-PJV-P0001, Rev 0 with 24590-PTF-N1D-PJV-P0001, Rev 1, Plant Item 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: NA

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

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:

S. Dahl — Date: 10/27/05

[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.

PLANT ITEM MATERIAL SELECTION DATA SHEET

R10618387

PJV-VSL-00002 (PTF)
PJV Drain Collection Vessel

ISSUED BY
RPP-WTP PDC

- Design Temperature (°F)(max/min): 200/-20
- Design Pressure (psig) (internal/external): 15/FV
- Location: incell

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on sheets 5 and 6

Options Considered:

- Vessel receives wash drains from PJV Demister elements
- Vessel receives condensate and flush drains from exhaust headers

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: 0.040 inch (includes 0.024 inch corrosion allowance and 0.004 inch erosion allowance)

Process & Operations Limitations:

- None

STEVEN WAKEMAN VAIL
STATE OF WASHINGTON
38250
REGISTERED
PROFESSIONAL ENGINEER

8/22/05

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	8/22/05	Issued for Permitting Use			
0	7/15/04	Issued for Permitting Use	DLA	JRD	APR

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

This vessel receives condensate collected in the headers of the PJV system.

a General Corrosion
Hamner (1981) lists corrosion rates in water for both 304L and 316L as < 2 mpy at temperatures up to 150°F. Similarly, corrosion rates in dilute caustic are less than 1 mpy.

Conclusion:
304L and 316L are expected to be sufficiently resistant with a probable general corrosion rate of less than 1 mpy at up to 200°F.

b Pitting Corrosion
Pitting should not be a concern for 304L or 316L at the stated low-chloride conditions and stated temperature.

Conclusion:
Under normal conditions, 304L is expected to be 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 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 are expected to be satisfactory.

Conclusion:
At the normal, stated, operating environment, 304L is satisfactory.

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 temperatures are acceptable for microbial growth but there appears to be 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
Not considered to be a concern in this vessel.

Conclusion:
Not a concern.

PLANT ITEM MATERIAL SELECTION DATA SHEET

j Erosion
Velocities within the vessel are expected to be low. Erosion allowance of 0.004 inch is sufficient for components with low solids content (< 2 wt%) at low velocities.

Conclusion:
Not expected to be 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.

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. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
2. Hamner, NE, 1981, *Corrosion Data Survey*, Metals Section, 5th Ed, NACE International, Houston, TX 77218
3. Sedriks, AJ, 1996, *Corrosion of Stainless Steels*, John Wiley & Sons, Inc., 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. Cole, HS, 1974, *Corrosion of Austenitic Stainless Steel Alloys Due to HNO_3 – HF Mixtures*, ICP-1036, Idaho Chemical Programs – Operations Office, Idaho Falls, ID
3. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073
4. Jones, RH (Ed.), 1992, *Stress-Corrosion Cracking*, ASM International, Metals Park, OH 44073
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. Uhlig, HH, 1948, *Corrosion Handbook*, John Wiley & Sons, New York, NY 10158
7. Van Delinder, LS (Ed), 1984, *Corrosion Basics*, NACE International, Houston, TX 77084

PLANT ITEM MATERIAL SELECTION DATA SHEET

OPERATING CONDITIONS

PROCESS CORROSION DATA SHEETS

Component(s) (Name/ID #) PJV drain collection vessel (PJV-VSL-00002)

Facility PTF

In Black Cell? Yes

Chemicals	Unit[1]	Contract Max		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	9.77E-04	9.37E-04			
Chloride	g/l	4.31E-04	4.63E-04			
Fluoride	g/l	4.88E-04	5.24E-04			
Iron	g/l					
Nitrate	g/l	7.06E-03	7.49E-03			
Nitrite	g/l	2.23E-03	2.39E-03			
Phosphate	g/l	1.60E-03	1.69E-03			
Sulfate	g/l	8.58E-04	9.20E-04			
Mercury	g/l					
Carbonate	g/l	2.70E-03	2.79E-03			
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 operation 59 °F to 113 °F, nominal 113 °F
3. pH will be nominally 9 to 10 but could get as low as 7

Assumptions:

PLANT ITEM MATERIAL SELECTION DATA SHEET

4.7.1.2 PJV Drain Collection Vessel

Routine Operations

The low points of the inlet header and sub-headers of the PJV system are provided with drain lines that drain condensate collected in the header to the PJV drain collection vessel PJV-VSL-00002. The condensate is transferred from PJV-VSL-00002 to PWD-VSL-00044.

Non-Routine Operations that Could Affect Corrosion/Erosion

None identified.

Attachment 2
05-ED-069

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Tank Waste Treatment and Immobilization Plant - Hanford Facility RCRA Permit Notification Form 24590-PTF-PCN-ENV-05-010.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel
Project Director

9/8/05
Date

Quarter Ending 9/30/2005 24590-WTP-PCN-ENV-05-008

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:		Reviewed by ORP Program Office:	
D. Klein	9/16/05 Date	R.J. Schepens	10/7/05 Date

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 change the interim compliance date for completion of compliance item number12. Permit package PTF-065, Secondary Containment for Outside RLD Tanks, is the schedule driver for completion of this item. The proposed new completion date is March 4, 2008. This date is based on the availability of calculations required to support the final design integrity assessment report and reflects the WTP's current Level IV Schedule.

Appendix 1.0
WTP Interim Compliance Schedule

Interim Compliance Schedule- WTP Facility		
	Compliance Schedule Submittal	**Interim Compliance Date**
	TANK SYSTEMS	
12.	Submit engineering information for each secondary containment and leak detection system for the WTP Tank System to be included in the permit	~~10/30/2005~~ 3/04/2008

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.5.a

Enter wording of WAC 173-303-830, Appendix I Modification citation: Change in interim compliance dates, with prior approval of the director.

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

Reason for denial:

Reviewed by Ecology:

S. Dahl 10/21/05
S. Dahl 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 2
05-ED-075

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of Permit Change Notice 24590-WTP-PCN-ENV-05-008 to update the completion date for DWP Compliance Schedule Item 12.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel
Project Director

9/21/05
Date

Quarter Ending 9/30/2005 24590-LAW-PCN-ENV-05-003

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator: D. A. Klein 9/16/05 Date

Reviewed by ORP Program Office: R. J. Schepens 10/17/05 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 LAW Facility Sump Data, 24590-LAW-PER-M-02-001, Rev. 4, was revised to delete the vessels associated with the third LAW melter that was eliminated with the 2+2 permit modification. The following vessels were deleted from room L-0125:

LCP-VSL-00003 Melter 3 Concentrate Receipt Vessel
LFP-VSL-00005 Melter 3 Feed Preparation Vessel
LVP-VSL-00006 Melter 3 Feed Vessel
LOP-SCB-00003 Melter 3 Submerged Bed Scrubber
LOP-WESP-00003 Melter 3 WESP
LOP-VSL-00003 Melter 3 SBS Condensate Vessel

As a result of these vessel deletions, sumps RLD-SUMP-00033 and RLD-SUMP-00034 were deleted from Table 1 - LAW Regulated Sumps. These two sumps are in place in the event that a third melter is installed in the future.

Sump Drains Added to Table 2 - Drains to LAW Sumps

SUMP NUMBER	ADDED DRAINS
RLD-SUMP-00028	RLD-VSL-00004 Overflow
RLD-SUMP-00029	LCP-BULGE-00001/2 Drain
RLD-SUMP-00030	Melter Feed Detection Box Leak
RLD-SUMP-00031	LCP-BULGE-00003 Drain
RLD-SUMP-00032	Melter Feed Detection Box Leak

Sump Drains Deleted from Table 2 - Drains to LAW Sumps

SUMP NUMBER	DELETED DRAINS
RLD-SUMP-00030	Concentrate Feed Receipt LCP-VSL-00001 Valve Bulge Drains
RLD-SUMP-00032	Concentrate Feed Receipt LCP-VSL-00002 Valve Bulge Drains
RLD-SUMP-00034	Concentrate Feed Receipt LCP-VSL-00003 Valve Bulge Drains

Additionally, the Plant Wash Vessel/SBS Condensate Collection Vessel Valve Bulge Drain was moved from RLD-SUMP-00035 to RLD-SUMP-00036.

The document contains other text and formatting revisions identified by revision bars.

[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 9/30/2005

Attachment 51, Appendix 9.5:

Replace Revision 3 of *LAW Facility Sump Data* (24590-LAW-PER-M-02-001) with the attached Revision 4 of the 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: 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 or the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

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

Reason for denial:

Reviewed by Ecology:

E. Freudenburg (for S. Dahl) 11/7/05

S. Dahl — Date

Attachment A to 24590-LAW-PCN-ENV-05-003

LAW FACILITY SUMP DATA, 24590-LAW-PER-M-02-001, REVISION 4

Document title: **LAW Facility Sump Data**

Contract number: DE-AC27-01RV14136

Department: Mechanical Systems

Author(s): P S. Holgado

Principal author signature: Rafaelita S. Holgado

Document number: 24590-LAW-PER-M-02-001, Rev. 4

Checked by: M. Sanvictores

Checker signature:

Date of issue: 4/21/05

Issue status: Issued ~~for Permitting~~ Use

Approved by: Janet Roth

Approver's position: LBL Project Engineering Manager

Approver signature: Janet Kay Roth

MACARIO C. SANVICTORES
STATE OF WASHINGTON
29255
REGISTERED
PROFESSIONAL ENGINEER

4/21/05

EXPIRES: 09/21/05

This bound document contains a total of 10 sheets

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	P.S. Holgado
1	8/27/02	Added statement regarding location of sumps	P.S. Holgado
2	9/19/02	Added Table 2	P.S. Holgado
3	3/19/03	Major revision, issued for permitting use.	P. S. Holgado
4	4/21/05	Revised for permitting use.	P. S. Holgado

Contents

Tables

1 Introduction

The Washington Administrative Code, WAC 173-303, requires the use of secondary containment for systems managing dangerous waste. This document provides a brief description of the secondary containment sumps regulated under the Dangerous Waste Permit that are located at elevation −21 ft and elevation +3 ft of the Low-Activity Waste (LAW) Vitrification Facility. Detailed information about these sumps is included in Table 1. Effluent streams that drain into these sumps are listed in Table 2.

2 Applicable Documents

WAC 173-303. *Dangerous Waste Regulations*. Washington Administrative Code.

3 Description

3.1 Elevation −21 Ft Sumps

3.1.1 C3/C5 Drains/Sump Collection Vessel RLD-VSL-00004 Cell Sump

The C3/C5 Drains/Sump Collection Vessel cell sump (RLD-SUMP-00028) is in a C5 area at elevation −21 ft. It is a dry sump, approximately 24 inches in diameter and 30 inches deep, and is equipped with liquid level detection and alarm. Any overflow from the C3/C5 Drains/Sump Collection vessel (RLD-VSL-00004) flows to this sump. Any material collecting in the sump can be transferred within 24 twenty four hours to the Plant Wash Vessel (RLD-VSL-00003) at el. +3 ft. using permanently installed electric submersible sump pumps. Sump waste that is transferred to the Plant Wash Vessel (RLD-VSL-00003) is eventually transferred to the Pretreatment Facility for processing.

3.2 Elevation +3 Ft Sumps

At elevation +3 ft, there are eight sumps, all dry sumps. The two sumps RLD-SUMP-00033 and RLD-SUMP-00034 located in the process cell (Room L-0125) assigned to the third Melter are not regulated and do not have permanently installed sump pumps and liquid level detectors. The rest of the sumps are provided with liquid level detection and alarm and permanently installed electric submersible sump pump. The pump transfers the sump contents to the Plant Wash Vessel (RLD-VSL-00003) located at the same elevation.

3.2.1 Process Cell Sumps

The melter feed system vessels and the primary offgas equipment for the two (2) LAW melters are located in two (2) lined process cells in the LAW Vitrification building. Each process cell contains the vessels and primary offgas equipment for a single LAW melter.

Process Cell for Melter 1, Room L-0123

LCP-VSL-00001	Concentrate Receipt Vessel
LFP-VSL-00001	Melter 1 Feed Preparation Vessel
LFP-VSL-00002	Melter 1 Feed Vessel
LOP-SCB-00001	Melter 1 Submerged Bed Scrubber (SBS)
LOP-WESP-00001	Melter 1 Wet Electrostatic Precipitator
LOP-VSL-00001	Melter 1 SBS Condensate Vessel

Process Cell for Melter 2, Room L-0124

LCP-VSL-00002	Concentrate Receipt Vessel
LFP-VSL-00003	Melter 2 Feed Preparation Vessel
LFP-VSL-00004	Melter 2 Feed Vessel
LOP-SCB-00002	Melter 2 Submerged Bed Scrubber
LOP-WESP-00002	Melter 2 Wet Electrostatic Precipitator
LOP-VSL-00002	Melter 2 SBS Condensate Vessel

Process Cell for Melter 3, Room L-0125

NONE

Each process cell is equipped with two sumps. The floor of the cell is sloped to drain potential spillage to a sump at the base of the east wall or west wall.

Water can be introduced into the sumps if needed for flushing.

Any material collecting in the process cell sumps can be transferred within twenty four hours to the Plant Wash Vessel (RLD-VSL-00003) using permanently installed electric submersible sump pumps.

Each sump is 15 inches deep by 30 inches in diameter, and is equipped with liquid level detection and liquid level alarm. Sump waste transferred to the Plant Wash Vessel (RLD-VSL-00003) is eventually transferred to the Pretreatment Facility for processing.

3.2.2 Effluent Cell Sumps

The Plant Wash Vessel (RLD-VSL-00003) and the SBS Condensate Collection Vessel (RLD-VSL-00005) are located in the effluent cell, room L-0126. The effluent cell is provided with two sumps, one in the west end and another in the east end. Any material collected in the effluent cell sump can be transferred to the Plant Wash Vessel (RLD-VSL-00003) within twenty four hours, using permanently installed electric submersible sump pumps.

Each sump is 15 inches deep by 30 inches in diameter, and is equipped with liquid level detection and liquid level alarm. Sump waste transferred to the Plant Wash Vessel (RLD-VSL-00003) is eventually transferred to the Pretreatment Facility for processing.

Table 1 - LAW Regulated Sumps

Sump Number	LAW Room Number & Elevation	Maximum Sump Capacity, Gal	Sump Type	Sump Dimensions, Inch	Piping and Instrumentation Diagram Number 24590-LAW-M6-	Leak Detection Type	Sump Material of Fabrication
RLD-SUMP-00028	L-B001B C3/C5 Drains/Sump Collection Vessel Cell Elev. -21 ft	59	Dry Sump	24 in. Diam x 30 in. Deep	RLD-P0002	Radar	UNS NO8367 (AL-6XN)
RLD-SUMP-00029	L-0123 Process Cell West End Elev. +3 ft	46	Dry Sump	30 in. Diam x 15 in. Deep	RLD-P0003	Radar	UNS NO8367 (AL-6XN)
RLD-SUMP-00030	L-0123 Process Cell East End Elev. +3 ft	46	Dry Sump	30 in. Diam x 15 in. Deep	RLD-P0003	Radar	UNS NO8367 (AL-6XN)
RLD-SUMP-00031	L-0124 Process Cell Sump West End Elev. +3 ft	46	Dry Sump	30 in. Diam x 15 in. Deep	RLD-P0003	Radar	UNS NO8367 (AL-6XN)
RLD-SUMP-00032	L-0124 Process Cell Sump East End Elev. +3 ft	46	Dry Sump	30 in. Diam x 15 in. Deep	RLD-P0003	Radar	UNS NO8367 (AL-6XN)

Table 1 - LAW Regulated Sumps

Sump Number	LAW Room Number & Elevation	Maximum Sump Capacity, Gal	Sump Type	Sump Dimensions, Inch	Piping and Instrumentation Diagram Number 24590-LAW-M6-	Leak Detection Type	Sump Material of Fabrication
RLD-SUMP-00035	L-0126 Effluent Cell West End Elev. +3 ft	46	Dry Sump	30 in. Diam x 15 in. Deep	RLD-P0003	Radar	UNS NO8367 (AL-6XN)
RLD-SUMP-00036	L-0126 Effluent Cell East End Elev. +3 ft	46	Dry Sump	30 in. Diam x 15 in. Deep	RLD-P0003	Radar	UNS NO8367 (AL-6XN)

Table 2 - Drains to LAW Sumps

Drain	Sump, LAW Room Number & Elevation	Maximum Flow Capacity, gal/min	Drain Type/ Nominal Operating Volume, Gal	Drain Line Size (Pipe Diameter), Inch	Piping and Instrumentation Diagram Number 24590-LAW-M6-	Pipe Material of Fabrication
• Pump Bulge RLD-BULGE-00001 Drain	RLD-SUMP-00028 L-B001B C3/C5 Drains/Sump Collection Vessel Cell Elev. -21 ft	60	N/A	2	RLD-P0002	316L SS
• Double-Walled Piping Outer Containment Drains		30		1		316L SS
• RLD-VSL-00004 Overflow		425		8		6 Moly
• Primary Offgas (LOP) Melter 1 Valve Bulge Drain	RLD-SUMP-00029 L-0123 Process Cell West End Sump Elev. +3 ft	60	N/A	2	LOP-P0001	6 Moly
• LCP-BULGE-00001/2 Drain		60		2		316L SS
• Melter Feed Detection Box Leak	RLD-SUMP-00030 L-0123 Process Cell East End Sump Elev. +3 ft	30	N/A	1	RLD-P0003	316L SS
• Melter 1 Feed Prep/Feed Vessel Valve Bulge Drain		60		2	LFP-P0001	316L SS
• Primary Offgas (LOP) Melter 2 Valve Bulge Drain	RLD-SUMP-00031 L-0124 Process Cell West End Sump Elev. +3 ft	30	N/A	2	LOP-P0002	6 Moly
• LCP-Bulge-00003 Drain		60		2	LCP-P0002	316L SS

Table 2 - Drains to LAW Sumps

Drain	Sump, LAW Room Number & Elevation	Maximum Flow Capacity, gal/min	Drain Type/ Nominal Operating Volume, Gal	Drain Line Size (Pipe Diameter), Inch	Piping and Instrumentation Diagram Number 24590-LAW-M6-	Pipe Material of Fabrication
• Melter Feed Detection Box Leak • Melter 2 Feed Prep/Feed Vessel Valve Bulge Drain	RLD-SUMP-00032 L-0124 Process Cell East End Sump Elev. +3 ft	30 60	N/A	1 2	LFP-P0003	316L SS 316L SS
None	RLD-SUMP-00035 L-0126 Effluent Cell West End Sump Elev. +3 ft	N/A	N/A	N/A	N/A	N/A
• Plant Wash Vessel/SBS Condensate Collection Vessel Valve Bulge Drain	RLD-SUMP-00036 L-0126 Effluent Cell East End Sump Elev. +3 ft	60	N/A	2	RLD-P0001	6 Moly

Attachment 2
05-ED-080

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-LAW-PCN-ENV-05-003.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel
Project Director

9/29/05
Date

Quarter Ending 9/30/2005 24590-HLW-PCN-ENV-05-007

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

Index

Submitted by Co-Operator:		Reviewed by ORP Program Office:	
D. Klein	9/16/05 Date	R.J. Schepens	10/17/05 Date

Quarter Ending 9/30/2005

24590-HLW-PCN-ENV-05-007

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 material selection data sheet (24590-HLW-N1D-HDH-P0005) and mechanical data sheet (24590-HLW-MVD-HDH-P0003) for HDH-VSL-00003 currently in Appendix 10.0 in the Dangerous Waste Permit (DWP).

Major changes to the material selection data sheet (24590-HLW-N1D-HDH-P0005) include: the description of the location of vessel was changed from 'in cell' to 'out cell' (i.e., not in a black cell), a description of the vessel's functions was added under the Corrosion Considerations section, additional information on erosion was added, and information on inadvertent addition of nitric acid was added.

Major changes to the mechanical data sheet (24590-HLW-MVD-HDH-P0003) include: Notes were added under the Vessel Design temperature that provided design temperatures and pressures for selected inlet nozzles/insert pipes consistent with connecting piping. The equipment cyclic data sheet portion was revised to update design pressure, operating temperature, contents of specific gravity, contents level and nozzle information and to add notes providing additional data necessary for fatigue analysis of nozzles and vessel.

Please replace the following data sheets in the DWP:

Appendix 10.6			
Replace:	24590-HLW-MVD-HDH-P0003, Rev. 1	With:	24590-HLW-MVD-HDH-P0003, Rev. 2
Appendix 10.9			
Replace:	24590-HLW-N1D-HDH-P0005, Rev. 0	With:	24590-HLW-N1D-HDH-P0005, Rev. 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: N/A

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

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class [1]1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to 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:

F. Freeburg (for S. Dahl) 11/7/05

S. Dahl — 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.

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No. R10631606

24590-HLW-MV-HDH-VSL-00003

Project:	RPP-WTP	P&ID:	24590-HLW-M6-HDH-P0002
Project No:	24590	Process Data Sheet:	Deleted
Project Site:	Hanford	Vessel Drawing	24590-HLW-MV-HDH-P0003
Description:	Waste Neutralization Vessel		

ISSUED BY RPP-WTP PDC

Reference Data

Charge Vessels (Tag Numbers)	NIA
Pulsejet Mixers / Agitators (Tag Numbers)	NIA
RFDs/Pumps (Tag Numbers)	NIA

Design Data

Quality Level		CM		Fabrication Specs	24590-WTP-3PS-MV00-TP001		
Seismic Category		SC-III		Design Code	ASME VIII Div 1		
Service/Contents		0.5 M Cerous Nitrate, 1M Nitric Acid, 5M NaOH, Demin Water		Code Stamp	Yes		
Design Specific Gravity		1.05 (2)		NB Registration	Yes		
Maximum Operating Volume	gal	4819 (Note 4)		Weights (lbs)	Empty	Operating	Test
Total Volume	gal	5315 (Note 4)		Estimated	17,500	58,000	62,000
Environmental Qualification (2)		NIA		Actual *			

Inside Diameter	inch	84			Wind Design	None	
Length/Height (TL-TL)	inch	204			Snow Design	None	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-FB01-T0001	
Internal Pressure	psig	Atm	15	NIA	Seismic Base Moment *	ft*lb	
External Pressure	psig	Atm	FV	NIA	Postweld Heat Treat	None	
Temperature	°F	113	237 (Notes 5 and 6) (2)	NIA	Corrosion Allowance	inch	0.04
Min. Design Metal Temp.	°F	16			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 source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

ERIC B. ISERN
STATE OF WASHINGTON
33449
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PROFESSIONAL ENGINEER
9/22/05

EXPIRES: 07/28/07

This Bound Document Contains a total of 4 Sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	REVIEWER	APPROVER
2	9/22/05	Issued for Permitting Use	K. Brightman	B. Balakrishnan	C. Slater	M. Hoffmann
1	3/24/04	Issued for Permitting Use				J. Julyk
0	10/29/02	Issued for Permitting Use	J. Jackson	C. Slater	N/A	S. Kirk

	MECHANICAL DATA SHEET: VESSEL	PLANT ITEM No. 24590-HLW-MV-HDH-VSL-00003

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	SA-240 304 (Note 2)	See Drawing	Auxiliary
Shell	SA-240 304 (Note 2)	See Drawing	Primary
Bottom Head	SA-240 304 (Note 2)	See Drawing	Primary
Support	SA-240 304 (Note 2)	See Drawing	N/A
Jacket/Coils/Half-Pipe Jacket	SA-240 304 (Note 2)	See Drawing	N/A
Internals	SA-240 304 (Note 2)	See Drawing	Thermowells Primary
Pipe	SA-312 TP304 (Note 2)	See Drawing	Note 1
Forgings/ Bar stock	SA-182 F304 (Note 2)	See Drawing	N/A
Bolting/Gaskets	SA193 B8 CLASS 2, SPIRAL WOUND GRAPHITE FILLED	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: Nozzle necks below max. operating level are primary, others auxiliary.

Note 2: Maximum carbon content of 0.030% for all welded components.

Note 3: Welds descaled as laid.

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

Note 5: For inlet nozzles/insert pipes N06/N06A, N07/N07A, N29/N29A, N30/N30A the temperature shall be 343°F at a pressure of 109 psig. △2

Note 6: For inlet nozzles N04 andN32 the temperature shall be 358°F at a pressure of 135 psig. △2

	MECHANICAL DATA SHEET: VESSEL	PLANT ITEM No. 24590-HLW-MV-HDH-VSL-00003

Equipment Cyclic Data Sheet

Component Plant Item Number:	***HDH-VSL-00003***
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 with0.030 % carbon.***
Design Life	***40 Years***
Component Function and Life Cycle Description	***The parent vessel is cyclically loaded and discharged in batch operation. In each batch operation, 2,037 gallons of liquid content is loaded and discharged.***

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***FV***	***15***	***10*** △2	***Nominal assumption*** △2
Operating Pressure	psig	***0***	***0***	***N/A*** △2	
Operating Temperature	°F	***68*** △2	***107*** △2	***N/A*** △2	
Contents Specific Gravity		***1.00***	***1.05*** △2	***N/A*** △2	
Contents Level	inch	***14***	***208***	***87,400*** △2	***A result of six one-hour cycles per day for 40 years*** △2
Localized Features					
Nozzles				***Normal operations will cause steam at 343°F temperature to enter the vessel via the inlet nozzles/insert pipes (N06/N06A, N07/N07A, N29/N29A, N30/N30A) six times per day, 1 hour each cycle. Normal operations will cause superheated steam at 358°F temperature to enter the vessel via inlet nozzles (N04, N32) twice per day, 8 hours each cycle.*** △2	
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.*
- *Contents of this document are Dangerous Waste Permit affecting.*
- *Nozzles N06/N06A, N07/N07A, N29/N29A, N30/N30A, and associated piping connected to ejectors shall be fatigue assessed/analyzed for pressure/temperature cycles over 40 years from 0 psig at 59°F to 109 psig at 343°F temperature. The pressure cycles shall coincide with temperature cycles.* 2
- *Nozzles N04, N32, and associated piping connected to ejectors shall be fatigue assessed/analyzed for pressure/temperature cycles over 40 years from 0 psig at 59°F to 135 psig at 358°F temperature. The pressure cycles shall coincide with temperature cycles.* 2
- *Heat Transfer summary for vessel:* 2

2 *A. Cell Ambient Temperature: Min. 59 °F, Max. 95 °F*

2 *B. Headspace temperature: 107 °F*

2 *C. Ambient and headspace natural convection heat transfer coefficients = 1.63 BTU/h-ft2-°F*
** Ignoring forced convection inside the vessel is bounding assumption.*

2 *D. Ejector transfers from vessel (Nozzles N06/N06A, N07/N07A, N29/N29A, N30/N30A):*
- *Only one of these nozzles will be used at a time during transfers.*
- *Transfer frequency: Refer to Equipment Cyclic Data, page 3*
- *Steam mass flow rate = 610 lb/hr*

2 *E. Condensate transfers (Nozzles N04/N32):*
- *These nozzles can be utilized simultaneously during transfers.*
- *Transfer frequency: Refer to Equipment Cyclic Data, page 3*
- *Steam mass flow rate = 230 lb/hr*

2 *F. During operation, one ejector transfer and one condensate transfer can take place simultaneously.*

PLANT ITEM MATERIAL SELECTION DATA SHEET

HDH-VSL-00003 (HLW)
Waste Neutralization Vessel

ISSUED BY
RPP-WTP PDC

- Design Temperature (°F) (max/min): 237/16
- Design Pressure (psig) (max/min): 15/FV
- Location: out cell

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 filled with the acidic decontamination solution at normal operating temperature.
- The vessel reaches a maximum operating temperature of 212°F.
- Off-normal conditions assume that raw ceric nitrate is accidentally sent to HDH-VSL-00002 and recovery involves transferring the $Ce(NO_3)_4$ into HDH-VSL-00003 for neutralization.

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 0.024 inch corrosion allowance and 0.016 inch erosion allowance)

Process & Operations Limitations:

- H_2O_2 must be present prior to or be introduced concurrently with the decontamination waste from HDH-VSL-00002.

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9/15/05

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	9/15/05	Issued for Permitting Use			
0	3/19/04	Issued For Permitting Use	DLA	JRD	SWV

PLANT ITEM MATERIAL SELECTION DATA SHEET

Corrosion Considerations:

This vessel is a holding point for the neutralization of the spent decontamination solution, steam condensate, nitric acid and demineralized water rinses from the canister decontamination vessel as well as rinse water from HDH-VSL-00001 prior to transfer to the PT facility.

a General Corrosion
During normal operation, the cerium IV will mostly be consumed in the canister decon vessel and what is not will be rapidly destroyed by the peroxide in the neutralization vessel. Under these circumstances, 304L would be a suitable vessel material. Corrosion rates of 304 stainless steel in Ce-IV/nitric acid solutions depend on temperature, nitric acid concentration, and cerium concentration, but are typically about 350 mpy. Thus, the solution containing Ce^{+4} is good for decontamination of stainless steel and therefore cannot be stored in stainless steel containers. If it were assumed that 1% of the Ce^{+4} remains when the solution reaches HDH-VSL-00003 and it is present for 40 years corroding stainless steel, then a stainless vessel would suffer about a 3 mpy corrosion rate or about 120 mil. However, because the Ce IV is diluted in the 304L vessel and rapidly neutralized, little corrosion is expected.

It is estimated that if an unused, undiluted batch of Ce IV is put into the 304L vessel and not neutralized twice a year, very little vessel corrosion would occur. According to Bray (1988, 1992), the amount of Ce^{+4} in a given batch is sufficient to remove less than 10 μm of stainless steel. If this occurs twice a year for 40 years, then about 800 μm (32 mil) would be consumed. This is less than the recommended corrosion allowance of 40 mils. Therefore, 304L is satisfactory.

According to Davis (1987), acid peroxide solutions corrode Ti-2 at rates of up to 30 mpy. Leaks of acid peroxide into a Ti-2 vessel would be deleterious.

Conclusion:
Based on relative corrosion rates and the worse case operating conditions, 304L or 316L can be used.

b Pitting Corrosion
In this system, there should be no chloride except for that brought over with any ^{137}Cs contamination. This should amount only to 0.13 Ci of ^{137}Cs, equivalent to about 1.5 mg of Cs and therefore 0.4 mg of chloride. With approximately 800 L of solution, the chloride is expected to be about 0.5 ppb.

Pitting of 304L is not expected to be a concern because of the low chloride concentration and the high nitrate concentration.

Conclusion:
Pitting of 304L is not considered a problem with the proposed solution.

c End Grain Corrosion
No published data, but not expected to be a concern. 304L stainless steel is acceptable for the vessel and no attack is expected.

Conclusion:
Not likely in this system.

d Stress Corrosion Cracking
Cracking is not a concern at the stated conditions; there is too much nitrate and too little chloride. It has been shown that post-decontamination cracking of the canister is not a concern and this vessel sees similar conditions. Therefore, 304L is suitable.

Conclusion:
304L is acceptable.

e Crevice Corrosion
See Pitting.

Conclusion:
See Pitting

f Corrosion at Welds
None anticipated.

Conclusion:
Weld corrosion is not considered a problem.

PLANT ITEM MATERIAL SELECTION DATA SHEET

g Microbiologically Induced Corrosion (MIC)
The proposed operating conditions are not conducive to microbial growth.

Conclusion:
MIC is not considered a problem.

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

Conclusions
Not a problem.

i Vapor Phase Corrosion
Not expected to be a problem.

Conclusion:
Not expected to be a problem.

j Erosion
Velocities within the vessel are expected to be small. A general erosion allowance of 0.016 inch is adequate for components with solids content less than 27.3 wt%.

Conclusion:
Not expected to be 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
Not a problem.

Conclusion:
Not a problem.

n Cavitation
None expected.

Conclusion:
Not a concern.

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

Conclusion:
Not applicable.

p Inadvertent Addition of Nitric Acid
Vessel receives nitric acid during normal operations.

Conclusion:
Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

References:

1. 24590-WTP-RPT-M-04-0008, Rev. 2, *Evaluation Of Stainless Steel Wear Rates In WTP Waste Streams At Low Velocities*
2. 24590-WTP-RPT-PR-04-0001, Rev. B, *WTP Process Corrosion Data*
3. Bray , LA, 1988, *Development of a Chemical Process Using Nitric Acid-Cerium (IV) for Decontamination of High-Level Waste Canisters*, Battelle, Pacific Northwest Laboratory, Richland, WA 99352
4. Bray, LA, MR Elmore, KJ Carson, RJ Elovich, GM Richardson, and LD Anderson, 1992, *Decontamination Testing of Radioactive-Contaminated Stainless Steel Coupons Using a Ce(IV) Solution*, Battelle, Pacific Northwest Laboratory, Richland, WA 99352
5. Davis, JR (Ed), 1987, *Corrosion, Vol 13*, In "Metals Handbook", ASM International, Metals Park, OH 44073
6. Mackey, DB Personal communication to JR Divine, 24 March, 2000
7. Meigs, R, Personal communication to D E Larson, 22 March 2000, amount of soluble Cs on the canister.

Bibliography:

1. Craig, BD, Editor, 1989, *Handbook of Corrosion Data*, ASM International, Metals Park, OH 44073
2. Davis, JR (Ed), 1994, *Stainless Steels*, In ASM Metals Handbook, ASM International, Metals Park, OH 44073

PLANT ITEM MATERIAL SELECTION DATA SHEET

OPERATING CONDITIONS

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Waste neutralization vessel (HDH-VSL-00003)

Facility HLW

In Black Cell? No

Chemicals	Unit[1]	Contract Maximum		Non-Routine (Note 5)		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/l	1.12E-03	1.87E-03	1.15E-03	1.92E-03	
Chloride	g/l					
Fluoride	g/l					
Iron	g/l	7.18E-01	7.16E-01	7.39E-01	7.37E-01	
Nitrate	g/l	7.64E+01	7.64E+01	2.42E+02	2.42E+02	
Nitrite	g/l					
Phosphate	g/l					
Sulfate	g/l					
Mercury	g/l					
Carbonate	g/l					
Undissolved solids	wt %	0.70%	0.70%	5.45%	5.45%	
Other (H2O2)	g/l	3.14E+02	3.14E+02	2.23E-04	1.69E-04	Note 2
Other (Cerium)	g/l	6.22E+00	6.22E+00	6.81E+01	6.81E+01	Note 3
pH	N/A					
Temperature	°F					Note 4
						Note 5

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. 30 wt% hydrogen peroxide is added as a reagent to deactivate cerium nitrate.
3. HDH-VSL-00002/4 overflow to this vessel and contain cerium nitrate, nitric acid.
4. Tmin 59 °F (BOD), Tnorm 113 °F.
5. HDH-VSL-00002 and HDH-VSL-00004 overflow to this vessel .

Assumptions

PLANT ITEM MATERIAL SELECTION DATA SHEET

5.2.5 Waste Neutralization Vessel (HDH-VSL-00003)

Routine Operations

The waste neutralization vessel (HDH-VSL-00003) is used as a holding point for the neutralization of the spent decontamination solution from the canister decontamination vessel, steam condensate, nitric acid and demineralized water rinses from the canister decontamination vessel, steam jet dilution, and wash water from the rinse tunnel canister rinse vessel (HDH-VSL-00001) prior to transfer to the PT facility. The waste neutralization vessel is equipped with service piping for demineralized water and process air, ventilation, level, temperature, and pressure transmitters, three steam ejectors (dual ejectors to the RLD-VSL-00007 and one to completely empty the waste neutralization vessel to the plant wash and drains vessel (RLD-VSL-00008), an overflow line, nozzles for the canister decontamination vessel's overflow and steam condensate, effluents from the canister decontamination vessels (HDH-VSL-00002/4) and rinse tunnel canister rinse vessel (HDH-VSL-00001), hydrogen peroxide and NaOH addition.

Non-Routine Operations that Could Affect Corrosion/Erosion

- HDH-VSL-00002 overflows to this vessel.
- HDH-VSL-00004 overflows to this vessel.

Quarter Ending 9/30/2005 24590-WTP-PCN-ENV-05-006

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

Index

Submitted by Co-Operator: D. Klein 9/16/05 Date

Reviewed by ORP Program Office: R.J. Schepens 10/17/05 Date

Quarter Ending 9/30/2005

24590-WTP-PCN-ENV-05-006

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 engineering specification for *Positive Material Identification (PMI) for Shop Fabrication* in the Dangerous Waste Permit. The following are the major changes to revision 4 of this specification: references to field fabrication were removed, additional materials were included in the scope, shop fabricated piping requirements were clarified, and additional base metal/weld metal combinations were included in Table 3.

Please replace the following:

Appendix 7.7			
Replace:	24590-WTP-3PS-G000-TP002, Rev. 3	With:	24590-WTP-3PS-G000-TP002, Rev. 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: N/A

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

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class [1]1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to 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:

E. Fredenburg (for S. Dahl) 11/7/05

S. Dahl — 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.

RIVER PROTECTION PROJECT – WASTE TREATMENT PLANT

ENGINEERING SPECIFICATION

FOR

POSITIVE MATERIAL IDENTIFICATION (PMI) FOR SHOP FABRICATION

9/16/05

EXPIRES: 12/07/05

Content applicable to ALARA? ☐ Yes ☒ No **ADR No.** Rev ISSUED BY RPP-WTP PDC	**Quality Designator** QL
NOTE: Contents of this document are Dangerous Waste Permit affecting.	DOE Contract No. DE-AC27-01RV14136

This bound document contains a total of 11 sheets

REV	DATE	BY	CHECK	REVIEW	E&NS	QA	DPEM
4	9/16/05	[signature]	APR	NA	NA	NA	[signature]
3	7/9/04	DA	APR	NA	NA	NA	MH
2	11/17/03	DA	SV	NA	NA	NA	MH
1	3/27/03	JJ	SV	NA	NA	NA	MH
0	9/17/02	JJ	CM	NA	NA	NA	SK

SPECIFICATION No. 24590-WTP-3PS-G000-TP002 **Rev** 4

Revision History

Revision	Reason for Revision
0	Issued for Permitting Use
1	Issued for Permitting Use
2	Issued for Permitting Use
3	Issued for Permitting Use
4	Issued for Permitting Use

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 by product materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

Contents

Tables

1 Scope

This Specification covers the minimum requirements for and the extent of application of Positive Material Identification (PMI) testing of shop fabricated pressure retaining equipment and piping used in services in contact with process fluid. This Specification applies to shop fabrication only. For field fabrication PMI requirements, see 24590-WTP-3PS-G000-T0010.

2 Applicable Documents

2.1 Reference Documents/Drawings

2.1.1 Deleted

2.1.2	24590-WTP-3PS-G000-T0010	Engineering Specification For Positive Material Identification (PMI) For Construction

3 Technical Requirements

3.1 General

The purpose of PMI is to ensure that the material is correctly supplied. Materials, equipment, and piping requiring PMI per this Specification are identified in Table 1. Specifically, within the black cells, PMI is required for all radioactive and non-radioactive systems and all fluid codes. Outside the black cells, PMI is required for shop fabricated items fabricated from the alloys identified in Table 1 when used in radioactive and dangerous waste systems as identified in Table 2. Table 2 lists systems, facilities, and fluid codes requiring PMI testing for shop fabricated piping. When required by this Specification, PMI testing will be done on each component of a pressure retaining assembly. This shall include each individual segment of pipe, each plate, and all other pieces of base materials (e.g., forgings, fittings, tubing, etc.) and all required pressure retaining welds in contact with process fluids made by the Seller.

For purposes of this Specification, the following definitions are used:

Alloy: Metallic materials (including welding filler materials) which contain alloying elements including but not limited to: Chromium (Cr), Nickel (Ni), Molybdenum (Mo), Copper (Cu) or Tungsten (W).

300 Series Stainless: Austenitic Stainless Steels (304L, 316L, etc.)

6 % Mo: AL6XN, 254 SMO, etc.

Duplex Stainless Steel: CD4MCu, etc.

Nickel Base: Alloy C-22, 625, 690, etc.

3.2 Responsibility

The Seller shall submit to the Buyer, for review and comment prior to fabrication, procedures covering how PMI will be conducted and documented. The Seller's procedures shall include the instrument manufacturer's procedures and requirements, operator qualification/re-qualification requirements, instrument calibration method(s), calibration frequency during testing, criteria for acceptance or rejection, material identification method, and record keeping.

3.3 Verification Method

3.3.1 Instruments used for PMI shall be of the type that will provide quantitative, recordable, elemental composition results for positive identification of the alloy elements present.

a PMI shall be done per the procedures outlined by the manufacturer of the PMI instrument being used. Modification of these procedures must be approved by the Buyer.

b Each PMI instrument shall be calibrated according to the manufacturer's requirements.

3.3.2 The methods/instruments listed below are acceptable. In application, they must not be used in a "go-no-go" mode. The only acceptable objective is the positive identification, listing, and quantification of the relevant elements listed in section 7.

a Portable X-ray fluorescence analyzers. Use is limited to the following instruments or their equivalent unless prior approval is given by the Buyer:

- TN Technologies Alloy Analyzer 9266, 9277 (The Metallurgist XR) or 9288
- Outokumpu X-Met 840, or X-Met 880
- Niton metal Alloy Analyzer (800 Series)
- Metorex X-Met 920 Metal Analyzer
- Innov-X Systems XT Series Analyzer

b Portable optical emission analyzers. Use is limited to the following instruments or their equivalent unless prior approval is given by the Buyer:

- SpectroPort Model TP-07 or TFO-02
- Outokumpu ARC-MET 900 or the New Spectrotest
- Spectrotest and Spectrotest Jr.

Any other instrument will require Buyer's approval.

Note: Arc strikes, if any, need not be removed.

3.3.3 In lieu of using portable instruments, chemical analysis can be performed on actual material samples. Care must be exercised while collecting samples, as contamination can be contributed by the removal tools. Sample extraction shall not weaken or reduce the functionality of the component. Laboratory analysis reports shall be traceable to the individual component from which the sample was taken (See section 6, below).

3.3.4 Parts that are too small to be tested using an alloy analyzer are exempt from PMI testing. If such exemption is claimed, the PMI procedure shall specify the minimum part size capable of being tested.

3.4 Welding Consumable Control

In addition to PMI testing required by this Specification, the Seller shall have in place, and implement, welding consumable material control systems that can be verified by auditing. PMI of completed pressure retaining welds is required as indicated in Table 1. Production "Run Off" weld test coupons may be used for chemical analysis checks.

4 Scope of PMI

PMI shall be performed on completed equipment, or assembled parts of equipment, at such time as to ensure that only verified materials have been used in the fabrication and final assembly of components. If the assembled equipment configuration prevents PMI of any individual part, then that part shall be tested prior to assembly and be noted as such on the PMI documentation.

4.1 Vessels, Exchangers, Tanks, Filters and other Manufactured Equipment

Vessels, exchangers, and other manufactured equipment shall have PMI testing performed at the Seller's facilities. This shall include piping and components supplied as part of an equipment "package" or skid.

4.2 Shop Fabricated Piping

4.2.1 PMI is required for all piping and piping components and for circumferential pressure retaining welds as indicated in Tables 1 and 2.

4.2.2 PMI is not required on autogenous welds, fillet welds, or socket welds.

4.3 Deleted

4.4 Valves and Pumps

PMI of valves and pumps is required for materials as indicated in Table 1 and Piping Fluid Codes as indicated in Table 2.

4.5 Bulk Materials (Straight Run Piping, Fittings, Stock Valves, Etc.)

PMI is required as indicated in Table 1.

5 Identification

5.1 General

All shop fabricated items/pieces that have been successfully subjected to the required PMI shall be marked. The mark shall be durable and last through transportation and receiving inspection at the Buyer's facility. See section 7 for items that do not pass PMI.

5.2 Marking Materials

Marking materials and adhesive tape selected shall not cause corrosion or other harmful effects. Requirements for marking materials:

- The total chloride/flouride content shall not exceed 200 ppm.
- The total sulfur content shall not exceed 400 ppm.
- The total of low melting point metals such as lead, zinc, copper, tin, antimony, and mercury shall not exceed 1 percent. Of this mercury shall not exceed 50 ppm.

5.3 Equipment and Equipment Components

When it has been verified that the material has a composition consistent with the material specified, then it must be stamped with letters "PMIV". Use low stress stamps for identification. Items that cannot be stamped shall have an alternate system of marking. Heat exchanger tubing shall not be stamped. Any alternate system, and the items for which it will be used, must have Buyer approval. To the maximum extent possible, the stamping/marking shall be located for ease of future reference/verification.

5.4 Piping Materials

When it has been verified that the material has a composition consistent with the material specified, then a colored adhesive tape, or other approved marking method, shall be applied at one end to facilitate proper identification.

5.5 Fasteners and Small Parts

Fasteners and small parts shall be marked in accordance with the Seller's procedure using a hard marking method, an indelible ink, or paint.

6 Records of PMI

Results shall be recorded on PMI report forms, which shall indicate, as a minimum, the following for each examination:

a Name of Inspector
b Date of Testing
c Test method, including PMI instrument name and serial number
d Equipment tag number or pipe spool number (purchase order number for bulk items) for the specific piece tested
e Quantitative analysis results for relevant elements (see section 7)

A map shall be prepared for fabricated equipment or pipe spool, including components and welds, showing the locations of PMI testing.

An extended Shop Spool Sheet shall be provided for each individual spool number where PMI was done.

In the case of bulk items, PMI results may be submitted in the form of a certificate verifying that parts were tested according to the requirements of this Specification. Results shall be reported by heat/lot and shall include the following:

a Name of Inspector
b Date of Testing
c Test method, including PMI instrument name and serial number

d Type and number of pieces tested
e Acceptable composition ranges for the relevant elements (see section 7)
f Material identified

PMI forms shall become a part of the permanent inspection records. Seller shall submit the completed forms as part of the Final Document Package when required by the Form G-321-V in the Purchase Order.

7 Acceptance, Rejection and Retesting Requirements

All materials tested shall be identified by the PMI instrument as being consistent with the composition of the specified material. The results shall fall within the chemical composition requirements of the ASTM, AWS or other applicable material specification allowing for the accuracy of the instrument. Any questionable PMI result shall be re-analyzed by the same or another instrument, after verification of proper surface preparation. See section 7.1, below, for materials and welds that fail to meet requirements on the second analysis.

The following elements shall be identified and recorded, even if the instrument does provide immediate identification (e.g. display of "316", "6 Mo", etc.):

Alloy	Elements
304, 304L	Ni, Cr
316, 316L	Ni, Cr, Mo
347	Ni, Cr, Nb
Duplex, 6% Mo, 254 SMO, AL6XN, etc.	Ni, Cr, Mo, Cu
Nickel base alloys, C-22, 625, 690, etc.	Ni, Cr, Mo, W

Welds joining dissimilar base materials or that do not match the base material composition may include an allowance for dilution. Acceptable composition ranges for commonly used combinations of base material and weld filler metals are included in Table 3. Other combinations, when required, shall be identified to the Buyer for approval.

7.1 If any material, component, or weld of a type not requiring 100% testing is found to be unacceptable, all other materials, components, or welds (same heat, lot, etc.) represented by that failed item shall be considered suspect. The Buyer shall be notified immediately if a component is confirmed to have failed the PMI. The Seller will then have the following options, with Buyer concurrence:

a Scrapping/removing all materials, components, or welds represented by the test piece (all of that heat, lot, etc.) and replacing with new components or filler metals, or
b Performing 100 percent examination of the remainder of the represented materials, components, or welds, and replacing each item that fails the PMI check, or
c Verifying correct chemistry by laboratory chemical analysis.

7.2 If questionable values obtained with portable analyzers are verified by laboratory analysis, the laboratory analysis data shall be used and recorded.

7.3 Any item or component containing materials that have not passed the PMI shall be clearly marked as "DO NOT USE – PMI FAILED" and segregated from the remainder of the stock.

Table 1 PMI Requirements for Shop Fabricated Items/Pieces

Type 304 & 304L Stainless Steel Components	Yes – 100 % when in black cells
Type 316, 316L, & 347 Stainless Steel Components	Yes – 100 %
6% Mo Components	Yes – 100 %
Duplex Stainless Steel Components	Yes – 100%
Nickel Base Alloy Components	Yes – 100 %
Alloy Valves	Yes – 100 % Body and Bonnet Only
Alloy Pumps	Yes – 100 % Casing Only
Alloy Piping (Spools, Jumper Pipes, Fittings, and Straight-Run Pipe)	Yes – 100 % for 6 % Mo, Nickel base alloys and all Jumper Pipes Yes – 100 % for 316L used in black cells or for the systems and piping fluid codes listed in Table 2 Yes – 100 % for 304L used in black cells
Alloy Pressure Retaining Welds in Contact with Process Fluids	Yes – 100 % of completed welds that join material required to have PMI testing
Bolting – B8M used for Pressure Retaining Connections	Yes – 5 % of total bolts, minimum one check per heat
Alloy Heat Exchanger Tubing	Yes – 5 % of total tubes, minimum one check per heat
Venturis	Yes – 100 % pipes and welds

Note:

1. The following items are exempted unless specifically designated for PMI by the Purchase Order:

a All type 304L stainless steel components, piping, and welds, except for those located in black cells
b All type 304L and 316L stainless steel field welds
c Non pressure-retaining parts, such as baffles, trays, tray clips, supports, pall-rings, support rings, etc.
d Non pressure-retaining welds and sections of piping, such as drains, vents, overflows, etc.
e Gaskets
f Tubing and instrumentation
g HVAC ducting
h Piping components located within piping systems for which PMI is NOT required

Table 2 Systems, Facilities and Fluid Codes Requiring PMI Testing (Shop Fabricated Piping)

System		Facility	Fluid Codes
ASX	Autosampling System	PTF, LAW, HLW, LAB	PB,ZF,ZJ,ZN,ZS
CNP	Cesium Nitric Acid Recovery Process System	PTF	GV,PA,PB,PC,PF,PH,PP,PW,PX,PZ,ZF,ZH, ZJ,ZL,ZN,ZR,ZS,ZY
CRP	Cesium Resin Addition Process System	PTF	GV,PA,ZF,ZL,ZS
CXP	Cesium Ion Exchange Process System	PTF	GV,PA,PB,PF,PX,ZF,ZJ,ZL,ZS
FEP	Waste Feed Evaporation Process System	PTF	GV,PU,PW,PX,PZ,ZF,ZR,ZS
FRP	Waste Feed Receipt Process System	PTF	GV,PB,PH,PW,PX,PZ,ZF,ZL,ZN,ZS
HCP	HLW Concentrate Receipt Process System	HLW	GV,PC,PW,PX,ZF,ZS
HDH	HLW Canister Decontamination Handling System	HLW	GV,PA,PJ,ZF,ZR
HFP	HLW Melter Feed Process System	HLW	GV,PA,PB,PC,PJ,PW,ZF
HLP	HLW Lag Storage and Feed Blending Process System	PTF	GV,PC,PF,PJ,PW,PX,ZF,ZS
HMP	HLW Melter Process System	HLW	PB,ZF,ZS
HOP	Melter Offgas Treatment Process System	HLW	GV,PA,PB,PW,ZF,ZR,ZS
HPH	HLW Canister Pour Handling System	HLW	PA
LCP	LAW Concentrate Receipt Process System	LAW	GV,PB,PH,PW,ZS
LFP	LAW Melter Feed Process System	LAW	GV,PB,PE,ZH,ZS
LMP	LAW Melter Process System	LAW	PB
LOP	LAW Primary Offgas Process System	LAW	GV,PU,PW,ZR,ZS
LVP	LAW Secondary Offgas/Vessel Vent Process System	LAW	GV,PW,ZF,ZS,ZY
PJV	Pulse Jet Ventilation System	HLW, PTF	GV,PU,PV,PW,ZF,ZS,ZY
PVP	Pretreatment Vessel Vent Process System	PTF	GV,PA,PH,PS,PU,PW,PZ,ZF,ZS,ZY
PWD	Plant Wash and Disposal System	HLW, PTF	GV,PA,PH,PX,PZ,ZF,ZH,ZJ,ZN,ZR,ZS,ZY
RDP	Spent Resin Collection and Dewatering Process System	PTF	GV,PA,ZF,ZL,ZS
RLD	Radioactive Liquid Waste Disposal System	LAB, LAW, HLW, PTF	GV,PA,PB,PC,PR,PV,PW,ZF,ZH,ZJ,ZL, ZN,ZR,ZS,ZY
TCP	Treated LAW Concentrate Storage Process System	PTF	GV,PA,PB,PH,PW,PX,ZF,ZR,ZS
TLP	Treated LAW Evaporation Process System	PTF	GV,PA,PB,PH,PU,PW,PZ,ZF,ZJ,ZR,ZS
UFP	Ultrafiltration Process System	PTF	GV,PB,PP,PW,PX,PZ,ZF,ZH,ZS

Table 3 Base Material and Weld Filler Metal Composition Requirements (Wt %)

Material	Cr	Ni	Mo	Cu	W	Notes
304L BM	18.0 - 20.0	8.0 - 12.0	---	---	---	
308L WFM	19.5 - 22.0	9.0 - 11.0	0.75 max	---	---	E/ER308L & LT
304L Welds	18.0 - 22.0	8.0 - 12.0	0.75 max	---	---	Note 1
304L BM	18.0 - 20.0	8.0 - 12.0	---	---	---	
308L WFM	19.5 - 22.0	9.0 - 11.0	0.75 max	---	---	E/ER308L & LT
CD4MCu BM	24.5 - 26.5	4.75 – 6.0	1.75 – 2.25	2.75 – 3.25	---	
304L/CD4MCu welds	18.0 - 26.5	4.75 – 12.0	2.0 max	---	---	Note 1
316L BM	16.0 - 18.0	10.0 - 16.0	2.0 - 3.0	---	---	
316L WFM	17.0 - 20.0	11.0 - 14.0	2.0 - 3.0	---	---	E/ER316L & LT
316L Welds	16.0 - 20.0	10.0 - 16.0	2.0 - 3.0	---	---	Note 1
316L BM	16.0 - 18.0	10.0 - 14.0	2.0 - 3.0	---	---	
316L WFM	17.0 - 20.0	11.0 - 14.0	2.0 - 3.0	---	---	E/ER316L & LT
CD4MCu BM	24.5 - 26.5	4.75 – 6.0	1.75 – 2.25	2.75 – 3.25	---	
316L/CD4MCu welds	16.0 – 26.5	4.75 – 16.0	1.75 – 3.0	---	---	Note 1
AL6XN BM	20.0 - 22.0	23.5 - 25.5	6.0 - 7.0	0.75 max	---	
625 WFM	20.0 - 23.0	55.0 min	8.0 - 10.0	0.50 max	---	E/ERNiCrMo-3
AL6XN Welds	20.0 - 23.0	25.5 min	7.0 - 10.0	0.75 max	---	Note 2
C-22 BM	20.0 - 22.5	Remainder	12.5 - 14.5	---	2.5 - 3.5	
C-22 WFM	20.0 - 22.5	Remainder	12.5 - 14.5	0.5 max	2.5 - 4.5	E/ERNiCrMo-10
C-22 Welds	20.0 - 22.5	52.0 min	12.5 - 14.5	---	2.5 - 4.5	Note 1

BM = Base metal; WFM = Weld filler metal

Notes:

1. Acceptance is based on the combined base metal and WFM spec requirements.
2. Acceptance is based on WFM spec and the expected amount of dilution for molybdenum.

8 Design Changes Incorporated by Reference

24590-WTP-SDDR-PROC-02-0124
24590-WTP-SDDR-PROC-03-0249
24590-WTP-SDDR-PROC-03-0267
24590-WTP-SDDR-PROC-03-0282
24590-WTP-SDDR-PROC-03-0306
24590-WTP-SDDR-PROC-03-0369
24590-WTP-SDDR-PROC-03-0453
24590-WTP-SDDR-PROC-04-00152

24590-WTP-SDDR-PROC-04-00183
24590-WTP-SDDR-PROC-04-00399*
24590-WTP-SDDR-PROC-04-00410*
24590-WTP-SDDR-PROC-04-00743*
24590-WTP-SDDR-PROC-04-00896*
24590-WTP-SDDR-PROC-05-00031*
24590-WTP-SDDR-PROC-05-00520*
24590-WTP-SDDR-PROC-05-00606*
24590-WTP-SDDR-PL-05-00004*
24590-WTP-SDDR-~~ML~~M-05-00055*

9/16/05

* new

Attachment 3
05-ED-078

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of Permit Change Notice 24590-HLW-PCN-ENV-05-007 to update material selection data sheet and mechanical data sheet for HDH-VSL-00003 and Permit Change Notice 24590-WTP-PCN-ENV-05-006 to update engineering specification for *Positive Material Identification (PMI) for Shop Fabrication.*

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel
Project Director

9/26/05
Date

Quarter Ending 12/30/05

24590-HLW-PCN-ENV-05-008

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:

D. Klein — Date: 10/13/05

Reviewed by ORP Program Office:

R. J. Schepens — Date: 11/7/05

Quarter Ending 12/30/05

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:

This modification is being issued to update existing HDH-VSL-00001 information contained in Part III, Chapter 10, Attachment 51, Appendix 10.9. Included with this modification is a revised Plant Item Material Selection Data Sheet, which provides updated corrosion and erosion data for this vessel. Specifically, the data sheet now addresses corrosion as it relates to the addition of nitric acid to the vessel. Document(s) specific to this modification package are listed below.

Please replace the following:

Appendix 10.9			
Replaced:	24590-HLW-N1D-HDH-P0007, Rev 0	With:	24590-HLW-N1D-HDH-P0007, Rev 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: N/A

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

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

Modification Approved: [X] Yes [ ] No (state reason for denial)	Reviewed by Ecology:
Reason for denial:	S. Dahl — Date: 11/15/05

[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 12/31/2005 24590-WTP-PCN-ENV-05-009

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

Index

Submitted by Co-Operator:

D. A. Klein — Date: 10/25/05

Reviewed by ORP Program Office:

R. J. Schepens — Date: 11/04/05

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 the Process Bulges Design and Fabrication specification 24590-WTP-3PS-MX00-TP001. Changes to this document include:

- Updates to the list of acronyms
- A definitions section was added
- A safety/quality classifications section was added
- Updates to the list of applicable industry codes and standards and reference documents
- Design requirements for the following were clarified
  - Process pumps
  - Process valve assemblies
  - Instrumentation
  - Electrical
  - Bulge performance
  - Design conditions
  - Environmental conditions

- Requirements for the following were clarified:
  - Process bulge confinement
  - Process bulge support frame
  - Process bulge shielding
  - Maintenance platforms
  - Lifting points
  - Fasteners
  - Pipework
  - Wall penetrations
  - Positive material identification
  - Prohibited materials
  - Materials storage
  - Fabrication
  - Preparation for shipment
  - Quality assurance

[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.

- Design requirements for the following were added
  - Floor penetrations
  - Column davits
  - Seismic loads
  - Nozzle loads

- Requirements for tests and inspections were clarified, including:
  - Surface finish inspections
  - Visual weld inspections
  - Liquid penetrant test
  - Radiography
  - Final inspection

- Documentation and submittals were also clarified.

The specific changes are identified in *Engineering Specification for Process Bulges Design and Fabrication* (24590-WTP-3PS-MX00-TP001), Rev 2.

A specification change notice is being developed to clarify qualification requirements for personnel performing nondestructive examination. The specification change notice will be provided to Ecology pursuant to Permit Condition III.10.C.9.h.

These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment.

Process Bulges Design and Fabrication Specification:

Attachment 51, Appendix 7.7:

Replace *Engineering Specification for Process Bulges Design and Fabrication* (24590-WTP-3PS-MX00-TP001), Rev. 1 with *Engineering Specification for Process Bulges Design and Fabrication* (24590-WTP-3PS-MX00-TP001), Rev. 2.

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: 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:

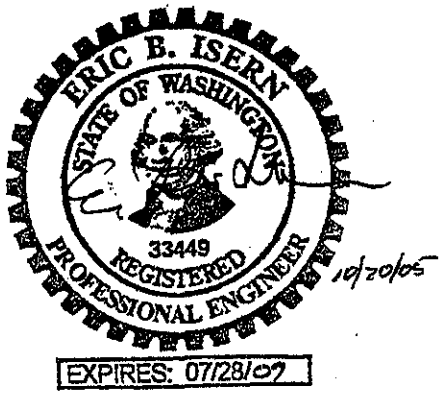
Reviewed by Ecology:
S. Dahl 11/15/05
S. Dahl Date

RIVER PROTECTION PROJECT – WASTE TREATMENT PLANT

ENGINEERING SPECIFICATION

FOR

Process Bulge Design and Fabrication



This bound document contains a total of 45 pages.

Content applicable to ALARA? ☒ Yes ☐ No

ADR No.
N/A

Rev
N/A

Quality Designator
QL
DOE Contract No. DE-AC27-01RV14136

NOTE: Contents of this document are Dangerous Waste Permit affecting.

REV	DATE	BY	CHECK	REVIEW	E&NS	QA	DPEM
2	10/24/05				N/A	N/A	
1	4/3/03	J. Jackson	C. Morley	D. Pfluger	N/A	N/A	M. Hoffmann
0	9/17/02	J. Jackson	C. Morley	N/A	N/A	N/A	S. Kirk

SPECIFICATION No.
24590-WTP-3PS-MX00-TP001

Rev
2

Revision History

Revision	Reason for Revision
0	Issued for Permitting Use
1	Issued for Permitting Use
2	Issued for Permitting Use

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.

Contents

Appendices

Tables

Figures

1 Scope

1.1 Project Description and Location

1.1.1 The River Protection Project-Waste Treatment and Immobilization Plant (RPP-WTP) is a complex of waste treatment facilities where the U.S. Department of Energy Hanford Site tank waste will be put into stable glass form. The Waste Treatment and Immobilization Plant Contractor will design, build and start-up the RPP-WTP pretreatment and vitrification facilities for the DOE Office of River Protection. The waste treatment facilities will pretreat and immobilize the low- activity waste and high-level waste currently stored in underground storage tanks at the Hanford Site.

The Hanford Site occupies an area of about 560 square miles and is located along the Columbia River, north of the city of Richland, Washington. The RPP-WTP Facility will be constructed at the east-end of the 200 East Area of the Hanford Site. The Counties of Benton, Franklin, and Grant surround the Hanford Site.

1.2 Equipment, Material, and Services Required

1.2.1 This specification establishes the requirements for the design, fabrication, project management, quality assurance, inspection, and testing of Process Bulges for use in the RPP-WTP Facilities.

1.2.2 The Seller shall provide fully detailed designs and all labor, materials, equipment, and services necessary to manufacture the Process Bulges in accordance with this specification and Process Bulge Data Sheet. Any discrepancies between this specification, referenced specifications, and the Process Bulge Data Sheet shall be brought to the attention of the Buyer for resolution.

1.2.3 The scope of work includes, but is not limited to:

- Detail design of all pipework, confinement, support, maintenance platforms, column davits, and shielding systems as required.
- Fabrication and/or assembly of all items and components.
- Performance testing of equipment to verify and demonstrate functionality and conformance to the design and technical requirements described in this document.
- Leak/pressure testing of all process systems to demonstrate primary and secondary confinement.
- Documentation of testing procedures, testing results, operation and maintenance procedures, and quality assurance procedures.

- Design document review in progressively complete package form. Delivery shall include 30%, 60%, 90%, and final design reviews.
- Preparation for shipping and packaging of all equipment.

1.2.4 The Seller shall also provide all special tools and/or equipment necessary for operation and maintenance of the Process Bulges and their components. The Seller shall prepare drawings of special tools and/or equipment and submit them to the Buyer for review. Special tools shall not include small hand tools available in the commercial market.

1.2.5 Specific activities excluded from the scope of this specification include:

- On site unloading
- Installation
- Commissioning

1.2.6 The Seller shall not be responsible for the supply of process pumps, the Buyer shall issue this equipment to the Seller as contractor furnished equipment for incorporation into the fabrication. Refer to the MR for the scope of procurement responsibilities for valves, actuators, and instrumentation.

1.3 Work by Others

1.3.1 The Seller may subcontract any portion of the work, provided the quality assurance requirements of this specification are maintained, and provided the Buyer approves the subcontractor and the scope of work.

1.3.2 The Seller will be ultimately responsible for the completeness and quality of all work covered in this specification.

1.4 Acronyms

AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
AP	Air Permit
APC	Additional Protection Class
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
CM	Commercial Material
DBE	Design Basis Earthquake
DOE	U.S. Department of Energy
EQDS	Environmental Qualification Data Sheet
ITS	Important to Safety
M&TE	Measurement and Test Equipment
MR	Material Requisition
MSDS	Material Safety Data Sheet
NRTL	Nationally Recognized Testing Laboratory
NQA	National Quality Assurance

OSHA	Occupational Safety & Health Administration
P&ID	Piping and Instrumentation Diagram
PCB	Polychlorinated Biphenyl
PMI	Positive Material identification
PO	Purchase Order
PT	Liquid Penetrant Test
QA	Quality Assurance
QAM	Quality Assurance Manual
QARD	Quality Assurance Requirements and Description
QL	Quality Level
RFQ	Request for Quote
RPP-WTP	River Protection Project-Waste Treatment Plant
RRC	Risk Reduction Class
SC	Safety Class
SC	Seismic Category
SDC	Safety Design Class
SDS	Safety Design Significant
SRD	Safety Requirements Document
SS	Safety Significant
SWL	Safe Working Load
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
UNC	Unified National Coarse
VT	Visual Test
WAC	Washington Administrative Code

1.5 Definitions

Buyer: Bechtel National Inc. for the RPP-WTP.

Seller: Manufacturer, assembler, fabricator, vendor, supplier, or equal who provides equipment, systems, components, services, or other products for delivery or direct benefit to the Buyer.

Buyer's Representative(s): The Buyer's designee(s), who shall witness onsite operations at the seller and sub-seller sites and perform onsite inspections and surveillance.

HEPA Filter: A high efficiency particulate air filter having a fibrous medium with a particle removal efficiency of 99.97% when tested with essentially mono-dispersed 0.3 μm test aerosol particles.

Important to Safety (ITS): Systems, structures, and components (SSCs) that serve to provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the workers and the public. ITS encompasses the broad class of facility features addressed (not necessarily explicitly) in the top-level radiological, nuclear, and process safety standards and principles that contribute to the safe operation and protection of workers and the public during all phases and aspects of facility operations (i.e., normal operation as well as accident mitigation). ITS includes SSCs designed as Safety Design Class (SDC)/ *Safety Class (SC)*, Safety Design Significant

(SDS)/ *Safety Significant (SS)*, and Risk Reduction Class (RRC)/*Additional Protection Class (APC)*.

Paragraph: When a paragraph of this specification, referenced document, referenced codes, or referenced standards is referenced in this specification, the paragraph referenced and all subparagraphs and sub-subparagraphs of the paragraph shall be considered inclusive.

Quality Level (QL): The quality level identifies the quality requirements to be applied to items and activities. The identified quality levels are QL-1, QL-2, QL-3, AP, and CM.

Quality Level 1 (QL-1): QL-1 items and activities shall meet the applicable requirements of NQA-1 (1989).

Quality Level 2 (QL-2): QL-2 items and activities shall meet the applicable requirements of NQA-1 (1989). The distinction between QL-1 and QL-2 is provided to identify that a higher degree of risk is associated with QL-1 items and activities.

Quality Level 3 (QL-3): QL-3 items and activities shall meet the applicable requirements of NQA-1 (1989) and those additional requirements of QARD and QAM.

Air Permit (AP): Except for those items identified as QL-1/QL-2, AP shall be applied to radioactive air emission control components identified in the air permit and the Radioactive Air Emission Control Technology Standards Compliance Matrices unless otherwise approved by the Washington State Department of Health. AP items and activities shall meet the applicable requirements of NQA-1 (1989). The distinction between QL-1/QL-2 and AP is provided to identify that a higher degree of risk is associated with QL-1/QL-2 items and activities.

Commercial Material (CM): Those permanent plant SSCs not identified as either QL-1, QL-2, QL-3, or AP are CM (which includes both RRC/APC and Non-ITS).

Risk Reduction Class (RRC) - Initial Safety Classification: RRC Systems, Structures, and Components are Important to Safety Systems, Structures, and Components that are neither Safety Design Class nor Safety Design Significant.

Additional Protection Class (APC) - Replacement Safety Classification: Systems, Structures, and Components are Important to Safety Systems, Structures, and Components that are neither Safety Class (SC) nor Safety Significant (SS).

Safety Design Class (SDC) - Initial Safety Classification: an SSC whose safety function is to prevent a worker or maximally exposed member of the public from receiving a radiological or chemical exposure that exceeds the exposure standards defined in the Safety Requirements Document (SRD) , or that is credited for the prevention of a critically event.

Safety Class (SC) - Replacement Safety classification: an SSC, including portions of process systems whose preventive or mitigative function is necessary to limit radioactive material exposure to the public, as determined from safety analyses.

Safety Design Significant (SDS) - Initial Safety Classification: an SSC that is required to ensure that exposure standards for normal operation are not exceeded; whose failure would directly prevent a SDC SSC from performing its safety function; or that implements the defense-in-depth requirements of the SRD Appendix B, section 3.0, Table 1.

Safety Significant (SS) - Replacement Safety Classification: an SSC that is not designated as SC, but whose preventive or mitigate function is a major contributor to defense-in-depth and/or worker safety as determined by safety analyses.

Seismic Category (SC): RPP-WTP seismic classifications for SSCs based on their safety function. Seismic Categories are I (SC-I), II (SC-II), III (SC-III), IV (SC-IV), and V (SC-V).

Seismic Category I (SC-I): ITS equipment/tanks which have a safety function. For the design of SC-I components, no credit for inelastic energy absorption is allowed. SC-I equipment/tanks shall be functional during and after a DBE.

Seismic Category II (SC-II): ITS equipment/tanks whose failure during a seismic event could prevent a SC-I SSC from performing its seismic safety function. For the design of SC-II equipment/tanks, credit for inelastic energy absorption is allowed. SC-II components shall maintain control and confinement of hazardous materials during and after a DBE, but do not need to be functional.

Seismic Category III (SC-III): (a) ITS SSC, but without SC-I or SC-II safety function, but with a chemical hazard. (b) Non-ITS SSC which has an inventory of radioactive or hazardous material in an amount less than ITS significant quantity.

Seismic Category IV (SC-IV): Non-ITS SSC without an inventory of radioactive or hazardous material, but must meet UBC 1997 loadings.

Seismic Category V (SC-V): Non-ITS SSC not requiring seismic design.

Risk: the product of probability and consequences of any event considered. These factors are, to the extent possible, assigned numeric values so that results of risk evaluations can be ordered using appropriate descriptions.

Safety Classification: categorized as SDC/SC, SDS/SS, or RRC/APC.

1.6 Safety/Quality Classifications.

The Quality Level (QL) and Seismic Category (SC) of the Process Bulges are specified on the data sheets in section 2 of the MR.

2 Applicable Documents

2.1 General

2.1.1 Work shall be done in accordance with the referenced codes, standards and documents listed below, which are an integral part of this specification.

2.1.2 When specified chapters, sections, parts, or paragraphs are listed following a code, industry standard or reference document, only those chapters, sections, parts, or paragraphs of the document are applicable and shall be applied. If a date or revision is not listed, the latest issue, including addenda, at the time of the Request for Quote (RFQ) shall apply. When more than one code, standard or referenced document covers the same topic, the requirements for all must be met with the most stringent governing.

2.2 Codes

UBC 1997	Uniform Building Code
WAC 296-24	Washington Administrative Code General Safety and Health Standards
AISC N690-94	Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities, as tailored in Appendix A
AISC M016-1989	Manual of Steel Construction, Allowable Stress Design, Ninth Edition, as tailored in Appendix B
ASME NQA-1-1989	Quality Assurance Program Requirements for NuclearFacilities
NFPA 70-1999	National Electrical Code

2.3 Industry Standards

2.3.1 American Society for Testing and Materials (ASTM)

ASTM F593	Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs
ASTM F594	Standard Specification for Stainless Steel Nuts

2.3.2 American Society of Mechanical Engineers (ASME)

ASME B31.3 1996	Process Piping
ASME Section V Article 6	Liquid Penetrant Examination
ASME Section V Article 9	Visual Examination
ASME Y14.100	Engineering Drawing Practices
ASME B18.2.1 1981	Square and Hex Bolts and Screws (Inch Series)
ASME B18.2.2 1987	Square and Hex Nuts (Inch Series)
ASME B30.20	Below-the-Hook Lifting Devices

2.4 Engineering Standards

Any additional Engineering Specifications/Standards proposed for use by the Seller shall be reviewed by the Buyer prior to incorporation into the design.

2.5 Reference Documents/Drawings

24590-WTP-3PS-SS90-T0001	Engineering Specification for Seismic Qualification of Seismic Category I/II Equipment and Tanks
24590-WTP-3PS-P000-T0001	Engineering Specification for Piping Material Classes General Description and Summary
24590-WTP-3PS-JQ06-T0003	Engineering Specification for Seismic Qualification of Control and Electrical Systems and Components
24590-WTP-3PS-JQ06-T0005	Engineering Specification for Environmental Qualification of Control and Electrical Systems and Components
24590-WTP-3PS-JQ07-T0001	Engineering Specification for Instrumentation for Package Systems
24590-WTP-3PS-JR00-T0010	Engineering Specification for Liquid Effluent Gamma Monitor - QL
24590-WTP-3PS-JV15-T0001	Engineering Specification for Actuators for On/Off Valves
24590-WTP-3PS-EKP0-T0001	Engineering Specification for Electrical Requirements for Packaged Equipment
24590-WTP-3PS-PS02-T0001	Engineering Specification for Shop Fabrication of Piping
24590-WTP-3PS-G000-T0003	Engineering Specification for Packaging, Handling and Storage Requirements
24590-WTP-3PS-G000-T0001	General Specification for Supplier Quality Assurance Program Requirements
24590-WTP-3PS-G000-TP002	Engineering Specification for Positive Material Identification (PMI)
24590-WTP-DC-ST-01-001	Structural Design Criteria
24590-WTP-3PS-PV00-T0001	Engineering Specification for Technical Supply Conditions for Valves
24590-WTP-3PS-AFPS-T0001	Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment
24590-WTP-PW-P30T-00001	WTP End Prep Detail for Field Butt Welds
24590-WTP-3PS-SS00-T0002	Engineering Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel
24590-WTP-3PS-FB01-T0001	Engineering Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks
RR-C-271D	Federal Specification Chains and Attachments, Welded and Weldless
DOE-RL-92-36	Hanford Site Hoisting and Rigging Manual - Hoists, Jib Cranes, and Monorail Systems
OSHA 29 CFR 1910.179	Occupational Safety and Health Standards Overhead and Gantry Cranes

3 Design Requirements

3.1 Basic Function

To support the use of 'hands on' maintainable equipment for process applications in out-cell areas, the Process Bulges are required to provide confinement structures for the safe operation and maintenance of process equipment such as pumps, valves, instruments and associated equipment. The Process Bulges shall have an expected working life of 40 years. Where specific components cannot meet this requirement they shall be identified and a mechanism for their replacement and/or maintenance shall be incorporated into the design.

3.1.1 Process Pumps

3.1.1.1 The Buyer shall supply all process pumps. The process pumps are vertically mounted centrifugal canned motor type and facilitate top-access maintenance techniques.

3.1.1.2 The Seller shall be responsible for the installation of the pumps including all necessary services, supports, electrical and instrumentation requirements.

3.1.1.3 The pump impeller and motor assembly shall be removable vertically.

3.1.1.4 When indicated on the P&ID the Seller shall furnish the pumps with a cooling water flush line to the motor/bearing assembly. The water flush shall be sacrificial and utilized only where the process fluid is unsuitable for use as the cooling medium.

3.1.1.5 Pump motor housings should be 'potted' to minimize internal fluid hold-up and should be oil free.

3.1.1.6 Power and instrumentation cabling to the pump/motor shall be run in sealed stainless steel conduit through the pump access plate to a terminal box mounted on the pump/motor access plate.

3.1.1.7 Pump supports shall be rigid to minimize pump vibration, deflection, and nozzle loadings.

3.1.1.8 If the pump includes a recirculation cooling water flush line, the line shall be hard piped to the pump, with a removable line from the top of the motor. If a cyclone solids separator is included, it shall be placed to allow an open vertical path for removal of the pump impeller and motor assembly. The cyclone solid separator shall be supported from the side of the Bulge containment.

3.1.2 Process Valve Assemblies

3.1.2.1 Unless otherwise specified in the MR, the Seller shall purchase the valves, extended drive spindles and actuators from the Buyer's valve distributor at the pre-negotiated firm unit prices set up in a blanket Purchase Order (PO). The Buyer will provide the valve distributor and PO number upon issuance of the MR for the Bulge(s).

3.1.2.2 Valves located inside the Process Bulge shall be top accessible valves with extended drive spindles. They shall be operated with either a pneumatic actuator or manually, external to the Bulge confinement. Each drive spindle requires the ability to be locked in place, external to the Bulge.

3.1.2.3 Actuators are pneumatic piston types and supplied complete with solenoid pilot valve, position limit switches, and visual semaphore indication. Actuators shall be Fieldbus interface compatible in accordance with specification 24590-WTP-3PS-JV15-T0001, *Engineering Specification for Actuators for On/Off Control Valves*.

3.1.2.4 All actuator/valve assemblies shall be 'fail closed' type unless otherwise stated on the P&ID.

3.1.2.5 All actuators shall be located externally on the top face of the Bulge. A nameplate shall be placed on top of each actuator to allow identification of the valve from above. Refer to 24590-WTP-3PS-JV15-T0001, *Engineering Specification for Actuator On/Off Valves*, section 7.1, Nameplate, for general mechanical nameplate requirements and attachment details.

3.1.2.6 Manual valves shall have a label attached to the top cap assembly. The label shall identify the valve number and position indication. Nameplate material shall be three-ply laminated plastic with white face, black core. The nameplate size shall be 2 1/2-inch length, 1 inch wide and 1/16-inch thickness. The letter size shall not be smaller than 1/4 inch; font shall be condensed gothic text, and engrave letters through the core with a round or square end cutter; V-shaped are not acceptable and shall be permanently affixed with by means of adhesive and 316 stainless steel screws.

3.1.2.7 Valve tags shall be removed from the valve bodies and attached to the top cap assemblies, external to the Bulge, to prevent them from becoming a sump plugging hazard if they become disconnected from the valve.

3.1.2.8 Extended Drive Shafts connecting the actuators to the valves shall be fitted with rotary seals to maintain confinement, and designed with double universal joints and a telescopic section to allow movement/misalignment of the valves in all three planes. In Bulges with shielding the Extended Drive Shaft shall be designed to prevent a vertical shine path.

3.1.2.9 The Seller shall furnish an air manifold (1" diameter minimum) on the top face of the Process Bulge to supply air to the valve actuators, complete with an air filter and pressure regulator. Each actuator shall be connected to the manifold using 3/8" 316 flexible stainless steel braided tubing and an isolation valve. The manifold and flexible connections shall be sized for the concurrent operation of all actuators. The location of the manifold should be routed so as to minimize the length of connections but must not prevent the removal of any access plate or plug.

3.1.2.10 Each air isolation valve requires a valve nameplate. The nameplate shall have the same number as its corresponding process valve.

3.1.2.11 The Seller shall provide a Valve Inspection Report detailing items inspected, dimensional inspections performed, verification of inspections required by section 5 and 11 of 24590-WTP-3PS-PV00-T0001, *Engineering Specification for Technical Supply Conditions for Valves,* as well as 8.3 of 24590-WTP-3PS-JV15-T0001, *Engineering Specifications for Actuators for On/Off Control Valves* by valve manufacturer (as a minimum). Results shall be documented and submitted in accordance with Section 3 (G-321-V Form) of the MR.

3.1.3 Instrumentation

3.1.3.1 Unless otherwise specified in the MR, the Seller shall purchase the instruments from the Buyer's instrumentation distributor at the pre-negotiated firm unit prices set up in a blanket Purchase Order (PO). The Buyer will provide the instrumentation distributor and PO number upon issuance of the MR for the Bulge(s).

3.1.3.2 Specific instrumentation and control requirements for the Process Bulges shall be in accordance with specification 24590-WTP-3PS-JQ07-T0001, *Engineering Specification for Instrumentation for Package Systems.*

3.1.3.3 Instrumentation signal transmission shall be per the instrumentation datasheet.

3.1.3.4 When the instrument datasheet calls for Foundation Fieldbus, appropriate junction devices and compliant cable products shall be provided. Systems shall consist of 1) Appropriate four or eight spur blocks with stainless steel receptacles Pepperl + Fuchs F2-JBSC-4.FF.7/8S or F2-JBSC-8.FF.7/8S or Buyer approved equal. 2) Spur cable shall be armored type, Pepperl + Fuchs C-V9-G-OR-XXXM-PVC-V9-FF-S or Buyer approved equal. 3.) All unused spur block points shall be capped with a closure cap. Pepperl + Fuchs V9-R-F-COV or Buyer approved equal. The location of the junction should be on the side of the Bulge. Spur cable shall be routed so as to

minimize the length, but should not prevent removal of any access plate.

3.1.3.5 Each spurblock shall have a nameplate attached to the Bulge near the associated spurblock. These nameplates shall identify the spurblock tag number, spurblock terminals, and associated equipment/instrument by terminal connection.

3.1.3.6 Where Foundation Fieldbus is not used, terminals and junction boxes shall be provided for instrument signals in accordance with specification 24590-WTP-3PS-JQ07-T0001, *Engineering Specification for Instrumentation for Package Systems.*

3.1.3.7 ITS instrumentation systems and components qualification shall be in according with specification 24590-WTP-3PS-JQ06-T0005, *Engineering Specification for Environmental Qualification of Control and Electrical Systems and Components.* The Buyer will provide requirements to the Seller with Environmental Qualification Data Sheets (EQDS).

3.1.3.8 Gamma Monitor design shall be in according with specification 24590-WTP-3PS-JR00-T0010, *Engineering Specification for Liquid Effluents Gamma Monitor - QL.*

3.1.4 Electrical

3.1.4.1 All electrical equipment and material, including industrial control panels and cabinets that are assemblies of industrial control devices, shall be suitable for installation and use in conformity with the provisions of NFPA 70-1999. Suitability of equipment shall be evidenced by listing or labeling as a completed assembly by Underwriters Laboratories (UL). Equipment and assemblies not listed or labeled shall be required to bear a UL "Field Evaluated Product" mark. Equipment and materials listed, labeled or field evaluated by other nationally recognized testing laboratories (NRTLs) as recognized by OSHA, may be accepted only after receipt of prior written approval from the Buyer.

3.1.4.2 Refer to specification 24590-WTP-3PS-EKP0-T0001, *Engineering Specification for Electrical Requirements for Packaged Equipment,* for AC voltage requirements.

3.1.4.3 A motor starter and controller shall be integral to the 480V MCC, 13.8/4.16 kV - 480V AC Secondary Unit Substation (Load Center), or the 13.8 kV switchgear. A local controller shall be used if specified. Refer to specification 24590-WTP-3PS-EKP0-T0001, *Engineering Specification for Electrical Requirements for Packaged Equipment,* for general information.

3.1.4.4 Refer to specification 24590-WTP-3PS-EKP0-T0001, *Engineering Specification for Electrical Requirements for Packaged Equipment,* for cable and wiring requirements.

3.1.4.5 Refer to specification 24590-WTP-3PS-EKP0-T0001, *Engineering Specification for Electrical Requirements for Packaged Equipment,* Appendix A, for nameplate requirements for electrical enclosures, equipment, and devices.

3.1.5 Bulge Construction

3.1.5.1 Process Bulges shall generally be comprised of a pipework assembly including pumps, instruments, valves and fittings as required, a confinement assembly, a confinement support structure, and when required, a Maintenance Platform and/or a shielding assembly.

3.1.5.2 Process Bulges shall be furnished with 1" diameter removable inspection plugs to allow access for a 'video-scope'. The plugs shall be located to provide the best access for the viewing of all internal equipment. The number of inspection plugs shall be minimized.

3.2 Performance

3.2.1 Process Bulges shall be designed and fabricated to fulfill the mechanical and process requirements identified on the Data Sheets and drawings identified under section 2 of the MR.

3.2.2 The Seller shall demonstrate that air operated valves complete a full on-off cycle in less than 5 seconds. Refer to 24590-WTP-3PS-JV15-T0001, *Engineering Specification for Actuators for On/Off Valves*, for supplied plant air pressure.

3.2.3 Actuators shall be sized for 80 psig supply pressure.

3.3 Design Conditions

3.3.1 Process Bulge pipework shall be designed in accordance with the Piping Class Sheets identified in the Process Bulge Data Sheet. Refer to specification 24590-WTP-3PS-P000-T0001, *Engineering Specification for Piping Material Classes General Description and Summary* for general requirements. Specifications for individual pipe classes will be provided, as needed, with the MR.

3.3.2 A recommended spare parts list shall be generated for all components requiring maintenance/replacement over a 40 year life.

3.4 Environmental Conditions

3.4.1 The RPP-WTP complex is at approximately 700 feet above sea level.

3.4.2	Atmosphere:	Process Bulge	Operating Position
	Dry-bulb Temperature	140°F max	50-80°F
	Relative Humidity	100% max	85%

3.4.3 Ambient lighting levels for Process Bulge areas will be 30 Lumens/ft^2

3.4.4 Radiation exposure will be as indicated on the Process Bulge Data Sheets and Instrument Data Sheets.

3.4.5 Bulges may be stored outdoors for 12 months prior to installation at ambient extreme temperatures ranging from minus 23 °F dry-bulb to 113 °F dry-bulb and relative humidity of 0 to 100%.

3.5 Mechanical Requirements

Process Bulges shall be designed and fabricated in accordance with the technical documents identified under section 2 of the MR. Variations to the design documents are permitted provided that the Seller's proposals meet the criteria stated herein, are communicated through drawings, and a general description of the proposed variation is reviewed by the Buyer prior to fabrication.

3.5.1 Process Bulge Confinement – General Requirements

3.5.1.1 Process Bulge confinement shall be designed to meet the requirements of AISC N690 – 94, *Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities.*

3.5.1.2 The Process Bulge confinement shall be fabricated using fully radiused (1" internal radius) corners along side and bottom edges to assist decontamination. Confinement plate thickness shall be as specified on the Process Bulge Data Sheet.

3.5.1.3 The confinement shall incorporate removable roof plates bolted to a roof support structure using 3/8" UNC stainless steel welded stud bolts and 1/8" thick flat elastomer gaskets. The roof plates shall provide gross access to the Bulge internal systems.

3.5.1.4 The roof plates support structure shall be fabricated from 4"x3" stainless steel angle section as a minimum.

3.5.1.5 The confinement roof structure shall be designed to support the static and dynamic loads including seismic loads from the valve actuator assemblies.

3.5.1.6 All confinement welds shall be continuous.

3.5.1.7 The base of the confinement shall slope in all directions to a fabricated drain. Minimum design requirements for the drain shall be a single strainer, designed to be manually removable from the exterior of the Bulge. When noted on the Process Bulge Datasheet, the drain shall be fitted with a primary and a secondary strainer and level instrumentation. The primary strainer shall incorporate a weir in its design to enable leak detection and level instrument testing. The primary strainer assembly shall be operable from the outside of the Bulge via an extended drive spindle.

3.5.1.8 As a minimum, the floor of the Bulge shall have a fall of 1:100 and the drain shall be located at the lowest point.

3.5.1.9 The base shall be adequately supported externally to prevent liquid traps caused by distortion during welding.

3.5.1.10 The confinement's external and internal surface finish shall be equal or better than that specified on the Process Bulge Data Sheet. All proposed surface finishes must be to a standard approved by the Buyer's inspector.

3.5.1.11 The confinement shall be designed for an internal negative pressure of 12 inches water gauge and a positive internal pressure equal to that when completely filled with water. There shall be no internal stiffeners unless approved by the Buyer.

3.5.1.12 Wash rings/spray nozzles shall be installed within the Bulge confinement at a high level to facilitate decontamination of the Bulge and pipework. The Seller shall determine the number and position of the wash rings. If spray nozzles are used, threaded connections are allowed at the connection of the nozzle and the pipe. Refer to the Process Bulge Data Sheet for pressure and flow limits supplied to the wash ring/spray nozzle.

3.5.1.13 A HEPA filter connection shall be located above the maximum height of the Bulge confinement.

3.5.2 Process Bulge Support Frame

3.5.2.1 The Bulge support frame shall be designed to support the confinement structure completely filled with water and, when no shielding is required, a Maintenance Platform and column davits as required.

3.5.2.2 The confinement structure shall be installed within a Bulge support frame fabricated using a minimum of 4" x 2" heavy gauge stainless steel rectangular hollow section.

3.5.2.3 The confinement shall incorporate stiffening pads at all frame connection points and connection shall be accomplished using continuous fillet welds.

3.5.2.4 The support frame shall incorporate leveling and hold-down features to secure the Bulge to the building structure, and to satisfy the requirements noted in section 3.6.1. The leveling and hold-down features shall conform to the Buyer's embed plate location drawings, provided in section 2 of the MR.

3.5.2.5 The support frame shall be designed such as to eliminate open section ends or any open ends shall be closed with fully welded end plates.

3.5.2.6 The support frame will be welded to the facility embeds by Buyer. Seller shall specify weld details to satisfy the seismic requirements in section 3.6.1 of this specification.

3.5.3 Process Bulge Shielding

3.5.3.1 Where indicated on the Process Bulge Data Sheets the Bulges shall be fitted with carbon steel shielding plates to the specified thickness.

3.5.3.2 Shielding structures shall be completely self-supporting and shall be constructed using a layered methodology, as required, with each layer of shielding being securely bolted and doweled to its predecessor. The initial layer of shielding plates shall be bolted to the Bulge support frame to ensure positional accuracy of shielding access plugs. 180° and 90° butt joints between adjacent shielding plates shall be alternately overlapped to maintain the required shielding thickness.

3.5.3.3 Shielding structures shall be designed to support the Maintenance Platform, and column davits, when required.

3.5.3.4 Access plugs shall be provided in the roof shielding plates with and instrument access.

3.5.3.5 Access plugs shall be designed to be locked in position.

3.5.3.6 When specified on the Process Bulge Data Sheet internal shielding plates shall be provided between adjacent pumps (when more than one pump is installed) and between pump and valve sections of the Process Bulge.

3.5.3.7 The maximum weight for a single shielding plate or plug required to be removable for maintenance operations shall not exceed 500 pounds. The minimum thickness of the shielding plate shall not be less than 1".

3.5.3.8 The maximum weight for a single shielding plate not routinely removed for maintenance operations shall not exceed 2,500 pounds. The minimum thickness of the shielding plate shall not be less than 1".

3.5.3.9 Each plate shall be uniquely identified using 1/2" high stamped characters to assist assembly and have suitable attachment points for lifting eyes. A sequentially numbered assembly map shall also be provided to assist in installing the shielding plates on site.

3.5.3.10 Where extended drive spindles pass through shielding plates the drive spindles shall be designed such that shielding integrity is not compromised.

3.5.3.11 Shielding will be welded to the facility embeds by Buyer. Seller shall specify weld details to satisfy the seismic requirements in the section 3.6.1 of this specification.

3.5.4 Maintenance Platforms

3.5.4.1 The Maintenance Platforms shall be designed to meet the requirements set forth in WAC 296-24, *General Safety and Health Standards,* Buyer specification 24590-WTP-DC-ST-01-001, *Structural Design Criteria,* and all other applicable codes and standards listed in section 2 of this specification.

3.5.4.2 The Maintenance Platform shall have a grid of removable grating sections to allow access to the Bulge below. Each removable section shall be positioned to facilitate maintenance of the Bulge equipment.

3.5.4.3 The Maintenance Platforms shall include guardrails. The guardrails shall be designed per WAC 296-24-750.

3.5.4.4 All openings in the guardrail shall have a safety gate or chain designed per the requirements of WAC 296-24-750.

3.5.4.5 The Maintenance Platform shall be designed in sections and shall be removable. The maximum weight of one section shall not exceed 2,500 pounds. The sections shall be bolted together and bolted to the supporting frame or shielding.

3.5.4.6 The Maintenance Platform shall be bolted to either the external layer of shielding, or the Bulge support frame if no shielding is required.

3.5.4.7 A fixed ladder shall be provided to allow access onto the Maintenance Platform. The ladder shall meet the requirements set forth in WAC 296-24-810. Use a concentrated load of 300 pounds for the ladder design.

3.5.5 Lifting Points

3.5.5.1 Bulges shall not be lifted with the shielding structure attached.

3.5.5.2 External pipework and fittings shall not be used for lifting.

3.5.5.3 Lifting points shall accept standard lifting equipment; chain blocks, wire rope or braiding shall not be permitted. If applicable, the lifting lugs shall be designed to accept Crosby shackles or equivalent meeting Federal Specification RR-C-271D.

3.5.5.4 All lifting attachments shall have either a safety factor of 3 based on the material yield strength, or 5 based on the material ultimate strength, whichever is most conservative. The lifting points shall have a label clearly identifying its unique number and SWL.

3.5.5.5 All lifting points shall be proof tested in situ and provided with test and examination certificates.

3.5.5.6 Items of equipment having eyebolts fitted, or having lifting points identified, shall be such that the point of lift is over the center of gravity of the equipment. Fitted eyebolts shall be removable for examination.

3.5.5.7 Seller shall provide any special designed lifting equipment not available from a commercial source. Such equipment may include, but is not limited to, rigging devices, such as spreader beams, structural lifting devices, strongbacks, and yokes. Rigging devices shall be designed, tested, and tagged in accordance with the applicable requirements of ASME B30.20.

3.5.6 Fasteners

3.5.6.1 UNC series threads shall be used for all screw fasteners and components with mating threads. This thread form shall be used throughout unless otherwise specified on equipment datasheets.

3.5.6.2 Steel bolts, screws, and nuts shall be in accordance with ASME B18.2.1-1981 & B18.2.2-1987.

3.5.6.3 Stainless steel bolts and cap screws shall be used except where repeated assembly and disassembly are required. In that case bolts and cap screws shall be fabricated from 'Nitronic 60' or equivalent to prevent galling. Stainless steel nuts shall be of type 300 stainless steel in accordance with ASTM F594, unless otherwise stated.

3.5.6.4 Welded Stud Connectors: Capacitor discharge stainless steel weld studs shall be ASTM F593, with the following minimum mechanical properties:

a. Tensile Strength:	95,000 psi
b. Yield Strength:	60,000 psi
c. Elongation:	20% in 4 diameters

3.5.6.5 The use of hexagon headed bolts with sufficient clearance for socket wrenches is preferred. The range of bolt sizes shall be kept to a minimum in order to limit the number of tools required.

3.5.6.6 High tensile steel fasteners shall not be employed in the construction of lifting equipment.

3.5.6.7 Bolts and set screws in rotating or reciprocating components, or where subject to vibration, shall be locked by a split pin, tab washer or wire, subject to prior approval of the method by the Buyer. Set screws used for locking purposes do not require locking. Washers, plain or spring, shall not be used unless specifically called for on drawings.

3.5.6.8 Sufficient envelope clearances are required around the bolt head for sockets.

3.5.7 Pipework

3.5.7.1 All piping shall be designed to meet the requirements of ASME B31.3 1996.

3.5.7.2 All pipework systems shall be self-draining with no liquid traps. Direction of slope shall be as indicated on the P&ID. Unless otherwise specified on the Process Bulge Data Sheet the normal pipe slope shall be 1:120.

3.5.7.3 All materials for pumps, pipework, valves and fittings shall be in accordance with the P&ID and Process Bulge Data Sheet and fabricated using 100% butt-welded construction unless otherwise stated.

3.5.7.4 Radiographic examination shall be carried out on all primary confinement pipework butt-welds using 100% radiography for QL components or 20% radiography for all other quality levels.

3.5.7.5 Where pipework passes through shielding plates these penetrations shall be positioned such that shielding integrity is not compromised e.g. in areas that have no direct shine-path to the radiological source.

3.5.8 Wall Penetrations

3.5.8.1 All process pipework leaving the Bulge and penetrating a wall shall be contained within a sleeve pipe. This sleeve pipe will provide secondary containment for the primary pipe. Refer to Table 1 for

associated sleeve sizes. The Bulge drain, and ventilation line (when required), do not require a sleeve pipe.

3.5.8.2 For pipes sloping into the Bulges, the sleeve pipe shall penetrate the Bulge confinement. An anchor washer shall be welded to the high end of the sleeve. The low-end of the sleeve is open to the Bulge confinement, allowing the process pipe to move freely. See Figure 1.

3.5.8.3 For pipe sloping away from the Bulge confinement, the sleeve pipe shall be welded to the external side of the Bulge confinement. The low-end of the sleeve is open in the black cell, allowing the process pipe to move freely. See Figure 1.

3.5.8.4 The sleeve pipe and seal washer material shall be equal to that used for the Bulge confinement.

3.5.9 Floor Penetrations

3.5.9.1 All process pipework leaving the Bulge and penetrating a floor shall be contained within a sleeve pipe. The sleeve pipe will provide secondary confinement for the primary pipe. Refer to Table 1 for associated sleeve sizes. The Bulge drain, and ventilation line (when required), do not require a sleeve pipe See Figure 2.

3.5.9.2 The sleeve pipes shall be welded to the external side of Bulge confinement plate. The sleeve pipe material shall be equal to that used for the Bulge confinement.

3.5.9.3 The process Bulge skirt shall be welded to Bulge confinement, supplied by the Seller.

3.5.9.4 The Bulge foot plates (1/2" minimum thickness) shall be welded to the embed plates at the Bulge frame locations (one at each corner and other midpoints as determined by the Seller) by the Buyer after installation. The Bulge foot plate material shall be equal to that used for the Bulge frame. Seller shall specify weld details to satisfy the seismic requirements in section 3.6.1 of this specification.

3.5.10 Column Davits

3.5.10.1 All column davits shall be designed to operate in the space envelope indicated in the Process Bulge Data Sheet. The boom and mast dimensions shall be determined by the Seller.

3.5.10.2 The column davits shall meet the requirements of DOE-RL-92-36, *Hanford Site Hoisting and Rigging Manual Hoists, Jib Cranes, and Monorail Systems*, and OSHA 29 CFR 1910.179 *Occupational Safety and Health Standards Overhead and Gantry Cranes*.

3.5.10.3 The column davits shall meet the performance and material requirements identified in the Process Bulge Data Sheet.

3.5.10.4 The column davits shall be manufacture's standard products, having minimum capacity 500 lbs, unless otherwise specified in the Process Bulge Data Sheet.

3.5.10.5 Seller shall design the column davits to lift valves, actuators, pumps, top cover plates, shielding plugs, gratings, etc. for maintenance operations.

3.5.10.6 The column davits shall be supported by Process Bulge support frame. The thrust and pull forces under load shall be considered.

3.5.10.7 The column davits shall be design to be interchangeable between as many Process Bulges as reasonable. The quantity of the required column davits is specified in section 2 of the MR.

3.5.10.8 The location and the number of column davit supports shall be determined by the Seller, unless otherwise specified in Process Bulge Data Sheet.

3.6 Loadings

3.6.1 Seismic

3.6.1.1 The Seismic Category is identified on the Process Bulge Data Sheet.

3.6.1.2 Seismic Category (SC) I & II Equipment design shall be in accordance with specification 24590-WTP-3PS-SS90-T0001, *Engineering Specification for Seismic Qualification of Seismic Category I/II Equipment and Tanks* , 24590-WTP-DC-ST-01-001, *Structural Design Criteria*, and AISC N690-94.

3.6.1.3 For Seismic Category (SC) III & IV Equipment seismic design shall be in accordance with 24590-WTP-3PS-FB01-T0001, *Engineering Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks*, 24590-WTP-DC-ST-01-001, *Structural Design Criteria*, UBC 1997 zone 2B requirements and AISC M016-1989.

3.6.1.4 Where required the Buyer will provide seismic data to enable the Seller to carry out a dynamic seismic analysis for each Process Bulge. Analyses shall be carried out for the pipework (including where applicable pumps with integral motors), confinement, support and shielding systems.

3.6.1.5 Where the ITS instrumentation system and component data sheets indicate SC-I for functional qualification, components shall be designed in according with specification 24590-WTP-3PS-JQ06-

T0003, *Engineering Specification for Seismic Qualification of Control and Electrical Systems and Components.*

3.6.2 Operation

3.6.2.1 All pumps, pipework, valves and fittings shall be adequately supported so as to minimize vibration, deflection and nozzle loadings.

3.6.2.2 Roof plate structures must be adequately supported to accommodate valve actuator static and dynamic loads.

3.6.3 Maintenance

3.6.3.1 During valve maintenance operations access will be required onto the shielding and roof plate structures. Therefore in addition to the normal operational loads these structures shall be designed to support personnel access loads of 500 lbs

3.6.4 Nozzle Load

3.6.4.1 The Seller shall design the Bulge to account for nozzle loading in the pipework. The loads listed in Table 2 are the minimum design loads acting on the Bulges from facility installed piping. The Seller shall determine the internal pipework loads and add these loads to the loads listed in Table 2 before calculating the nozzle load. Normal load combinations to be considered shall be: Weight + Thermal. Occasional loading combinations to be considered shall be: Weight + Thermal + Seismic I, II, III and IV.

3.6.4.2 Anchor points for wall penetrating pipework shall be the anchor washer, for pipes sloping into the Bulge confinement, and the Bulge confinement plate, for the pipes sloping away from the Bulge confinement. Refer to Figure 1.

3.6.4.3 Anchor points for floor penetrating pipework shall be the Bulge confinement.

3.6.4.4 When required, the Seller shall either design suitable reinforcement pads in the confinement plates or increase the confinement thickness.

3.7 Accessibility and Maintenance

3.7.1 Equipment that is expected to require maintenance, calibration or replacement e.g. pumps/motors, valves and instruments shall be located in areas of the Bulge that offer the best access; this will usually be the front and sides of the Bulge.

3.7.2 The location of equipment within the Bulge shall be such that any items requiring lifting during maintenance can be accessed with the column davits supplied by the Seller.

3.7.3 The Bulge roof plates and shielding top plates shall incorporate equipment access ports and shielding plugs respectively for the maintenance of pumps/motors, valves and instruments.

3.7.4 Each access port shall be contained within a bagging ring or tenting flange to facilitate bagging/tenting techniques to maintain confinement during maintenance.

3.7.5 Where indicated on the Process Bulge Data Sheet, pumps shall be fitted with extended bolts shall enable the pump motor/impeller unit to be unbolted from the pump casing without breaking confinement.

3.7.6 The centerline of the closest piece of internal equipment shall be a minimum of 15" from the cell wall.

4 Materials

4.1 Positive Material Identification

4.1.1 Refer to specification 24590-WTP-3PS-G000-TP002, *Engineering Specification for Positive Material Identification (PMI)* for Positive Material Identification requirements.

4.2 Construction

4.2.1 Seller shall provide Material Safety Data Sheets (MSDS) for all coatings and materials used in the construction of the Process Bulge.

4.2.2 Process fluids may contain caustic solutions (up to pH-14) but nitric acid solutions may also be used for decontamination of the pipework, pump, valves, and instruments/instrument tubing both inside and outside of the pipework assembly. All materials selected by the Seller shall be suitably corrosion and radiation resistant for the specified service.

4.2.3 Materials shall be as specified in the Process Bulge Data Sheet and Instrument Data Sheets. Any proposed substitutes or concessions shall be agreed with the Buyer prior to procurement or incorporation into the work.

4.2.4 All materials shall be new and comply with this specification and relevant standards.

4.2.5 All flanges and pipe fittings shall be welded-neck and long radius types respectively unless otherwise specified and shall conform to ANSI standards.

4.2.6 No threaded flanges or fittings shall be used for process pipework.

4.2.7 Material certificates shall be supplied for all stainless steel pipe, plate, sheet and sections. Materials without specified mill test certificates must be approved by the Buyer prior to ordering, however additional material analysis may be required, either by wet or dry methods, to verify compliance with test certification or to determine material composition. Where such testing is required, any additional costs shall be the responsibility of the Seller.

4.2.8 The Seller shall have and implement provisions to ensure that materials used or supplied are not counterfeit or of suspect origin. Particular attention should be given to high strength bolting material (grade 5 strength equivalent and higher) and pipe fittings.

4.3 Prohibited Materials

4.3.1 No asbestos containing materials, bronze, copper, lead, zinc, mercury, tin, antimony, cadmium, or other low melting point metals, PCBs or compounds of lead base paints or lubricants containing lithium or boron shall be used. 'Teflon' or compounds thereof must be qualified for use with the radiation levels specified on the Process Bulge Data Sheet.

4.4 Special Requirements

4.4.1 Where special requirements or restrictions are to be applied to the established items, these will be specified on the Process Bulge Data Sheets or in accompanying contractual documentation. In the absence of such instructions, the manufacturer's standard product shall be supplied as specified or as approved by the Buyer.

4.5 Storage of Special Materials (e.g., stainless steel) prior to work

4.5.1 Stainless steel is susceptible to corrosion caused by the contact and interaction with incompatible materials. All stainless steel material shall be stored in separate areas away from other materials.

4.5.2 The Seller shall submit Material Control Procedures for controlling, handling, storage and traceability of materials such as weld rods, production items or Government Owned materials.

5 Fabrication

The Seller shall obtain written Final Design approval from the Buyer prior to the start of fabrication activities.

5.1 General Requirements

5.1.1 For all piping, refer to Specification 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*. All welding procedures must be pre-approved by the Buyer prior to the start of fabrication.

5.1.2 Structural welding procedures shall be carried out in accordance with AISC N690 – 94, *Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities*, and specification 24590-WTP-3PS-SS00-T0002, *Engineering Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel*. All welding procedures must be pre-approved by the Buyer prior to start of fabrication.

5.2 Assembly

5.2.1 Flatness of the completed Bulge confinements shall be 1/8" per foot, with no greater than 3/16" over the entire length of the Bulge except for areas around cutouts. Areas around cutouts shall be flat within 1/16" per foot.

5.2.2 Cutout locations shall be within +/- 1/8" and cutout size shall be within +/- 1/16" except where noted on the Buyer sketches.

5.2.3 All Bulge confinement corners shall have a 1" +/- 1/16" internal radius.

5.2.4 The minimum material thickness for Bulge confinements shall be in accordance with the Process Bulge Data Sheet.

5.2.5 The Process Bulges shall have edges that are both smooth and not sharp to the touch.

5.2.6 The method of fabrication shall minimize the number and amount of seams, overlaps, or other discontinuities, which could trap radioactive contamination.

5.3 Tolerances

Manufacturing and fabrication tolerances for all equipment, accessories, and components shall conform to the following requirements:

5.3.1 Machined Components:

5.3.1.1 Machined surfaces shall be aligned within +/- 0.5 degrees of design conditions.

5.3.1.2 THICKNESS: Thickness tolerances shall conform to the requirements of the referenced commercial standard. In the absence of such criteria, allowable thickness shall be plus 0.010 inches, minus 0.005 inches.

5.3.1.3 DIMENSIONS:

a) 0-4 inch	+/- 0.010 inch.
b) 4 inch – 36 inch	+/- 0.02 inch.
c) 3 feet – 10 feet	+/- 0.03 inch.
d) 10 feet – 20 feet	+/- 0.06 inch.
e) Over 20 feet	+/- 0.13 inch

5.3.2 Fabricated Components:

5.3.2.1 Nozzle and flange alignment shall be within +/- 0.5 degrees of design conditions.

5.3.2.2 Rotating shaft alignment shall be specified by the Seller to minimize valve turning torque at the actuator.

5.3.2.3 Thickness tolerances shall conform to the requirements of the referenced commercial standard applicable to the material being fabricated. When plate thicknesses are specified herein or in other supporting documentation they shall be considered to mean minimum thickness.

5.3.2.4 DIMENSIONS:

a) 0-4 inch	+/- 0.020 inch.
b) 4 inch – 36 inch	+/- 0.04 inch.
c) 3 feet – 10 feet	+/- 0.06 inch.
d) 10 feet – 20 feet	+/- 0.13 inch.
e) Over 20 feet	+/- 0.25 inch

5.3.2.5 Weld joint preparation, for field welds, shall be in accordance with drawing 24590-WTP-PW-P30T-00001, *WTP End Prep Detail for Field Butt Welds*.

6 Tests and Inspections

6.1 Non-Destructive Examinations

6.1.1 Unless otherwise specified all welds shall be inspected in accordance with the requirements outlined in the reference 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*. All primary pipework for QL components shall be inspected in accordance with Appendix A of 24590-WTP-3PS-PS02-T0001.

6.2 Personnel Qualifications

6.2.1 Refer to specification 24590-WTP-3PS-PS02-T0001, Engineering Specification for Shop Fabrication of Piping.

6.3 Shop Tests

6.3.1 General Requirements

6.3.1.1 The Process Bulge piping shall be hydrostatically tested in accordance with ASME B31.3 1996. The Seller shall submit hydrostatic test procedures to Buyer for review and permission to proceed, prior to commencement of testing. The pipework shall be dried after testing.

6.3.1.2 The Process Bulge confinement shall be flooded with test water. After a period of 12 hours there shall be no visible sign of leakage. The confinement shall be dried after testing.

6.3.1.3 Test water used for hydrostatic testing shall be tested for chlorides. The chloride content of the test medium shall not exceed 50 ppm and the water temperature shall not exceed 120°F.

6.3.1.4 Where installed, the Seller shall demonstrate a full removal and replacement operation for pumps, valves, and instruments utilizing the tent or bag-in/bag-out method. The Seller shall provide maintenance manual(s) detailing procedures for removal and replacement of valves, instrumentation, and pumps. Spare o-rings, valve seats, and seals shall be ordered to replace original maintainable parts used in the removal/replacement demonstration. The Seller shall demonstrate the assembly and disassembly of the shielding.

6.3.1.5 The Seller shall demonstrate the correct operation of all valves.

6.3.1.6 Seller shall submit procedures for and perform a wiring insulation test and continuity check. Refer to 24590-WTP-3PS-EKP0-T0001, *Engineering Specification for Electrical Requirements for Packaged Equipment,* section 7.1 for additional testing requirements. Results of the test and check shall be included in the required documentation packages.

6.3.1.7 Seller shall demonstrate all internal equipment and surfaces are thoroughly washed by the spray rings/nozzles.

6.3.1.8 Seller shall demonstrate operation, assembly and disassembly of the column davits.

6.3.2 Surface Finish Inspection

6.3.2.1 The Seller shall develop and implement a procedure for visually inspecting the surface finish of each manufactured item. The inspections shall be performed after completion of all fabrication, cleaning, and testing, and just prior to final packaging.

6.3.2.2 Inspection of weld surface finishes, shall confirm that design requirements listed on the Process Bulge Datasheet have been met.

6.3.2.3 Following inspection, the Seller shall document acceptance of surface finishes.

6.3.3 **Visual Weld Inspection**

6.3.3.1 The Seller shall develop and implement a procedure to perform visual weld inspections (visual tests, VT) to inspect each weld. The inspection for piping shall be developed in accordance with ASME B31.3 - 1996, and shall include inspection materials and acceptance criteria. The remaining VT shall be developed in accordance with ASME Section V, Article 9. The visual weld inspection procedure shall be submitted to the Buyer for review and approval, prior to the inspection. Surface porosity and undercutting is not allowed.

6.3.3.2 The Seller shall prepare a visual weld inspection report for each fabricated item, which records inspection results, the date and time of inspection, and signatures of certified inspection personnel performing the inspection.

6.3.3.3 The visual weld inspection reports shall be included in the required documentation packages.

6.3.3.4 The Seller shall summarize the VT results in the weld map report for each item.

6.3.3.5 The Seller shall notify the Buyer in advance of inspection. The Buyer may send representatives to witness or perform an independent inspection.

6.3.4 Liquid Penetrant Test

6.3.4.1 The Seller shall develop and implement a procedure to perform a liquid penetrant test (PT) to inspect each weld, excluding handrails. PT testing for piping shall be in accordance with ASME B31.3 – 1996. All Remaining PT shall be developed in accordance with ASME Section V Article 6, and shall include inspection materials, dwell time for dye and developer, and acceptance criteria. The liquid penetrant procedure shall be submitted to the Buyer for review and acceptance, prior to testing.

6.3.4.2 Acceptance criteria for PT inspection shall be in accordance with ASME B31.3 - 1996. Surface porosity and undercutting is not allowed.

6.3.4.3 The Seller shall prepare a liquid penetrant test report for each weld connection on each fabricated item, which will record PT inspection results, the weld number, the date and time of inspection, and signatures of the certified inspection personnel performing the test.

6.3.4.4 The Seller shall include the liquid penetrant test reports in the required documentation packages.

6.3.4.5 The Seller shall summarize the PT results in the weld map report for each item.

6.3.4.6 The Seller shall notify the Buyer in advance of the test. The Buyer may send representatives to witness or perform an independent test.

6.3.5 Radiography

6.3.5.1 The Seller shall develop and implement a procedure to perform radiographic weld examinations of piping butt-welds as specified in 3.5.7.4. The inspection shall be developed in accordance with ASME B31.3-1996, and shall include inspection materials and acceptance criteria. The weld radiography procedure shall be submitted to the Buyer for review and approval, prior to performing the radiographic examinations.

6.3.5.2 The Seller shall prepare a weld inspection report for fabricated piping systems, which records inspection results, the date and time of the inspection, and signatures of certified personnel performing the inspection.

6.3.5.3 The weld inspection report shall be included in the required documentation packages along with the exposed film, a copy of the technique and the reader sheets. The film must be suitably packaged to preclude moisture and handling damage.

6.3.5.4 The Seller shall summarize the radiography results in the weld map report for each item.

6.3.5.5 The Seller shall notify the Buyer in advance of inspection. The Buyer may send representatives to witness or perform an independent inspection.

6.3.6 Final Inspection

6.3.6.1 The Seller shall develop and implement a procedure for final inspection of each fabricated item. The inspections shall be performed after completion of all fabrication, cleaning, and testing, and just prior to final packaging.

6.3.6.2 The Seller shall inspect all surfaces for contamination. Visible evidence of contamination is not acceptable.

6.3.6.3 The Seller shall prepare a final inspection report for each item, which documents the results of the final inspection. The Seller shall include the final inspection report in the documentation package for each piece.

6.4 Control of Measurement and Test Equipment

6.4.1 Testing shall be performed using calibrated equipment when required. The equipment shall be calibrated against certified measurement standards, having known valid relationships to national standards, at established intervals to ensure accuracy.

6.4.2 The Seller shall maintain records and mark equipment to show calibration status.

6.4.3 The Seller shall notify the Buyer when M&TE are found to be out of calibration after being used for inspection purposes, in compliance with this specification.

6.5 Inspection and Test Status

The Seller shall maintain a positive system for identifying inspection and testing status of items and systems.

6.6 Control of Nonconforming Items

The Seller shall provide a method of notifying the Buyer of fabrication items and activities, which do not conform to requirements.

7 Preparation for Shipment

7.1 General Requirements

7.1.1 Refer to section 7 of the Material Requisition for general requirements and Specification 24590-WTP-3PS-G000-T0003, *Engineering Specification for Packaging, Handling, and Storage Requirements.*

7.2 Cleanliness

7.2.1 Refer to 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping* for general requirements.

7.3 Painting

7.3.1 All ferrous surfaces other than corrosion resistant steel and finished machined mating surfaces shall be prepared and painted by the Seller in accordance with the paint manufacturer's instructions. Refer to specification 24590-WTP-3PS-AFPS-T0001, *Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment* for painting requirements.

7.4 Tagging

7.4.1 A stainless steel nameplate containing the following information shall be rigidly attached to each Bulge. The nameplate shall be located in a prominent position for ease of visibility. The information shall be stamped or etched using 1/2" high characters. The nameplate shall include the following information, minimum:

Seller's Name/Address/Phone Number
Date of Manufacture
Buyer's Purchase Order Number
Seller's Contract Number
Plant Item Number
Weight of Assembly

7.4.2 When shipping loose bolting material, both QL and CM shall be placed in separate containers (box, bag). The container shall be marked with the Buyer Purchase Order Number, Plant Item Number, and Bill of Material item number to facilitate material control and assembly.

7.4.3 Each column davit shall be tagged with a permanent stainless steel tag indicating for which Bulges it was designed.

7.5 Packaging

7.5.1 Refer to 24590-WTP-3PS-G000-T0003, Engineering Specification for Packaging, Handling and Storage Requirements for general requirements.

7.6 Documentation

7.6.1 Seller shall ensure that appropriate documentation is prepared and, if required, signed by the appropriate person(s). The shipping documentation shall accurately reflect specific traceability to the items being shipped.

7.6.2 Seller shall ensure that appropriate documentation is prepared for the Process Bulges. At a minimum, documentation shall include the following information, as applicable:

- Manufacturer name, model number, and serial number
- Plant Item Number

7.7 Shipping Instructions

Shipping shall be conducted in accordance with Buyer specification 24590-WTP-3PS-G000-T0003, *Engineering Specification for Packaging, Handling and Storage Requirements.*

7.7.1 Process Bulges shall be shipped completely assembled. When required, shielding, Maintenance Platforms, and ladders shall be shipped separately.

7.7.2 Weatherproof shipping lists (two per packaged item) shall be prepared and submitted, and shall clearly identify the contents of each package sent to the Buyer. All submittals and shipping boxes shall be identified with the Buyer's PO number.

7.7.3 Seller shall provide a complete identification and location of temporary material contained within the equipment for shipment, handling, or storage that must be removed prior to commissioning (e.g., shipping blocks, glove bags, components shipped inside larger sections, etc.). In addition, the Seller shall provide instructions for the removal of temporary materials, as required.

7.7.4 The Process Bulges shall be mounted on skids, in crates, or in boxes, as suited for the intended method of transport. Lifting weight shall be clearly marked on both the equipment and its shipping documents.

8 Quality Assurance

8.1 General Requirements

The Quality Level will be identified on the Process Bulge Data Sheet and on the QA Data Sheet issued with the MR. Refer to section 9 of the Material Requisition for general requirements, and Specification 24590-WTP-3PS-G000-T0001, *General Specification for Supplier Quality Assurance Program Requirements.*

8.2 Quality (Q) Related Components

8.2.1 Seller shall have in place a QA program meeting the requirements of NQA-1 (1989), marked as applicable in the Supplier Quality Assurance Program Requirements Data Sheet attached to the MR, and Specification 24590-WTP-3PS-G000-T0001, *General Specification for Supplier Quality Assurance Program Requirements.*

8.2.2 The successful bidder must pass a pre-award survey by the Buyer. Seller shall demonstrate that its quality program is in compliance with the procurement quality requirements listed in the Supplier Quality Assurance Program Requirements Data Sheet. The Seller shall allow the Buyer, Buyer's Representative, and DOE access to their facility and records pertaining to this PO for the purpose of QA audits and surveillance at mutually agreed times.

8.2.3 All items shall be manufactured in accordance with the Seller's Quality Assurance Program that meets the requirements of NQA-1 (1989), and has been previously evaluated and accepted by the RPP-WTP QA organization.

8.2.4 Seller shall submit their QA program and work plan to the Buyer for review prior to commencement of work. The plan shall include documents and procedures to implement work and include a matrix of essential QA elements cross referenced with documents/procedures.

9 Configuration Management

Equipment and/or components covered by this specification are identified with Plant Item Numbers, shown on the data sheets included in section 2 of the MR. Bulges shall be identified in accordance with Tagging in section 7.4 of this specification.

10 Documentation and Submittals

10.1 General

10.1.1 Seller shall submit to the Buyer all detailed designs, documentation, procedures, instructions, calculations, analyses, manufacturer's data, inspection reports, test reports, certifications, certificates, manuals, MSDS, and drawings required per this specification, the applicable codes, standards, and reference documents in Section 2 of this specification, and the MR.

10.1.2 Seller shall submit to Buyer Engineering and Quality Verification documents in the forms and quantities shown in Form G-321-E, *Engineering Document Requirements,* and Form G-321-V, *Quality Verification Document Requirements* attached to the MR.

10.1.3 Seller shall submit a report identifying any deviations and/or conflicts per Section 2 of the MR to the Buyer for review.

10.1.4 All documentation submittal packages shall have a documentation inventory sheet attached, listing all documents and the number of pages.

10.1.5 All detailed designs, drawings, supporting calculations, supporting analysis, supporting models, procedures, instructions, manufacturer data, operations manuals, and maintenance manuals shall be issued to the Buyer for review prior to the manufacture of the Process Bulges, special tools, and/or purchase of special tools and gaskets.

10.1.6 Seller shall submit storage requirements and instructions for Buyer's review. Documentation shall include maintenance requirements for the equipment and its components while in storage.

10.1.7 Data sheets in section 2 of the MR shall be marked-up by the Seller and submitted to the Buyer for the review with the detailed design. Seller shall fill in all of the information that is marked as "To be determined by the vendor" and mark-up actual overall Process Bulge dimensions based on the detailed design.

10.1.8 Seller shall provide all operations manuals, maintenance manuals, and spare parts lists for Process Bulges and components, as applicable.

10.2 30% Design Review

10.2.1 Seller shall conduct a 30% design review with the Buyer. Seller shall submit all drawings, procedures, calculations, analysis, and supplementary information necessary to conduct the 30% design review to the Buyer for review.

10.2.2 Finalized outline dimensions for the Process Bulges shall be included in the 30% design review. Finalized dimensions shall, at a minimum, include the following:

- dimensioned layout drawings of the Process Bulge, shielding and Maintenance Platform
- pipe slopes and nozzle locations
- platform configuration and attachments, ladder location, and openings in the platform guardrails
- penetration in walls/floor details
- volume of the internal pipework
- weight of the Process Bulge including shielding and Maintenance Platform, where required
- anchor requirements (anchor size, location, layout, etc.)
- completed Buyer supplied Mechanical Data Sheets, Electrical Data Sheets, and Instrument Data Sheets, as applicable

- preliminary maintenance procedure, including bag-in/bag-out procedure.

10.3 60% Design Review

10.3.1 Seller shall conduct a 60% design review with the Buyer. Seller shall submit all drawings, procedures, calculations, analyses, and supplementary information necessary to conduct the 60% design review to the Buyer for review including as a minimum:

- equipment assembly/arrangement drawings
- shop detail drawings with sufficient detail to facilitate fabrication, manufacture, or installation. This includes a complete Bill of Material (BOM), internal piping details, cross-sectional details, structural details, and anchor details
- wiring diagrams including schematic diagrams and interconnecting wiring diagrams for electrical/instrumentation requirements
- instrument air schematic diagrams
- engineering calculations and analyses (seismic and nozzle loads).

10.4 90% Design Review

10.4.1 Seller shall conduct a 90% design review with the Buyer. Seller shall submit all drawings, procedures, calculations, analyses, and information necessary to conduct a 90% design review to the Buyer for review.

10.5 Final Design Review

10.5.1 The Seller shall provide a final design report including all design documents, manuals, and drawings that are required by this specification.

10.6 Drawings

10.6.1 All drawings shall be produced per the drawing practices set forth in ASME Y14.100, *Engineering Drawing Practices*.

10.6.2 As-built drawings, with final dimensions, shall be developed and submitted after completion of the Bulge fabrication.

10.7 Calculations

All calculations to be provided shall be orderly, complete, and sufficiently clear to permit verification. The body of the calculations shall include:

- a concise statement of the purpose of the calculation
- input data, applicable criteria, and stated assumptions
- a list of references used, including drawings, codes, standards, and computer programs (indicate the version or issue date)
- a discussion of rationale used for design assumption basis
- equations used for all computations
- numerical calculations including identification of units used
- a concise statement addressing the calculation results and/or recommendations
- a table of contents for complex calculations.

10.8 Schedules

10.8.1 A detailed schedule of engineering, document submittal, material purchase, fabrication, shop tests, and shipment shall be submitted.

10.8.2 All procedures and instructions shall be completed and submitted to the Buyer a minimum of eight (8) weeks prior to Process Bulge shipment.

11 References

11.1 Incorporated Design Changes

- 24590-WTP-3PN-MX00-00003
- 24590-WTP-SDDR-PROC-03-0106
- 24590-WTP-3PN-MX00-00004
- 24590-WTP-3PN-MX00-00006

11.2 Design Changes Incorporated by Reference

- 24590-WTP-SDDR-PROC-03-0102
- 24590-WTP-SDDR-PROC-02-0063

Figure 1 Typical Representation of Process Pipework and Sleeve Pipes Penetrating the Cell Wall

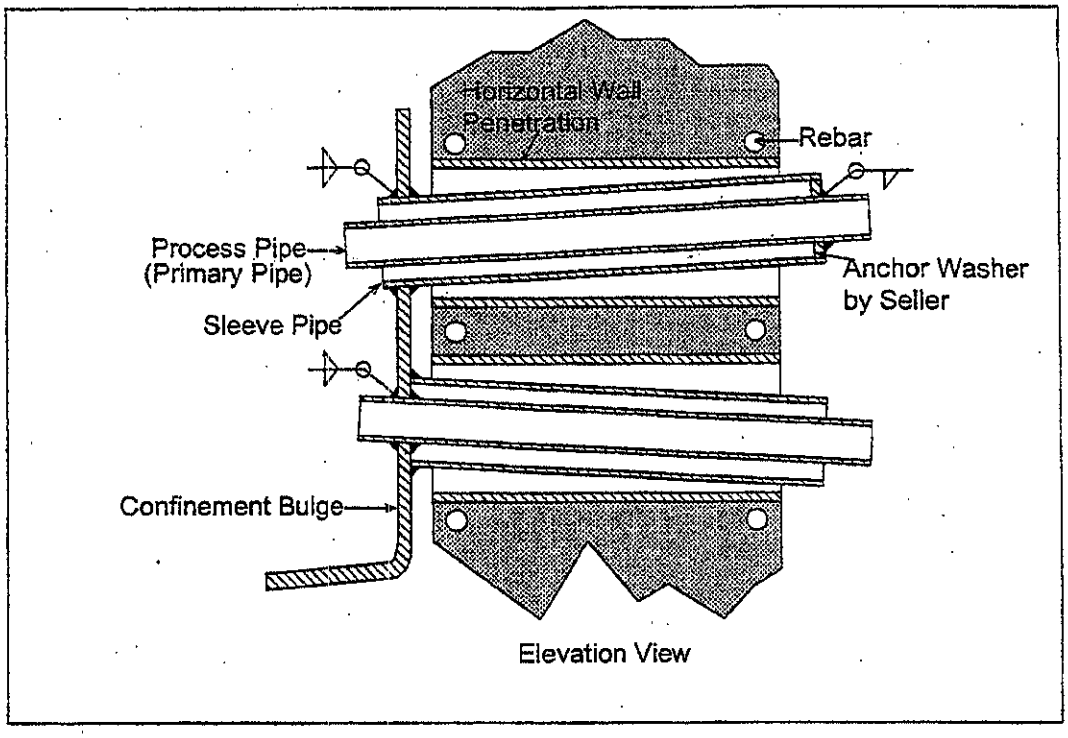


Figure 2 Typical Representation of Process Pipework and Floor Penetrations

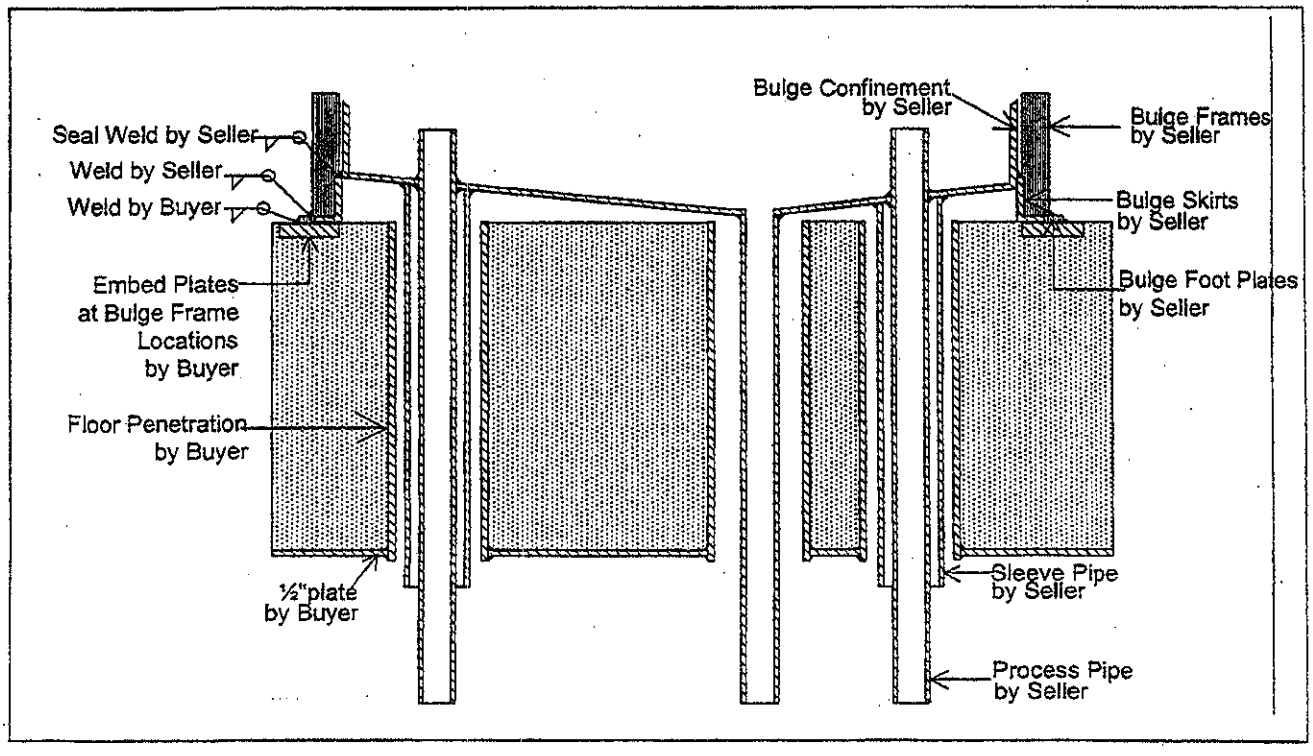
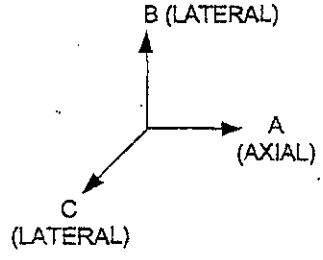


Table 1 **Process Pipe and Sleeve Pipe Sizes**

Process Pipe Size	Sleeve Pipe Size	Sleeve Pipe Schedule
1.0"	2.0"	40S
1.5"	3.0"	40S
2.0"	3.0"	40S
3.0"	4.0"	10S
4.0"	6.0"	10S
6.0"	8.0"	10S

Table 2 Design Nozzle Load

Pipe Size	Load	Forces lbs			Moments ft-lbs		
		Fa	Fb	Fc	Ma	Mb	Mc
1 in	Normal	76	108	108	98	168	168
	Occasional	208	240	240	282	442	442
2 in	Normal	276	388	388	430	732	732
	Occasional	764	876	876	1226	1926	1926
3 in	Normal	560	772	772	1688	2884	2884
	Occasional	1542	1754	1754	4828	7584	7584
4 in	Normal	952	1332	1332	3204	5468	5468
	Occasional	2620	3000	3000	9124	14348	14348



Appendix A

Implementing Standards for ANSI/AISC N690, "Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities"

Revision: 1994
Sponsoring Organization: American National Standards Institute/American Institute of Steel Construction

WTP Specific Tailoring

The following tailoring of ANS/AISC N690 is required for use by the WTP contractor as an Implementing Standard for structural design.

Page 22, Section Q1.5.7.1 Primary Stresses

Revise the stress limit coefficients for compression in Table Q1.5.7.1 as follows:

- 1.3 instead of 1.5 [stated in footnote (c)] in load combinations 2,5, and 6
- 1.4 instead of 1.6 in load combinations 7, 8, and 9
- 1.6 instead of 1.7 in load combination 11

Justification: These changes are made for consistency with the NRC requirements of Appendix F of section 3.8.4 of NUREG-0800 (Draft Rev. 2).

Page 22, Section Q1.5.7.1 Primary Stresses

Delete the following load combinations:

4. D + L + Eo
6. D + L + Ro + To + Eo

Justification: These load combinations are required for evaluation of an Operation Basis Earthquake (OBE). The WTP project has not identified an OBE event.

Appendix B

Implementing Standards for AISC M016, Manual of Steel Construction, Allowable Stress Design (ASD)

Revision: 9th Edition
Sponsoring Organization: American Institute of Steel Construction

WTP Specific Tailoring

The following tailoring of M016 is required for use by the WTP contractor as an implementing standard for design of structural steel for Seismic Category III SSCs.

No specific section

Load combinations for design of structural steel members utilize those identified in UBC 97, section 1612.3.

Justification: These load combinations represent the commercial requirements for allowable stress design of structural steel. Use of these load combinations will ensure compliance with the commercial design in accordance with the UBC.

No specific section

Seismic detailing requirements shall be in accordance with UBC 97, Chapter 22, Division V, section 2214, for moderate seismic risk structures.

Justification: The requirements contained in this section contain accepted industry practice for design of important commercial steel structures. Use of this section will ensure compliance with the commercial design in accordance with the UBC.

Attachment 2
05-ED-090

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form 24590-WTP-PCN-ENV-05-009.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel
Project Director

10/31/05
Date

Hanford Facility RCRA Permit Modification Notification Forms

Part V, Chapter 16
1325-N Liquid Waste Disposal Facility

Index

Page 2 of 2: Hanford Facility RCRA Permit, Chapter 16, V.16.B

Submitted by Co-Operator:		Reviewed by RL Program Office:	
P. L. Pettiette	11-30-05 Date	D. T. Evans	12/5/05 Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Part V, Chapter 16	**1325-N Liquid Waste Disposal Facility**

Description of Modification:

Hanford Facility RCRA Permit, Chapter 16, V.16.B

CHAPTER 16

1325-N Liquid Waste Disposal Facility

The 1325-N Liquid Waste Disposal Facility (LWDF) 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 wastes.

This Chapter sets forth the modified closure requirements for the 1325-N LWDF.

V.16.A COMPLIANCE WITH APPROVED MODIFIED CLOSURE PLAN

The Permittees shall comply with all requirements set forth in the Hanford Facility Dangerous Waste Permit, as specified in Attachment 3, Permit Applicability Matrix and the unit-specific conditions identified below for the 1325-N LWDF, including all modifications.

In the event that the Part V – Unit-Specific Conditions for 1325-N LWDF conflict with the Part I – Standard Conditions and/or Part II – General Facility Conditions of the Permit the unit-specific conditions for 1325-N LWDF prevail.

1325-N LIQUID WASTE DISPOSAL FACILITY, ATTACHMENT 41:

Chapter 1.0	Part A Dangerous Waste Permit, from Class 1 modification dated September 30, 2005 1325-N Liquid Waste Disposal Facility Revision 8
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
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.	Closure activities at the 1325-N Liquid Waste Disposal Facility have been performed such that site restoration is completed. Therefore, the following Permit Conditions apply to the 1325-N Liquid Waste Disposal Facility:
V.16.B.1.a	Inspection frequency is once every twelve months.
V.16.B.1.b.	No Contingency Plan or emergency equipment is required
V.16.B.1.c.	No hazardous waste operations unit specific training relative to dangerous waste management hazards, contingency plan implementation, effective response to emergencies, communications systems, alarm systems, response to fire or explosion, emergency equipment, or procedures for using, inspecting, repairing, and replacing emergency and monitoring equipment is required.
V.16.B.1.d.	Training for personnel conducting groundwater monitoring activities is required under Permit Condition II.C.

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 department to review and approved as a Class [1]1.

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 Forms

Part V

Chapter 18, 1324-N Surface Impoundment
Chapter 19, 1324-NA Percolation Pond

Index

Submitted by Co-Operator:

P. L. Pettiette — 11-30-05 Date

Reviewed by RL Program Office:

D. T. Evans — 12/5/05 Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
1324-N Surface Impoundment	**Part V, Chapter 18 and Attachment 42**

Description of Modification:

Hanford Facility RCRA Permit, Part V.18:

CHAPTER 18

1324-N Surface Impoundment

The 1324-N Surface Impoundment was a TSD unit that operated as a percolation unit for dangerous wastes. This unit completed their Closure Plan.

V.18.A. COMPLIANCE WITH APPROVED MODIFIED CLOSURE PLAN

The Permittees shall comply with all requirements set forth in Hanford Facility Dangerous Waste Permit, as specified in Attachment 3, Permit Applicability Matrix and the unit-specific conditions identified below for the 1324-N Surface Impoundment , including all modifications.

In the event that the Part V – Unit-Specific Conditions for 1324-N Surface Impoundment conflict with the Part I – Standard Conditions and/or Part II – General Facility Conditions of the Permit the unit-specific conditions for 1324-N Surface Impoundment prevail.

1324-N SURFACE IMPOUNDMENT, ATTACHMENT 42:

Chapter 1.0	Part A, Dangerous Waste Permit, from Class 1 modification dated September 30, 2005 1324-N Surface Impoundment, Revision 4
Chapter 2.0	Unit Description, from Class 1 modification dated August 2004
Chapter 3.0	Ground Water Monitoring, from Class 1 modification dated August 2004
Chapter 4.0	Closure, from Class 1 modification dated August 2004
Chapter 5.0	Post-Closure Plan, from Class 1 modification dated August 2004

V.18.B. AMENDMENTS TO THE APPROVED MODIFIED CLOSURE PLAN

V.19.B.1.	Closure activities at the 1324-N Surface Impoundment have been performed such that site restoration is completed. Therefore, the following Permit Conditions apply to the 1324-N Surface Impoundment:
V.19.B.1.a	Inspection frequency is once every twelve months.
V.19.B.1.b.	No Contingency Plan or emergency equipment is required
V.19.B.1.c.	No hazardous waste operations unit specific training relative to dangerous waste management hazards, contingency plan implementation, effective response to emergencies, communications systems, alarm systems, response to fire or explosion, emergency equipment, or procedures for using, inspecting, repairing, and replacing emergency and monitoring equipment is required.
V.19.B.1.d.	Training for personnel conducting groundwater monitoring activities is required under Permit Condition II.C.

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 department to review and approved as a Class [1]1.

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 Washington State Department of Ecology, or downgraded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
1324-NA Percolation Pond	**Part V, Chapter 19 and Attachment 42**

Description of Modification:

Hanford Facility RCRA Permit, Part V.19:

CHAPTER 19

1324-NA Percolation Pond

The 1324-NA Percolation Pond is an inactive TSD unit that is currently undergoing modified closure activities. This TSD unit was operated as a surface impoundment unit for dangerous wastes. This Chapter sets forth the modified closure requirements for this TSD unit.

V.19.A. COMPLIANCE WITH APPROVED MODIFIED CLOSURE PLAN

The Permittees shall comply with all requirements set forth in Hanford Facility Dangerous Waste Permit, as specified in Attachment 3, Permit Applicability Matrix and the unit-specific conditions identified below for the 1324-NA Percolation Pond, including all modifications.

In the event that the Part V – Unit-Specific Conditions for 1324-N Surface Impoundment conflict with the Part I – Standard Conditions and/or Part II – General Facility Conditions of the Permit the unit-specific conditions for 1324-NA Percolation Pond prevail.

1324-NA PERCOLATION POND, ATTACHMENT 42:

Chapter 1.0	Part A, Dangerous Waste Permit, from Class 1 modification dated September 30, 2005 1324-NA Percolation Pond, Revision 4
Chapter 2.0	Unit Description, from Class 1 modification dated August 2004
Chapter 3.0	Ground Water Monitoring, from Class 1 modification dated August 2004
Chapter 4.0	Closure, from Class 1 modification dated August 2004
Chapter 5.0	Post-Closure Plan, from Class 1 modification dated August 2004

V.19.B.	AMENDMENTS TO THE APPROVED MODIFIED CLOSURE PLAN
V.19.B.1.	Closure activities at the 1324-NA Percolation Pond have been performed such that site restoration is completed. Therefore, the following Permit Conditions apply to the 1324-NA Percolation Pond:
V.19.B.1.a	Inspection frequency is once every twelve months.
V.19.B.1.b.	No Contingency Plan or emergency equipment is required
V.19.B.1.c.	No hazardous waste operations unit specific training relative to dangerous waste management hazards, contingency plan implementation, effective response to emergencies, communications systems, alarm systems, response to fire or explosion, emergency equipment, or procedures for using, inspecting, repairing, and replacing emergency and monitoring equipment is required.
V.19.B.1.d.	Training for personnel conducting groundwater monitoring activities is required under Permit Condition II.C.

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 department to review and approved as a Class [1]1.

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 Washington State Department of Ecology, or downgraded to a Class [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification

Part III, Chapter 5 and Attachment 35
242-A Evaporator

Replacement Chapters

Attachment 35, Chapter 3.0
Attachment 35, Chapter 4.0
Attachment 35, Chapter 11.0

Chapter 3.0 **Waste Analysis Plan**

Figures

Tables

GLOSSARY

ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
CFR	Code of Federal Regulations
C_T	total carbon
DOE	U. S. Department of Energy
DQO	data quality objective
DQO/DEFT	data quality objective/decision error feasibility trials
DSC	differential scanning calorimeter
DST	Double-Shell Tanks
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ETF	200 Area Effluent Treatment Facility
GC	gas chromotography
HDPE	high-density polyethylene
HFFACO	Hanford Federal Facility Agreement and Consent Order
IC_T	total inorganic carbon
IR	infared
LDR	land disposal restriction
LERF	Liquid Effluent Retention Facility
MS	mass spectrometry
N/A	not applicable
QA	quality assurance
QC	quality control
RCRA	*Resource Conservation and Recovery Act of 1976*
RPD	relative percent difference
TEDF	Treated Effluent Disposal Facility
TCLP	toxicity characteristic leaching procedure
TOC	total organic carbon
TSD	treatment, storage, and/or disposal
VOA	volatile organic analysis
WAC	Washington Administrative Code
WAP	waste analysis plan

1 **METRIC CONVERSION CHART**

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			**Volume**		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76456	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Force			**Force**		
pounds per square inch	6.895	kilopascals	kilopascals	0.14504	pounds per square inch

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

4

3.0 WASTE ANALYSIS PLAN

3.1 INTRODUCTION

This waste analysis plan (WAP) addresses analysis necessary to manage the waste at the 242-A Evaporator according to *Resource Conservation and Recovery Act* (RCRA) requirements included in the *Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste* (Ecology and EPA 1994), *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement, Ecology et., al. 2003, Washington Administrative Code (WAC), Chapter 173-303, and Part 264 of the Code of Federal Regulations.

Modifications of the WAP require modifications of the permit. Permit modifications are discussed in Section I.C of the Hanford Facility RCRA Permit and WAC 173-303-830.

Where information regarding treatment, management, and disposal of the radioactive source byproduct material and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954 as amended) has been incorporated into this document, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit or chapter 70.105 RCW and its implementing regulations but is provided for information purposes only.

3.2 PURPOSE

The purpose of the WAP is to ensure waste at the 242-A Evaporator is managed properly in accordance with WAC 173-303-300. To ensure the waste analysis is comprehensive, a data quality objectives (DQO) analysis was performed on all streams at the 242-A Evaporator. Sampling and analysis identified in the DQO analysis related to meeting RCRA requirements are included as an integral part of this WAP.

Regulatory and safety issues are addressed in the WAP by establishing boundary conditions for waste to be received and treated at the 242-A Evaporator. The boundary conditions are set by establishing limits for items such as reactivity, waste compatibility, and control of vessel vent organic emissions. Waste that exceeds the boundary conditions would not be acceptable for processing without further actions, such as blending with other waste.

3.3 SCOPE

This WAP discusses RCRA sampling and analysis of the waste in selected Double-Shell Tank (DST) System tanks to determine the acceptability of the waste for processing at the 242-A Evaporator. Sampling and analysis of DST System waste for other reasons, such as preparation for tank-to-tank transfers, is included in the waste analysis plan for the DST System.

RCRA sampling of the process condensate transferred to the Liquid Effluent Retention Facility (LERF) can be performed either at the 242-A Evaporator or at LERF. A discussion of process condensate sampling at the 242-A Evaporator is included in this WAP, while discussion of process condensate sampling at LERF is included in the *Hanford Facility RCRA Permit, Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility, Waste Analysis Plan*.

Samples of other 242-A Evaporator waste streams, such as steam condensate, cooling water, and 242-A-81 back flush water, are taken as required for process control but are excluded from this plan because these streams have been previously characterized and determined to be nondangerous waste streams.

3.4 242-A EVAPORATOR PROCESS DESCRIPTION

The 242-A Evaporator, located in the 200 East Area of the Hanford Site, separates the incoming waste from the DST System into two aqueous streams as described in the following paragraph. Also associated with the 242-A Evaporator are utility waste streams such as cooling water and steam condensate, which are not dangerous waste. Description of the waste processed by the 242-A Evaporator is described in Section 3.4.

The 242-A Evaporator process uses a conventional forced-circulation, vacuum evaporation system to concentrate mixed waste solutions from the DST System tanks. The incoming stream is separated by evaporation into two liquid streams: a concentrated slurry stream and a process condensate stream. The slurry contains the majority of the radionuclides and inorganic constituents. After the slurry is concentrated to the desired amount, the slurry stream is pumped back to the DST System and stored for further treatment. Vapor from the evaporation process is condensed, producing process condensate, which is primarily water with trace amounts of organic material and a greatly reduced concentration of radionuclides. The process condensate is transferred to LERF for storage and treatment. Vacuum for the evaporator vessel is provided by two steam jet ejectors, producing a gaseous vessel vent exhaust. The 242-A Evaporator vessel vent stream is filtered and discharged through an exhaust stack. Figure 3.1 shows a simplified schematic of the 242-A Evaporator process. A more detailed description of the 242-A Evaporator process is provided in Chapter 4.0.

3.5 WASTE IDENTIFICATION

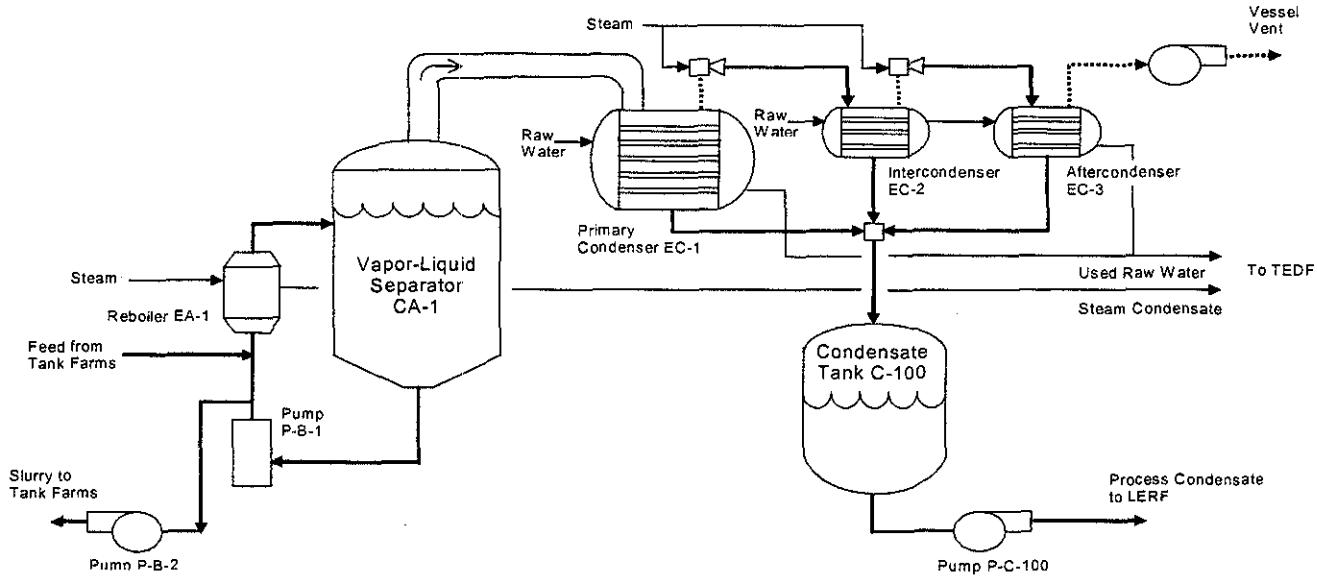
All of the waste accepted by the 242-A Evaporator comes from DST System. The waste in the DST System tanks is received from onsite generators, which characterize the waste before transfer to the DST System. Waste characterization is based on analytical data and/or process knowledge. Based on this information, the waste in certain DST System tanks are selected as 'candidates' for processing in the 242-A Evaporator. The contents of these candidate feed tanks are subjected to closer scrutiny and evaluated against 242-A Evaporator waste acceptance criteria before the final tank selection is made. To meet waste acceptance criteria, the contents of several tanks could be blended together in the feed tank (241-AW-102) prior to processing.

3.5.1 General Constituent Description

The only waste stream processed at the 242-A Evaporator is the DST System waste stream, which consists of mixed waste received from various Hanford Site activities. The mixed waste is a radioactive aqueous solution containing dissolved inorganic salts such as sodium, potassium, aluminum, hydroxides, nitrates, and nitrites. The mixed waste in some tanks has detectable levels of heavy metals such as lead, chromium, and cadmium. The radionuclide content includes fission products such as the Sr-90 and Cs-137, and actinide series elements such as uranium and plutonium. Small quantities of ammonia and organics, such as acetone, butanol, and tri-butyl phosphate, could also be present. Waste received in the DST System has been chemically adjusted to ensure the waste is compatible with materials used for construction of the waste tanks and the 242-A Evaporator. The consistency of the waste in the DST System ranges from liquid supernate to thick sludge. Waste fed to the 242-A Evaporator is supernate taken from the DST System; the sludge is not processed through the 242-A Evaporator.

The slurry is an aqueous solution containing the same components as the feed stream with increased concentrations. Most of the volatile constituents are evaporated and transferred to the process condensate. The process condensate is a dilute aqueous solution with ammonia, volatile organics, and trace quantities of radionuclides and inorganic constituents.

Figure 3.1. 242-A Evaporator Simplified Schematic



3.5.2 Classification of Waste

The waste processed at the 242-A Evaporator is classified as a mixed waste because it contains radioactive components and is a dangerous waste. The concentrated slurry produced by the evaporation process is also a mixed waste because it contains the same mixed waste constituents as the waste feed. The process condensate is classified as a mixed waste because it contains radioactive components and is a listed waste. The process condensate is a listed waste because it is derived from a listed waste.

Analysis of utility streams which do not contact mixed waste solutions, such as cooling water and steam condensate, are conducted per the requirements of the 200 Area Treated Effluent Disposal Facility, which receives these streams. These analyses are not discussed in this plan because these streams are not dangerous waste under WAC 173-303.

3.5.3 Dangerous Waste Numbers

Waste transferred to the 242-A Evaporator could be assigned any of the dangerous waste numbers found in Chapter 1.0, Part A, Form (latest Revision). These numbers are identical to the ones in the Part A, Form (latest Revision) for the DST System. Process knowledge and historical data indicate that the slurry stream returning to the DST System contains the same dangerous waste constituents as the waste feed, so the same dangerous waste numbers are applicable to the feed and slurry.

Table 3.1 lists the dangerous waste numbers assigned to the process condensate. The process condensate is designated with the dangerous waste numbers F001 to F005 because the process condensate is derived from treatment of DST System waste assigned these numbers.

Table 3.1. Waste Designation for Process Condensate.

Waste number	Characteristic/Source	Basis for designation
F001	Spent halogenated solvents	Derived from F001 waste
F002	Spent halogenated solvents	Derived from F002 waste
F003	Spent nonhalogenated solvents	Derived from F003 waste
F004	Spent nonhalogenated solvents	Derived from F004 waste
F005	Spent nonhalogenated solvents	Derived from F005 waste
F039	Multi-source leachate from waste disposal operations	Future receipt of waste with the F039 number, derived from F001 through F005.

3.6 WASTE ACCEPTANCE PROCESS

This section describes the actions performed before every campaign to determine if the waste in the DST System tanks is acceptable for treatment at the 242-A Evaporator. This section also describes the procedures and processes for sampling the process condensate stream at the 242-A Evaporator, if required by the waste acceptance criteria for treatment at the 200 Area Effluent Treatment Facility (ETF).

3.6.1 Candidate Feed Waste Acceptance Process

Candidate feed tank sampling performed for this WAP is done in the DST System before transfer of the waste to the 242-A Evaporator. Certain DST System tanks are selected as `candidates' for waste to be processed in the 242-A Evaporator. This section describes the method for determining if the waste in a candidate feed tank is acceptable for processing.

The following activities are performed to determine if candidate waste feed will meet the evaporator waste acceptance criteria.

- Estimate concentrations of the eight Critical analytes to determine the minimum number of feed tank samples needed for compliance with the waste acceptance criteria. The eight Critical analytes are Ammonia, Nitrite, Nitrate, Hydroxide, Acetone, Pu-239/240, Cs-137, and Sr-90. The evaporator DQO also specifies that a boil down study be performed to evaluate the impacts of solid formation.
- Evaluate Potential for Energetics/Uncontrolled Chemical Reactions: The 242-A Evaporator Waste Analysis Plan (WAP, Ecology 2003) requires that no exothermic reaction occur below 168°C and the ratio of exotherm-to-endotherm energy be less than 1.
- Evaluate Potential for Separable Organic Phase: Prior to operation of the evaporator, the absence of separable organics in the feed must be verified.
- Evaluate Feed Ammonia Concentration: The concentration of ammonia in the feed stream is limited to 6800 mg/L and must be confirmed.
- Calculate Process Condensate Ammonia and Organic Concentrations: Radionuclide, ammonia, and volatile organic concentrations are needed for the LERF waste profile sheet (refer to Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan.)
- Calculate Vessel Vent Ammonia Emissions: Ammonia monitoring is required by the Hanford Facility Dangerous Waste Permit (Ecology 2003) to determine that the ammonia emissions do not exceed 100 lbs per 24 hours.

3.6.1.1 Selecting Candidate Feed Tanks

For each 242-A Evaporator campaign, DST System tanks are selected as candidate feed tanks based on process knowledge of chemical properties with respect to waste acceptance criteria (Section 3.6.1). After a candidate tank is selected, the waste in the tank is sampled and analyzed and the data evaluated to confirm waste acceptability. Every candidate feed tank is sampled and analyzed to confirm waste acceptability.

3.6.1.2 Determining the Number of Candidate Feed Tank Samples

The method for determining the number of feed tank samples is specified in the data quality objectives (DQO) (Banning et al. 2005) and this WAP, and uses power analysis software supplied by the U.S. Environmental Protection Agency (EPA) (EPA 2001). Estimated concentrations of eight critical analytes (Section 3.6.1) are used to determine the minimum number of samples, accounting for the desired confidence level and how close the estimated concentrations are to the waste acceptance limits a random number generator is then used to determine the sample locations in the tank, using constraints given in the WAP.

Figure 3.2 illustrates the decision logic used to determine the number of samples to be taken. Preliminary concentrations of critical analytes are compared to the waste acceptability limits statistically to determine the number of samples necessary to verify the composition of the waste. The statistical analysis accounts for how close the concentrations of critical analytes are to the limits and the desired confidence level. The closer the concentrations are to the limits, or the greater the desired confidence level, the more samples must be taken. For regulatory compliance, acetone is used as the critical analyte because it is often present at elevated levels. A 95% confidence level is specified for acetone. Critical analytes for process control are also assessed. Acetone analysis is usually not available from preliminary data, so process control analytes (such as nitrate and hydroxide) are often used. The statistical analysis includes the generation of power curve calculations using *Data Quality Objectives Decision Error Feasibility Trials* (EPA 2001 or current revision) software developed by the EPA. This software requires input of minimum and maximum

expected values, action levels, mean sample results, standard deviations of sample results, and upper and lower confidence levels. The software outputs the minimum number of samples required. In general, three samples are taken as a minimum because taking two samples would require resampling if one sample should be lost or contaminated in the laboratory. A maximum of five samples generally is applied to minimize exposure to sampling personnel.

3.6.1.3 Assessing Candidate Feed Tank Analysis

When results of the sample analysis are available (and before the waste is processed), a second statistical analysis, similar to the first, is performed with the new analyte data to verify a sufficient number of samples were taken (Figure 3.3).

Candidate feed tank sampling and analysis, in conjunction with the waste acceptance criteria in Section 3.6.1, are used to assess whether established limits (limits are defined in the 242 Evaporator DQO, Banning 2004 and *Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan*) would be exceeded. Based on the results, four possible options are implemented:

- The waste is acceptable for processing at the 242-A Evaporator without further actions.
- The waste is unacceptable for processing as a single batch, but is acceptable if blended with other waste to be processed.
- The waste is unacceptable for processing.
- Perform further evaluation to determine if action limit can be protected through mid-campaign monitoring/sampling and/or process adjustments.

If the waste is suitable for evaporation, it will be transferred to the feed tank (241-AW-102) for processing.

3.6.2 Process Condensate Waste Sampling Process

RCRA sampling of process condensate is completed per the Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan before treatment at the ETF. Depending on programmatic needs, this sampling can be performed at the 242-A Evaporator during a campaign or at LERF after the campaign is completed.

Before the start of a 242-A Evaporator campaign, the decision whether process condensate sampling will be performed at the 242-A Evaporator or at LERF is documented in the operating record. Planning for process condensate sampling at the 242-A Evaporator (i.e., number of samples, when samples are taken, etc.) is completed before starting the campaign.

3.6.2.1 Determining the Number of Process Condensate Samples

The purpose of sampling the process condensate stream at the 242-A Evaporator is to confirm that the stream is acceptable for treatment at the ETF. Before starting a 242-A Evaporator campaign where sampling will be performed at the 242-A Evaporator instead of LERF, characterization of the process condensate will be developed based on process knowledge. Process knowledge includes previous documented process condensate analysis, estimated concentrations based on documented candidate feed tank analysis, etc. RCRA sampling of the process condensate stream at the 242-A Evaporator is performed during the campaign to confirm the characterization is correct. Sampling frequency is determined using the following equation:

Number of process condensate = N + 1 samples required (per campaign). Where N is the number of candidate feed tanks to be processed during the campaign.

For example, a campaign processing waste from only one candidate feed tank would require two samples, while a campaign processing waste from three candidate feed tanks would require four samples. Sampling is spread approximately evenly through the campaign, allowing for operational events such as unexpected shutdowns and planned maintenance outages. This sample frequency represents a confirmation rate of about one sample every 5 to 8 days of processing. This is reasonable based on the extensive database of previous process condensate analysis. A minimum of two samples is taken to allow averaging of results.

3.6.2.2 Assessing Process Condensate Analysis

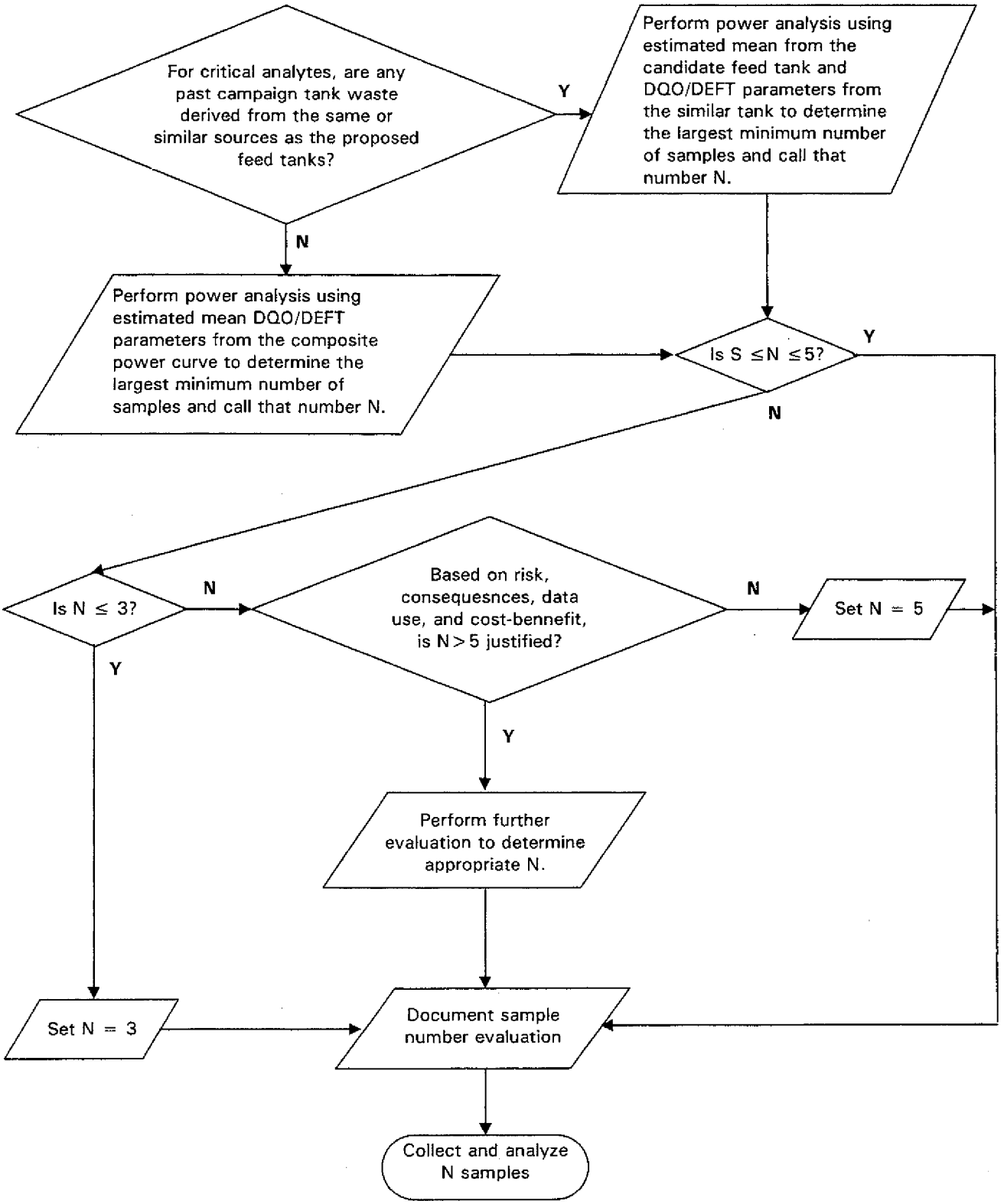
The process condensate sample results are assessed against the requirement in the Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan. The discussion of the waste management decision process for process condensate sampling, including the reevaluation process, is also included in the Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan.

3.7 242-A EVAPORATOR ACCEPTANCE CRITERIA

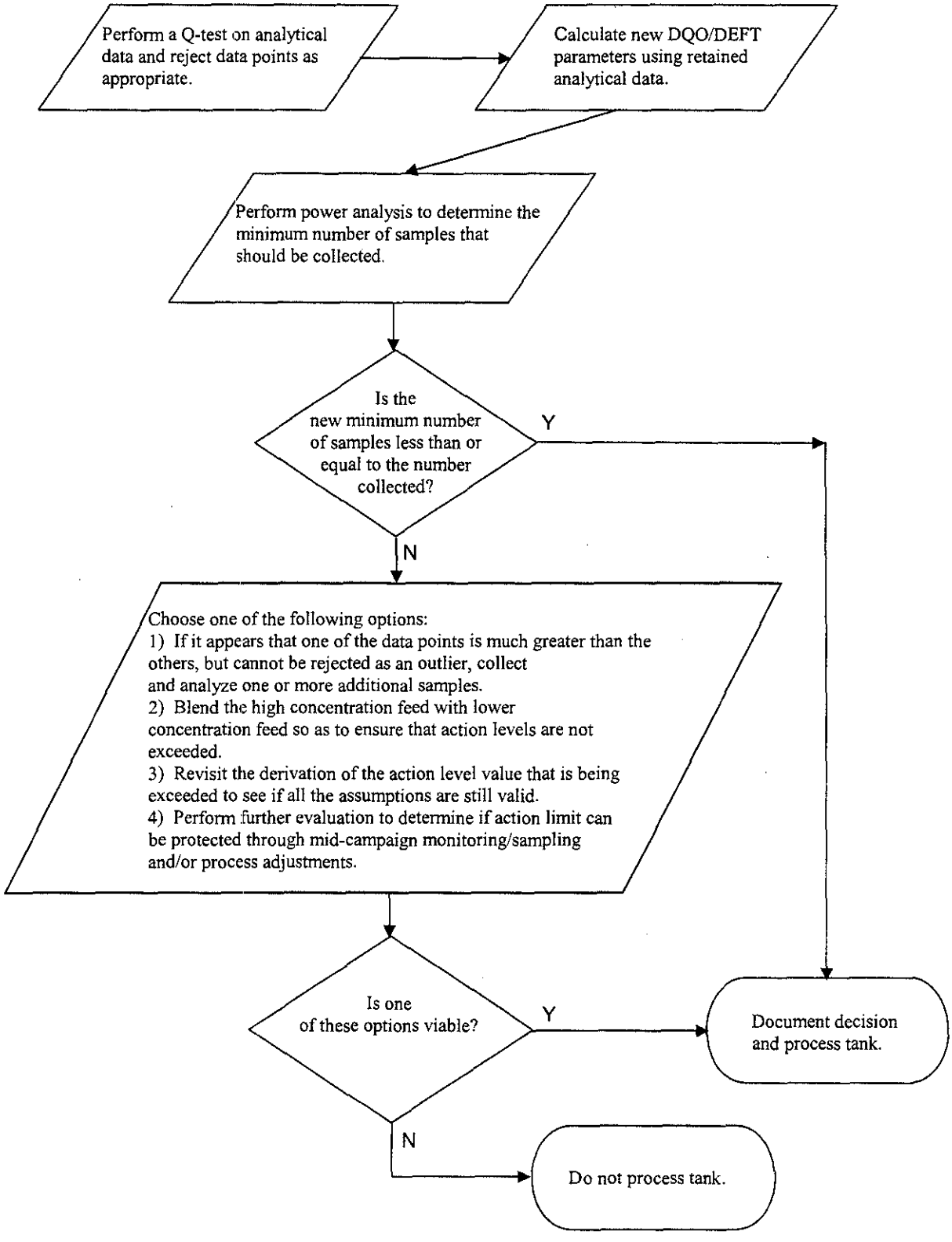
Acceptance criteria for the 242-A Evaporator have been established from regulatory requirements, operating experience, previous sample analyses, and engineering calculations. Processing criteria are maximum and/or minimum values of a waste analyte that, if exceeded, alert the operator that management of the waste requires further attention. The rationale for selecting a given analyte for inclusion in this WAP, as required by WAC 173-303-300, is indicated in this section.

Additional analyses (such as specific gravity and radionuclide analysis) of the feed tanks, process condensate, and other streams are performed to ensure that the facility is operating within established parameters. This process control sampling and analysis is outside the scope of this plan because it is not used to assess compatibility of the waste with other waste and with the 242-A Evaporator tank systems.

Figure 3.2. Strategy for Determining the Number of Candidate Feed Tank Samples.



1 Figure 3.3. Strategy for Verifying the Number of Candidate Feed Tank Samples.



3.7.1 Candidate Feed Tank Waste Acceptance Criteria

The following sections discuss waste acceptance criteria for candidate feed tanks to be processed in the 242-A Evaporator.

3.7.1.1 Exothermic Reactions

WAC 173-303-395 requires waste handling be conducted to prevent an uncontrolled reaction that could damage the tank system structural integrity or threaten human health or the environment. To evaluate the possibility of an uncontrolled reaction at the elevated temperatures in the evaporator vessel, a differential scanning calorimeter (DSC) test is performed on sample of all candidate waste to be processed. DSC measures the amount of heat absorbed or released by a sample as the temperature is increased. Waste exhibiting exotherms below 168°C, or with an absolute value of the exotherm-to-endotherm ratio greater than one, will not be processed in the 242-A Evaporator without further technical evaluation.

3.7.1.2 Compatibility

WAC 173-303-395 requires waste handling be conducted to prevent an uncontrolled reaction that could damage the tank system structural integrity or threaten human health or the environment. To verify there will be no adverse affects because of mixing the contents of different waste tanks in the feed tank and evaporator vessel, a compatibility evaluation is performed on waste in the candidate feed tanks. As samples from each of the planned waste sources are mixed, observations are made to note any changes in color, temperature, clarity, or any other visually determinable characteristic. This would indicate an unexpected chemical reaction that might have an impact on 242-A Evaporator operations. If such visible changes are observed when mixing samples, the waste would not be processed in the 242-A Evaporator without further technical evaluation.

Organic Constituents

The 242-A Evaporator performs distillation of waste containing organic concentrations greater than 10 parts per million by weight; therefore, organic air emissions are subject to WAC 173-303-690 (which incorporates 40 CFR 264, Subpart AA, by reference). Organic emissions from TSD units on the Hanford Site subject to 40 CFR 264, Subpart AA are controlled to ensure emissions to do not exceed 1.4 kilograms per hour and 2,800 kilograms per year. To ensure these requirements are met, the levels of volatile organics in the 242-A Evaporator feed must be limited to prevent excessive organic emissions during processing. Engineering calculations were used to determine the feed limits given in Table 3.2. The limits include a modifier "(R-1)/R", which adjusts the limits based on the campaign's planned boiloff rate. R is the ratio of feed flow rate to slurry flow rate. Typically, R is between 1 to 2, making the range of (R-1)/R 0 to 0.5.

In addition, analysis of the individual components in Table 3.2, total carbon (C_T) and total inorganic carbon (IC_T) analysis are performed as a screening tool to account for other organic species that might be present in the waste. The value of C_T minus IC_T represents the total organic concentration in the waste. If the C_T minus IC_T limit is exceeded, additional volatile organic species might be present and a more detailed evaluation will be conducted to determine organic emissions out of the vessel vent. The limit for evaluation is 174.4 milligrams per liter, based on the conservative assumption that all organic species present in the waste are as volatile as acetone. Acetone was chosen because of its relatively high volatility and low percentage of carbon.

The level of volatile organics in the feed must also be limited to ensure organic constituents that transfer to the process condensate are compatible with the LERF liner. The high density polyethylene (HDPE) liner used at the LERF is exposed to process condensate that could contain trace quantities of chemicals that could cause degradation of the liner material. Based on the liner manufacturer's compatibility data, the

concentration limits in Table 3.3 are imposed on those classes of constituents that could potentially degrade the liner. To ensure that these limits are not exceeded in the process condensate, the concentration limits are applied to the candidate feed tanks as well, with the modifier "(R-1)/R". A C_T minus IC_T analysis, similar to the one described previously, is also applied to the LERF liner limits. The strictest limit for organic species in Table 3.3 is 2,000 milligrams per liter. Assuming the organic is acetone (with its low percentage of carbon); this converts to a carbon value of 1,240 milligrams per liter.

The calculations in Tables 3.2 and 3.3 require use of the 'sum of the fractions' technique. A calculation is performed where the analysis of each constituent is divided by its associated limit to produce a fraction of the limit. If the sum of these fractions is less than 1, the waste meets the requirements in the tables.

3.7.2 Process Condensate Acceptance Criteria

The waste acceptance criteria for process condensate sampling, including treatability, LERF liner compatibility, compatibility with other waste, etc., is given in the Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan.

Table 3.2. Candidate Feed Tank Limits for Vessel Vent Organic Discharge[a].

Feed constituent	Limit (milligrams per liter) b, c
Acetone	174.4 ([R-1]/R)
1-Butanol	452 ([R-1]/R)
2-Butoxyethanol	190.4 ([R-1]/R)
2-Butanone	116 ([R-1]/R)
Tri-butyl phosphate	2.03E+4 ([R-1]/R)
Total carbon and Total inorganic carbon	(CT-ICT) < 174.4 ([R-1]/R) (as acetone)

[a] Limits are based on a maximum continuous operating time equivalent to 6 months per year. If total operating time is expected to exceed 6 months per year, the limits must be re-evaluated.

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

[b] The limits are applied using the sum of the fractions technique: where i is the number of organic constituents detected in analysis of the waste feed tank. Total carbon and total inorganic carbon analysis are not part of the summation.

[c] R is the ratio of feed flow rate to slurry flow rate (typically R = between 1 and 2).

1 **Table 3.3. Candidate Feed Tank Limits for LERF Liner Compatibility [f]**

Chemical family/parameter[a]	Current target compounds	Limit (milligrams per liter)[b,c]
Alcohol/glycol	1-Butanol	500,000 ([R-1]/R)
Alkanone [d]	Sum of acetone, 2-butanone	200,000 ([R-1]/R)
Alkenone [e]	None targeted	2,000 ([R-1]/R)
Aromatic/cyclic hydrocarbon	None targeted	2,000 ([R-1]/R)
Halogenated hydrocarbon	None targeted	2,000 ([R-1]/R)
Aliphatic hydrocarbon	None targeted	500,000 ([R-1]/R)
Ether	2-Butoxyethanol	2,000 ([R-1]/R)
Other hydrocarbons	Tri-butyl phosphate	2,000 ([R-1]/R)
Oxidizers	None targeted	1,000 ([R-1]/R)
Acids, bases, and salts	Ammonia	100,000 ([R-1]/R)
Total carbon and total inorganic carbon	Not applicable	$(C_T\text{-}IC_T) < 1{,}240$ ([R-1]/R) (as acetone)

2

a If a chemical fits in more than one chemical family, the more restrictive limit applies.

b The limits are applied using the sum of the fractions technique: where i is the number of constituents detected in analysis of the waste feed tank. Total carbon and total inorganic carbon analysis are not part of the summation.

$$\sum_{n=1}^{i}\left(\frac{Conc_n}{LIMIT_n}\right) \leq 1$$

c R is the ratio of feed flow rate to slurry flow rate (typically R = between 1 and 2).

d Ketone containing only saturated alkyl group(s)

e Ketone containing unsaturated alkyl group(s)

This table is used to ensure process condensate generated from candidate feed tank treatment is within LERF liner compatibility limits

3.8 SAMPLE COLLECTION AND ANALYSIS

This section discusses sampling and analysis, including sampling procedures, sample collection points, sample quality assurance/quality control (QA/QC), and selection of analytes.

3.8.1 Sample Collection

This section describes collection of candidate feed tank and process condensate samples for RCRA analysis. Candidate feed tank waste is sampled and analyzed before the start of each 242-A Evaporator campaign. Process condensate samples are taken at the 242-A Evaporator only if the decision is made before the start of the campaign that sampling will be done at the 242-A Evaporator instead of LERF.

3.8.1.1 Candidate Feed Tank Sample Collection

Candidate feed tank samples are obtained by using a grab sampling method (e.g. "bottle on a string method") specified in ASTM E300, *Standard Practices for Sampling Industrial Chemicals* (ASTM 1986). The number of lateral sampling locations in candidate feed tanks is limited by the availability of tank risers providing access into the tank. Generally, only a few risers in each tank are actually available for sampling because the risers are dedicated to instrumentation or other uses. Sampling within a vertical column is generally limited only by the depth of waste in the tank. The criteria in Table 3.4 are used when determining the specific sampling locations.

Riser selection is made by numbering the available risers that are at least 4.6 meters from each other and using a random number generator to select which risers will be used. Sample depths are determined by dividing the tank level into 1-foot increments and using a random number generator to determine a depth, which meets the criteria given in Table 3.4.

3.8.1.2 Candidate Feed Tank Sampling Quality Assurance and Quality Control

For each candidate feed tank sample, a sample solution is drawn from the sample riser using one or more sample bottles. All sample bottles are precleaned, amber-colored glass bottles sealed with Teflon* caps or septum caps and lined septums; however, the sample bottle for VOA must be sealed with septum cap and lined septum.

For candidate feed tank sampling quality control, one field blank, consisting of one or more sample bottles, is taken during the sample event. Field blanks are inserted at least 1-foot into the head space through any one of the sample risers used during the sample event. One trip blank, also consisting of one or more sample bottles, is taken during each sample event. Trip blanks are analyzed as independent samples for VOA. Field and trip blanks use the same types of sample bottles as the actual samples and are filled with reagent-grade water before shipment to the field.

Preservatives are not used with candidate feed tank samples because of concerns with high radiation exposure that would result from additional handling of sample solutions. It is not practical to refrigerate the bulky, shielded sample pigs and shipping containers. Biological activity, generally the largest problem in environmental samples, is unlikely in candidate feed tank samples because of the high salt content, pH, and radioactivity.

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*Teflon is a trademark of E.I. DuPont de Nemours & Company

The chain of custody is documented on a data sheet that includes a unique sample number, date and time sample was taken, custody seal number, and signature of the sampler. When possession of the sample is transferred to other persons, such as the shipper or laboratory, the signature of the relinquisher and receiver are recorded, along with date and time of the transfer. The receiver at the laboratory also documents on the data sheet that the sample seal number is correct and the seal is intact. The chain-of-custody data sheets are included in the operating record.

3.8.1.3 Deviations from Specified Sampling Practices

The WAP requires ASTM E 300 'bottle on a string procedure' for sampling (ASTM E300-86). Due to high radiation fields, some deviations to the standard have been necessary to implement safely the sampling practices in the field. These deviations are documented below.

- Requirement: The sampling apparatus be filled and allowed to drain before drawing the sample.

  Deviation: Sampling personnel lowers the sampling apparatus to the specified level and collects the sample. To pour the contents out and resample would encourage the spread of radiological contamination and additional whole body and extremity radiation exposure.

- Requirement: Bottles and jars may be made of clear or brown glass or polyethylene with necks shaped to receive glass stopper or a screw cap made of metal or plastic material.

  Deviation: Sampling personnel uses clear or amber glass with necks shaped to receive rubber stoppers. Glass stoppers were used at one time but resulted in broken sample bottles during the removal of the glass stoppers from the glass bottles.

- Requirement: Stopper and label bottles immediately after taking the samples and deliver them to the laboratory.

  Deviation: Sampling personnel screws on the bottle cap after the sample has been collected. Because of the alkalinity of the tank waste sample labels will not stay on bottles after samples are collected. Therefore, sample bottles are etched with the sample numbers before the samples are collected. The samples are shipped to the laboratory as soon as resources are available, within three days of sample collection.

- Requirement: Select wiping cloths so that lint is not introduced, contaminating the samples.

  Deviation: Sampling personnel uses damp cotton towels to wipe down sample bottles after the sample bottles have been capped. The intent is to remove any waste that may have been deposited on the bottle during the sampling event to minimize contamination and personnel exposure.

- Requirement: To prevent the loss of the liquid during shipment and to protect against moisture and dust, cover the closure of the glass bottle with plastic caps, which have been swelled in water, wiped dry, placed over the top of the stoppered bottle, and allowed to shrink tightly in place. Screw-top bottles are recommended. The cap should be lined with material inert to the sample. The screw caps should be secured by use of adhesive tape or similar material.

  Deviation: Sampling personnel uses screw caps and 4-mil plastic bags. The cap is Teflon-lined which is inert to the sample. The sample bottle is placed inside a plastic bag, which is placed inside a steel pig (or sample pig). The steel pig is placed inside a shipping pig. The screw cap is not secured with adhesive tape. Securing the sample bottle caps with tape would present the laboratory with difficulty

of removing the caps remotely (in the hot cell). If the sample leaks from the sample bottle, it is trapped in the plastic bag. The custody seal is placed on the shipping pig per procedure.

- Requirement: All sampling apparatus and closures shall be clean, dry, free of contaminants, and constructed of materials that are inert to the product to be sampled.

  Deviation: The weldments are wiped down at the fabrication shop but are stored in open bins inside the warehouse. The stoppers are received in bags and are inspected for dirt and wiped down. By training, visual inspection is made of the sampling equipment to verify that the equipment does not contain any gross contamination. If any is found, the equipment is either replaced or wiped down. The bottles with screw caps are washed and certified and are not opened until at the time of the sampling event. The bottles are opened when the last sample is completed so that only one bottle is opened at the time of sampling to insert the rubber stopper from the sample holder. The weldments, stopper, and bottles are constructed from materials that are inert to the product to be sampled.

3.8.1.4 Process Condensate Sample Collection

Process condensate samples, when performed at 242-A Evaporator instead of LERF, are taken from the process condensate transfer line in the condenser room of the 242-A Building. Grab sampling is performed during the campaign at the SAMP-RC3-2 sampler or other sample port. Samples of process condensate are collected in a manner consistent with SW-846 procedures (EPA 1986) as documented in sampling procedures, which are maintained and implemented by unit personnel.

3.8.1.5 Process Condensate Sampling Quality Assurance and Quality Control

For information on process condensate sample collection, including the number and types of sample bottles, sampling QA/QC, etc., refer to the Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan.

3.8.2 Analyte Selection and Rationale

The DQO analysis for the 242-A Evaporator examined the data needs for sampling the candidate feed tanks and determined that the analyses in Table 3.5 should be conducted to satisfy WAC 173-303-300 requirements. Table 3.5 also contains the rationale for these parameters being selected. Section 3.6 provides additional detail on the rationale.

For information on process condensate sample analyte selection and rationale, refer to the Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan.

Table 3.4. Candidate Feed Tank Sample Point Selection.

Number of samples	Location of sample points
Two samples	One sample taken from the upper half of the waste from one riser and the other sample taken from the lower half of the waste from another riser.
Three samples	Two Samples taken from one riser (one from the top half and the other from the bottom half of the waste) and one sample from another riser
Four samples	Two samples taken from each of two separate risers. One sample is to be taken from the top half of the waste and one from the bottom half of the waste from each of the selected risers.
Five samples	Same as for four samples except one sample from either the top or bottom half of the tank will be taken from a third riser

Table 3.5. Analytes for Candidate Feed Tanks

Parameter	Test technique	Analyte	Rationale
Exotherm	Differential scanning calorimeter	Temperature and energy	Verify the waste will not undergo an exothermic reaction (Section 3.6.1.2).
Compatibility test	Mixing and compatibility study	Visual physical changes	Verify the waste is chemically compatible (Section 3.6.1.3).
Organic compounds	Gas chromatograph/ mass spectrometer	Acetone, 1-Butanol, 1-Butoxyethanol, 1-Butanone, Tri-butyl phosphate	Used in calculations to verify that vessel vent emissions will not exceed regulatory limits and to prevent compatibility problems with the LERF liner (Section 3.6.1.4).
	Carbon coulometric detector	Total carbon, Total inorganic carbon	Used in calculations to verify that vessel vent emissions will not exceed regulatory limits and to prevent compatibility problems with the LERF liner (Section 3.6.1.4).
Ammonia	Ion selective electrode	Ammonia	To prevent compatibility problems with the LERF liner (Section 3.6.1.45.1.3).

3.9 ANALYTICAL METHODS AND QUALITY ASSURANCE AND QUALITY CONTROL

This section provides information on the analytical methods and QA/QC for candidate feed tank samples, including discussions concerning laboratory selection and analytical methods. For information on process condensate analytical methods and QA/QC, refer to the Hanford Facility RCRA Permit, Part III, LERF/200 Area ETF unit-specific conditions, Chapter 3.0, Waste Analysis Plan.

3.9.1 Laboratory Selection

Because of the samples, it is anticipated that candidate feed tank sample analyses will be conducted at the 222-S Laboratory Complex. Other laboratories at the Hanford Facility could be used provided they are equipped to handle such samples. Laboratory selection depends on availability, analytical needs, and the ability of the laboratory to meet permit and quality assurance requirements.

3.9.2 Analytical Methods

The analytical methods that must be followed for RCRA sampling of the candidate feed tanks are included in Table 3.5. Performance-based specifications rather than procedure-based specifications are used for

determining the appropriate analytical methods. This allows for necessary adjustments to the methods for Hanford Facility-specific issues; related to high radioactivity of the sample matrix, while ensuring acceptable data quality. Because of the high radioactivity, the analytical method will in some cases deviate from those in national standards such as *Test Methods For Evaluating Solid Waste*, SW-846 (EPA 1986) and *Standard Methods for the Examination of Water and Waste Water* (AWWA 1989).

3.9.3 Laboratory Quality Assurance and Quality Control

Candidate feed tank analytical and sampling methods conducted as part of this plan meet the data quality requirements contained in Table 3.7. Quality control check samples (i.e., calibration samples and/or laboratory control samples) generally are performed once per sample event (e.g., once for all samples from one candidate feed tank). Matrix spike and duplicate analysis are performed once per sample event for all methods except differential scanning calorimetry (DSC). A duplicate analysis is performed for DSC analysis to determine method precision. Accuracy for DSC is evaluated by using the laboratory control standard.

The QA/QC program for sampling and analysis related to this unit must, at a minimum, comply with the applicable Hanford Site standard requirements and the regulatory requirements. All analytical data will be defensible and will be traceable to specific, related quality control samples and calibrations.

Table 3.6. Analytical Methods for Candidate Feed Tank Stream Analytes.

Category	Analyte	Performance-based analytical methods	Basis for method	Equipment/Method
Organics	Acetone 2-Butanol 2-Butanone	Purge and trap and GC/MS (VOA)	SW-846 Method 8260	A diluted sample is purged with nitrogen or helium and organic vapors are trapped in an adsorbent column. The column is desorbed at 180° C into a 30-m long wide- or narrow-bore capillary column. The GC column is heated/desorbed into an MS for analysis.
	2-Butoxyethanol Tri-butyl Phosphate	Solvent extraction and GC/MS (semi-VOA)	SW-846 Method 3520B and 8270A	A diluted sample is adjusted to pH <2 (pH <6 in some cases) using sulfuric acid solution. The sample is placed in a continuous liquid-liquid extractor using methylene chloride as the extractant. The extractant is placed in an evaporator and volume is reduced. The extractant is injected into a GC/MS for analysis.
Inorganic	Ammonia	Ion selective electrode	AWWA Method 4500-NH3	The sample is preserved by the addition of hydrochloric acid solution to pH <2. For analysis, a diluted sample is made alkaline by sodium hydroxide solution. The ammonia is measured by an ammonia gas sensing electrode. A standard ammonium chloride solution is added and measured by the electrode in two stages. Based on the three readings, an ammonia concentration is calculated.
Other	Exotherm	Differential scanning calorimeter	N/A	A sample is placed in the DSC unit and heated to 500° C. The differential heat flow between the sample and a reference pan is monitored by thermocouples. A duplicate sample is run on the equipment.
	Mixing and compatibility study	Lab specific	N/A	Solution from each sample are mixed and visually checked for gas evolution, heat generation, precipitation, dissolution of solids, color change, clarity, and any other observable characteristics.

Category	Analyte	Performance-based analytical methods	Basis for method	Equipment/Method
	Total carbon	Combustion with IC_T/TOC coulometric detection OR Persulfate oxidation with IC_T/TOC coulometric detection	Combustion and persulfate treatment: AWWA Method 5310 Coulometry: ASTM D4129 (AWWA approval pending)	A diluted sample is injected into a furnace heated to 800° C while purged with oxygen. The furnace converts carbon to carbon dioxide, which is carried by the oxygen. The gas sample passes through adsorbent columns to remove acid vapors, sulfur oxides and nitrogen oxides. The carbon dioxide is absorbed in an organic solution and measured with a coulometric carbon analyzer. OR: A diluted sample is acidified with sulfuric acid, converting inorganic carbon to carbon dioxide. The sample purged with oxygen, stripping the carbon dioxide. Then, persulfate is added to the sample to oxidize the organic carbon. The sample is again acidified with sulfuric acid and purged with oxygen. The gas samples from both steps pass through an adsorbent column to remove acid vapors, sulfur oxides and nitrogen oxides. The carbon dioxide is absorbed in an organic solution and measured with a coulometric carbon analyzer.
	Total Inorganic Carbon	Acidification with IC_T/TOC coulometric detection	Acidification: AWWA Method 5310. Coulometry: ASTM D4129 (AWWA approval pending) GC/MS - gas chromatography/mass spectrometry VOA - volatile organic analysis IC_T - total inorganic carbon TOC - total organic carbon	A diluted sample is acidified with sulfuric acid/sulfamic acid, converting inorganic carbon to carbon dioxide. The sample purged with oxygen, stripping the carbon dioxide. The gas sample passes through scrubbers to remove acid vapors, sulfur oxides and nitrogen oxides. The carbon dioxide is absorbed in an organic solution and measured with a coulometric carbon analyzer.

Table 3.7. Quality Assurance Requirements for Candidate Feed Tank Stream Analytes

Category	Analyte	Estimated quantitation limit (matrix specific)	Precision (RPD between duplicates), %	Accuracy (recovery of matrix spike[1]), %	Action level [2]
Organics	Acetone	28 mg/L	<25	40-110	> 87 mg/L[3]
	1-Butanol	20 mg/L	<25	30-110	> 226 mg/L[3]
	2-Butoxyethanol	30 mg/L	<25	30-110	> 95.2 mg/L[3]
	2-Butanone (methyl ethyl ketone)	18 mg/L	<25	40-110	> 58 mg/L[3]
	Tri-butyl phosphate	50 mg/L	<25	40-125	> 1.015E+4 mg/L[3]
Inorganic	Ammonia	400 μg/ml	<20	75-125	> 50,000 mg/L
Other	Exotherm	None	<20[4]	Not applicable [4]	< 168 °C or absolute value of ratio of exotherm to endotherm > 1
	Mixing and compatibility study	Not applicable	Not Applicable	Not Applicable	Visual: unusual changes in color, temperature, clarity, etc.
	Total carbon	25 μg/mL	<20	75-125	C_T-IC_T > 87 mg/L
	Total inorganic carbon	25 μg/mL	<20	75-125	C_T-IC_T > 87 mg/L

Reserved.
In deriving the action levels, the ratio of feed flow rate to slurry flow rate (R) is assumed to be 2.
For organic species limits, sum of the fractions rule apply (refer Tables 3.2 and 3.3). Total carbon and total inorganic carbon are not included in the summation of organics.
Precision for this method is evaluated by the deviation between sample (unspiked) and sample replicate.
Accuracy for DSC is evaluated by using the laboratory control standard.
RPD - relative percent difference C_T - total carbon IC_T - total inorganic carbon
Mg/L - milligram per liter μg/L - microgram per liter

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Chapter 4.0 Process Information

Figures

Table

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4.0 PROCESS INFORMATION

Where information regarding treatment, management, and disposal of the radioactive source byproduct material and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954 as amended) has been incorporated into this document, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit or chapter 70.105 RCW and its implementing regulations but is provided for information purposes only.

The 242-A Evaporator receives mixed waste from the DST System that contains inorganic and organic constituents and radionuclides. A 242-A Evaporator simplified process flow diagram is given in Figure 4.1. The 242-A Evaporator separates the mixed waste received from the DST System, generating the following waste streams:

- A concentrated aqueous waste stream (slurry) containing the nonvolatile components, including most of the radionuclides, inorganic constituents, and nonvolatile organics such as tri-butyl phosphate
- A dilute aqueous waste stream (process condensate) containing the volatile components, primarily water with low concentrations of radionuclides, inorganic constituents, and volatile constituents such as ammonia and acetone.

The slurry is routed back to the DST System pending further treatment. The process condensate is transferred to the LERF for storage until processed through the ETF.

The 242-A Evaporator process employs a conventional forced circulation, vacuum evaporation system to concentrate the DST System waste solution. The major components of this system include the reboiler, vapor-liquid separator, recirculation pump and pipe loop, slurry product pump, condenser, jet vacuum system, and condensate collection tank

The vapor-liquid separator, C-A-1, also called the evaporator vessel, and the condensate collection tank, C-100, meet the definition of a tank in WAC 173-303-040. Other process equipment associated with these tank systems is considered ancillary equipment. Drawings that aid in understanding the systems are provided in Section 4.3.

The 242-A Evaporator receives waste from a DST System tank, 241-AW-102 that serves as the 242-A Evaporator feed tank. The feed enters the recirculation line and blends with the main process slurry stream, which is pumped to the reboiler.

In the reboiler, the mixture is heated to the specified operating temperature, normally 38 to 77°C, using 21 to 69 kilopascals gauge pressure steam. The low-pressure steam provides adequate heat input, and the resulting low-temperature differential across the reboiler minimizes scale formation on the heat transfer surfaces. The static pressure of the waste in the reboiler is sufficient to suppress the boiling point so the waste does not boil in the reboiler tubes. Boiling occurs only near or at the liquid surface in the vapor-liquid separator.

The heated slurry stream is discharged from the reboiler to the vapor-liquid separator (C-A-1) that typically is maintained at an absolute pressure of 5.3 to 10.7 kilopascals. Under this reduced pressure, a fraction of the water in the heated slurry flashes to steam and the steam is drawn through two, wire mesh deentrainer pads into a 42-inch diameter vapor line that leads to the primary condenser, leaving behind a more concentrated slurry solution in the vapor-liquid separator.

After a brief residence time in the vapor-liquid separator, the slurry exits from the bottom through the lower portion of the recirculation line and is recirculated by the recirculation pump (P-B-1). The pump discharges the slurry back to the reboiler via the upper portion of the recirculation line, thus completing the recirculation loop.

The specific gravity of the waste liquid is monitored closely to ensure that the target density, established before the beginning of the campaign, is not exceeded. A portion of the slurry is removed from the upper portion of the recirculation line using the slurry pump (P-B-2) and transferred through an encased underground pipeline (pipe-within-a-pipe) to a designated slurry receiver tank in the DST System.

The vapors are drawn from the vapor-liquid separator, through a 42-inch diameter vapor line and enter a series of three condensers, where the vapors are condensed using raw water. The condensed vapors, called process condensate, are collected in tank C-100. Steam jets are used to create a vacuum on the vapor-liquid separator drawing the process vapors into and through the condensers. Noncondensable vapors are drawn from the condensers, then through a series of particulate filters and vented to the atmosphere. The air discharges are monitored continuously when the 242-A Evaporator is operating to verify that standards for radionuclide and ammonia emissions standards are met.

Process condensate contains the volatile constituents of the waste and trace quantities of inorganic materials and radionuclides. The process condensate is pumped from tank C-100 through an encased underground pipeline (pipe-within-a-pipe) to the LERF.

During a campaign, the evaporation process is continuous with typical feed flow rates of 260 to 450 liters per minute, process condensate flow rates of 150 to 230 liters per minute, and slurry flow rates of 110 to 230 liters per minute. The evaporator process is shutdown when the desired endpoint concentration of the slurry is met. Endpoints are established at the beginning of the campaign, based on the target specific gravity of the waste, or allowable waste volume reduction (WVR) and defined operating limits. If the evaporation rate cannot achieve the desired endpoint, slurry in the DST System serving as the slurry receiver is transferred to the feed tank for one or more passes through the 242-A Evaporator. At the end of each campaign, the 242-A Evaporator process equipment is shutdown, emptied, flushed with raw water, and placed in a safe standby mode.

Other discharges during 242-A Evaporator processing include condensate from the steam used to heat the waste and cooling water used to condense the vapors. The 242-A Evaporator is designed to prevent contamination of these streams. The fluids on the uncontaminated side of the heat exchangers are maintained at a higher pressure than the waste stream so that uncontaminated fluid migrates toward the contaminated waste if a leak were to occur. The steam condensate and the cooling water are monitored continuously for radiation, pH, conductivity, and discharged to TEDF as long as none of the discharge limits are exceeded. The steam condensate and cooling water streams were assessed in the stream specific reports (WHC 1990a and WHC 1990b) and are not dangerous waste in accordance with WAC 173-303.

The 242-A Evaporator process is controlled by the MCS. The MCS computer monitors process parameters and controls the parameters where required. Once the configuration parameters and other process control inputs are set, the MCS maintains the process parameters within specified ranges by sending output signals that operate specific pieces of equipment (e.g., control valves).

4.1 TANK SYSTEMS

This section discusses information associated with design requirements, integrity assessments, and any additional requirements for tanks used to treat and store mixed waste in the 242-A Evaporator.

4.1.1 Design Requirements

The following design requirements were addressed in the 242-A Evaporator/Crystallizer Tank System Integrity Assessment Report (IAR) (Appendix 4B):

- Minimum design wall thicknesses and measured wall thicknesses at various points throughout the tank systems

- Design standards used in construction, including references
- Waste characteristics
- Materials of construction and compatibility of materials with the waste being processed
- Corrosion protection
- Seismic design basis evaluation.

The conclusion of the integrity assessment report is that the 242-A Evaporator system is not leaking and is fit for use. The inspections, tests, and analyses performed provide assurance that the tank system has adequate design, sufficient structural strength, and sufficient compatibility with the waste to not collapse, rupture, or fail during operation. The report also states that a review of construction files indicates that the building structure was designed and constructed to withstand a design-basis earthquake.

4.1.2 PC-5000 Transfer line

Process condensate from the 242-A Evaporator is transferred to the LERF using a pump located in the 242-A Evaporator and approximately 1,500 meters of pipe, consisting of a 3-inch carrier pipe within a 6-inch outer containment pipeline. Flow through the pump is controlled through a valve at flow rates from 150 to 300 liters per minute.

The encased fiberglass transfer line (PC-5000) exits the 242-A Evaporator below grade and remains below grade at a minimum 1.2-meter depth for freeze protection, until the pipeline emerges at the LERF catch basin, at the corner of each basin. All piping at the catch basin that is less than 1.2 meters below grade is wrapped with electric heat tracing tape and insulated for protection from freezing. Additional detail including information on secondary containment, leak detection and integrity assessment for this line is provided in § 4.1.6.3.3 and §4.1.4.1.

4.1.3 Vapor-Liquid Separator (C-A-1) and Ancillary Equipment

The following sections describe the vapor-liquid separator (C-A-1) and ancillary equipment.

Waste Feed System. Feed to the 242-A Evaporator is supplied via a pump located in the 241-AW-102 feed tank. The feed pump transfers the waste to the 242-A Evaporator through a 3-inch diameter carbon steel transfer pipeline encased in a 6-inch diameter carbon steel pipe to provide secondary containment. The feed pipeline is equipped with a leak detection system.

Samples can be taken from the waste feed when needed. The feed sampler (SAMP-F-1) is located in a sample enclosure located in the hot equipment storage room.

Evaporator Process Loop. The 242-A Evaporator process loop equipment components are as follows:

- Reboiler (E-A-1)
- Vapor-liquid separator (C-A-1)
- Recirculation pump (P-B-1)
- Recirculation loop.

Figure 4.2 is a simplified process flow diagram showing the major components of the process loop.

Reboiler (E-A-1). Waste is heated as the waste passes through the reboiler before entering the vapor-liquid separator. The reboiler is a vertical tube unit with steam on the shell-side and process solution on the tube-side. The 364 tubes in the reboiler are enclosed in a 1.03-meter outside diameter, 4.6-meter-long stainless steel shell. Both the reboiler shell and tubes are constructed of 304L stainless steel. The shell is 0.64 centimeter thick and the tubes are 14-gauge steel. The reboiler is designed to distribute steam evenly and to prevent tube damage from water droplets that may be present in the steam.

Vapor-Liquid Separator (C-A-1). Process solution from the reboiler enters the vapor-liquid separator via the upper recirculation line. Some of the solution flashes into vapor, which exits through a vapor line at the top of the vapor-liquid separator. The remaining solution (slurry) exits through the recirculation line at the bottom.

The separator consists of a lower and upper section. The lower (liquid) section is a stainless steel shell 4.3 meters in diameter having an 85,200 to 94,600 liter normal operating capacity (including recirculation loop and reboiler). The maximum design capacity is 103,000 liters. The upper (vapor) section is a stainless steel shell 3.5 meters in diameter containing two deentrainment pads. These wire mesh pads remove liquids and solids that entrain into the vapor section of the vessel. Spray nozzles, using recycled process condensate or filtered raw water, wash collected solids from the deentrainment pads and vessel walls. Both sections of the vapor-liquid separator are constructed of 0.95-centimeter-thick stainless steel.

Operating parameters in the vapor-liquid separator are monitored to provide an indication of process problems such as slurry foaming, deentrainer flooding, or excessive vapor temperatures. Instrumentation also is available to monitor the liquid levels in the vapor-liquid separator. Interlocks are activated when high pressures or high- or low-liquid levels are detected, shutting down the evaporation process and placing the facility in a safe configuration.

The vapor-liquid separator and recirculation loop can be flushed to remove any residual solids from the system and/or to reduce radiation levels. The most common flush solution is water, but dilute nitric or citric acid solutions could be used. All acidic flush solutions are chemically adjusted to meet DST acceptance criteria before transfer to the DST System. Antifoam solution is added (at very low flow rates - approximately 0.04 to 0.4 liters per minute) to the vessel to prevent foaming. The antifoam solution is a noncorrosive, nonregulated silicone-based solution that is compatible with the evaporator components.

Recirculation Pump. The stainless steel recirculation pump (P-B-1), is constructed as part of the recirculation loop to the reboiler. The 28-inch diameter axial flow pump has 60,900 liters per minute output. The recirculation pump is designed to handle slurry up to 30 percent undissolved solids by volume at specific gravities up to 1.8. The recirculation pump moves waste at high velocities through the reboiler to improve heat transfer, keep solids in suspension, and reduce fouling of the heat transfer surfaces.

The recirculation pump is equipped with shaft seals with high-pressure recycled process condensate (or water) introduced between the seals to prevent the waste solution from leaking out of the system. Seal water pressure and flow are monitored and controlled to shut down the recirculation pump if conditions are not adequate to prevent waste liquid from migrating into the seal water. The used seal water is routed to the feed tank.

Recirculation Loop. The recirculation loop consists of a 28-inch diameter stainless steel pipe that connects the vapor-liquid separator to the recirculation pump and reboiler. The lower loop runs from the bottom of the vapor-liquid separator to the recirculation pump inlet. The upper loop connects the pump discharge to the reboiler and the reboiler to the vapor-liquid separator. The feed line from the feed tank and the slurry line to underground storage tanks are connected to the upper recirculation line.

Slurry System. The slurry system draws a portion of the concentrated waste from the upper recirculation loop and transfers it to the DST System. The major components of the slurry system are the slurry pump and the slurry transfer pipelines. Figure 4.3 shows a simplified flow diagram of the slurry system. These components are described in the following paragraphs.

The slurry pump (P-B-2) is used to transfer slurry from the recirculation loop to the underground storage tanks. The pump is driven by a variable speed motor and is constructed of 304L stainless steel. The slurry pump is designed to generate high pressures to alleviate the possibility of a transfer line plugging.

Interlocks control the operation of the slurry pump. The slurry pump (P-B-2) is shutdown if any of the following occur:

- Excessive pressure is detected in the slurry lines to 241-AW Tank Farm
- A leak is detected in the slurry transfer lines secondary containment
- A leak is detected in the 241-AW Tank Farm process pits where the transfer lines enter the DST System.

The slurry pump uses a shaft seal with recycled process condensate (or water) and pressure and flow controls similar to the system described above for the recirculation pump.

Transfer pipelines are 2-inch diameter, carbon steel encased lines which route slurry to a designated underground DST within the 200 East Area. All transfer pipelines are encased in a secondary containment pipe and equipped with leak detectors between the primary and encasement piping. The pipelines are sloped to drain to the valve pit. The detection of any leak automatically shuts off the slurry pump.

The flow rate of the slurry transfer to the DST System is monitored and a decrease in flow below a specified value automatically will shut down the slurry pump (P-B-2) and initiate a line flush with water. The objective of flushing the transfer line is to prevent settling of solids, which precludes plugging the slurry transfer lines.

Samples can be taken from the slurry line when needed via a sampler (SAMP-F-2) that is located near the feed sampler in the load out and hot equipment storage room.

4.1.3.1 Condensate Collection Tank (C-100) and Ancillary Equipment

The following section discusses the condensate collection tank (C-100) and ancillary equipment. This equipment collects process condensate via the condensers in the vacuum condenser system, filters the condensate, and pumps the process condensate to LERF. Figure 4.4 provides a simplified process flow diagram showing the major components of the process condensate system. The following major components make up the process condensate system:

- Vacuum condenser system
- Condensate collection tank (C-100)
- Process condensate pump (P-C-100)
- Condensate filters (F-C-1, F-C-2, and F-C-3)
- Process condensate radiation monitoring, sampling system and diversion system (RC3)
- Seal pot
- Process condensate recycle system.
- Vessel Vent System

Vacuum Condenser System. Vapors removed from the vapor-liquid separator flow to a series of three condensers where the vapors are condensed using raw water. Condensate drains to the condensate collection tank (C-100). The vacuum condenser system consists of the following major components:

- Primary condenser (E-C-1)
- Intercondenser (E-C-2)
- Aftercondenser (E-C-3)

- Steam jet ejectors (J-EC1-1 and J-EC2-2).

Figure 4.5 provides a simplified process flow diagram showing the major components of the vacuum condenser system. These system components are discussed in the following sections.

Primary Condenser (E-C-1). Vapors drawn from the vapor-liquid separator flow through the 42-inch (3.5 feet) vapor line, into the E-C-1 condenser where the majority of the condensation takes place. Noncondensed vapors exit to the intercondenser (E-C-2) while the condensed vapors (process condensate) drain to the condensate collection tank (C-100). Cooling water passes through the cooling tubes and exits to TEDF.

The carbon steel condenser shell measures approximately 5.3 meters (17.4 feet) long and has a 2.2-meter (7.2 feet) inside diameter. The condenser consists of 2,950 equally spaced carbon steel tubes that are 3.6 meters (11.8 feet) long with a 1.9-centimeter (0.75 inches) outside diameter.

Intercondenser (E-C-2). Noncondensed vapors from E-C-1 enter the intercondenser. The vapor stream contacts the cooling tubes in the condenser where cooling water provides additional condensation. The condensate drains to the condensate collection tank (C-100). Noncondensed vapors and used cooling water are routed to the aftercondenser.

The carbon steel intercondenser measures 2.2 meters (7.2 feet) long with a 0.39 meter (1.3 feet) inside diameter. This heat exchanger contains 144 tubes that are 1.7 meters (5.6 feet) long with a 1.9-centimeter (0.75 inches) outside diameter.

Aftercondenser (E-C-3). Vapor discharged from the intercondenser enters the aftercondenser. Cooling is supplied to the aftercondenser by the cooling water from the intercondenser. Condensate is routed to the condensate collection tank (C-100), while the noncondensed vapors are filtered, monitored, and discharged to the atmosphere through the vessel ventilation system. The cooling water is discharged to TEDF.

The carbon steel aftercondenser measures 2.3 meters (7.5 feet) long and has a 0.20-meter (0.66 feet) inside diameter. This heat exchanger contains 45 tubes that are 1.8 meters (5.9 feet) long with a 1.9-centimeter (0.75 inches) outside diameter.

Steam Jet Ejectors. The vacuum that draws the vapors from C-A-1 into the condensers is created by a two-stage steam jet ejector system. The first-stage jet ejector (J-EC1-1) maintains a vacuum on the primary condenser, which in turn creates a vacuum on the vapor-liquid separator. The ejector consists of a steam jet, pressure controller, and air bleed-in valve. Steam and noncondensed vapors from the primary condenser are ejected from J-EC1-1 into the intercondenser. The desired vacuum is obtained by controlling steam pressure and bleeding ambient air as necessary into the vapor header through an air intake filter. The second-stage jet ejector (J-EC2-1) creates the vacuum that moves vapors from the intercondenser through the aftercondenser.

Condensate Collection Tank (C-100). Process condensate from the primary condenser, intercondenser, aftercondenser, and the vessel ventilation system drain to the condensate collection tank (C-100). The tank is 4.3 meters in diameter, 5.8 meters high, and is constructed of 0.79-centimeter (0.31 inches)-thick stainless steel. The tank has a maximum design capacity of 67,400 liters (17,805 gallons). Normal operating volume is approximately 50 percent of the tank capacity. A carbon steel base supports the tank. An agitator is installed but not used.

In the event of a tank overflow, the solution is routed through an overflow line to the drain system, which returns waste to the feed tank (241-AW-102). Overflow occurs when the volume exceeds about

60,600 liters. The overflow line is equipped with a liquid filled trap to isolate the drain system from the tank.

Process feed samples are evaluated for the presence of a separate organic layer and process controls are used to reduce the risk of the condensate collection tank to receive small amounts of immiscible organics with the condensed waste. If detected, the organic layer is removed by overflowing tank C-100 back to the feed tank 241-AW-102. The liquid level in the tank is controlled well above the discharge pump intake point and a controlled overflow is conducted upon completion of each processing cycle (campaign) to ensure that an organic layer does not accumulate and cannot be pumped to LERF.

Process Condensate Pump. A pump (P-C-100) moves the process condensate from tank C-100 through the condensate filter to LERF. The process condensate pump is a centrifugal pump constructed of 316 stainless steel.

Condensate Filters. After leaving the condensate collection tank, the process condensate is filtered to remove solids. The primary condensate filter (F-C-1) has a welded steel housing. A second filter system (F-C-3), installed downstream is also used to filter the process condensate. This system has duplex in-line filters in a cast iron housing. Both filters employ a filter material that is compatible with the process condensate.

Process Condensate Radiation Monitoring, Sampling and Diversion System. The process condensate transferred to LERF is monitored continuously for radiation. If radiation levels exceed established limits, an alarm is received and interlocks immediately divert the stream back to the condensate collection tank (or the feed tank) and shut off the process condensate pump. This ensures process condensate containing excessive radionuclides due to an accidental carryover from the vapor-liquid separator is not transferred to LERF.

Seal Pot. The condensate collection tank receives condensed liquids from the vessel ventilation system. A seal pot collects the drainage before discharge into the condensate collection tank and isolates the tank from the vessel ventilation system.

Condensate Recycle System. For waste minimization, a portion of the process condensate from tank C-100 is recycled for use as decontamination solution for the deentrainment pad sprays and seal water for the recirculation pump (P-B-1) and slurry pump (P-B-2). Use of process condensate instead of raw water results in approximately 10 percent reduction in waste volume generated during continuous operation of the 242-A Evaporator. Filtered raw water also is available as a backup for sprays and seal water. A 2-inch (5.1 centimeters) diameter carbon steel line, stainless steel centrifugal pump (P-C106), and filters (F-C-5 and F-C-6) supply process condensate from tank C-100 to the pad sprays and pump seals. The filters are disposable cartridge filters in carbon steel housings arranged in parallel with one filter in service while the other is in standby.

4.1.4 Integrity Assessments

The integrity assessment report (Appendix 4B, Integrity Assessment Report) discusses:

- The standards used during design and construction of the 242-A Evaporator and the adequacy of those standards
- The characteristics of the DST waste processed
- The adequacy of the materials of construction to provide corrosion protection from the waste processed
- The age of the tanks and the affect of age on tank integrity

- The results of the leak tests, visual inspections, and tank wall thickness inspections
- The frequency and scope of future integrity assessment
- Deficiencies in secondary containment design. These deficiencies are discussed in-the integrity assessment report.

An independent, qualified, registered professional engineer certified the integrity assessment.

The inspections, tests, and analyses performed provide assurance that the 242-A Evaporator tank system has adequate design, sufficient structural strength, and sufficient compatibility with the waste to not collapse, rupture, or fail during operation. No evidence of degradation was noted during the visual test, ultrasonic test, or leak test. Both condensate collection tank C-100 and the vapor-liquid separator/reboiler loop passed leak tests. The frequency of subsequent integrity assessments has been established at every 10 years. This frequency is based on the results of the 1998 integrity assessment.

4.1.4.1 PC-5000

An integrity assessment for PC-5000 was performed, including a hydrostatic leak/pressure test at 10.5 kilograms per square centimeter gauge (150 pounds per square inch). A statement by an independent, qualified, registered professional engineer attesting to the integrity of the piping system is included in *Integrity Assessment Report for the 242-A Evaporator/LERF Waste Transfer Piping, Project W105* (WHC 1993), along with the results of the leak/pressure test.

4.1.5 Additional Requirements for Existing Tanks

Refer to information in Section 4.1.2 and the integrity assessment report, which includes measuring tank wall thicknesses, evaluating corrosion protection, and performing leak tests.

4.1.6 Secondary Containment and Release Detection for Tank Systems

This section describes the design and operation of secondary containment sumps, drain lines, and leak detection systems for the 242-A Evaporator.

4.1.6.1 Requirements for All Tank Systems

The Construction Specification for 242-A Evaporator-Crystallizer Facilities Project B-100 (Vitro 1974) was used during preparation, design, and construction of the tank and secondary containment systems. The integrity assessment report details how the construction specification relates to the national codes and standards.

Constructing the building and vessels per this specification ensures that foundations are capable of supporting tank and secondary containment systems and that uneven settling and failures from pressure gradients do not occur. The integrity assessment report (Appendix 4B) states that the 242-A Evaporator has adequate design, sufficient structural strength, and sufficient compatibility with the wastes to not collapse, rupture, or fail during service loads associated with normal operations and that the building structure was designed and constructed to withstand a design basis earthquake".

The integrity assessment report (Appendix 4B) describes the building and secondary containment system. This system is designed to ensure any release is detected within 24 hours. The secondary containment system also is designed to contain 100 percent of the maximum operating capacity of the vapor-liquid separator/reboiler loop, and the drain systems are sloped to allow collection of solution and have sufficient capacity to drain this volume in less than the required 24 hours.

The integrity assessment report describes the protective coating material and sealant used to protect concrete and joints from attack by leaks to the secondary containment. The materials of construction for the sump and drain lines are also compatible with the waste processed at the 242-A Evaporator.

4.1.6.2 242-A Building Secondary Containment

The 242-A Building serves as a secondary containment vault for the vapor-liquid separator (C-A-1), condensate collection tank (C-100), and ancillary equipment used for transferring mixed waste at the 242-A Evaporator. The concrete for the operating area was poured to form a monolithic structure. Where needed, joints in the concrete were fabricated with preformed filler conforming to the standards of the American Society of Testing and Materials. Joint filler is sealed with a polysulfide sealant per the requirements of the construction specifications (Vitro 1974).

Before restart in 1994, a new acrylic special protective coating was applied to the concrete in the pump, evaporator, and condenser rooms. The coating meets the requirements of the construction specifications (Vitro 1974), including resistance to very high radiations doses, temperatures of 77° C, and spills of 25 percent caustic solution.

The following six rooms contain equipment used to process or store*mixed waste:

- Pump room
- Evaporator room
- Condenser room
- Ion exchange room
- Load out room* (used for temporary storage of mixed waste)
- Hot equipment storage room.

4.1.6.2.1 Pump Room

The pump room secondary containment walls are 0.38 to 0.56-meter (1.25 to 1.84-feet) thick reinforced concrete. The secondary containment floor is 0.51-meter-thick reinforced concrete. The pump room floor is lined with 0.64-centimeter (0.25-inch) stainless steel and the concrete walls and ceiling cover blocks are painted with a special protective coating. The pump room contains pipe jumpers used to transport feed and slurry solutions between the vapor-liquid separator and the DST System, and the process recirculation loop, recirculation pump (P-B-1), and slurry pump (P-B-2).

Leaks in the pump room collect in the pump room sump, a 1.5-meter (4.9-feet) by 1.5-meter (4.9-feet) by 1.8-meter (5.9 feet) deep sump with a 0.64-centimeter (0.25-inch) stainless steel liner. The pump room sump collects spills from various sources for transfer to the feed tank, 241-AW-102. Figure 4.6 provides a simplified process flow schematic of sources, which drain to the pump room sump. Drainage to the sump includes:

- Leaks to the pump room floor from equipment in the pump room
- Evaporator room floor drain
- Hot equipment storage room floor drain
- Loadout room floor drain
- Raw water backflow preventer drain.

Solution in the pump room sump is transferred to the feed tank (241-AW-102) using a steam jet. A 10-inch secondary containment overflow line is provided for draining large volumes of solution should a catastrophic tank failure occur. Because the overflow line provides a direct path between the air space of tank 241-AW-102 and the pump room, a minimum level of water must be maintained in the sump to

prevent cross ventilation. A leak into the pump room sump would be detected by a rise in the sump level. Instrumentation provided alarms on high sump level.

The recirculation and slurry pumps in the pump room are equipped with mechanical seals having pressurized water introduced between the seals. The seal water is maintained at a pressure that exceeds the process pressure at the seal to ensure water leaks into the process solution, but waste solution does not leak out. Water from seal leakage is collected in funnels in the pump room and routed to feed tank 241-AW-102 via the 10-inch overflow line described previously.

4.1.6.2.2 Evaporator Room

The evaporator room secondary containment walls are 0.56-meter-thick reinforced concrete. The secondary containment floor is 0.51-meter-thick reinforced concrete. The evaporator room contains the vapor-liquid separator vessel (C-A-1), part of the recirculation loop, the reboiler, the 42-inch vapor line, and line used to empty the vapor-liquid separator to feed tank 241-AW-102.

Leaks in the evaporator room flow to a floor drain that routes through a 3-inch line to the pump room sump described in Section 4.1.6.2.1. A leak in the evaporator room would be detected by a rise in the pump room sump level. The floor of the evaporator room and a portion of the pump room floor are 3.0 meters below grade to contain the entire contents of the vapor-liquid separator, reboiler, and recirculation loop in the event of a catastrophic failure. The floor and walls of the evaporator room up to an elevation of 1.8 meters are painted with a special protective coating.

4.1.6.2.3 Condenser Room

The condenser room secondary containment walls are 0.36- to 0.56-meter-thick reinforced concrete. The secondary containment floor is 0.51-meter-thick reinforced concrete. The condenser room contains all the components of the process condensate system described in Section 4.1.3.1 (refer Figure 4.4), including tank C-100.

Leaks in the condenser room flow to two floor drains that join and route through a 6-inch line to feed tank 241-AW-102. Leaks in the condenser room are detected by the following:

- Unexpected changes in liquid level in tank C-100. Instrumentation is provided to monitor liquid level in the tank, including high- and low-level alarms.
- Daily visual inspections of process condensate system components and piping.

The floor and walls of the condenser room up to an elevation of 1.2 meters are painted with a special protective coating.

4.1.6.2.4 Load out and Hot Equipment Storage Rooms

The load out and hot equipment storage rooms secondary containment walls are 0.30- to 0.56-meter (0.98- to 1.84-feet) thick reinforced concrete. The secondary containment floors are 0.15-meter (0.49-feet) thick reinforced concrete. The room contains two recirculation lines and samplers used to sample the feed and slurry streams. The lines and samplers are located in a shielded enclosure adjacent to the pump room wall.

The load out and hot equipment storage room contains two sumps: the drain sump and decontamination sump. The sumps are 0.91 meter in diameter, about 1.2 meters deep, and lined with stainless steel. Both sumps drain via a 3-inch drain line to the pump room sump described in Section 4.1.6.2.1. The sumps, floor, and walls of the load out and hot equipment storage room up to an elevation of 3.8 meters are painted with a special protective coating.

Leaks in the sampler piping, flow into two drains in the sample enclosure, which drain via a 2-inch line to the decontamination sump, which drains to the pump room sump (described in 4.1.6.2.1). Leaks in the sampler piping are detected by leak detectors in the sampler enclosures or a rise in the pump room sump level.

4.1.6.2.5 242-A Building Drain Lines

Figure 4.6 provides a simplified process flow schematic of sources routed to the 242-A Building drain lines. The 242-A TSD unit boundary includes these lines up until they exit the 242-A Building. At this point, the lines are considered DST system components. Four lines serve to drain the 242-A Building and equipment to feed tank 241-AW-102:

- Pump room sump drain line (DR-334): a 10-inch carbon steel line that transfers process condensate overflow/diverted liquids and empty-out of the pump room sump to the feed tank
- Vapor-liquid separator vessel drain line (DR-335): a 10-inch carbon steel line that allows gravity drain of the vessel to the feed tank
- Condenser room drain line (DR-343): a 6-inch carbon steel line that drains potential leakage from the condenser room.
- Diverted process condensate drain line (DR-338): process condensate liquid drains through DR-338 into sump drain line (DR-334) which drains to 241-AW-102.

The four lines are sloped to drain about 170 meters to feed tank 241-AW-102 via the drain pit (241-AW-02D). Although WAC 173-303-640(1)(c) exempts systems that serve as secondary containment from requiring secondary containment, drain lines DR-334, DR-335, and DR-338 have outer encasement piping.

The drain lines are connected to a cathodic protection system to prevent external corrosion from contact with the soil. The cathodic protection system consists of:

- A rectifier that converts supplied alternating current voltage to an adjustable direct current voltage
- Numerous anodes buried near the underground piping and connected to the rectifier.
- Return wiring that connects the piping to the rectifier, completing the circuit.

The rectifiers are inspected to component degradation has not occurred. Test stations along the system are checked annually to verify 0.85 volt is maintained on the system, as required by the National Association of Corrosion Engineers.

Further detail regarding design and construction of DR-334,-335,-338 and -343 is provided in DOE/RL-90-39 (Hanford Facility Dangerous Waste Permit Application Double-Shell Tank System). Further detail regarding the design, operation, maintenance, and inspection of the cathodic protect system for these lines are also provided in DOE/RL-90-39.

4.1.6.3 Transfer Line Containment

This section describes the design and operation of secondary containment and leak detection systems for transfer lines between the DST System and the 242-A Evaporator, and from 242-A to LERF (one line only, PC-5000). The 242-A TSD boundary for lines running between 242A and the DST System ends at exterior wall of 242-A building. At this point, these lines (e.g., feed and slurry line piping) are DST System components. For further detail regarding SN-269, SN-270, SL-167, and SL-168 refer to DOE/RL-90-39.

The PC-5000 transfer line transfers process condensate (Section 4.1.2) from the 242-A building to LERF. The 242-A TSD unit boundary includes PC-5000 up to the LERF fence line (Chapter 1.0, topographic map, and Section 4.1.2, for the TSD unit boundary)

4.1.6.3.1 Feed Line Piping

Two feed lines (SN-269 and SN-270) (one in service and one spare), each consist of 3-inch transfer piping within a 6-inch secondary containment encasement piping. Both the transfer and encasement pipes are constructed of Schedule 40 carbon steel. The lines run below grade about 120 meters from pump pit 241-AW-02E (above feed tank 241-AW-102) to the 242-A Building.

To detect transfer-piping failures, leak detector risers equipped with conductivity probes are installed on the encasement lines. The transfer piping and encasements are sloped towards the conductivity probe, which, on leak detection, annunciates an alarm in the 242-A Evaporator control room. A valve in the pump pit (241-AW-02E) can be opened to drain solution from the encasement pipe into the pit, which drains to feed tank 241-AW-102.

4.1.6.3.2 Slurry Line Piping

The slurry pump (P-B-2) transfers solution through one of two transfer lines: SL-167, for transfer to valve pit 241-AW-B (standard configuration), or SL-168 for transfer to valve pit 241-AW-A (alternate configuration, presently out of service). Slurry solution can be routed via double-encased piping from these valve pits to any designated DST slurry receiver. Both slurry transfer lines consist of 2-inch transfer piping within a 4-inch secondary containment encasement piping. Both the transfer and encasement pipes are constructed of Schedule 40 carbon steel. The lines run below grade about 73 meters between the 242-A Building and the valve pits.

These slurry lines contain leak detector risers and conductivity probes similar to the feed line piping described in Section 4.1.6.3.1.

4.1.6.3.3 PC-5000

The process condensate transfer line (PC-5000) from the 242-A Evaporator is centrifugally cast, fiberglass-reinforced epoxy thermoset resin pressure pipe fabricated to meet the requirements of ASME D2997 (ASME 1984). The 3-inch (7.6-cm) carrier piping is centered and supported within 6-inch (15.2-cm) containment piping. Pipe supports are fabricated of the same material as the pipe, and meet the strength requirements of ANSI B31.3 (ANSI 1987) for dead weight, thermal, and seismic loads.

Drawing H-2-79604 provides details of the piping from the 242-A Evaporator to LERF.

This permit includes the portion of the PC-5000 line leaving the 242-A Evaporator facility to the fence line of LERF (Chapter 1.0 and topographic maps for unit boundary).

Single-point electronic leak detection elements are installed along the transfer line at 305-meter (1000 foot) intervals. The leak detection elements are located in the bottom of specially designed test risers. Each sensor element employs a conductivity sensor, which is connected to a cable leading back to the 242-A Evaporator control room. If a leak develops in the carrier pipe, fluid will travel down the exterior surface of the carrier pipe or the interior of the containment pipe. As moisture contacts a sensor unit, the alarm sounds in the 242-A Evaporator and/or the ETF control room and the zone of the leak is indicated on the digital display. The pump located in the 242-A Evaporator is shut down, stopping the flow of aqueous waste through the transfer line. A low-volume air purge of the annulus between the carrier pipe and the containment pipe is provided to prevent condensation buildup and minimize false alarms by the leak detection elements.

4.1.6.4 Additional Requirements for Specific Types of Systems

Addressed in this section are additional requirements in WAC 173-303-640 for vault systems like the 242-A Building to ensure neither buildup of ignitable vapors nor does infiltration of precipitation occur. This section also addresses secondary containment for ancillary equipment and piping associated with the tank systems.

4.1.6.4.1 Vault Systems

The 242-A Building is a vault constructed partially below ground, providing secondary containment for the tank systems. The DST System waste processed at the 242-A Evaporator is designated ignitable and reactive because of the presence of nitrite and nitrate salts, which are considered oxidizers per 49 CFR 173. Because of their low volatility, these compounds are unlikely to be present in the vapor phase of the tank systems at the 242-A Evaporator. However, to prevent the spread of contamination, the vapor-liquid separator (C-A-1) is ventilated and maintained at lower air pressure than the building air space. This ensures air leakage is from uncontaminated building air space into the tank vapor space. Vapors from the vapor-liquid separator flow to the vacuum condenser system described in Section 4.0.

The condensate collection tank (C-100), collects process condensate that is not designated ignitable or reactive.

The tank systems and ancillary equipment are located within the 242-A Building, which is completely enclosed to prevent run-on and infiltration of precipitation into the secondary containment system.

4.1.6.4.2 Ancillary Equipment

The 242-A Building provides secondary containment for ancillary equipment. Double containment is provided for the feed and slurry transfer lines between the 242-A Building and the AW Tank Farm by pipe-in-pipe arrangements. Therefore, all ancillary equipment has secondary containment and the daily inspection requirements in WAC 173-303-640(4)(f) are not applicable.

4.1.7 Variances from Secondary Containment Requirements

The integrity assessment report (Appendix 4B) discusses the following three deficiencies associated with the secondary containment system:

Pump Room Sump. The pump room sump does not comply with secondary containment requirements because liquid must be kept in the sump to provide a seal to prevent airflow between the pump room and feed tank 241-AW-102. Although the sump has a 0.63-centimeter (0.25-inch)-thick stainless steel liner to prevent corrosion of the concrete floor, the sump does not have secondary containment.

Routine Discharges through Secondary Containment. The configuration of the 242-A Evaporator process requires routine, batch discharges of dangerous waste through secondary containment drain lines. These routine discharges include the following.

- Steam condensate, cooling water, and process condensate sample stations drain to the feed tank, 241-AW-102, through drain line DR-343. Total discharge is about 38 liters (10 gallons) per month during operation.

- Sample bottle water sprays down in the feed and slurry sample stations drain to the decontamination sump in the load out and hot equipment storage room. The decontamination sump then drains to the pump room sump. Total discharge is about 76 liters per month during operation.

Transfer Piping Wall Penetrations. Three dangerous waste transfer line piping sections passing through the 242-A Building wall are single-walled, i.e., no secondary confinement in the wall (about 56-centimeter-thick reinforced concrete).

These deficiencies were identified to Ecology, October 28, 1993. Ecology's response stated, "No physical revision of the pipe wall penetrations or the floor drains in the evaporator pump room will be required prior to evaporator restart." The response required the following.

- If at any time leakage is seen or detected from these installations, or if for any reason these installations are repaired or rebuilt, they will be rebuilt or repaired in accordance with regulations.

- Should a spill occur in the evaporator pump room, the sump and the piping shall be rinsed three times as required in WAC 173-303-160, as appropriate. 'Appropriate' in this case means that the original regulation was written for a free container, not a sump, so that judgment will have to be used in the application of the regulation. The rinsate shall be transferred to the double-shell tanks.

4.1.8 Tank Management Practices

All waste to be processed at the 242-A Evaporator must be sampled to determine if the waste is compatible with the materials of construction at the 242-A Evaporator. Before each campaign, candidate feed tanks are sampled per the requirements of the waste analysis plan (Chapter 3.0). Based on the results, three possible options are implemented.

- The waste is acceptable for processing without further actions.

- The waste is unacceptable for processing as a single batch, but is acceptable if blended with other waste that is going to be processed.

- The waste is unacceptable for processing.

The 242-A Evaporator process is controlled by the MCS. The MCS computer monitors liquid levels in the vapor-liquid separator (C-A-1) and condensate collection tank (C-100). The MCS system manages liquid levels in the C-A-1 using an auto-cascade function that controls feed delivery to the C-A-1 vessel. The MCS system also manages liquid levels in the C-100 using an auto-cascade function to maintain the tank level at approximately 50-percent. The MCS has alarms that annunciate on high-liquid levels for both C-A-1 and C-100 to notify operators that actions must be taken to prevent overfilling of these vessels.

An interlock is activated when high-liquid level in the vapor-liquid separator (C-A-1) is detected, automatically shutting down the feed transfer pump at feed tank 241-AW-102, thereby preventing overfilling of the vessel and carryover of slurry into the process condensate system. The condensate collection tank (C-100) has an overflow line that routes solution to feed tank 241-AW-102 in case of overfilling.

Process and instrumentation drawings are listed in Section 4.3.

4.1.9 Labels or Signs

A labeling upgrade was completed before restart in 1994 for tank C-100 to identify the waste contents and major risks associated with waste stored within the tank. Tank C-100 ancillary piping is labeled "PROCESS CONDENSATE" to alert trained personnel which pipes in the condenser room contain dangerous waste. The vapor-liquid separator (C-A-1) is located in the evaporator room, a normally unoccupied area. This area is posted as a high radiation area with ALARA access controlled and limited

to trained personnel only. The tank labels are visible from the walls of the tank enclosure rooms, which are less than 15 meters from the tank systems; therefore, label visibility requirements are met.

4.1.10 Air Emissions

Tank systems that contain extremely hazardous waste, and is acutely toxic by inhalation must be designed to prevent the escape of such vapors. The DST System waste in the vapor-liquid separator, C-A-1, is designated extremely hazardous waste; however, no determination has been performed to determine if the waste is acutely or chronically toxic. Most of the toxic compounds in the DST waste are not volatile, but because of the high radioactivity of the waste, controls are included to prevent or mitigate the release of tank vapors. The vapor-liquid separator is maintained under vacuum to ensure air leakage is from uncontaminated building air space into the tank vapor space. The boiling vapor in C-A-1 passes through deentrainment pads and sprays to prevent liquid and solid carryover into the vapor section of the tank. The vapor stream passes through three condensers that remove the condensable components. The noncondensable vapors pass through HEPA filters before being discharged to the environment.

4.1.11 Management of Ignitable or Reactive Wastes in Tank Systems

Although the DST System waste reprocessed at the 242-A Evaporator is designated ignitable because of the presence of oxidizers (nitrates and nitrites), the waste does not meet the definition of a combustible or flammable liquid given in National Fire Protection Association (NFPA) code number 30 (NFPA 1996). The buffer zone requirements in NFPA-30, which require tanks containing combustible or flammable solutions be a safe distance from each other and from public way, are not applicable.

An analysis is performed on the DST System waste to be processed to verify the waste does not react exothermically at the elevated temperatures at the 242-A Evaporator. The waste analysis plan (Chapter 3.0) discusses waste acceptance requirements due to reactive waste designation.

4.1.12 Management of Incompatible Wastes in Tank Systems

Waste transferred to the 242-A Evaporator must be compatible before mixing. The waste analysis plan (Chapter 3.0) includes waste compatibility requirements.

4.2 AIR EMISSIONS CONTROL

This section addresses the requirements of Air Emission Standards for Process Vents, under Subpart AA (incorporated by reference in WAC 173-303-690).

4.2.1 Applicability of Subpart AA Standards

The 242-A Evaporator performs distillation that specifically requires evaluation of process vents for the applicability of 40 CFR 264 Subpart AA.

Waste processed at the 242-A Evaporator routinely contains greater than 10 parts per million organic concentrations; therefore, organic air emissions are subject to 40 CFR 264.1032, which requires organic emissions from all affected vents at the Hanford Facility be less than 1.4 kilograms per hour and 2.8 megagrams per year, or control devices be installed to reduce organic emissions by 95%.

The 242-A Evaporator has one process ventilation system that vents both the vapor-liquid separator (C-A-1) and the condensate collection tank (C-100). The vent lines from both tanks combine before entering an off-gas system consisting of a deentrainer, a prefilter/demister, HEPA filters, and an exhaust fan. The vessel vent off-gas system is located on the third floor of the condenser room, with the

exhaust stack extending horizontally through the east wall of the building at an elevation of 14.7 meters above ground level. The exhaust stack bends to run vertically with the discharge point 18.6 meters above ground level.

The annual average flow rate for the vessel vent is given in *Radionuclide Air Emissions Report for the Hanford Site - Calendar Year 1995* (DOE-RL 1996) as 18 cubic meters per minute and the total annual flow was 9.6 E+06 cubic meters. During waste processing, the airflow is about 20.5 cubic meters per minute, with about 4.3 cubic meters per minute ventilated from tank C-100 and the remainder from the vapor-liquid separator and air inleakage.

Organic emissions occur during waste processing, which is less than 6 months (182 days) each year. This is the maximum annual operating time for the 242-A Evaporator, as shutdowns are required during the year for maintenance outages, candidate feed tank analysis, and establishing transfer routes for staging waste in the DST System. The total operating time for the two campaigns in 1994 was 86 days.

4.2.2 Process Vents - Demonstrating Compliance

This section outlines how the 242-A Evaporator complies with the requirements of 40 CFR 264, Subpart AA, including a discussion of the basis for meeting the organic emission limits, calculations demonstrating compliance, and conditions for reevaluating compliance.

4.2.2.1 Basis for Meeting Limits/Reductions

The TSD units at the Hanford Facility subject to 40 CFR 264, Subpart AA meet the organic air emission limits of 1.4 kilograms per hour and 2.8 megagrams per year, established in 40 CFR 264.1032, by the design of the facility. The 242-A Evaporator and the other TSD units collectively can meet these standards without the use of air pollution control devices.

4.2.2.2 Demonstrating Compliance

Process vent organic air emissions are controlled by establishing limits for acceptance of waste at the 242-A Evaporator. Before startup of each campaign, the waste to be processed is sampled in the DST System to determine the organic content. If the concentrations of organic constituents are less than the limits in the waste analysis plan (Chapter 3.0), the waste can be processed, provided the Hanford Facility will not exceed 1.4 kilograms per hour and 2.8 megagrams per year. The waste acceptance limits in the waste analysis plan are based on equilibrium calculations and assumptions given in *Organic Emission Calculations for the 242-A Evaporator Vessel Vent System* (WHC 1996). The calculation to determine organic emissions consists of the following steps:

1. Determine the emission rate of each candidate feed tank organic constituent by multiplying the constituent concentration by the corresponding partition factor in *Organic Emission Calculations for the 242-A Evaporator Vessel Vent System* (WHC 1996).
2. Sum the emission rates of all organic constituents to determine the emission rate for the candidate feed tank. The maximum emission rate for the campaign is the rate from the candidate tank with the greatest emission rate.
3. Determine the total amount of emission during the campaign by using operating time and a weighted average emission rate, based on the volume of each candidate feed tank processed.

The organic emission rates and quantity of organics emitted during the campaign are determined using these calculations and are included in the operating record for each campaign, as required by 40 CFR 264.1035. The Hanford Facility has a system to ensure organic emissions from units subject to

40 CFR 264, Subpart AA are less than the limits of 1.4 kilograms per hour and 2.8 megagrams per year. Records documenting total organic emissions are available for Ecology review on request.

4.2.2.3 Reevaluating Compliance with Subpart AA Standards

Calculations to determine compliance with Subpart AA will be reviewed when any of the following conditions occur at the 242-A Evaporator:

- Changes in the configuration or operation that affect the assumptions in the Organic Emission Calculations for the 242-A Evaporator Vessel Vent System (WHC 1996).
- Annual operating time exceeds 182 days.

4.3 ENGINEERING DRAWINGS

The drawings in Table 4.1 are process and instrumentation diagrams for the systems at the 242-A Evaporator that contact mixed waste. These drawings are provided for general information, and demonstrate adequacy of the tank systems design.

Table 4.1. Process and Instrumentation Diagrams

System	Drawing Number	Drawing Title
Vapor-Liquid Separator	H-2-98988 Sheet 1	P & ID Evaporator Recirc System
Reboiler/Recirculation Line	H-2-98988 Sheet 2	P & ID Evaporator Recirc System
Slurry System	H-2-98989 Sheet 1	P & ID Slurry System
Condensate Collection Tank	H-2-98990 Sheet 1	P & ID Process Condensate System
Secondary Containment Drain System	H-2-98995 Sheet 1	P & ID Drain System
Secondary Containment Drain System	H-2-98995 Sheet 2	P & ID Drain System
Condensers	H-2-98999 Sheet 1	P & ID Vacuum Condenser System
Pump Room Sump	H-2-99002 Sheet 1	P & ID Jet Gang Valve System
Condensate Recycle System	H-2-99003 Sheet 1	P & ID Filtered Raw Water System
Process Condensate Line PC-5000	H-2-79604	Piping Plot for PC-5000 between 242 A and the LERF fence line

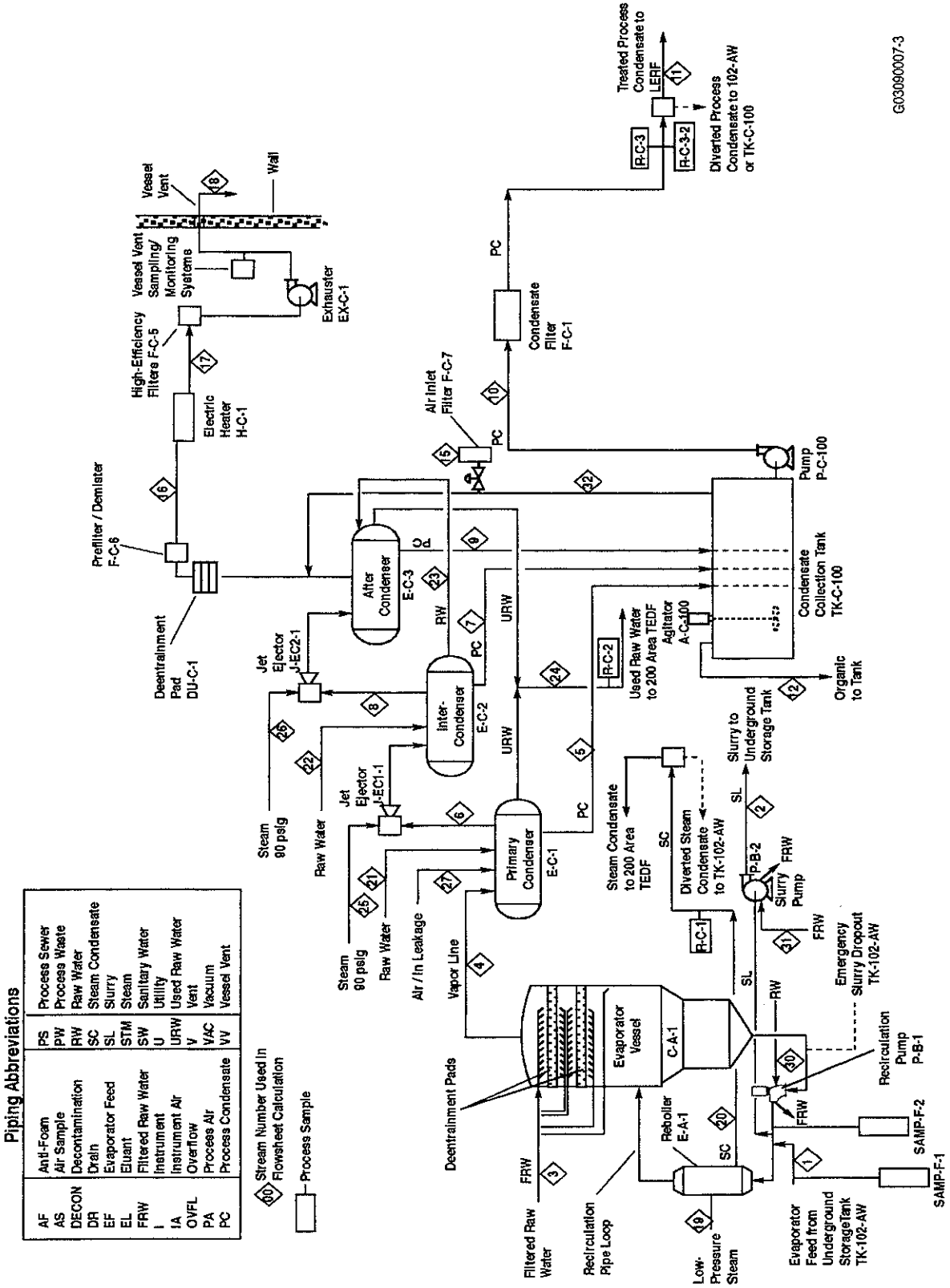
The drawings in Table 4.2 are for secondary containment systems for the 242-A Evaporator. Because secondary containment systems are the final barrier for preventing the release of dangerous waste into the environment, modifications that affect the secondary containment systems will be submitted to the Washington State Department of Ecology, as a Class 1, 2, or 3 Permit modification, as required by WAC 173-303-830.

Table 4.2. 242-A Evaporator Secondary Containment Systems Drawings

System	Drawing Number	Drawing Title
242-A Building	H-2-69277 Sheet 1	Structural Foundation Plan Sections & General Notes - Areas 1 & 2
	H-2-69278 Sheet 1	Structural Foundation Elevations & Details - Areas 1 & 2
	H-2-69279 Sheet 1	Structural First Floor Plan & AMU - Areas 1 & 2
Pump Room Sump Drainage	H-2-69352 Sheet 1	Sections Process Waste Drainage
242-A Building Drainage	H-2-69354 Sheet 1	Plan Process Waste Drainage
Pump Room Sump	H-2-69369 Sheet 1	Pump Room Sump Assembly & Details

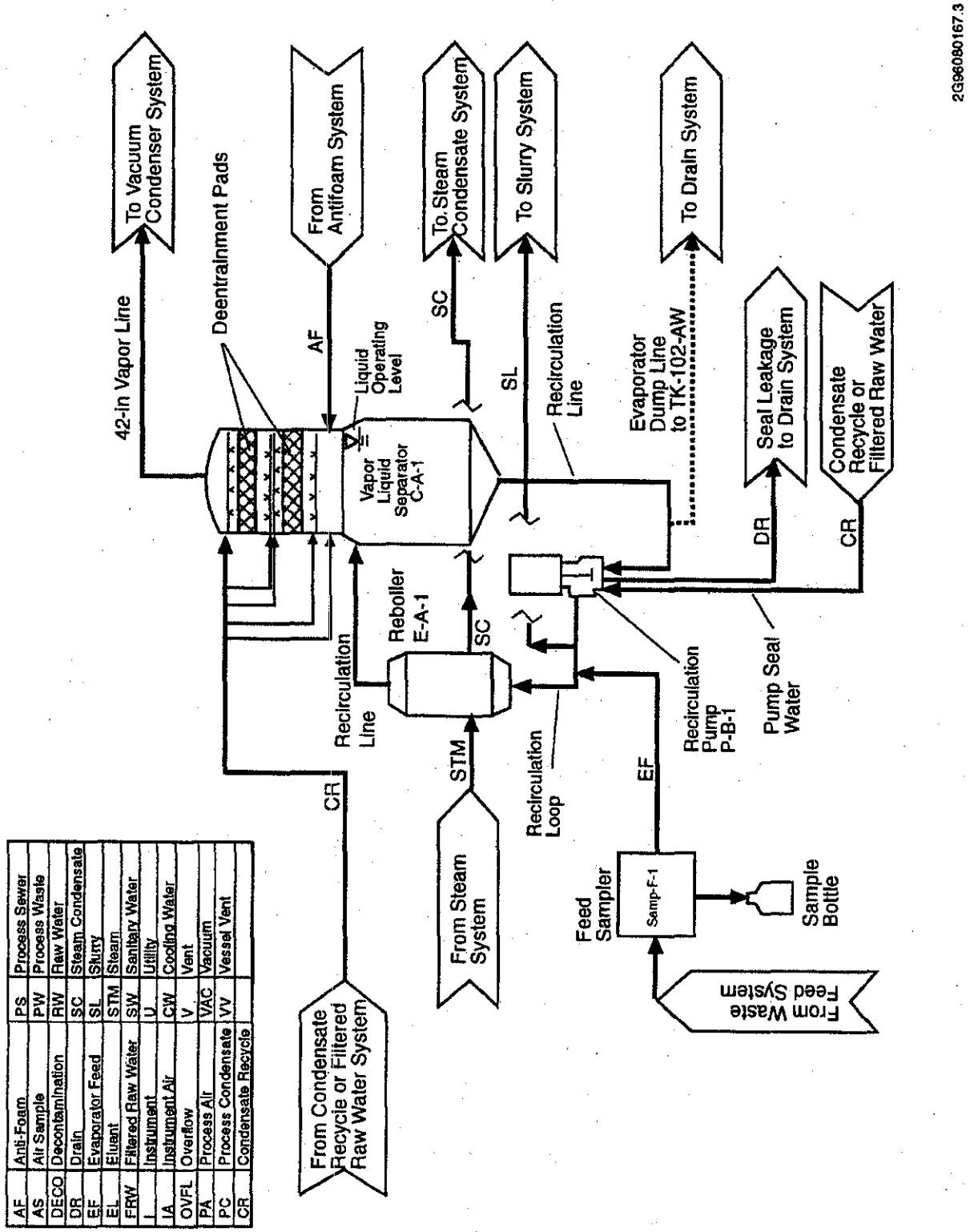
1

Figure 4.1. 242-A Evaporator Simplified Process Flow Diagram



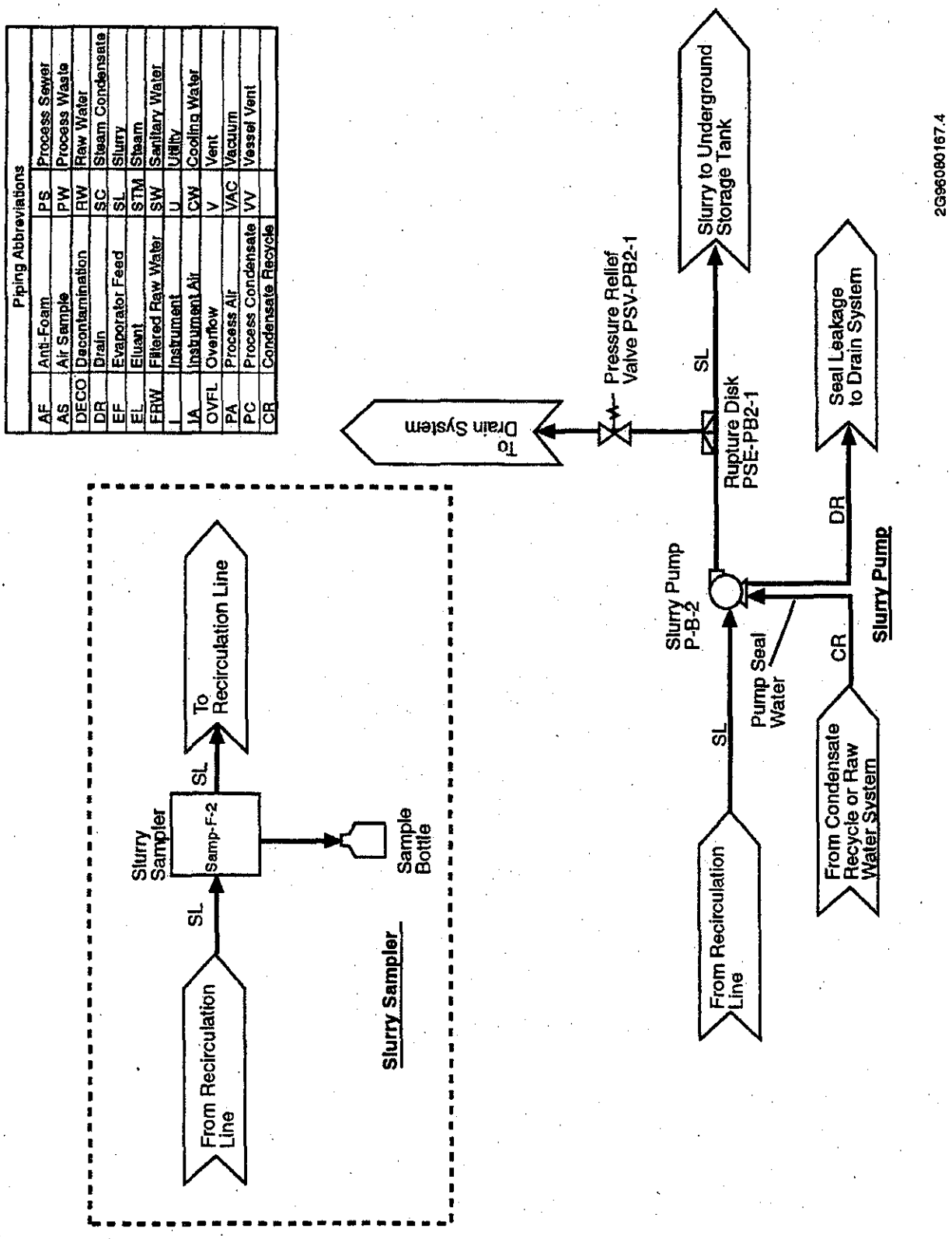
1
2

Figure 4.2. 242-A Evaporator Process Loop



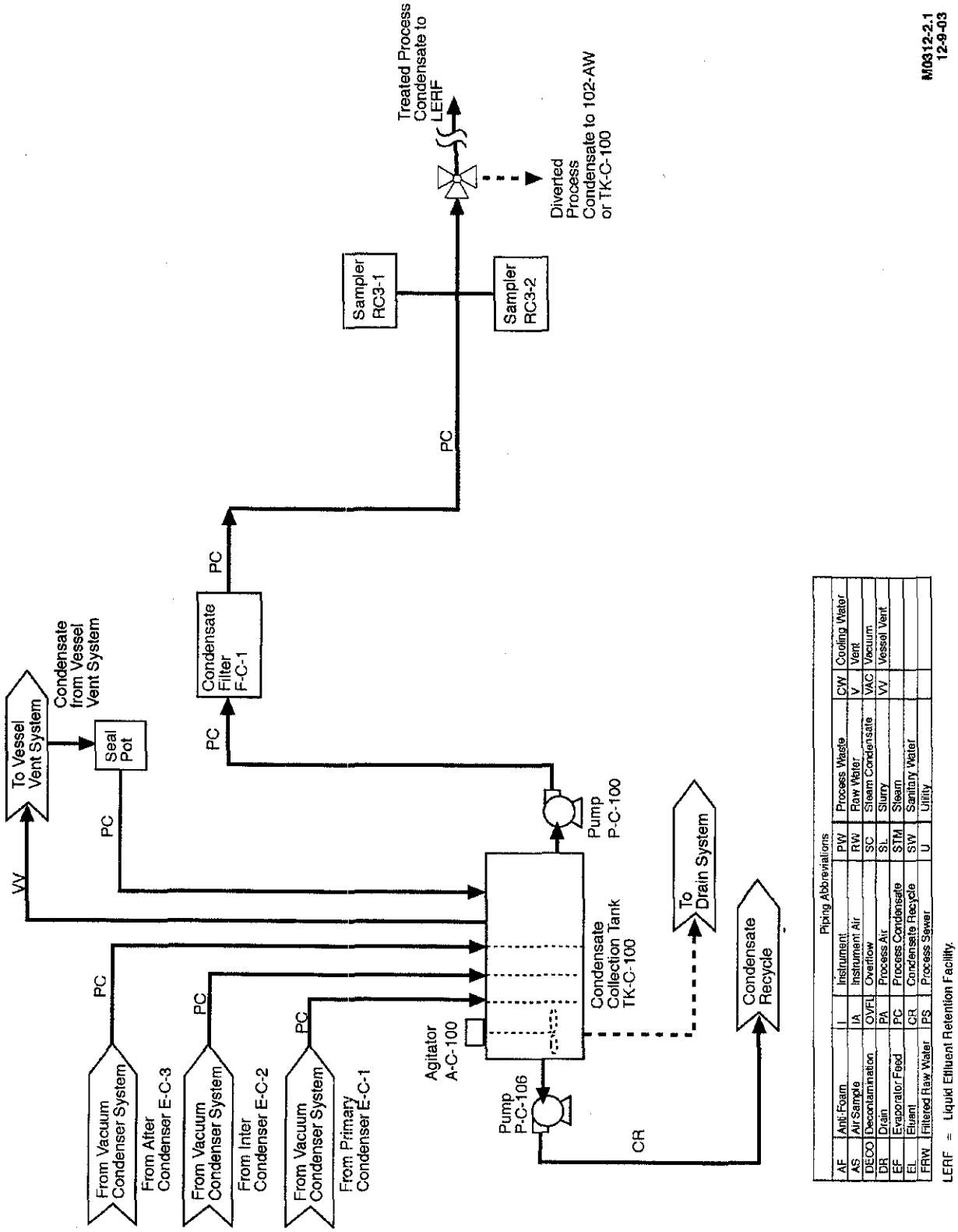
1
2

Figure 4.3. 242-A Evaporator Slurry System



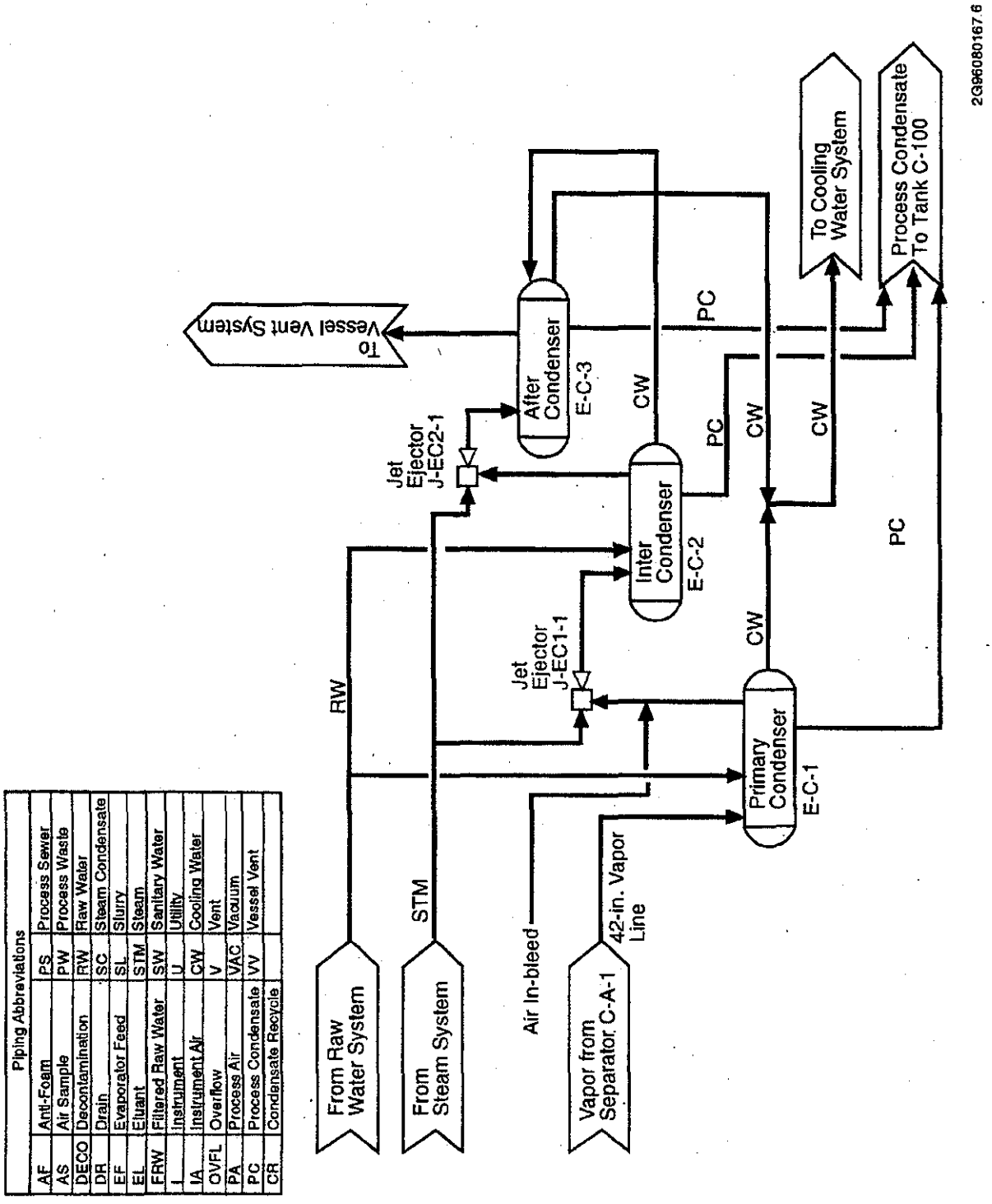
1
2

Figure 4.4. 242-A Evaporator Process Condensate System



1

Figure 4.5. 242-A Evaporator Vacuum Condenser System



1
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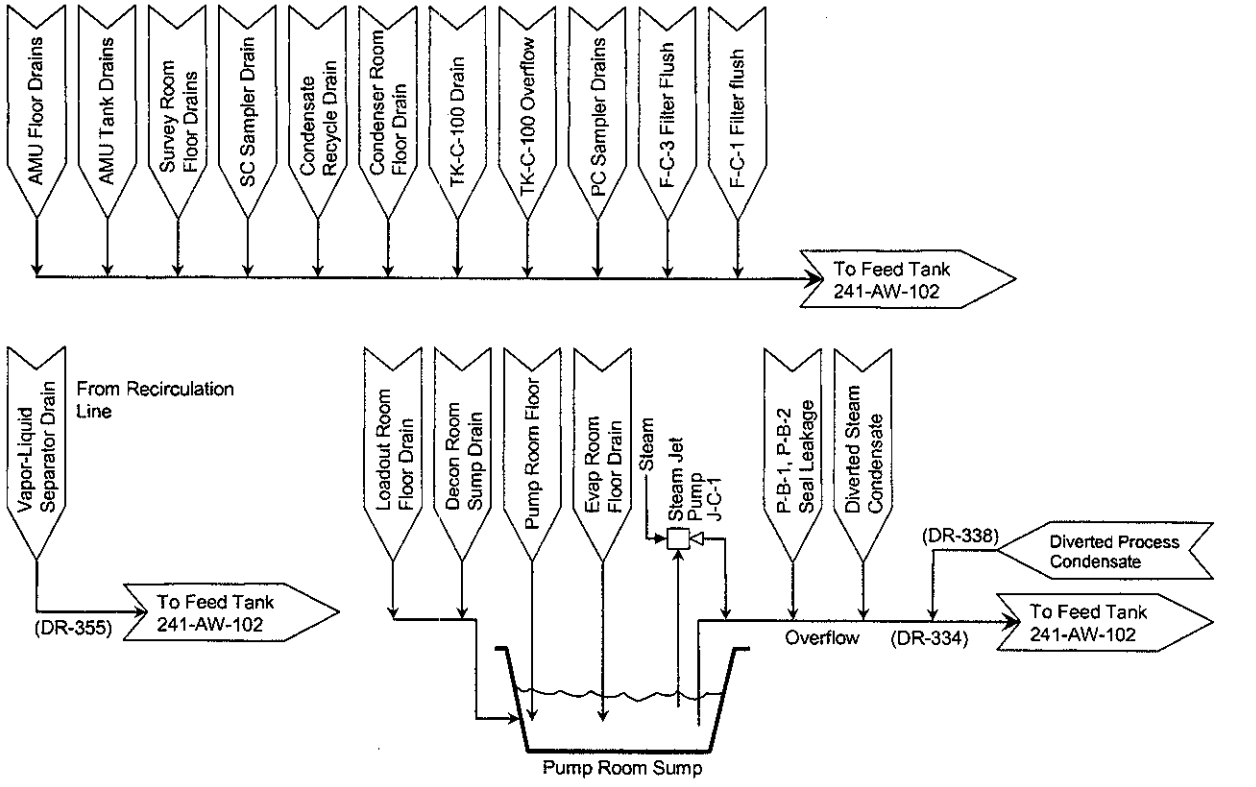
Figure 4.6. 242-A Evaporator Drain System



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Chapter 11.0 **Closure and Financial Assurance**

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11.0 CLOSURE AND FINANCIAL ASSURANCE

This chapter describes the planned activities and performance standards for closing the 242-A Evaporator. Final closure will begin when the 242-A Evaporator is no longer needed.

Where information regarding treatment, management, and disposal of the radioactive source byproduct material and/or special nuclear components of mixed waste (as defined by the Atomic Energy Act of 1954 as amended) has been incorporated into this document, it is not incorporated for the purpose of regulating the radiation hazards of such components under the authority of this permit or chapter 70.105 RCW and its implementing regulations but is provided for information purposes only.

11.1 CLOSURE PLAN/FINANCIAL ASSURANCE FOR CLOSURE

The 242-A Evaporator will be clean closed with respect to dangerous waste contamination that resulted from operation as a TSD unit. To facilitate closure, the 242-A Evaporator is being viewed as consisting of six components: tanks, ancillary equipment, piping, concrete floors/liners, structures, and underlying soil. Only areas that have treated, stored, or handled dangerous waste will undergo closure activities. Remedial actions with respect to contamination that was not a result of use of these areas for treatment, storage, or handling of dangerous waste are outside the scope of this closure plan.

Contaminated equipment, tanks, and piping removed from the 242-A Evaporator will be considered "debris" and transported to an appropriate permitted treatment, storage, or disposal unit for final disposition. Uncontaminated structures will be left for future use or disassembled, dismantled, and removed for disposal. Uncontaminated equipment and structures could include aqueous makeup, HVAC and piping, steam condensate and cooling water piping, the control room, change rooms and administrative/office areas.

The pipes located west and north of the 242-A Evaporator, which connect to A Farm and AW Farm, are in the same bundles with pipes used for transfers between tanks in the DST System. To minimize radiation exposure during closure, these pipes will be closed at the same time the piping for the DST System is closed. Closure of these pipes will be performed per Double-Shell Tank System Dangerous Waste Permit Application (DOE/RL-90-39).Clean closure requires decontamination or removal and disposal of all dangerous waste, waste residues, contaminated equipment, soil, or other material established in accordance with the clean closure performance standards of WAC 173-303-610(2). This and future closure plan revisions will provide for compliance with these performance standards. All work will be performed ALARA with respect to worker exposure to dangerous and/or any other workplace hazards. Activities that are planned to achieve clean closure are presented in the following sections.

11.2 CLOSURE PERFORMANCE STANDARD

Clean closure, as provided for in this plan, and in accordance with WAC 173-303-610(2), will eliminate future maintenance and will be protective of human health and the environment.

After closure, the appearance of the land where the 242-A Evaporator is located will be consistent with the appearance and future use of the surrounding land areas. This closure plan proposes to leave clean structures and equipment in place after closure for potential future operations. This need will be evaluated at the time of closure.

11.2.1 Closure Standards for Metal Surfaces, and Concrete

This closure plan proposes use of a 'clean debris surface' (defined in the following paragraph) as the clean closure performance standard for the metal surfaces, and concrete that will remain after closure. This approach is consistent with Ecology guidance (Ecology 1994) for achievement of clean closure.

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

Decontamination of concrete, per the 'debris rule' is based on a physical extraction method (40 CFR 268.45, Table 1). The performance standard is based on removal of the contaminated layer of debris. The physical extraction performance standard for concrete is removal of 0.6 centimeter of the surface layer and treatment to a clean debris surface.

11.2.2 Closure Standards for Tanks

Using the 242-A Evaporator's decontamination system, the tank system could be flushed and decontaminated. The rinsate will be sampled and analyzed. Results of the analysis with less than designation limits for the constituents of concern will be accepted as indicating that the tanks are clean with respects to dangerous waste residues. An alternative to decontaminating the tanks is to remove and dispose of the tanks accordingly.

11.2.3 Closure Standards for Internal and/or External Piping

The internal and/or external piping of 242-A Evaporator will be flushed and drained as part of closure. For piping where the contaminated surfaces can be inspected, an inspection will be performed to see if the piping meets the clean debris surface standard in 40 CFR 268.45 incorporated by reference and can be declared non-dangerous in accordance with WAC 173-303-071(3)(qq). If it is not possible to inspect the contaminated surfaces or meet the clean debris surface performance standard, the particular piping of concern will be removed, designated, and disposed of accordingly.

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

11.2.4 Closure Standards for Ancillary Equipment

Ancillary equipment is defined as pumps and other miscellaneous equipment not otherwise specified in this closure plan. Ancillary equipment will be removed and disposed.

11.2.5 Closure Standards for Underlying Soils

Clean closure of soil under the 242-A Evaporator will be accomplished by determining that the coated concrete floor and stainless steel liners, kept contaminants from reaching the soil. The coated concrete and liners provided secondary containment for all the tanks, process piping, and ancillary equipment within the building. Unless inspections identify potential through-thickness cracks indicating containment failure and a subsequent potential for soil contamination from TSD unit operations, the soil will be considered clean closed. However, if inspections identify such cracks, and there have been

documented spills in the vicinity, potential soil contamination will be investigated. Soils will be sampled and analyzed for constituents of concerns. If the soil analytical results determine that, the constituents of concern are at or below agreed to regulatory cleanup levels, the soil will be considered clean closed. Permit Condition II.K defines regulatory cleanup levels. Sampling and disposal objectives will be determined at the time of closure activities through the data quality objectives process. If verification sampling is required, a sampling analysis plan will be prepared before closure in a manner consistent with Ecology guidance (Ecology 1994) for achievement of clean closure.

11.3 CLOSURE ACTIVITIES

At the time of closure, the closure plan will be modified as necessary to reflect current regulations and information. If it is determined that clean closure is not possible, the closure plan will be modified to address required postclosure activities.

11.3.1 General Closure Activities

Closure of the 242-A Evaporator will include removal of accumulated liquid waste (i.e., liquid remaining from evaporator campaigns) by transferring the waste to the DST System and/or LERF. After the waste has been removed, clean closure of the tanks, process equipment, the piping, concrete/liners, and the structures will be accomplished by decontaminating the components, if required and demonstrating that clean closure performance standards are met in accordance with WAC 173-303-610. Clean closure of the soil will be accomplished by demonstrating that the concrete and liners kept the contaminants from reaching the soil. If it is determined that soil contamination is possible, investigation and cleanup of the soils will also be managed in accordance with WAC 173-303-610(2)(b).

Equipment or materials (personnel protective equipment, steam cleaners, etc.) used in performing closure activities will be decontaminated or disposed at a permitted TSD facility as appropriate.

11.3.2 Constituents of Concern for Closure for 242-A Evaporator

Based on process knowledge and the risk to human health and the environment, the constituents of concern for closure will be selected from the list of dangerous waste numbers in Chapter 1.0 through the data quality objective process.

11.3.3 Removing Dangerous Waste

All of the waste inventory at the 242-A Evaporator will be processed before closure. Any residue remaining in piping and equipment will be removed to an appropriate TSD unit.

11.3.4 Decontaminating Structures, Equipment, and Soils

Before closure activities begin, all waste inventories will be removed. To facilitate closure, tanks, internal and/or external piping, ancillary equipment, concrete floors/liners, structures, and soil directly beneath the structure will be decontaminated, as necessary, to demonstrate that the clean closure performance standards are met.

Removal and disposal of most of the components will be determined at the time of closure. Clean closure of the soil will be accomplished by demonstrating that the concrete/liners kept contaminants from reaching the soil.

11.3.4.1 Tanks

In accordance with WAC 173-303-640 (8) at closure all pumpable waste will be removed from the interior of the tanks, including the internal components such as the process condensate agitator. Both interior and exterior tanks surfaces will be decontaminated by flushing or spraying with steam, a water-soluble cleaner, or other approved method, or removed as debris and disposed appropriately.

If the tanks are decontaminated, the tanks will be inspected visually for compliance with the clean debris surface standard (40 CFR 268.45, Table 1, Extraction Technologies). If any areas are found not to meet the clean debris surface performance standard, these areas will be decontaminated in-place. Per the debris rule, only removal of contaminants from the surface layer is necessary for metal surfaces. Contamination will be removed as specified in 40 CFR 268.45, Table 1, Extraction Technologies and/or other Ecology approved methods.

If the decontamination option is used, the outside of the tanks also will be inspected for compliance to the clean debris surface standard. Any areas found not to meet this performance standard will be decontaminated in-place. Contamination will be removed from the surface layer using any of the methods described for internal tank decontamination as specified in *Alternate Treatment Standards for Hazardous Debris* (40 CFR 268.45, Table 1, Extraction Technologies and/or other Ecology approved methods).. Before using decontamination solutions on the outside of the tanks, the floor will be inspected for cracks or other openings that could provide a pathway to soil. This inspection will be performed as described in Section 11.2.1 of this chapter in conjunction with mapping of potential through-thickness cracks. Any such cracks will be mapped. The cracks will be sealed before beginning treatment or other engineered containment devices (e.g., collection basins) will be used to collect and contain solutions.

Decontamination waste will be generated as a result of decontamination activities. Decontamination waste may include but not be limited to the following: contaminated rags, and decontamination residue (liquids and solvents used in the decontamination process). This waste will be collected, designated, and managed in accordance with WAC 173-303. If it is not possible to meet the closure by removal or decontamination (clean closure) performance standard, contaminated portions of the tanks could be removed, designated, and disposed of in accordance with 40 CFR 268, incorporated by reference by WAC 173-303-140 as appropriate. The inspections for a clean debris surface will be documented on an inspection record.

11.3.4.2 Internal and/or External Piping and Ancillary Equipment

The internal piping and ancillary equipment for the 242A Evaporator will be flushed and drained as part of closure. For piping where the contaminated surfaces can be inspected, an inspection will be performed to see if the piping meets the clean debris surface standard in 40 CFR 268.45 and can be declared non-dangerous. If it is not possible to meet the clean debris surface standard or the piping cannot be inspected, portions of the internal piping will be removed, designated, and disposed of accordingly.

External piping (transfer lines) and ancillary equipment between 242A and LERF consists of below grade and above grade piping. Below grade piping will be dispositioned at closure either by removal, designation and disposal in accordance with WAC 173-303-610(5) and 40 CFR 268 or closed in accordance with another Ecology approved process. For above grade piping, it will be dispositioned consistent with the provisions for internal piping.

Rinsate from the external piping and internal piping will be processed through ETF. Details regarding the process for rinsing any internal and external piping and ancillary equipment will be provided in the

closure plan in accordance with WAC 173-303-610(3)(a)(v) upon modification as stated in Section 11.6 Dangerous and/or mixed-waste generated during closure activities will be managed in accordance with WAC 173-303-610(5). Removal of any dangerous wastes or dangerous constituents during partial or final closure will be handled in accordance with applicable requirements of WAC 173-303-610(5).

If the performance standards are not met, the interior surfaces will be cleaned using an appropriate decontamination method and the method repeated until the surfaces meet the clean closure performance standard.

The 207-A pump pit, located east of the 242-A Evaporator, will be closed using the performance standards for pipes and concrete (e.g., WAC 173-303-610(5) and 40 CFR 268 debris rule standards Table 1, Extraction technologies.). A visual inspection will be performed. If the interior surfaces meet the performance standards (clean debris surface), the 207-A pump pit will be considered clean closed.

If the performance standards are not met for any components described above, the interior surfaces will be cleaned using an Ecology approved decontamination method and the method repeated until the surfaces meet the clean closure (clean debris surface) performance standard; or a decision will be made to remove, designate and dispose of piping and equipment in accordance with WAC 173-303.

11.3.4.3 Concrete/Liner

The coated concrete floor and the pump room sump liner provide secondary containment for all the tanks, process piping, and ancillary equipment. All concrete and liners will be inspected visually and surveyed radiologically before any decontamination. The purpose of the inspection will be twofold: to identify and map any cracks in the concrete that might have allowed contaminants a pathway to the soil below and to identify areas that potentially are contaminated with dangerous waste or dangerous waste residues. The inspection standard will be a clean debris surface as defined in Section 11.2 .1. The inspection of the concrete for a clean debris surface will be documented on an inspection record. Those areas already meeting the standard will be clean closed as is.

Those potentially contaminated areas will undergo decontamination to meet the clean closure standard of a clean debris surface. The concrete will be washed down; the rinsate collected, designated, and disposed of accordingly. The concrete will be re-inspected for a clean debris surface. Concrete surfaces indicated by visual examination, as potentially still being contaminated will have the surface layer removed to a depth of 0.6 centimeter by scabbing or other approved methods. This will not threaten the environment, even if potential through-thickness cracks had been found during the inspection, because concrete decontamination (scabbing) will not employ liquid solutions that could enter cracks and because scabbing residues will be vacuumed away from cracks as any residue is generated.

Achievement of a clean debris surface will be documented on an inspection record. Decontamination residues will be collected, designated, and managed as appropriate.

11.3.4.4 Structures

If contaminated with either dangerous or mixed waste constituents, structures will be decontaminated and/or disassembled, if necessary, packaged, and disposed in accordance with existing land disposal restrictions (WAC 173-303-140).

Closure steps could include the following activities.

- Containerize (as necessary and practicable) and remove any remaining waste.

- Review operating records for spillage incidents and visually inspect area surfaces for evidence of contamination or for cracks that could harbor contamination or allow the escape of decontamination solutions. Inspect storage area surfaces for visible evidence of contamination (e.g., discoloration, material degradation, wetness, and odor). If contamination is evident, the affected area(s) will be decontaminated.

- Decontaminate walls and floors to minimize the potential for loose contamination and to facilitate any required radiation surveys and/or chemical field screening. Wash down could be by water rinse or high-pressure, low-volume steam cleaning coupled with a detergent wash. After decontamination, the building walls and floor will be compared to closure performance standards.

- Collect rinsate and manage as dangerous waste for appropriate disposal.

- Secure (lock) personnel entries into building and post doors with appropriate warning signs.

Clean closure of structures will occur in accordance with WAC 173-303-610. Remediation of soil contamination beneath or around containment buildings will be performed in conjunction soil closure requirements.

11.3.4.5 Underlying Soils

Clean closure of soil under the 242-A Evaporator will be accomplished by demonstrating that the coated concrete floor and stainless steel liners kept contaminants from reaching the soil. The coated concrete floor provided secondary containment for all the tanks, process piping, and ancillary equipment. Unless inspections identify potential through-thickness cracks indicating containment failure and a subsequent potential for soil contamination from TSD unit operations, the soil will be considered clean closed. However, if inspections identify such cracks, and there have been documented spills in the vicinity, potential soil contamination will be investigated.

Where it is possible to inspect visually directly beneath the tanks, a visual inspection will be performed. Where it is not possible to inspect visually beneath the tanks, an evaluation of the tank integrity will be made. The condition of the tank will be evaluated to determine if there was any potential for leakage. If no cracks, severe corrosion, or evidence of leaks is observed, it will be reasoned that mixed or dangerous waste solutions could not have penetrated to the soil directly below the tank.

11.4 MAXIMUM WASTE INVENTORY

The 242-A Evaporator is used to treat mixed waste from the DST System by removing water and most volatile organics. Two waste streams leave the 242-A Evaporator following the treatment process. The first waste stream, the concentrated slurry (in which approximately half the water content is removed and a portion of the volatile organics), is pumped back into the DST System. The second waste stream, process condensate (containing a portion of the volatile organics removed form the mixed waste during the evaporation process), is routed through condensate filters before being transferred to LERF. The 242-A Evaporator is used to treat up to 870,642 liters of mixed waste per day.

Tank C-100 receives process condensate and potentially contaminated drainage from the vessel vent system. The maximum design capacity for the C-100 tank is 67,380 liters.

Vapor-liquid separator, C-A-1, is located in the evaporator room and is used to separate vapor from the boiling slurry solution and deentrain liquid from the vapor before it enters the condensers in the condenser room. The maximum design capacity of C-A-1 is 103,217 liters.

11.5 CLOSURE OF TANKS

Clean closure of 242-A Evaporator will consist of the removal and disposal of all dangerous waste and the decontamination and/or removal and disposal of contaminated equipment, including tanks.

11.6 SCHEDULE FOR CLOSURE

Closure of 242-A Evaporator is not anticipated to occur within the next 15 to 20 years. The actual year of closure will depend on the time required for current waste to be processed and what role the 242-A Evaporator will play in processing additional waste generated during future activities in the 200 Areas. Other factors affecting the year of closure include changes in operational requirements, lifetime extension upgrades, and unforeseen factors. When a definite closure date is established, a revised closure plan will be submitted to Ecology. The activities required to complete closure are planned to be accomplished within 180 days in accordance with WAC 173-303-640(4)(c). Should a modified schedule be necessary, a revised schedule will be presented and agreed to before closure in accordance with WAC 173-303-640(4)(b).

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ENCLOSURE 2
Hanford Facility RCRA Permit Modification Notification
Part III, Chapter 3
PUREX Storage Tunnels
Attachment 28, Chapter 7.0

Part III, Chapter 5 and Attachment 35
242-A Evaporator
Attachment 35, Chapter 6.0

*Complete document in located in Sensitive Table

Hanford Facility RCRA Permit Modification Notification Forms

General Permit Conditions

Index

Submitted by Co-Operator:		Reviewed by RL Program Office:	
Lori L. Fritz	Date	Briant L Charboneau	Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **General**	Permit Part & Chapter: **Permit Condition II.AA.**

Description of Modification:

Permit Condition II.AA:

II.AA. AIR EMISSION STANDARDS FOR PROCESS VENTS

The Permittees shall comply with applicable requirements of WAC 173-303-690 (40 CFR 264, Subpart AA) for process vents associated with Part III units performing specific separations processes unless exempted by WAC 173-303-690(1)(d). Threshold limits applied to process vents potentially requiring emission controls subject to WAC 173-303-690 are evaluated based on the summation of applicable emission sources for the entire Hanford Facility. When the summed emissions fall below threshold limits in 40 CFR 264.1032(a)(1), no emission control devices are required. If threshold limits in 40 CFR 264.1032(a)(1) are predicted to be exceeded, the Permittees shall notify Ecology to determine the appropriate course of action. Unit-specific information is contained in Part III of the Permit for applicable units.

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.1.a

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

B.1.a. General Facility Standards, Changes to waste sampling or analysis methods: To conform with agency guidance or regulations

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: **General**	Permit Part & Chapter: **Permit Condition II.BB.**

Description of Modification:

Permit Condition II.BB:

II.BB. AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

The Permittees shall comply with applicable requirements of WAC 173-303-691 (40 CFR 264, Subpart BB) for certain equipment leaks associated with Part III units unless exempted by WAC 173-303-691(1)(e) or (f) and identified in accordance with 40 CFR264.1064(g)(5) or (6). Air emission standards apply to equipment that contacts or contains hazardous wastes with organic concentrations of at least 10 percent by weight. Unit-specific information is contained in Part III of the Permit for applicable units.

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.1.a

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

B.1.a. General Facility Standards, Changes to waste sampling or analysis methods: To conform with agency guidance or regulations

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: **General**	Permit Part & Chapter: **Permit Condition II.CC.**

Description of Modification:

Permit Condition II.CC:

II.CC. AIR EMISSION STANDARDS FOR TANKS, SURFACE IMPOUNDMENTS, AND CONTAINERS

The Permittees shall comply with applicable requirements of WAC 173-303-692 (40 CFR264, Subpart CC) for containers, tanks, and surface impoundment areas associated with Part III units unless exempted by WAC 173-303-692(1)(b). Unit-specific information is contained in Part III of the Permit for applicable units.

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.1.a

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

B.1.a. General Facility Standards, Changes to waste sampling or analysis methods: To conform with agency guidance or regulations

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