0082509

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

09-EMD-0095

JUL - 8 2009

RECEIVED
JUL 15 2009
EDMC

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

Dear Ms. Davis:

CLASS 1 MODIFICATIONS TO THE HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY ACT PERMIT, QUARTER ENDING JUNE 30, 2009

In accordance with Hanford Facility Resource Conservation and Recovery Act Permit (Permit) Condition I.C.3, enclosed for your notification are the Class 1 modifications for the quarter ending June 30, 2009. Enclosure 1 includes the Class 1 modifications for quarter ending June 30, 2009. Enclosure 2 includes the Class 1 modifications for quarter ending June 30, 2009, containing Official Use Only information, and is not for public distribution.

These modifications update information in Part III of the Permit. The modifications for Part III pertain to the PUREX Storage Tunnels, Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility, 325 Hazardous Waste Treatment Units, Waste Treatment and Immobilization Plant, 331-C Storage Unit, and 400 Area Waste Management. The Class 1 modifications are being made to ensure that activities are conducted in compliance with the Permit. A record of these modifications is maintained in the Hanford Facility Operating Record.

If you have any questions, please contact me or your staff may contact Ray J. Corey, Assistant Manager for Safety and Environment on (509) 376-0108.

Sincerely,

David A. Brockman
Manager

EMD: ACM

Enclosures

cc w/encls: See Page 2

Document transmitted contains OUO information

When separated from attachment(s), handle this document as non-sensitive information

cc w/encls:
W. J. Taylor, ORP
Environmental Portal, LMSI, A3-95
Ecology NWP Library
HF Operating Record (S. Thompson, FH, E6-28)
Administrative Record, H6-08 (TSD: H-0-1, S-2-1, S-2-8, T-3-4, H-0-8, S-3-5, S-4-2)

cc w/o encls:
J. M. Ayres, Ecology
R. W. Bond, Ecology
K. A. Conaway, Ecology
T. Feigenbaum, BNI
E. A. Fredenburg, Ecology
J. A. Hedges, Ecology
W. J. Johnson, WRPS
M. Kluse, PNNL
J. G. Lehew, CHPRC
D. G. Ruscitto, FHI
E. R. Skinnarland, Ecology
C. G. Spencer, WCH
S. A. Szendre, Ecology

ENCLOSURE 1

Class 1 modifications for quarter ending June 30, 2009

Ms. Greta P. Davis, Ecology
Consisting of 358 pages, including cover sheet

Hanford Facility RCRA Permit Modification Notification Forms

Part III, Operating Unit 2
PUREX Storage Tunnels

Index

Page 2 of 3: Hanford Facility RCRA Permit III.2
Page 3 of 3: Addendum J, J.3

Submitted by Co-Operator:

Steven T. Dahlgren — Date: 5/27/09

Reviewed by RL Program Office:

Matthew S. McCormick — Date: 6/2/09

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
PUREX STORAGE TUNNELS	**PART III, OPERATING UNIT 2**

Description of Modification:

Hanford Facility RCRA Permit III.2:

PART III, OPERATING UNIT 2 UNIT-SPECIFIC CONDITIONS

PUREX Storage Tunnels

UNIT DESDRIPTION:

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.

Operating Unit 2:

Chapter 1.0 Part A Form, Revision 6, dated May 2005

Chapter 3.0 Waste Analysis Plan, dated October 2006

Chapter 4.0 Process Information, dated October 2006

Chapter 6.0 Procedures to Prevent Hazards, dated October 2006 (also refer to Permit Attachment 33, §6.1)

Addendum J~~Chapter 7.0~~ Contingency Plan, dated June 30, 2008~~October 2006~~

Chapter 8.0 Personnel Training, dated October 2006

Chapter 11.0 Closure and Financial Assurance, dated October 2006

Chapter 12.0 Reporting and Recordkeeping (refer to Permit Attachment 33, Table 12.1)

III.2.A COMPLIANCE WITH UNIT SPECIFIC PERMIT CONDITIONS

III.2.A.1 The Permittees shall comply with all requirements set forth in the Hanford Facility RCRA Permit (Permit) as specified in Permit Attachment 3, Permit Applicability Matrix, including all approved modifications. All chapters, subsections, figures, tables, and appendices included in the following unit-specific Permit Conditions are enforceable in their entirety.

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

III.2.B UNIT-SPECIFIC CONDITIONS

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

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

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

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 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
PUREX STORAGE TUNNELS	**PART III, OPERATING UNIT 2**

Description of Modification:

Remove Chapter 7.0, dated September 30, 2008, and replace with Addendum J, dated June 30, 2009

Chapter 7.0, §7.3:

J.3 IMPLEMENTATION OF THE PLAN

In accordance with WAC 173-303-360(2)(b), the BED ensures that trained personnel identify the character, source, amount, and areal extent of the release, fire, or explosion to the extent possible. Identification of waste can be made by activities that can include, but are not limited to, visual inspection of involved containers, sampling activities in the field, reference to inventory records, or by consulting with facility personnel. Samples of materials involved in an emergency might be taken by qualified personnel and analyzed as appropriate. These activities must be performed with a sense of immediacy and shall include available information.

The BED shall use the following guidelines to determine if an event has met the requirements of WAC 173-303-360(2)(d):

1. The event involved an unplanned spill, release, fire, or explosion,

AND

2.a The unplanned spill or release involved a dangerous waste, or the material involved became a dangerous waste as a result of the event (e.g., product that is not recoverable.), or

2.b The unplanned fire or explosion occurred at the PUREX Storage Tunnels or transportation activity subject to RCRA contingency planning requirements,

AND

3. Time-urgent response from an emergency services organization was required to mitigate the event, or a threat to human health or the environment exists.

As soon as possible, after stabilizing event conditions, the BED shall determine, in consultation with the ~~FH~~ Site contractor environmental single-point-of-contact, if notification to the Washington State Department of Ecology is needed to meet WAC-173-303-360(2)(d) reporting requirements. If all of the conditions under 1, 2, and 3 are met, notifications are to be made to Ecology. Additional information is found in Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 4.2.

If review of all available information does not yield a definitive assessment of the danger posed by the incident, a worst-case condition will be presumed and appropriate protective actions and notifications will be initiated. The BED is responsible for initiating any protective actions based on their best judgment of the incident.

The BED must assess each incident to determine the response necessary to protect the personnel, facility, and the environment. If assistance from HP, HFD, or ambulance units is required, the Hanford Emergency Response Number (911) must be used to contact the POC and request the desired assistance. To request other resources or assistance from outside the Central Plateau Surveillance and Maintenance facilities, the POC business number is used (373-3800).

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

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

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 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification

Part III, Operating Unit 2
PUREX Storage Tunnels

Remove and Replace the Following Sections:

- Part III, Operating Unit 2, PUREX Permit Conditions dated September 30, 2008, replace with PUREX Permit Conditions dated June 30, 2009

PART III, OPERATING UNIT 2 UNIT-SPECIFIC CONDITIONS

PUREX Storage Tunnels

UNIT DESDRIPTION:

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.

Operating Unit 2:

Chapter 1.0	Part A Form, dated October 1, 2008
Chapter 3.0	Waste Analysis Plan, dated October 2006
Chapter 4.0	Process Information, dated October 2006
Chapter 6.0	Procedures to Prevent Hazards, dated October 2006 (also refer to Permit Attachment 33, §6.1)
Addendum J	Contingency Plan, dated June 30, 2009
Chapter 8.0	Personnel Training, dated October 2006
Chapter 11.0	Closure and Financial Assurance, dated October 2006
Chapter 12.0	Reporting and Recordkeeping (refer to Permit Attachment 33, Table 12.1)

III.2.A COMPLIANCE WITH UNIT SPECIFIC PERMIT CONDITIONS

III.2.A.1 The Permittees shall comply with all requirements set forth in the Hanford Facility RCRA Permit (Permit) as specified in Permit Attachment 3, Permit Applicability Matrix, including all approved modifications. All chapters, subsections, figures, tables, and appendices included in the following unit-specific Permit Conditions are enforceable in their entirety.

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

III.2.B UNIT-SPECIFIC CONDITIONS

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

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Hanford Facility RCRA Permit Modification Notification Forms

Part III, Operating Unit 3
Liquid Effluent Retention Facility & 200 Area Effluent Treatment Facility

Index

Page 2 of 3: Hanford Facility RCRA Permit, III.3
Page 3 of 3: Chapter 7.0

Submitted by Co-Operator:

NCB

Leonard T. Blackford — Date 6/3/09

Reviewed by RL Program Office:

Matthew S. McCormick — Date 6/15/09

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
LERF/200 Area ETF	**Part III, Operating Unit 3**

Description of Modification:

Hanford Facility RCRA Permit III.3:

OPERATING UNIT GROUP 3 PERMIT CONDITIONS
Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility

UNIT DESCRIPTION:

The Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility (LERF and 200 Area ETF) consists of an aqueous waste treatment system that provides storage and treatment for a variety of aqueous mixed waste located in the 200 East Area.

This document sets forth the operating conditions for the LERF and 200 Area ETF.

Operating Unit Group 3:

Chapter 1.0	Part A Form, dated October 1, 2008
Chapter 3.0	Waste Analysis Plan, dated June 30, 2007
Chapter 4.0	Process Information, dated December 31, 2007
Chapter 5.0	Groundwater Monitoring (PNNL-11620 & WHC-SD-EN-AP-024), dated June 30, 2008
Chapter 6.0	Procedures to Prevent Hazards, dated June 30, 2007 (also refer to Permit Attachment 33, §6.1)
Chapter 7.0	Contingency Plan, dated June 30, 2009~~December 31, 2007~~
Chapter 8.0	Personnel Training, dated June 30, 2008
Chapter 11.0	Closure and Post Closure Requirements, dated October 2006
Chapter 12.0	Reporting and Recordkeeping (refer to Permit Attachment 33, Table 12.1)

III.3.A COMPLIANCE WITH UNIT SPECIFIC PERMIT CONDITIONS

III.3.A.1 The Permittees shall comply with all requirements set forth in the Hanford Facility RCRA Permit (Permit) as specified in Permit Attachment 3, Permit Applicability Matrix, including all approved modifications. All chapters, subsections, figures, tables, and appendices included in the following unit-specific Permit Conditions are enforceable in their entirety.

III.3.A.2 In the event that the Part III-Unit-Specific Conditions for Operating Unit 3, LERF and 200 Area ETF conflict with the Part I-Standard Conditions and/or Part II-General Facility Conditions of the Permit, the unit-specific conditions for Operating Unit 3, LERF and 200 Area ETF prevail.

III.3.B UNIT SPECIFIC CONDITIONS

III.3.B.1 Portions of Permit Attachment 4, *Hanford Emergency Management Plan,* (DOE/RL-94-02) that are not made enforceable by inclusion in the applicability matrix for that document are not made enforceable by reference in this document.

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

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

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: KAC

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
LERF/200 Area ETF	**Part III, Operating Unit 3**

Description of Modification:

Chapter 7.0, §7.3:

7.3 IMPLEMENTATION OF THE PLAN

In accordance with WAC 173-303-360(2)(b) the BED ensures that trained personnel identify the character, source, amount, and areal extent of the release, fire, or explosion to the extent possible. Identification of waste can be made by activities that can include, but are not limited to, visual inspection of involved containers, sampling activities in the field, reference to inventory records, or by consulting with facility personnel. Samples of materials involved in an emergency might be taken by qualified personnel and analyzed as appropriate. These activities must be performed with a sense of immediacy and shall include available information.

The BED shall use the following guidelines to determine if an event has met the requirements of WAC 173-303-360(2)(d):

1. The event involved an unplanned spill, release, fire, or explosion,

AND

2.a The unplanned spill or release involved a dangerous waste, or the material involved became a dangerous waste as a result of the event (e.g., product that is not recoverable.), or

2.b The unplanned fire or explosion occurred at the ETF/LERF or transportation activity subject to RCRA contingency planning requirements,

AND

3. Time-urgent response from an emergency services organization was required to mitigate the event or a threat to human health or the environment exists.

As soon as possible, after stabilizing event conditions, the BED shall determine, in consultation with the ~~FH~~ site contractor environmental single point-of-contact, if notification to the Washington State Department of Ecology (Ecology) is needed to meet WAC 173-303-360 (2)(d) reporting requirements. If all of the conditions under 1, 2, and 3 are met, notifications are to be made to Ecology. Additional information is found in Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02), Section 4.2.

If review of all available information does not yield a definitive assessment of the danger posed by the incident, a worst-case condition will be presumed and appropriate protective actions and notifications will be initiated. The BED is responsible for initiating any protective actions based on their best judgment of the incident.

The BED must assess each incident to determine the response necessary to protect the personnel, facility, and the environment. If assistance from Hanford Patrol, Hanford Fire Department, or ambulance units is required, the Hanford Emergency Response Number (911) must be used to contact the POC and request the desired assistance. To request other resources or assistance from outside the ETF/LERF, the POC business number is used (373-3800).

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

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

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 5/28/09

G. P Davis — Date

Hanford Facility RCRA Permit Modification

Part III, Operating Unit 3
Liquid Effluent Retention Facility & 200 Area Effluent Treatment Facility

Remove and Replace the Following Sections:

- Part III, Operating Unit 3, Unit Specific Conditions dated June 30, 2008, replace with Unit Specific Conditions dated June 30, 2009

OPERATING UNIT GROUP 3 PERMIT CONDITIONS

Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility

UNIT DESCRIPTION:

The Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility (LERF and 200 Area ETF) consists of an aqueous waste treatment system that provides storage and treatment for a variety of aqueous mixed waste located in the 200 East Area.

This document sets forth the operating conditions for the LERF and 200 Area ETF.

Operating Unit Group 3:

Chapter 1.0	Part A Form, dated October 1, 2008
Chapter 3.0	Waste Analysis Plan, dated June 30, 2007
Chapter 4.0	Process Information, dated December 31, 2007
Chapter 5.0	Groundwater Monitoring (PNNL-11620 & WHC-SD-EN-AP-024), dated June 30, 2008
Chapter 6.0	Procedures to Prevent Hazards, dated June 30, 2007 (also refer to Permit Attachment 33, §6.1)
Chapter 7.0	Contingency Plan, dated June 30, 2009
Chapter 8.0	Personnel Training, dated June 30, 2008
Chapter 11.0	Closure and Post Closure Requirements, dated October 2006
Chapter 12.0	Reporting and Recordkeeping (refer to Permit Attachment 33, Table 12.1)

III.3.A COMPLIANCE WITH UNIT SPECIFIC PERMIT CONDITIONS

III.3.A.1 The Permittees shall comply with all requirements set forth in the Hanford Facility RCRA Permit (Permit) as specified in Permit Attachment 3, Permit Applicability Matrix, including all approved modifications. All chapters, subsections, figures, tables, and appendices included in the following unit-specific Permit Conditions are enforceable in their entirety.

III.3.A.2 In the event that the Part III-Unit-Specific Conditions for Operating Unit 3, LERF and 200 Area ETF conflict with the Part I-Standard Conditions and/or Part II-General Facility Conditions of the Permit, the unit-specific conditions for Operating Unit 3, LERF and 200 Area ETF prevail.

III.3.B UNIT SPECIFIC CONDITIONS

III.3.B.1 Portions of Permit Attachment 4, *Hanford Emergency Management Plan,* (DOE/RL-94-02) that are not made enforceable by inclusion in the applicability matrix for that document are not made enforceable by reference in this document.

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Hanford Facility RCRA Permit Modification Notification Forms

Part III, Operating Unit 5
325 Hazardous Waste Treatment Units

Permit Modification Index

Page 2 of 7:	Hanford Facility Permit, III.5
Page 3 of 7:	Addendum C, Process Information
Page 4 of 7:	Addendum E, Procedures to Prevent Hazards
Page 5 of 7:	Addendum F, Preparedness and Prevention
Page 6 of 7:	Addendum H, Closure Plan
Page 7 of 7:	Addendum I, Inspection Requirements

Submitted by Co-Operator:

Eric G. Damberg — 6 JUN 2009 Date

Reviewed by DOE Program Office:

Joe R. Franco — 6/23/09 Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
325 Hazardous Waste Treatment Units	**Part III, Operating Unit 5**

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

PART III, OPERATING UNIT GROUP 5 PERMIT CONDITIONS

325 Hazardous Waste Treatment Units

UNIT DESCRIPTION:

The 325 Hazardous Waste Treatment Units (325 HWTUs) store and treat dangerous and/or mixed waste in containers and in a 1,218-liter tank. The 325 HWTUs consist of the Shielded Analytical Laboratory (SAL) that includes Rooms 32, 200, 201, 202, and 203; and the Hazardous Waste Treatment Unit (HWTU) that includes Rooms 520, 524, and 528 of the 325 Building located in the south portion of the 300 Area.

List of Addenda Specific to Operating Unit Group 5

Addendum A Part A Form, dated September 30, 2008
Addendum B Waste Analysis Plan, dated March 31, 2009
Addendum C ~~Chapter 4.0~~ Process Information, dated June 30, 2009~~June 30, 2005~~
Addendum D Groundwater Monitoring (Reserved)
Addendum E~~Chapter 6.0~~ Procedures to Prevent Hazards, dated June 30, 2009~~April 29, 2009~~
Addendum F Preparedness and Prevention, dated June 30, 2009
Addendum G Personnel Training, dated March 31, 2009
Addendum H~~Chapter 11.0~~ Closure Plan, dated June 30, 2009~~August 2004~~
Addendum I Inspection Requirements, dated June 30, 2009
Addendum J Contingency Plan, dated December 31, 2008

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

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

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

Reviewed by Ecology:
G. P. Davis 5/28/09
G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
325 Hazardous Waste Treatment Units	**Part III, Operating Unit 5**

Description of Modification:

Addendum C, Process Information:

Remove Chapter 4.0, Process Information dated June 30, 2009 and replace with Addendum C, Process Information dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
325 Hazardous Waste Treatment Units	**Part III, Operating Unit 5**

Description of Modification:

Addendum E, Procedures to Prevent Hazards:

Remove Chapter 6.0, Procedures to Prevent Hazards and replace with Addendum E, Procedures to Prevent Hazards dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
325 Hazardous Waste Treatment Units	**Part III, Operating Unit 5**

Description of Modification:

Addendum F, Preparedness and Prevention:

Add Addendum F, Preparedness and Prevention dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
325 Hazardous Waste Treatment Units	**Part III, Operating Unit 5**

Description of Modification:

Addendum H, Closure Plan:

Remove Chapter 11, Closure Plan dated August 2004, and replace with Addendum H, Closure Plan dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
325 Hazardous Waste Treatment Units	**Part III, Operating Unit 5**

Description of Modification:

Addendum J, Contingency Plan:

Add Addendum I, Inspection Requirements dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification
Part III, Operating Unit 5
325 Hazardous Waste Treatment Units

Remove and replace the following sections for Part III, Operating Unit 16:

- Remove Operating Unit 16, Unit Specific Conditions dated March 31, 2009, and replace with Unit Specific Conditions dated June 30, 2009
- Remove Chapter 4.0, Process Information dated June 30, 2009 and replace with Addendum C, Process Information dated June 30, 2009
- Remove Chapter 6.0, Procedures to Prevent Hazards and replace with Addendum E, Procedures to Prevent Hazards dated June 30, 2009
- Add Addendum F, Preparedness and Prevention dated June 30, 2009
- Remove Chapter 11, Closure Plan dated August 2004, and replace with Addendum H, Closure Plan dated June 30, 2009
- Add Addendum I, Inspection Requirements dated June 30, 2009

PART III, OPERATING UNIT GROUP 5 PERMIT CONDITIONS

325 Hazardous Waste Treatment Units

Unit Description:

The 325 Hazardous Waste Treatment Units (325 HWTUs) store and treat dangerous and/or mixed waste in containers and in a 1,218-liter tank. The 325 HWTUs consist of the Shielded Analytical Laboratory (SAL) that includes Rooms 32, 200, 201, 202, and 203; and the Hazardous Waste Treatment Unit (HWTU) that includes Rooms 520, 524, and 528 of the 325 Building located in the south portion of the 300 Area.

List of Addenda Specific to Operating Unit Group 5

Addendum A	Part A Form, dated September 30, 2008
Addendum B	Waste Analysis Plan, dated March 31, 2009
Addendum C	Process Information, dated June 30, 2009
Addendum D	Groundwater Monitoring (Reserved)
Addendum E	Procedures to Prevent Hazards, dated June 30, 2009
Addendum F	Preparedness and Prevention, dated June 30, 2009
Addendum G	Personnel Training, dated March 31, 2009
Addendum H	Closure Plan, dated June 30, 2009
Addendum I	Inspection Requirements, dated June 30, 2009
Addendum J	Contingency Plan, dated December 31, 2008

Definitions

Reserved

Acronyms

Reserved

III.5.A COMPLIANCE WITH UNIT-SPECIFIC PERMIT CONDITIONS

III.5.A.1 The Permittees will comply with all conditions in this Chapter and its addenda with respect to dangerous and/or mixed waste management and dangerous waste management units in 325 Hazardous Waste Treatment Units (HWTUs), in addition to requirements in Permit Parts I and II.

III.5.B GENERAL WASTE MANAGEMENT

III.5.B.1 The Permittees are authorized to accept dangerous and/or mixed waste that satisfies the waste acceptance criteria in Addendum B according to the waste acceptance procedures in Addendum B for storage in the 325 HWTUs.

III.5.B.2 The Permittees are authorized to store and/or treat dangerous and/or mixed waste physically located in the 325 HWTUs as of the effective date of this Permit, and wastes accepted for storage or treatment pursuant to Permit Condition III.5.B.1.

III.5.B.3 The Permittees will maintain the physical structure of the 325 HWTUs as documented in Addendum C, Section C.1.4.1. [WAC 173-303-630(7)]

III.5.B.4 The Permittees will conduct waste loading and unloading operations consistent with and no less stringent than those practices described in Addendum F, Section F.2.1. [WAC 173-303-395]

III.5.C WASTE ANALYSIS

III.5.C.1 The Permittees will comply with requirements in Addendum B for waste analysis for all dangerous and/or mixed waste managed at this unit. [WAC 173-303-300(5)]

III.5.C.2 The Permittees will have an accurate and complete waste profile as described in Addendum B, Section B.1.1.1.2.1 for every waste stream accepted by the 325 HWTUs. [WAC 173-303-380(1)(a)(b)]

III.5.C.3 The Permittees will place a copy of each waste profile required by Permit Condition II.5.C.2 in the Hanford Facility Operating Record, 325 HWTUs File required by Permit Condition II.I.2. [WAC 173-303-380(1)(a)(b)]

III.5.C.4 The Permittees will comply with the requirements in Addendum C, Sections C.1.11, and C.2.1.5, to prevent hazards from ignitable, reactive, or incompatible wastes. [WAC 173-303-395(1)]

III.5.C.5 The Permittees will make a copy of the waste profile required by Permit Condition III.5.C.2 available upon request. [WAC 173-303-380(1)(a) and (b)]

III.5.D RECORDKEEPING AND REPORTING

III.5.D.1 The Permittees will place the following into the Hanford Facility Operating Record, 325 HWTUs File required by Permit Condition II.I.2: [WAC 173-303-380]

III.5.D.1.a A description of and quantity of each dangerous and/or mixed waste accepted for storage in the 325 HWTUs; [WAC 173-303-380(1)(a)]

III.5.D.1.b Records and results of any sampling or analysis of wastes accepted for storage at the 325 HWTUs, and from any other sampling and analysis required by Addendum B; [WAC 173-303-380(1)(c)]

III.5.D.1.c Summary reports and details of all incidents that require implementation of Addendum J, Contingency Plan according to the requirements of Permit Condition III.5.G.1; [WAC 173-303-380(1)(d)]

III.5.D.1.d An inspection log, or a summary of such log, of inspections conducted pursuant to Permit Condition III.5.H.1; [WAC 173-303-380(1)(e)]

III.5.D.1.e Records required by WAC 173-303-380(1)(k) and (o), incorporated by reference.

III.5.E SECURITY

III.5.E.1 The Permittees will maintain security at the 325 HWTUs according to the requirements in Addendum E, and in accordance with Permit Attachment 33 and required by Permit Condition II.L. [WAC 173-303-310(2)(b)]

III.5.E.2 The Permittees will post warning signs at all entrances to the 325 HWTUs. [WAC 173-303-310(2)(a)]

III.5.F PREPAREDNESS AND PREVENTION

III.5.F.1 The Permittees will comply with the Preparedness and Prevention requirements in Addendum F. [WAC 173-303-340]

III.5.G CONTINGENCY PLAN

III.5.G.1 The Permittee will comply with Addendum J, in addition to the requirements of Permit Condition II.A when applicable. Enforceable portions of Addendum J are identified in Permit Addendum J, Page J-i. [WAC 173-303-350]

III.5.H INSPECTIONS

III.5.H.1 The Permittee will perform inspections of the 325 HWTUs according to Addendum I, Inspection Plan. The inspection shall include:

III.5.H.1.a All monitoring equipment, safety and emergency equipment, security devices and operating and structural equipment that help prevent, detect, or respond to hazards to the public health or the environment. [WAC 173-303-320(2)]

III.5.H.2 The inspection schedule required by Permit Condition III.5.H.1 will provide the frequency of inspection for specific items. The frequency should be based on the rate of possible deterioration of equipment and the probability of an environmental or human health incident. Areas subject to spills must be inspected daily when in use. [WAC 173-303-320(2)(c)

III.5.H.3 The Permittee must remedy any problems revealed by inspections conducted pursuant to Permit Condition III.5.H.1, on a schedule that prevents hazards to the public health and the environment. Where a hazard is imminent or has already occurred, remedial action must be taken immediately. [WAC 173-303-320(3)]

III.5.H.4 The Permittees will place a copy of the inspection requirements and schedule prepared according to Permit Condition III.5.H.1 in the Hanford Facility Operating Record, 325 HWTUs File required by Permit Condition II.I.2. [WAC 173-303-320(2)(a)]

III.5.H.5 The Permittee will keep an inspection log or summary of inspections conducted pursuant to Permit Condition III.5.H.1, including at a minimum the following:

III.5.H.5.a Date and time of the inspection;

III.5.H.5.b Printed name and the handwritten signature of the inspector;

III.5.H.5.c Notation of the observations made;

III.5.H.5.d An account of spills or discharges in accordance with Permit Condition II.E, and the date and description of any repairs or remedial actions taken.

III.5.I TRAINING PLAN

III.5.I.1 The Permittee will include Addendum G training requirements in the written training plan required by Permit Condition II.C. [WAC 173-303-330]

III.5.J OTHER GENERAL REQUIREMENTS

III.5.J.1 The Permittees will conduct waste management activities within 325 HWTUs authorized by this Permit according to the requirements in Addendum F, Sections F.3.1, and F.3.2. The Permittees will document compliance with these provisions in the Hanford Facility Operating Record, 325 HWTUs File. [WAC 173-303-395(1)(a)-(c)]

III.5.J.2 The Permittees will comply with the requirements of WAC 173-303-395(2), incorporated by reference.

III.5.K CLOSURE

III.5.K.1 The Permittees will close the 325 HWTUs in accordance with Addendum H, Closure Plan. [WAC 173-303-610(4)]

III.5.K.2 The Permittees will amend the Closure Plan in accordance with Permit Condition II.J.2 and Addendum H. [WAC 173-303-610(3)(b)]

III.5.K.3 The Permittees will provide Ecology with a Notice of Closure according to Permit Condition II.J.1. [WAC 173-303-610(3)(c)]

III.5.L POST CLOSURE

Reserved

III.5.M CRITICAL SYSTEMS

Reserved

III.5.N RESERVED

III.5.O CONTAINERS

III.5.O.1 Container Storage Unit Standards

III.5.O.1.a The Permittees will maintain the integrity of container storage secondary containment as documented in Addendum C, Sections C.1.4, and C.1.5, including all chemically resistant coatings and sealants described in Addendum C, Section C.1.4.1.1, as necessary to ensure any spills or releases do not migrate to the underlying concrete or soils.

III.5.O.1.b The Permittees will place documentation of any damage to and subsequent repairs of chemically resistant coatings in the Hanford Facility Operating Record, 325 HWTUs File required by Permit Condition II.I.2. [WAC 173-303-630(7)]

III.5.O.1.c Within thirty (30) days of the effective date of this Permit, the Permittee will place documentation in the Hanford Facility Operating Record, 325 HWTUs File identifying the specific chemical resistant floor and wall coatings used for secondary containment in the 325 HWTUs. This documentation will demonstrate that these materials are impervious to the wastes managed in each of the 325 HWTUs cells to contain spills until the collected material is detected and removed.. [WAC 173-303-630(7)(a)(i)]

III.5.O.2 Container Management Standards

III.5.O.2.a The Permittees are authorized to manage containerized wastes at the 325 HWTUs according to the requirements of Addendum C, Section C.1.2. [WAC 173-303-630(2)]

III.5.O.2.b The Permittees will store containers according to the waste segregation and storage arrangements specified in Addendum C, and the hazard class assigned as part of the waste acceptance process required by Addendum B. [WAC 173-303-630(7), WAC 173-303-395(2)]

III.5.O.2.c In addition to storage capacity limitations specified elsewhere in this Chapter, the Permittees will ensure that the storage limits for flammable liquids, combustible liquids, combustible fibers, flammable gasses and liquefied flammable gasses identified in WAC 173-303-630(8)(b) are not exceeded at any time. In addition, the Permittees will ensure the capacity limitation for explosive waste in WAC 173-303-630(8)(a) is not exceeded at any time. [WAC 173-303-630(8)]

III.5.O.2.d The Permittees will label containers according to the requirements of Addendum C, Section C.1.3. The Permittees will also ensure that:

III.5.O.2.d.i Container labels are not obscured or are otherwise unreadable;

III.5.O.2.d.ii Containers are oriented so that labels are readily visible;

III.5.O.2.d.iii Container labels are removed or completely obscured when the container to which they are attached is rendered empty. [WAC 173-303-630(3)]

III.5.O.2.e The Permittees will ensure wastes are compatible with containers in which they are managed and with other wastes stored at the 325 HWTUs according to the requirements Addendum C, Sections C.1.10 and C.1.11, and Addendum F, Section F.2.2. [WAC 173-303-630(4), WAC 173-303-630(9)]

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

III.5.O.2.g The Permittees will ensure the physical arrangement and spacing of containers within the 325 HWTUs satisfies the following requirements. [WAC 173-303-630(5)(c)]

III.5.O.2.g.i The Permittees will comply with the requirements for waste stored in cells, storage cabinets and shelves, as documented in Addendum C, Section C.1.2;

III.5.O.2.g.ii The Permittees will ensure the physical arrangement and spacing of drums that are stored in the 325 HWTUs are stored in rows no more than two drums wide and with a separation of at least thirty (30) inches between rows of drums to ensure that all drums are readily accessible for movement and inspection. [WAC 173-303-630(5)(c), WAC 173-303-340(3)]

III.5.O.2.h The Permittees will remove any accumulated liquids from container storage areas in the 325 HWTUs, including individual secondary containment systems (spill pallets, portable booms, or other commercially available drum containment systems) that may be used to ensure containers are not in contact with free liquids and to prevent overflow of the container storage area secondary containment. [WAC 173-303-630(7)]

III.5.O.2.i The Permittees may treat wastes in containers via consolidation of wastes, decanting of free liquids and addition of absorbents. Absorbents must satisfy the requirements of WAC 173-303-140(4)(b)(iv), incorporated by reference, for wastes to be land disposed in Washington. The Permittees may not use addition of absorbents for purposes of changing the treatability group of a waste with respect to the land disposal restriction standards of 40 CFR 268, incorporated by reference by WAC 173-303-140.

III.5.O.2.j Waste stored in the SAL is exempt from WAC 173-303-692, as the SAL is used exclusively to manage mixed waste. The Permittees will comply with the requirements for air emissions from containers in Addendum C, Section C.3 for waste stored in the 325 HWTUs. [WAC 173-303-692]

III.5.O.3 Container Storage Inspection Requirements

III.5.O.3.a The Permittee will inspect the 325 HWTUs according to Addendum I, Inspection Requirements. [WAC 173-303-630(6)]

III.5.O.3.b The Permittees will comply with the requirements of WAC 173-303-395(1)(d), incorporated by reference. [WAC 173-303-395(1)(d)]

III.5.P TANK SYSTEMS

III.5.P.1 The Permittees will develop, maintain, and follow a written schedule and requirements for conducting integrity assessments. The schedule will meet the requirements of Addendum C, Section C.2.1.1.2 and consideration of the following factors:

III.5.P.1.a Results of past integrity assessments;

III.5.P.1.b Age of the tank system(s);

III.5.P.1.c Materials of construction of each tank system, including any liners;

III.5.P.1.d Characteristics of the wastes managed by each tank system;

III.5.P.1.e Any other relevant factors. [WAC 173-303-640(2)(e)]

III.5.P.2 The Permittees will maintain a copy of the schedule required by Permit Condition III.5.P.1 in the Hanford Facility Operating Record, 325 HWTUs File, and conduct periodic integrity assessments according to the schedules and requirements of the schedule. If results of these assessments indicate a tank has structural deficiencies or lacks integrity such that it may collapse, rupture or fail, the Permittees must follow the requirements of WAC 173-303-640(7), incorporated by reference. [WAC 173-303-640(2)(e)]

III.5.P.3 If the findings of an integrity assessment conducted pursuant to Permit Condition III.5.P.1 indicate a tank has structural deficiencies or lacks integrity such that it may collapse, rupture or fail, the Permittees will evaluate the waste acceptance criteria in Addendum B, the applicable tank design and/or operating requirements in Addendum C, and any other Permit requirements which may reasonably influence the integrity of the tank in question. Based on this review, the Permittees will request the required Permit modifications in accordance with Permit Condition I.C.3 to minimize any adverse effects of future waste management activities on the integrity of the tank. [WAC 173-303-640(2)(d), WAC 173-303-815(2)(b)]

III.5.P.4 Tank System Operating Requirements

III.5.P.4.a The Permittees will comply with the requirements of WAC 173-303-640(5)(a), incorporated by reference.

III.5.P.4.b The Permittees will comply with the requirements of Addendum C, Section C.2.1.2.4. [WAC 173-303-640(5)(b)]

III.5.P.4.c The Permittees will comply with the requirements of Addendum C, Section C.2.1.4. [WAC 173-303-640(5)(d)]

III.5.P.4.d The Permittees will comply with the requirements of WAC 173-303-640(7), incorporated by reference, in response to spills or leaks from tank systems at Operating Unit Group 5. [WAC 173-303-640(5)(c)]

III.5.P.4.e The Permittees will comply with the requirements of WAC 173-303-640(10), incorporated by reference.

III.5.P.5 Tank System Inspection Requirement

III.5.P.5.a The Permittees will inspect the Operating Unit Group 5 tank systems authorized by Permit Condition III.5.B.2 according to Addendum I, Inspection Requirements. [WAC 173-303-640(6)(a)-(c)]

III.5.P.5.b The Permittees will place documentation of inspections conducted pursuant to Permit Condition III.3.P.5.a in the Hanford Facility Operating Record, 325 HWTUs File required by Permit Condition II.I.2. These records will contain the following information: [WAC 173-303-640(6)(d)]

III.5.P.5.b.i Date and time of the inspection

III.5.P.5.b.ii Printed name and the handwritten signature of the inspector

III.5.P.5.b.iii Notation of the observations made

III.5.P.5.b.iv Date and description of any repairs or remedial actions taken, and/or the scheduled date for the repairs or remedial actions.

III.5.P.5.c The Permittees will remedy any problems revealed by the inspections required by Permit Condition III.3.P.9, on a schedule that prevents hazards to the public health and environment. Where a hazard is imminent or has already occurred, remedial action must be taken immediately. [WAC 173-303-640(6)(d)]

III.5.P.6	Approved Waste and Storage Limits
III.5.P.6.a	Subject to conditions in Addendum C, the Permittees may store a maximum of 1,218 liters of dangerous and/or mixed waste in the tank system in the 325 HWTUs (S02). A maximum of 1,218 liters per day of dangerous and/or mixed waste may be treated in tanks in the 325 HWTUs (T01).
III.5.P.6.b	The Permittees shall only store or treat in the SAL tank the following mixed waste listed in the Dangerous and Mixed Waste Tank System:
III.5.P.6.b.i	Dangerous and/or mixed waste generated by Pacific Northwest National Laboratory; or
III.5.P.6.b.ii	Mixed waste generated at other Hanford Facility locations and mixed waste generated from offsite facilities, which have been transferred and accepted by the 325 HWTUs pursuant to the provisions in Addendum B, Waste Analysis Plan, and this Permit.
III.5.P.6.b.iii	The Permittee shall not place or store containerized dangerous and/or mixed waste, accepted by the 325 HWTUs pursuant to incoming wastes procedures in Addendum B, Waste Analysis Plan, in any area other than container storage areas as identified in Addendum C, Section C.1.2.
III.5.P.7	Tank System Design and Construction
III.5.P.7.a	Tank System Installation and Certification will be retained by the Permittees and made available upon request.
III.5.P.8	Integrity Assessments
III.5.P.8.a	Results of the integrity assessments shall be included in the Hanford Facility Operating Record, 325 HWTUs File until final closure and corrective action are complete and certified.
III.5.P.8.b	Any tank system, including its secondary containment system, found to be leaking, or otherwise unfit for service, immediately shall be removed from service and the Permittees shall comply with the requirements of WAC 173-303-640(7). Such a tank system, including its secondary containment system, shall not be returned to service until the Permittees have obtained the required certification.
III.5.P.8.c	The Permittees shall maintain the integrity of all containment systems for tank systems.
III.5.P.9	Tank Management Practices
III.5.P.9.a	The Permittees shall not place mixed wastes or treatment reagents in the tank system if these could cause the tank, its ancillary equipment, or a containment system to rupture, leak, corrode, or otherwise fail.

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Addendum C — Process Information

C. PROCESS INFORMATION C.1

C.1 CONTAINERS C.1
C.1.1 Container Selection C.1
C.1.2 Container Management Practices C.2
C.1.3 Container Labeling C.3
C.1.4 Containment Requirements for Storing Containers C.4
C.1.5 Structural Integrity of Base C.5
C.1.6 Containment System Drainage C.6
C.1.7 Containment System Capacity C.7
C.1.8 Control of Run-on C.7
C.1.9 Removal of Liquids from Containment System C.8
C.1.10 Management of Ignitable and Reactive Waste in Containers C.9
C.1.11 Management of Incompatible Waste in Containers C.9

C.2 TANK SYSTEMS C.10
C.2.1 Shielded Analytical Laboratory Tank System C.10

C.3 AIR EMISSIONS CONTROL C.15

Figures

Figure C.1. Hazardous Waste Treatment Unit Secondary Containment System C.16
Figure C.2. SAL Tank System C.17

Table

Table C.1. Typical Storage Containers Used at the 325 Hazardous Waste Treatment Units C.15

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C. PROCESS INFORMATION

This addendum provides a description of waste management, equipment, treatment processes, and storage operations.

The 325 HWTUs receive and treat and/or store wastes described in Addendum B, Waste Analysis Plan. Small-volume containers are segregated by compatibility and stored until sufficient quantity is accumulated to prepare a labpack or bulk container (usually a 208-liter (55 gallon) drum.) Waste introduced into the Shielded Analytical Laboratory (SAL) tank is containerized for further management as described in Section C.2.1. Containers are repackaged for shipment as necessary and shipping documentation prepared pursuant to Permit Condition II.N for shipment to a permitted onsite dangerous waste management unit or offsite TSD facility for any necessary further treatment and compliant disposal.

C.1 CONTAINERS

The following sections describe the management of dangerous waste in containers at the 325 HWTUs. Container management occurs at both the HWTU and the SAL. Both portions of the 325 HWTUs are used to store and treat dangerous wastes generated from onsite programs, primarily research laboratory analytical activities in the 325 Building and other PNNL facilities. Containers are then prepared for shipment to other on-site units or off-site TSD facilities for further treatment as required and compliant disposal. Descriptions of the containers used are provided in the sections that follow for the HWTU and SAL.

C.1.1 Container Selection

C.1.1.1 Containers Located in the Hazardous Waste Treatment Unit

Rooms 520, 524 and 528 of the HWTU are used to store and treat dangerous waste generated primarily from laboratory operations throughout the 325 Building and the Hanford Facility. The containers used to store and treat dangerous waste vary widely from original manufacturer containers to laboratory glassware for sample analysis or to 322-liter containers used to overpack smaller containers. Containers used are selected based on several criteria, which may include guidance provided in PNNL's Environmental Management System, Department of Transportation container specifications, specific safety requirements (e.g. fire code requirements for storage of flammable liquids), compatibility with the waste, and/or waste acceptance criteria provided by the facilities to which the waste will ultimately be shipped. Suitable containers are identified by the waste generator and reviewed by 325 HWTUs staff prior to waste acceptance. Acceptable containers for acidic waste include plastic, steel lined with plastic, glass, and fiberglass containers. Acceptable containers for other waste include steel, glass, fiberglass, plastic, and steel lined with plastic. Table C.1 provides an example of the types of containers that could be used in the HWTU rooms, including the material of construction and the capacity of the container.

All containers of dangerous waste are labeled to describe the contents of the container and the major hazards of the waste as required under WAC 173-303-395 and WAC 173-303-630(3). Each container is assigned a unique identifying number. All containers used for onsite transfer are selected and labeled according to requirements of this permit, and any other applicable rules and regulations, such as 49 CFR as required by WAC 173-303-190.

All flammable liquid waste is stored in compatible containers and in Underwriter's Laboratory (UL)-listed and Factory Mutual (FM)-approved flammable storage. Wastes that also designate as ignitable are managed according to the requirements of WAC 173-303-630(8)(b) and WAC 173-303-395(1)(a)-(c). Solid chemicals are stored on shelving or in drums in specifically designated areas based on the hazard classification (49 CFR 172.101).

C.1.1.2 Shielded Analytical Laboratory Containers

The primary function of the SAL is to conduct preparation and analysis of samples of highly radioactive materials originating from various locations on the Hanford Site. The types of containers used to store

dangerous waste in the SAL can vary widely from laboratory glassware for sample analysis to 322-liter containers used to overpack smaller containers.

The containers used for storage or treatment of dangerous waste are compatible with the waste stored in the containers. Containers used are selected based on several criteria, which may include guidance provided in PNNL's Environmental Management System, Department of Transportation container specifications, specific safety requirements (e.g. fire code requirements for storage of flammable liquids), compatibility with the waste, and/or waste acceptance criteria provided by the facilities to which the waste will ultimately be shipped. Suitable containers are identified by the waste generator and reviewed by 325 HWTUs staff prior to waste acceptance. Acceptable containers for acidic waste include plastic, steel lined with plastic, glass, and fiberglass containers. Acceptable containers for other waste include steel, glass, fiberglass, plastic, and steel lined with plastic. Table C.1 provides an example of the types of container that could be used in the SAL, including the material of construction and the capacity of the container.

Rooms 32, 200, 201, 202, and 203 are used to store dangerous waste in containers. The back face of the SAL (Rooms 200, 202, and 203) is typically used to store waste in larger containers. These containers include various types of 208-liter steel containers (lined and unlined). Because of the nature of some mixed waste being stored at the SAL, it is often necessary that these standard 208-liter containers be modified. This modification ensures that the containers are specially shielded to be compliant with ALARA criteria. These specially designed shielded containers are packaged to contain anywhere from 3.79 liters to 53 liters of waste depending on the amount of shielding required. The solid waste typically is packed in individual 3.79-liter to 4.73-liter containers before placement in the 208-liter shielded container. The shielding is accomplished by surrounding the small containers with concrete, lead, or other materials.

All containers of dangerous waste are labeled to describe the contents of the container and the major hazards of the waste as required under WAC 173-303-395 and WAC 173-303-630(3). Each container is assigned a unique identifying number. All containers used for onsite transfer are selected and labeled according to requirements of the permit and any applicable regulations, such as 49 CFR when required by WAC 173-303-190.

All flammable liquid waste is segregated from any incompatible waste types and packaged in approved containers as described above.

C.1.2 Container Management Practices

Management practices and procedures for containers of dangerous waste ensure the safe receipt, handling, preparation for transfer, and transportation of the waste in compliance with requirements of this permit. The following sections describe the container management practices used for the HWTU and the SAL. Table C.1 lists the typical containers used in the 325 HWTUs.

C.1.2.1 Hazardous Waste Treatment Unit Container Management Practices

Dangerous waste containers are inspected for integrity and adequate seals before being accepted at the HWTU. Waste received for storage and treatment from outside Rooms 520, 524 and 528 is either picked up by HWTU personnel or moved to Rooms 520, 524 and 528 in containers suitable for the waste. Depending on the container weight, size or number of containers to be moved, container(s) of dangerous waste are hand carried or moved on a platform or handcart, as appropriate, to Rooms 520, 524 or 528. 325 HWTUs staff moves the dangerous containers, keeping incompatible wastes separated. Unsupervised 325 HWTUs staff does not perform waste movement operations until they are formally trained.

Waste in containers that are damaged, leaking, lack integrity, or not securely sealed to prevent leakage are not accepted at Rooms 520, 524 and 528. Examples of acceptable packaging include laboratory reagents in their original bottles, U.S. Department of Transportation-approved containers, spray cans, sealed ampules, paint cans, leaking containers that have been over packed, etc. Unit operations personnel have the authority to determine whether a container is in poor condition or inadequate for storage using the

criteria referenced by WAC 173-303-190 and to use professional judgment to determine whether the packaging could leak during handling, storage, and/or treatment.

Inspection of Containers. A system of daily, weekly, and yearly inspections are in place to ensure container integrity, and to check for proper storage location, prevent capacity overrun, etc. Inspections are detailed in Addendum I. Containers are inspected for integrity as part of the HWTU waste acceptance process documented in Addendum B. Containers found to be in poor condition or inadequate for storage are not accepted unless over packed or repackaged into acceptable containers.

Container Handling. All HWTU staff is instructed in proper container handling and spill prevention safeguards as part of their training (Addendum G). Containers are kept closed except when adding or removing waste in accordance with WAC 173-303-630(5)(a). All personnel are trained and all operations are conducted to ensure that containers are not opened, handled, or stored in a manner that would cause the container to leak or rupture. All flammable cabinets containing dangerous waste are maintained with a minimum of 76 centimeters of aisle space in front of the doors. In room 520, the walk-in fume hood containing the 208-liter containers is designed to hold four 208-liter containers and has over 76 centimeters of aisle space; the containers are not stacked in the hood. In room 524, the walk-in fume hood containing the 208-liter containers is designed to hold two 208-liter containers and has over 76 centimeters of aisle space in front of the doors; the containers are not stacked in the hood. Waste-handling operations can be conducted only when two or more persons are present in the unit or when the personnel present have immediate access to a communication device such as a telephone or hand-held radio.

C.1.2.2 Shielded Analytical Laboratory Container Management Practices

Containers are not opened, handled, or stored in a manner that would cause the containers to leak or rupture. Containers will remain closed except when sampling, adding, or removing waste; or when analysis or treatment of the waste is ongoing. Containers of incompatible waste are segregated in the storage areas. In-cell containers will be stacked no more than four high and labels will not be obscured.

Inspection of Containers. A system of daily, weekly, and yearly inspections are in place to ensure container integrity, and to check for proper storage location, prevent capacity overrun, etc. Inspections are detailed in Addendum I. Containers are inspected for integrity before acceptance at or transport to the SAL. Containers found to be in poor condition or inadequate for storage are not accepted.

Container Handling. All personnel are instructed in proper container-handling safeguards as part of their training (Addendum G). Containers are kept closed except when adding or removing waste in accordance with WAC 173-303-630(5)(a).

All container handling in the hot cells must be performed remotely with manipulators. Waste samples managed in the SAL enter the cells through rotating transfer wheels located in the back walls of cells 1, 2, and 6 and through a 17.8-centimeter borehole in the back wall of cell 1. After analysis of the sample and necessary confirmation of results, compatible solid waste samples are consolidated into appropriate size containers often referred to as 'paint cans' and usually stored in cell 1. However, any of the cells can be used for storage of waste during operations.

After evaluation for treatment and the subsequent treatment, liquid waste is either transferred to the SAL tank (discussed in §C.2), prepared for disposal through stabilization, or absorbed onto appropriate material as necessary to meet the anticipated final disposal unit waste acceptance criteria. The waste is repackaged into shielded 208-liter containers and stored in the back face area of the SAL. Waste-handling operations are conducted outside of the cells only when a minimum of two persons are present in the unit or when the personnel present has immediate access to a communication device such as a telephone or hand-held radio.

C.1.3 Container Labeling

Once the material has been designated as a dangerous waste, all containers are marked and/or labeled to describe the content of the container as required by WAC 173-303-395 and WAC 173-303-630(3).

Containers also are marked with a unique identifying number assigned by the generating unit. All containers used for transfer of dangerous waste are prepared for transport in accordance with WAC 173-303-190.

C.1.4 Containment Requirements for Storing Containers

A description of secondary containment system design and operation is provided for the HWTU and SAL in this section.

C.1.4.1 Secondary Containment System Design and Operation for the Hazardous Waste Treatment Unit

The secondary containment system for the HWTU has three primary components: UL or FM-approved storage cabinets, individual secondary containment devices, and the firewater containment system (Figure C.1).

Liquid dangerous waste and other waste requiring secondary containment in containers not exceeding the secondary containment capacity of the cabinet is stored in Rooms 520, 524, and 528 in steel storage cabinets. The secondary containment capacity of the cabinets is documented in the Hanford Facility Operating Record, 325 HWTUs File, and the quantity of waste stored in the cabinet or the capacity of the largest container in the cabinet will be limited by that capacity. The containers are selected as described in Section C.1.1.1 and are kept closed except when waste is being added or withdrawn. Ignitable and reactive waste is managed in accordance with WAC 173-303-395(1)(a) and the Uniform Building Code (ICBO 1991) (Note: The UBC references requirements of the Uniform Fire Code, or UFC).

Larger waste containers that contain bulk liquids are stored inside DOT approved containers providing secondary containment, or managed on spill containment pallets. For compatible wastes consolidated into lab-pack containers, the DOT approved outer container serves as secondary containment – such outer containers will be stored directly on the floor. Containers holding waste not subject to containment system requirements pursuant to WAC 173-303-630(7)(c) will be stored on the floor.

Each cabinet is clearly marked as containing either flammable or corrosive waste. Flammable waste cabinets are painted yellow, and corrosive cabinets are painted blue.

Prior to acceptance at the unit, liquid "bulk" containers (i.e. containing free liquids) which will not be stored in cabinets will be evaluated to determine compatibility with any other "bulk" containers currently in storage in Rooms 520 or 528. If incompatible (as determined by the Waste Analysis Plan), the incompatible liquid wastes will be placed within drip pans or similar secondary containment devices complying with WAC 173-303-630(7)(a). This is intended to prevent incompatible materials from mixing in the fire water tank secondary containment system. Containers from 65 to 328 liters (17 to 85 gallons) capacity holding only wastes that do not contain free liquids, do not exhibit either the characteristic of ignitability or reactivity as described in WAC 173-303-090(5) or (7), and are not designated as F020, F021, F022, F023, F026, or F027 will be stored in DOT approved drums on the floor within the unit. Labpacks are considered not to require further secondary containment and will also be stored directly on the floor.

Rooms 520 and 528 are located on the main floor of the 325 Building and are constructed of concrete. The concrete floors of both rooms have been equipped with a heat-sealed seamless chemical-resistant polypropylene coating that covers the entire floor area of both rooms and laps approximately 10 centimeters up all of the outside walls of each room. The coated floor is capable of containing minor spills and leaks of liquid mixed waste, and prevents migration of spilled waste from one room to another.

Major spills or leaks of liquid mixed waste flow into the firewater containment system. The firewater containment system consists of floor trenches located at each entrance to 520 and 528 and the firewater containment tank located in the basement of the building. The system is designed to collect the fire-suppression water in the event that the automatic sprinkler system was activated. The location of the trenches is shown in Figure C.1.

The floor trenches located under the double doors on the west side of Rooms 520 and 528 are approximately 20 centimeters wide, 46 centimeters deep and 1.91 meters long. The floor trench located under the single south door of Room 520 is approximately 20 centimeters wide, 46 centimeters deep, and 1.5 meters long. The floor trench located under the single southwest door of Room 528 is 20 centimeters wide, 61 centimeters deep, and 1.5 meters long. The trenches extend completely across the entrance of each room so that liquids do not flow out through a doorway. The trenches are constructed of 14-gauge stainless steel and are equipped with a steel grate cover. All seams are welded to ensure integrity. Trenches under the double doors are equipped with two drains in the bottom, and trenches located under single doors are equipped with one drain to allow liquid to drain from the trench through 15-centimeter-diameter carbon steel piping to the firewater containment tank.

The firewater containment tank is located beneath Room 520 in the basement of the 325 Building. The rectangular tank has dimensions of 1.65 meters by 2.25 meters by 1.92 meters and a capacity of 22,710 liters. The sides and floor of the tank are constructed of epoxy-coated carbon steel plate. The steel sides and floor provide support for the chemical-resistant polypropylene liner. The tank is secured to the concrete floor of the 325 Building basement with 1.3-centimeter bolts at 1.82-meter intervals.

The possibility of mixing incompatible waste in the containment system is minimized since the number of containers open at one time is limited to those in process (waste not in process is stored in closed containers). As noted above, independent secondary containment will be provided for bulk liquid wastes which are incompatible with any other bulk liquid wastes in storage. In addition, the very large volume of any firewater flow would dilute waste and would minimize the possibility of adverse reactions.

C.1.4.2 Secondary Containment System Design and Operation for the Shielded Analytical Laboratory

The secondary containment in the SAL is divided into three systems: the six hot cells, the front face (Room 201), and the back face area (Rooms 200, 202, and 203). Figure C.2 provides a first floor plan view depicting these three areas.

The secondary containment for the six hot cells consists of the stainless steel base of the cell. All waste requiring it is stored in secondary containment consisting of larger containers (e.g. "paint cans" as noted in Section C.1.2.2) and/or pans/trays.

The secondary containment system for the back face of the SAL consists of shielded 208-liter containers and plastic containers. Waste is packaged in containers (e.g., paint cans, bottles, and bags) before removal from the hot cells. Containers of liquid waste are placed into plastic containers that provide secondary containment and prevent spilled liquids from contacting other waste containers. Once removed from the hot cells, the containers are placed into specially designed, shielded 208-liter containers to provide secondary containment. Some containers are placed in shielded cubicles in Room 202 or in the glove boxes in Room 203 depending on container dose rates. The location of the cubicles and glove boxes is shown in Figure C.2. If any bulk liquid waste is stored in the back face area, it is provided with compliant secondary containment per WAC 173-303-630(7)(a).

The secondary containment system for the front face of the SAL, which is minimally used to store mixed waste (near the north end away from the manipulator area), is similar to the system for the back face. Containers holding liquid and solid mixed waste are placed into containers to provide secondary containment.

C.1.5 Structural Integrity of Base

A description of the requirements for base or liner to contain liquid is provided in the following sections for the HWTU and the SAL.

C.1.5.1 Requirements for Base or Liner to Contain Liquids in the Hazardous Waste Treatment Unit

The floors in Rooms 520 and 528 have been equipped with a chemical-resistant polypropylene coating. All seams in the coating were finished by heat welding to ensure the integrity of the coating. The coating currently is free of cracks, gaps, and will be maintained that way throughout the life of the HWTU. The condition of the floor is inspected weekly as part of the inspection program (Addendum I). Floor coating assessment is carried out whenever the floor coating is observed to be chipped, bubbled up, scraped, or otherwise damaged in a manner that would impact the ability of the coating to contain spilled materials. Minor nicks and small chips resulting from normal operations are repaired periodically.

The floor coating holds spilled liquid until the liquid is cleaned up, or enters the drains in each room. Once the liquid has entered the drains, the liquid drains into the firewater containment tank in the basement, where the liquid is stored pending chemical analysis and treatment and/or disposal.

The base of the HWTU floors consists of 14.2 centimeter, reinforced, poured concrete slabs with no cracks or gaps. The concrete is mixed in accordance with ASTM 094, Section 5.3, Alternate 2, and is finished with a smooth troweled surface. The concrete base has a load capacity of 976 kilograms per square meter.

The floor trenches that prevent liquids from migrating from rooms 520 and 528 are constructed of 14-gauge stainless steel. All seams are welded and the connections with the drains are tight. The stainless steel is compatible with and resistant to the liquid mixed waste managed in the HWTU.

C.1.5.2 Requirements for Base or Liner to Contain Liquids in the Shielded Analytical Laboratory

The base currently is free of cracks, gaps, and will be maintained that way throughout the life of the SAL. The base of the floor for the six hot cells consists of a 0.48-centimeter layer of stainless steel formed on top of poured concrete. The stainless steel base is compatible with most of the waste generated in the hot cells. The exceptions are waste containing hydrofluoric acid and high concentrations of hydrochloric acids. This waste is stored in individual secondary containment to prevent contact of the waste with the stainless steel in the event that a primary waste container was to fail. Because the volumes of waste generated and stored are small and the hot cell floors are not sloped, waste spilled during waste handling activities probably would remain localized and be cleaned up expeditiously to ensure that no damage occurs to the stainless steel. In order to avoid spillage reaching the stainless steel tank serving the hot cells, separate secondary containment is provided for waste stored in the six cells as required by WAC 173-303-630(7). Liner and base requirements for the SAL tank are discussed in §C.2.

The bases of the back face and front face of the SAL consist of a 15.2 -centimeter, reinforced, poured concrete slabs with no cracks or gaps. The concrete base has a load capacity of 976 kilograms per square meter. The base in Room 201 is topped with a seamless chemical resistant polypropylene coating. Rooms 202 and 203 are topped with epoxy-based paint. The Room 200 concrete floor is painted with an epoxy-based paint, and has epoxy sealant applied to a trap door in the floor that enables transfer of equipment between Rooms 200 and 32. The airflow between these rooms is from Room 200 to Room 32 due to positive air pressure in Room 200.

C.1.6 Containment System Drainage

A description of the containment system drainage for the HWTU and SAL is provided in this section.

C.1.6.1 Containment System Drainage for the Hazardous Waste Treatment Unit

The floors in Rooms 520 and 528 are not sloped. Small spills of liquid probably will collect in the cabinet and remain in a localized area until the spills are cleaned up. Containers of dangerous waste are stored in drums, on shelves within open-faced hoods, or within flammable or corrosive storage-cabinets to prevent the containers from contacting spilled materials. Large spills of liquid material would spread laterally across the flat surface of the floor. The flow of the spilled liquid would be stopped by an outside

wall(s) of the room or by one of the trenches protecting the entrances to the room. The lower 10 centimeters of the outside walls of the rooms are covered with the same chemical-resistant coating as that on the floor to prevent spills from migrating through the walls.

The floor in Room 524 is not sloped. All liquid waste in this room will be stored in secondary containment. The secondary containment for liquids will consist of steel storage cabinets with secondary containment, DOT approved containers or one of the stainless steel 'container pans'. Any container holding waste not subject to containment system requirements will be stored on the floor.

The floor drains across each exit in Rooms 520 and 528 drain spills to an emergency firewater containment tank (22,710-liter capacity) located in the basement of the 325 Building. The tank captures all drained liquid, where the liquid is stored until sampling and analysis indicates a proper treatment and/or disposal method.

C.1.6.2 Containment System Drainage for the Shielded Analytical Laboratory

The stainless steel base of the hot cell is not sloped. Because of the small volume of waste that is handled, small spills probably would remain in a localized area until the spills are cleaned up. As a result, all containers of liquid mixed waste are stored within secondary containment to prevent contact with accumulated liquids.

The bases of the front and back faces are not sloped. Containers in these areas are stored within secondary containment and off the base surface to prevent spilled liquids from contacting the containers.

C.1.7 Containment System Capacity

A description of the containment system capacity for the HWTU and SAL is provided in the following sections.

C.1.7.1 Containment System Capacity for the Hazardous Waste Treatment Unit

The maximum combined total volume of all containers of dangerous waste stored in the HWTU is 12,000 liters. The largest mixed waste storage container is a 322-liter container. The firewater containment tank provides secondary containment for larger containers stored in Rooms 520 and 528. The capacity of the firewater containment tank is 22,710 liters; therefore, the containment system is more than adequate to contain either 10 percent of the total volume of waste (2,840 liters) or the entire volume of the largest container (322 liters).

C.1.7.2 Containment System Capacity for the Shielded Analytical Laboratory

The total amount of liquid to be stored in the hot cells is governed by the area constraint of the cells. Typically, the largest amount of liquid waste to be stored in the hot cells at one time is 75.8 liters. In-cell secondary containment as described in Section C.1.4.2 is provided for all stored wastes requiring it per WAC 173-303-630(7).

Liquid waste stored in Room 201 is stored in the fume hood. The waste is stored in glass or plastic bottles that are placed in individual plastic containers of a size that is sufficient to hold all of the contents of the inner vessel. The quantity of liquid waste stored in the hood is governed by the area constraint in the hood. Similarly, liquid waste stored in Room 202 is stored in glass or plastic bottles that are each placed in individual secondary containment.

The floors of the front face and back face are constructed of concrete, and the rear face floor is coated with an epoxy-based paint. The rear face floor in Rooms 202 and 203 is covered with epoxy paint. Because of the small quantities of liquid stored in the front face and back face, any spill that is not contained by the plastic overpack probably would remain on the floor in a localized area until cleaned.

C.1.8 Control of Run-on

Run-on control for the HWTU and SAL is described in the following sections.

C.1.8.1 Control of Run-on for the Hazardous Waste Treatment Unit

The 325 Building mitigates the possibility of run-on for the HWTU. The level of the main floor is approximately 1.52 meters above the level of the ground surface around the building.

C.1.8.2 Control of Run-on for the Shielded Analytical Lab

The 325 Building mitigates the possibility of run-on for the SAL. The level of the main floor is approximately 1.52 meters above the level of the ground surface around the building.

C.1.9 Removal of Liquids from Containment System

The removal of liquids from the containment system for the HWTU and SAL is described in the following sections.

C.1.9.1 Removal of Liquids from the Hazardous Waste Treatment Unit Containment System

On discovery of liquid accumulation in the containment resulting from a spill or other release, the Building Emergency Director (BED) must be contacted in accordance with the contingency plan (Addendum J). The BED may determine that the contingency plan should be implemented. If the incident is minor, and if the BED approves, removal of the liquid commences immediately following a safety evaluation. Appropriate protective clothing and respiratory protection will be worn during removal activities; an industrial hygienist could be contacted to determine appropriate personal protection requirements and any other safety requirements that might be required, such as chemical testing or air monitoring. In addition, ventilation of the spill area might be performed if it is determined to be safe and if appropriate monitoring of the air discharge(s) is performed.

Liquid spills are contained within the Room 520, 524 or 528 storage cabinets, floor, or within the firewater containment tank. Localized spills of liquids to the floor of the HWTU rooms are absorbed with an appropriate absorbent (after the appropriate chemical reaction has occurred to neutralize reactivity in the case of reactive waste or after neutralization has occurred in the case of corrosive materials). The absorbent material is recovered and placed in an appropriate container. The floor, cabinets, and any other impacted containers can be cleaned by dry rags, soap and water, or a compatible solvent, if necessary, to remove external contamination. Contaminated rags and other cleanup material are disposed of in an appropriate manner. If spilled materials in the HWTU reach the firewater containment tank, the material will be held in place until chemical analysis indicates an appropriate treatment and/or disposal method. The waste analysis procedures and analytical methods used to designate the spilled materials are documented in Addendum B, Waste Analysis Plan. The tank is designed to allow easy access for material sampling. Depending on the results of the analysis, the collected spill material will be recovered and disposed of at an appropriate facility.

C.1.9.2 Removal of Liquids from the Shielded Analytical Laboratory Containment System

On discovery of liquid accumulation in the hot cells or in the back or front face containment resulting from a spill or other release, the BED must be contacted in accordance with the contingency plan (Addendum J). The BED could determine that the contingency plan should be implemented. If the incident is minor, and if the BED approves, removal of the liquid commences immediately following a safety evaluation. For in-cell spills, hot cell technicians will clean up the spill using sorbents or wipers (possibly including neutralization of a spilled acid or base) and the waste will be submitted for disposal in accordance with Addendum B. For liquids discovered in the back or front face areas, appropriate protective clothing and respiratory protection will be worn during removal activities; an industrial hygienist could be contacted to determine appropriate personal protection requirements and any other safety requirements that might be required, such as chemical testing or air monitoring. In addition, ventilation of the spill area could be performed if it is determined to be safe and if appropriate monitoring of the air discharge(s) is performed.

Localized spills of liquids to the floor of the SAL will be absorbed with an appropriate absorbent (after the appropriate chemical reaction to neutralize reactivity has occurred in the case of reactive waste or after neutralization has occurred in the case of corrosive materials). The absorbent material will be recovered and placed in an appropriate container. The floor, cabinets, and any other impacted containers can be cleaned by dry rags, soap and water, or a compatible solvent, if necessary, to remove external contamination. Contaminated rags and other cleanup material will be disposed of in accordance with applicable regulations and PNNL internal waste management procedures.

C.1.10 Management of Ignitable and Reactive Waste in Containers

Management of ignitable and reactive-waste in containers within the HWTU and SAL is described in the following sections.

C.1.10.1 Management of Ignitable and Reactive Waste in Containers in the Hazardous Waste Treatment Units

Ignitable and reactive wastes are stored in compliance with Article 79, Regulations for Flammable and Combustible Liquids (ICBO 1997). Containers of ignitable and reactive waste are stored in individual flammable storage cabinets within the HWTUs.

C.1.10.2 Management of Ignitable and Reactive Waste in Containers in the Shielded Analytical Laboratory

Ignitable and reactive wastes are stored in compliance with Article 79, Regulations for Flammable and Combustible Liquids (ICBO 1997). Containers of ignitable and reactive waste are stored in individual flammable storage cabinets within the SAL.

C.1.11 Management of Incompatible Waste in Containers

The prevention of reaction of ignitable, reactive, and incompatible waste in containers for the 325 HWTUs is discussed in the following sections.

C.1.11.1 Management of Incompatible Waste in Containers at the Hazardous Waste Treatment Unit

Containers of ignitable and reactive waste are stored in segregated flammable storage cabinets. Addendum F, §F.3.2, describes the methods used to determine the compatibility of dangerous waste so that incompatible waste is not stored together. Incompatible waste is never placed in the same container or in unwashed containers that previously held incompatible waste. Operations are conducted such that extreme heat or pressure, fire or explosions, or violent reactions do not occur. Uncontrolled toxic mists, fumes, dust, or gases in sufficient quantities to threaten human health or the environment are not produced; uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosion are not produced; and damage to the container does not occur. Information on the hazard classification of waste accepted by the HWTU is documented by the generating unit, which is carefully reviewed by HWTU personnel before waste acceptance. Mixing of incompatible waste is prevented through waste segregation and storage. As the containers received in the HWTU usually are smaller than 19 liters, the most common segregation is performed by storage of incompatible hazard classes in separate chemical storage cabinets. Guidance for the segregation is provided in Addendum F, §F.3.2.

Minimum aisle space is maintained according to the Uniform Fire Code to separate incompatible waste, and the aisle space requirements of WAC 173-303-630(5) and (9), and WAC 173-303-340(3). The possibility of adverse reaction is minimized (see Addendum F, §F.3.1 for methods used to prevent sources of ignition).

C.1.11.2 Management of Incompatible Waste in Containers at the Shielded Analytical Laboratory

Incompatible waste in the SAL hot cells is managed by placing primary containers into a second container or tray capable of managing any leak or spilled material. Incompatible waste is never placed in the same container, second container or tray, or in an unwashed container that previously held incompatible waste.

Treatment operations are conducted to ensure that extreme heat or pressure, fire, or explosive or violent reactions do not occur. Potential releases would be controlled by the ventilation system that exhausts through two high-efficiency particulate air (HEPA) filters set in series, and due to the limited amount of waste in the SAL. These HEPA filters are part of the building exhaust system, which is maintained and inspected routinely in accordance with PNNL preventive maintenance standards. Emissions from the 325 Building stack, and control devices for those emissions, are regulated by the Washington State Department of Health pursuant to Chapter 246-247 WAC, and the Washington State Department of Ecology (Ecology) pursuant to Chapters 173-400, 173-401, and 173-460 WAC, respectively. Air-pressure barriers for containment control are achieved by supplying air from areas of least contamination (i.e., offices) to areas of higher contamination (i.e., cells). These systems ensure proper emission flow through the HEPA filters.

Because waste normally is treated in the SAL hot cells, human exposure to the remote potential of mixing incompatible waste or reactive waste is minimal. Waste generated and treated within the SAL hot cells is stored within separate secondary containers, which eliminates the potential for combining incompatible waste. Waste stored in the front or back face of the SAL is packaged by hazard classes for transfer or is segregated in separate secondary containment.

C.2 TANK SYSTEMS

The following sections describe the management of dangerous waste in the SAL tank system. The tank system consists of the tank; associated piping, valves and pumps; and secondary containment. The tank system is located in Room 32 of the SAL and is used to collect liquid waste generated from the analytical laboratory operations. This SAL tank system is described in §C.2.1 and depicted in Figure C.2.

C.2.1 Shielded Analytical Laboratory Tank System

The SAL is an analytical chemistry laboratory used primarily to prepare and analyze samples for research and development activities and waste characterization. Storage and treatment of dangerous waste in containers also occurs in the SAL. This work is conducted in six inter-connected hot cells. Liquid waste generated during these operations is collected, treated if necessary and may be containerized or drained from the hot cells to the SAL tank located in Room 32 of the basement directly below the hot cells. A stainless steel trough, 15.2 centimeters wide by 7.62 centimeters deep, traverses the front of all six hot cells in which solution is poured. The trough is equipped with stainless steel grating to capture solids during solution pour. The trough collects any liquid waste poured from analytical chemistry operations, mixed waste treatment operations, other chemical and mixed waste stored in the hot cells, and spills or leaks. The liquid waste is transferred through a common stainless steel pipeline that drains into the SAL tank. The waste is treated in the tank, as needed, and batch transferred from the SAL tank to containers for disposal through a pressurized transfer line that leads back into Cell 6 of the SAL. The SAL tank volume is 1,218 liters and has a throughput of 10,000 kilograms per year.

C.2.1.1 Design, Installation, and Assessment of Tank Systems

The following sections discuss the design and installation of the SAL tank and provide information on the integrity assessment.

C.2.1.1.1 Design Requirements

Waste stored in the SAL tank has a pH between 7 and 12. The tank is constructed of 316L stainless steel. This material is compatible with any of the dangerous waste that is discharged to the tank.

The tank system design has been reviewed by an independent, qualified, registered professional engineer to verify that the strength of the material is adequate and that it can withstand the stress of daily operation. The professional engineer evaluation is included in the tank integrity assessment.

The SAL tank is a vertical double-shell tank supported by 3 legs and stands approximately 1.7 meters above the ground. The top head is a 0.95-centimeter-thick flat stainless steel plate. Both bottom heads are flanged and dished heads (torispherical), and the bottom height is 10.2 centimeters above ground. The inner shell is 107 centimeters outside diameter, the outer shell is 114 centimeters outside diameter, and each shell is 0.8-centimeter-thick stainless steel plate. The tank is located inside a containment pan that has a 203-centimeter diameter and is 51 centimeters high; the total volume of the pan is 1,648 liters. The pan provides for secondary containment of leaks from the tank, piping, and ancillary equipment and instruments located above the tank. Flanged and threaded connections are located within the containment boundary of the pan to capture any leaks that might occur from these connections. Outside the containment area, all connections are welded. There are no outlets, drainage or otherwise, on the bottom or sides of the tank.

Solution enters the tank through a gravity flow, welded drain line piped from the hot cells. The SAL sources that tie into this drainpipe includes: the hot cells, sink drain, hood drain via the sink drain, and floor drain. The cup sink drain and hood drain line is sealed off and is not in use. The drain line also functions as the tank vent that is exhausted by the hot cell exhaust system. A return line of stainless steel is attached to the top of the tank and can be 'jetted' using water pressure to transfer the tank contents back up to Cell 6 of the SAL. A mixer is located on top of the SAL tank to provide agitation of the contents for sampling and washout purposes. Process water also is provided to the tank system for cleanout of the tank and associated piping. The solution is stored in the SAL tank, treated as needed and transferred to containers for final disposal.

The SAL tank is located in a controlled access room and is monitored from two operating panels. The smaller sample panel is located next to the SAL tank, and the second main control panel is located in Room 201, the main operating gallery. The sample panel provides control for activities related to pulling a sample, such as activating the sample pump and controlling process water, and monitoring the liquid level of the tank. The main control panel provides the operators with the ability to monitor and control the entire SAL tank system. The main control panel provides level indication, high, and high-high level annunciation and contains switches for controlling pumps, agitators, valves, etc. The SAL tank is instrumented with three types of level-monitoring devices. Two devices are wired into the annunciator at the main control panel to provide high-level alarms, and one high-level alarm annunciates at the annunciator board in the control room on the third floor. This control room is staffed 24 hours a day, 7 days a week. If a high-alarm situation occurs after normal working hours, operations personnel would be notified immediately by the alarm and would take corrective action according to procedure. The SAL tank system normally is operated on the day shift. Personnel occupy the main operating gallery in Room 201, where the personnel would be alerted to off-normal conditions on the main control panel. A high-level alarm also would deenergize the process water solenoid valves to the closed position on three water lines into the hot cells and on the process water lines to the SAL tank. The containment pan contains a conductivity element that alarms at the main control panel should solution be detected in the pan. Operating procedures require that inspections of the entire system be made daily when in use (Addendum I).

C.2.1.1.2 Integrity Assessments

An independent, qualified, registered professional engineer's tank integrity certification has been completed and is on file in the Hanford Facility Operating Record, 325 HWTUs File.

C.2.1.2 Secondary Containment and Release Detection for Tank Systems

This section describes the secondary containment systems and leak detection systems installed in the SAL.

C.2.1.2.1 Requirements for Tank Systems

The secondary containment system for the SAL Tank in Room 32 consists of two components. The SAL tank is a double-walled vessel and the outer tank provides secondary containment for the inner tank. However, since the inner tank cannot be easily inspected, the outer tank is considered the "primary containment" and a pan installed under the tank is considered to provide secondary containment for the tank system.

The existing drainpipe from the hot cells to the SAL tank is a single-walled, 5.1-centimeter welded stainless steel pipe. This piping is visually inspected for leaks on a daily basis when the tank system is in use, by means of a remote video system. Flanges in this piping and ancillary equipment are located so that secondary containment is provided by the SAL tank secondary containment pan. The 325 Building provides additional containment. The basement floors are concrete, and any liquid release remains in the immediate area until cleanup. The openings to the drains in the basement are elevated 10.2 centimeters above the floor; thus, any spill would remain in the basement until enough liquid collects to fill the entire basement to a 10.2-centimeter depth. The SAL tank can hold a maximum of 1,218 liters, and the entire contents of the SAL tank would fill an area of only 3.5 meters by 3.5 meters to a depth of 10.2 centimeters. Because the basement is larger than 3.5 meters square, the liquid from the SAL tank would not enter a drain opening. Details of the design, construction, and operation of the secondary containment system are described in the following sections.

C.2.1.2.2 Requirements for Secondary Containment and Leak Detection

The secondary containment has been designed to prevent any migration of waste or accumulated liquid from the tank system to the soil, groundwater, or surface water. The secondary containment system also can detect and collect releases of accumulated liquids. A zoom color television camera surveillance system allows for tank, ancillary equipment, and general Room 32 viewing. The camera, located in Room 32, is equipped with auxiliary lighting and mounted on a remote controlled pan and tilt head. The color monitor and camera controls are housed in a dedicated cabinet in Room 527A. The HWTU will have the option of either keeping the camera/monitor controls in Room 527A or moving it to another location for operational flexibility. By maintaining operational flexibility of where the camera controls are located, the HWTU can meet ALARA (As Low As Reasonably Achievable) requirements and minimize the expense of added HWTU training requirements.

The following is the system description.

Materials of construction. The tank and components are constructed of 316L stainless steel; this material is compatible with the aqueous waste being discharged to the tank. The waste has a pH between 7 and 12.

Strength of materials. The system design has been reviewed by an independent, qualified, registered professional engineer to verify that the strength of materials is adequate and that the tank can withstand the stress of daily operation. In addition, pressure relief valves are installed in each line exiting the SAL tank. In the event that there is a blockage in the pipe or tubing, pressure will not build up in the lines. The pressure relief valves are set to 30 psi, which is well below the design strength of stainless steel pipe and tubing. Waste drains back into the SAL tank when a pressure relief valve opens.

Strength of foundation. The system design has been reviewed by an independent, qualified, registered professional engineer to verify that the strength of the tank mounting and foundation is adequate to withstand the design-basis earthquake (DBE). This ensures that the foundation is capable of providing support to the tank and will resist settlement, compression, or uplift.

Leak detection system description. The SAL tank is double walled, and a conductivity probe is installed in the annulus to detect any leak of liquid from the primary containment. If liquid is detected by the probe, alarms are sounded immediately in a local control panel located in Room 32 and in the main control room.

A pan installed beneath the SAL tank provides secondary containment. The containment pan has a conductivity element that alarms at the main control panel if the presence of liquid in the pan is detected.

The containment pan has a 203-centimeter diameter and a 51-centimeter height with a containment capacity of 1,648 liters. The containment pan will easily hold the total capacity of the 1,218-liter SAL tank plus any potential process water that might be released.

Removal of liquids from secondary containment. The tank containment, the outer shell of the double-walled vessel, is designed to contain a liquid leak from the inner vessel until provisions can be made to remove the liquid. The liquid might not be removed within 24 hours because of the coordination that must take place in the 325 Building. A tube is installed in the tank annulus, extending to the bottom and is capped at the top. If liquid were detected in the annulus, the liquid could be removed by connecting a tube between the capped fitting and the transfer pump, which would pump out the liquid to appropriate containers.

A delay of greater than 24 hours in removing the liquid from the secondary containment poses no threat to human health or the environment, because the waste continues to be contained in a sealed vessel. In the event that the outer tank should also leak, the containment pan installed beneath the tank provides secondary containment.

C.2.1.2.3 Secondary Containment and Leak Detection Requirements for Ancillary Equipment

Secondary containment for the SAL tank system ancillary equipment is provided by the containment pan below the SAL tank, by double-walled piping for the sample line between the tank and the sample station, and by daily visual inspection during use of the entire system including the existing single-walled piping. Flanged and threaded connections, joints, and other connections are located within the confines of the containment pan. Outside this pan, only double-walled piping and welded piping is allowed. The pumps are magnetic coupling pumps located above the pan. All construction material is stainless steel; for the welded parts, the material is 316L stainless steel. Stainless steel material is compatible with the expected corrosive, dangerous, and mixed waste stored in the SAL tank. The strength and thickness of the piping, equipment supports, and containment pan are designed to onsite standards that take into account seismic requirements for the region and corrosion protection. The entire system is located on an existing basement floor built in the 1960s. The 325 Building has proven over time to be of a sound structural integrity to withstand mild earthquake forces. The containment pan has a liquid element sensor that alarms immediately at the main control panel should any leakage be detected. The containment pan has a 203-centimeter diameter and a 51-centimeter height, or 1,648 liters of capacity. The containment pan will hold the total capacity of the 1,218-liter SAL tank plus any potential process water that also might be released. In the event of an alarm, the process water solenoid valves will become de-energized to the closed position to minimize the loss of additional water.

The 325 Building is staffed or monitored 24 hours a day, 7 days a week. The control system is designed to alarm on any leak/spill or high-level alarm encountered. The personnel responding to the alarm condition will stop or secure the action causing the leak/spill, warn others of the spill, isolate the spill area, and minimize individual contamination and exposure. The spilled or leaked waste will be removed in an expeditious manner according to Addendum J requirements for cleaning up spills and leaks. Any required release reports will be filed according to the requirements of WAC 173-303-640(7).

C.2.1.2.4 Controls and Practices to Prevent Spills and Overflows

The SAL tank system has been designed to provide safe and reliable operation that prevents the system from rupturing, leaking, corroding, or otherwise failing. The tank is provided with redundant-level instrumentation to monitor tank levels. Both capacitance- and conductance-level probes are used for level monitoring and alarming. The tank will alarm on high level and interlock the process water to fail close. The process water is supplied to both the hot cells and the tank system. The containment pan is equipped with a liquid-sensing element to detect the presence of liquid and alarms at the main control panel if liquid is detected. Normally, liquid is drained to the tank by operators pouring solution into the troughs in the hot cells. This operation is carried out in a 'batch mode'. If this operation sets off a high-level alarm, the operators stop pouring solution into the troughs. Even if this operation caused an alarm condition, no

spill is expected, because the tank has sufficient freeboard to hold additional waste solution. The initial level alarm is set at 92 percent of full volume. This provides an allowance of 97 liters.

Trained personnel respond to spills by stopping or securing the action causing the spill, notifying others in the area of the spill, and following the requirements of Addendum J. Measures are in place to inspect the system daily (see Addendum I).

C.2.1.3 Tank Management Practices

Wastes to be introduced to the SAL tank are first profiled and approved in accordance with the Waste Analysis Plan, Addendum B, before introduction. Introduction of liquid waste to the SAL tank is conducted by pouring the waste into the troughs. The troughs tie into the 5.08-centimeter drain header located under the hot cells. This drain header is sloped down to the SAL tank located in Room 32 of the basement. The existing drain header is the only method of introducing mixed waste solutions into this tank. The drain line is fully welded and is constructed of 316L stainless steel material. Because this drain line also serves as the SAL tank vent line, the SAL tank operates at the same pressure as that of the hot cells. The heating, ventilation, and air conditioning operating pressure for the hot cells, and therefore the SAL tank, is -1.27 centimeters water (vacuum). The SAL tank operates at slightly subatmospheric pressure, and no pressure controls are necessary for this tank system.

The SAL tank is fully monitored with tank-level instruments. A main control panel provides level status and high-alarm annunciation. Two control panels are provided with the SAL tank monitoring system. One control panel is located adjacent to the sampling station in Room 32 to control the sampling pump when samples are pulled. A second control panel is located on the operating floor in Room 201, the SAL main operating gallery. Tank status is monitored from the first floor control panel. Because waste solution is generated in a batch mode, waste solution drained to the tank is effectively controlled through operating and administrative procedures in order to prevent high-level-alarm conditions. A safety cutoff system for the tank will shut off all incoming water to the SAL in conjunction with a high-level-alarm condition. A backup tank system was determined to be unnecessary for the SAL operations because of the presence of tank monitoring devices and the use of administrative and operational (batch-processing) controls.

The tank transfer controls provide similar safety features. The SAL tank volume may be transferred to SAL Cell 6 for treatment and/or subsequent storage in containers using a transfer line. As with the drain lines, the transfer line is constructed of single-wall stainless steel piping. All transfer line connections outside the tank's secondary containment system are protected against over pressurization via a pressure-relief valve on the tank set for 19 psig.

C.2.1.4 Marking or Labeling

Due to the ALARA concerns associated with the SAL tank, the tank itself is not labeled. The tank is located in a locked room to comply with ALARA standards. Access points to the room are labeled to meet the requirements of WAC 173-303-395 and WAC 173-303-640(5)(d). The marking of the access points is legible from a distance of 15 meters and identifies the major risks associated with the waste. The label adequately warns employees, emergency response personnel, and the public of the major risks associated with the waste being stored within the tank. The tank also has a written placard identifying important hazard concerns.

C.2.1.5 Ignitable, Reactive, and Incompatible Waste

Many different types of samples and waste materials will be brought to the SAL hot cells for analytical or research activities. These samples are accompanied by internal PNNL documentation that provides waste characterization information from the sample-generating unit. Chemical characterization provided in these forms is based on previous chemical analysis or process knowledge. The hazard potential includes exposure to mixed waste, corrosive chemicals, and hazardous chemicals. All operations performed in the SAL hot cells are conducted by qualified operators following approved procedures. Typical hot cell analytic processes generate liquid waste that is highly acidic and/or that have a high chloride level. A

small quantity of organic waste is generated and segregated prior to treatment or disposal. If heavy metals are present in the liquid waste before neutralization, the metals are precipitated as hydroxides incident to the neutralization and are filtered from the solution. If the chloride content of the liquid is above 0.01 Molar, the chlorides may be removed through silver nitrate precipitation. Therefore, waste solutions are not expected to be ignitable, reactive, or incompatible when transferred to the SAL tank.

C.3 AIR EMISSIONS CONTROL

There are no process vents in Operating Unit Group 5 (325 HWTU), so the requirements of WAC 173-303-690 do not apply. Similarly, there is no equipment managing or contacting dangerous or mixed waste with volatile organics above 10 wt%, so the requirements of WAC 173-303-691 do not apply. The SAL is used solely for the management of mixed waste and is therefore exempt from WAC 173-303-692. Containers stored in the HWTU will be evaluated for compliance with WAC 173-303-692 as follows.

Compliance with the Subpart CC standards is maintained at the HWTU by utilizing DOT-specification containers for storage, when the container has a design capacity greater than 0.1 m^3 (26.4 gallons). Containers greater than 0.46 m^3 (121 gallons) are not typically utilized at the HWTU, and if they are, they would be used only for materials with low vapor pressures. Hence Level 1 container standards are the only standards that must be met.

To meet the Level 1 standards, the following standards are observed:

- Opening hazardous waste containers only occurs when adding or removing waste, or for necessary inspection or sampling, after which the container is promptly re-closed.
- Inspection of the closure of hazardous waste containers is checked prior to loading for shipment to the HWTU as part of the waste acceptance process (Addendum B, Section B.2.1).
- Any waste container greater than 0.1 m3 capacity stored longer than one year is re-inspected at least once every 12 months to check the container for deterioration or damage. Any deterioration or damage is documented and promptly repaired in accordance with 40 CFR 264.1086(c)(4)(iii).

Determination that containers with capacity greater than 0.46 m^3 (121 gallons) are not in "light material service" is provided through the acceptance criteria in the 325 HWTUs waste analysis plan (Addendum B, Section B.1.1.1.2).

Table C.1. Typical Storage Containers Used at the 325 Hazardous Waste Treatment Units

Material of Construction	Waste Capacity
Glass container/bottles	1 milliliter to 3.79 liters
Plastic containers/bottles	1 milliliter to 19 liters
Paint cans	0.47 liters to 4.73 liters
Steel containers	114 liters, 322 liters
Plastic-lined steel containers	114 liters, 208 liters
Steel 'shielded' 208-liter container	Various nominal capacity depending on necessary shielding; 3.79 liters; 53 liters
Overpack containers	322 liters

Figure C.1. Hazardous Waste Treatment Unit Secondary Containment System

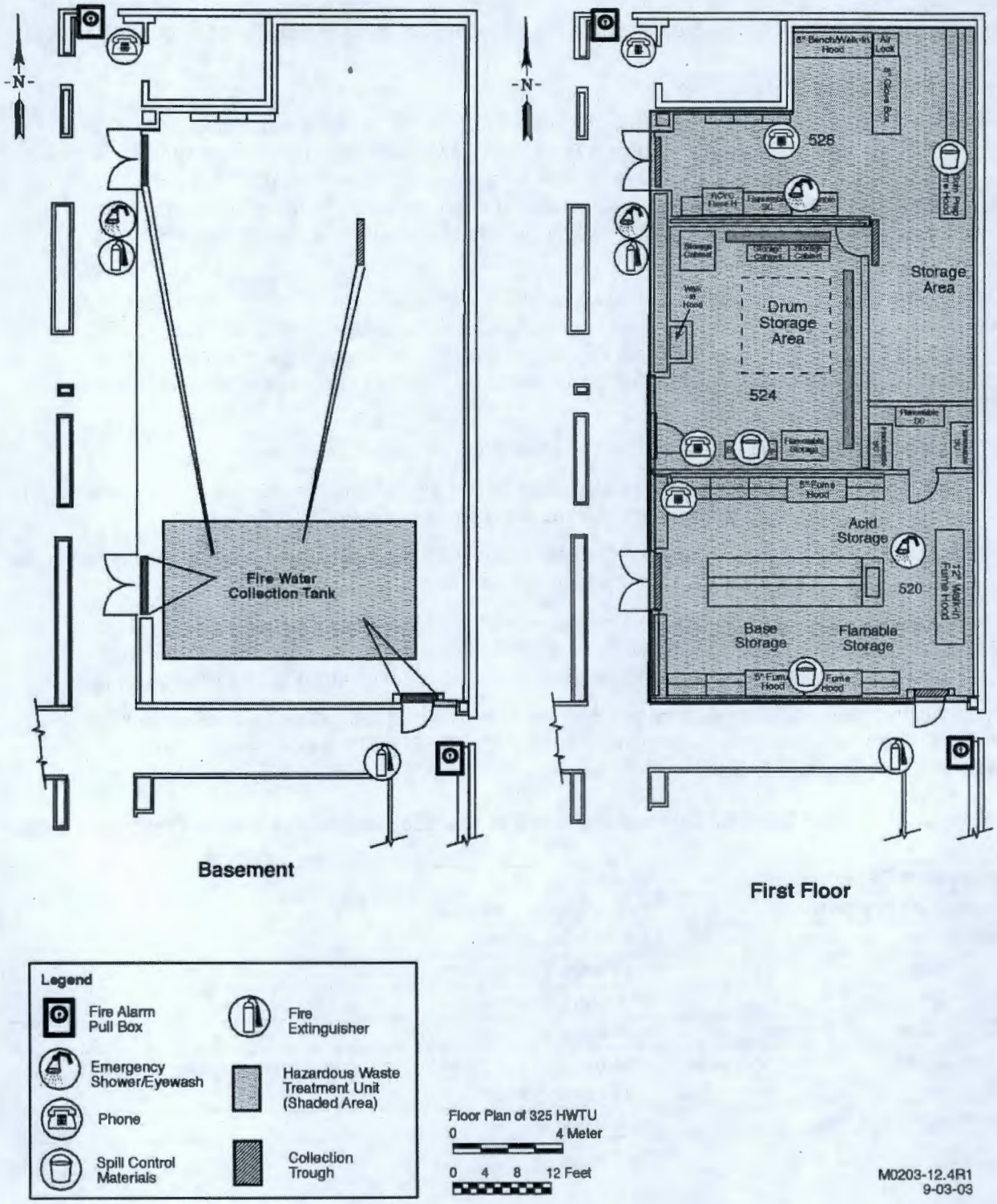
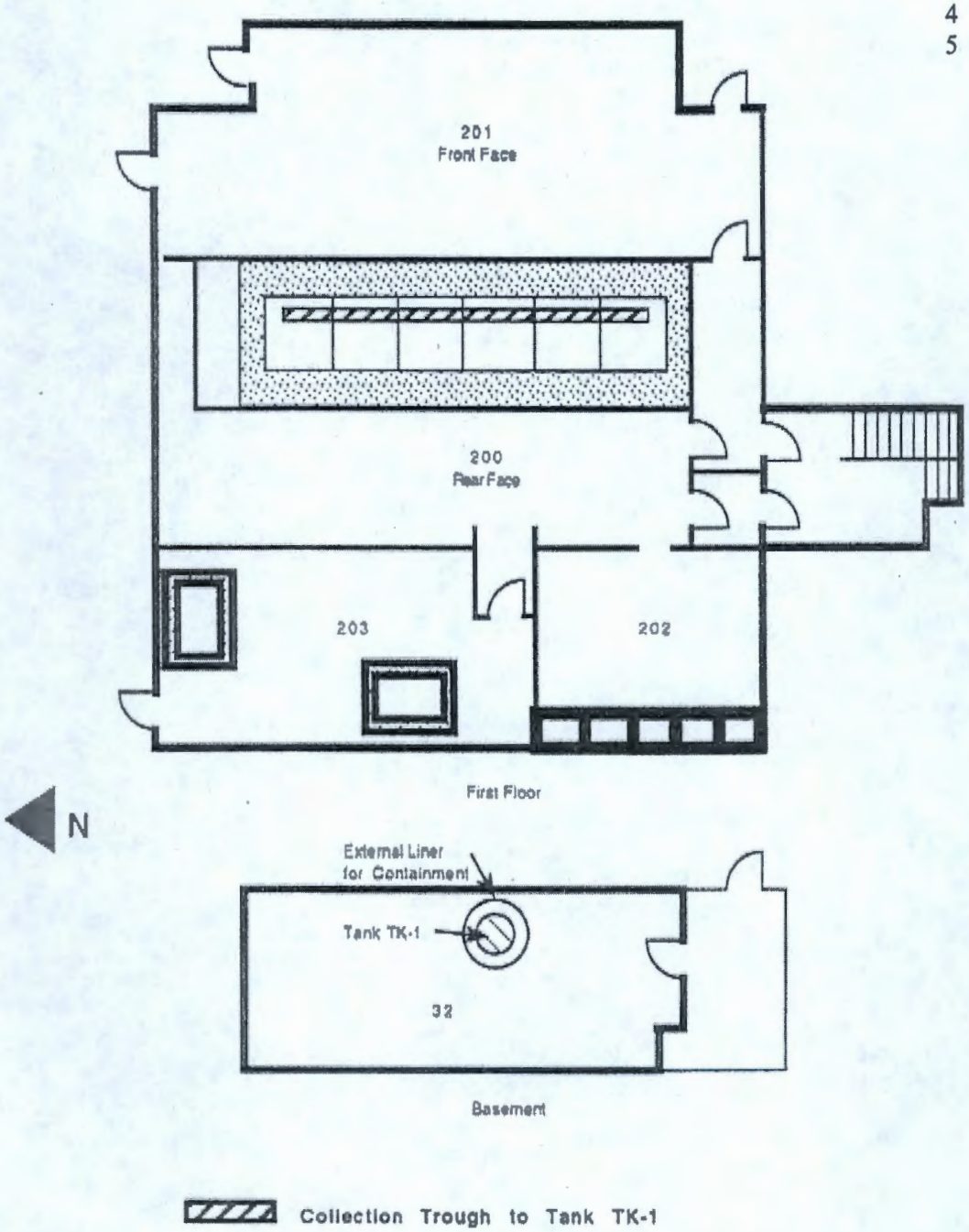


Figure C.2. SAL Tank System



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E. PROCEDURES TO PREVENT HAZARDS E.1
E.1 SECURITY E.1
E.1.1 Waiver E.1

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E. PROCEDURES TO PREVENT HAZARDS

The 325 HWTUs are operated to minimize exposure of the general public and operating personnel to dangerous waste.

E.1 SECURITY

Refer to Permit Attachment 33, Chapter 6.0, §6.1.

E.1.1 Waiver

Waiver of the security procedures and equipment requirements for the 325 HWTUs are not requested. Therefore, the waiver requirement outlined in WAC 173-303-310(1)(a) and (b) are not applicable.

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Addendum F — Preparedness and Prevention

F. PREPARDENESS AND PREVENTION F.1

F.1 PREPAREDNESS AND PREVENTION REQUIREMENTS F.1
F.1.1 Equipment Requirements F.1
F.1.2 Aisle Space Requirements F.3

F.2 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT F.3
F.2.1 Unloading Operations F.3
F.2.2 Run-off F.4
F.2.3 Water Supplies F.4
F.2.4 Equipment and Power Failure F.4
F.2.5 Personal Protection Equipment F.4

F.3 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND/OR INCOMPATIBLE WASTE F.5
F.3.1 Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste F.5
F.3.2 Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste F.6
F.3.3 Management of Incompatible Waste in Tank Systems F.7
F.3.4 Management of Incompatible Waste in Containers or Tanks F.7

Figures

Figure F.1. Locations of Emergency Equipment at the Hazardous Waste Treatment Units F.8
Figure F.2. Locations of Emergency Equipment at the Shielded Analytical Laboratory (First Floor) F.9
Figure F.3. Locations of Emergency Equipment at the Shielded Analytical Laboratory (Basement) F.10

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F. PREPARDENESS AND PREVENTION

F.1 PREPAREDNESS AND PREVENTION REQUIREMENTS

The following section documents the preparedness and prevention measures taken at the 325 HWTUs.

F.1.1 Equipment Requirements

The following sections describe the internal and external communications and emergency equipment in use at the 325 HWTUs.

F.1.1.1 Internal Communications

Internal communication systems are used to provide immediate emergency instruction to personnel in the 325 HWTUs. Internal communications address general emergencies that might occur in the 300 Area and the 325 Building, as well as specific emergencies that might occur. Personnel have access to these internal communication devices whenever waste is handled.

Because of the nature of activities that occur in the 300 Area, the potential exists for emergencies outside of the 325 HWTUs that could impact operations and personnel. Fire alarm signals are located in each building throughout the 300 Area. The nearest emergency siren for 'area evacuation' and 'take cover' is located approximately 46 meters northwest of the 325 Building on top of the 326 Building and is audible in all parts of the 325 Building. Numerous criticality howlers (horns) are located throughout the 325 Building and are audible in all parts of the building.

Internal communications to provide emergency instruction in the event of an emergency in the 325 HWTUs and in the 325 Building are listed below:

- Fire alarms
- Differential pressure alarms (for the SAL)
- Differential pressure alarm in the glove box in Room 528
- Leak detection alarms (for the SAL)
- Building-wide public address (PA) system
- Intercom system (for the SAL)
- Telephones

The fire alarms are used to provide notification for immediate evacuation of the 325 Building. The fire alarms are initiated on activation of the manual pull boxes, heat detectors, and the sprinkler system. Fire alarm pull boxes are located as indicated in Figures F.1 through F.3. Air monitoring systems with alarms are located in the 325 HWTUs. The PA system is used for building wide broadcasting of verbal emergency instructions to 325 Building personnel. The telephone system is used to provide verbal emergency instructions to 325 HWTUs personnel. The telephones also can be used to transmit verbally emergency information to personnel outside of the 325 HWTUs and to request emergency services. A network of telephones is provided throughout the 325 Building. Locations of telephones within the 325 HWTUs are shown in Figures F.1 through F.3. In addition to the telephone communication system, personnel have access to hand-held radios. The radios are available from the Building Manager. All of the radios transmit at the same frequency and are capable of summoning the PNNL Single Point Contact in case of an emergency.

Hazardous Waste Treatment Unit. There are two fire alarm pull boxes near the HWTU; one is located in the hall north of the entrance to Room 528, and one is in the hallway just east of the south entrance to Room 520. Rooms 520 and 528 are equipped with smoke detectors that, upon activation, initiate the fire alarm system and close dampers between the two rooms and the corridor. Heat detectors are provided in the glove box in Room 528. There are two fire alarm bells just outside the HWTU. These fire alarm bells are located north of the entrance to Room 528 in the hall and east of the south entrance to Room 520 in the hall.

Additionally, a fire alarm strobe is installed in Room 528. The locations of the fire pull boxes are shown in Figure F.1.

The glove box in Room 528 is equipped with a differential air pressure alarm that monitors the glove box for loss of negative pressure. If a loss occurs, a local alarm is sounded.

The PA system speakers are located in Rooms 520 and 528.

Shielded Analytical Laboratory. There are four fire alarm pull boxes provided in the SAL; three are in Room 201, and one is in Room 203. Additionally, a fire alarm pull box is located just outside of Room 32. Heat detectors are provided in the six large interconnected hot cells in the SAL. Several fire alarm bells are located throughout the 325 Building, including two fire alarm bells within the SAL (one each in Rooms 201 and 203). These alarms are audible at all locations within the SAL.

The six interconnected hot cells in the SAL are equipped with a differential air pressure alarm that monitors the hot cells for loss of negative pressure. If a loss occurs, a local alarm is sounded.

A cable leak detection system is installed in Room 200. The cable runs behind the back wall of all six hot cells. Liquid escaping from the hot cells on the rear face (Room 200) would contact the cable and automatically sound an alarm device in Room 201. This conductivity cable runs from the hot cells to the secondary containment pan for the SAL tank in Room 32. Any release of the tank system contents to this pan, which contacts the cable, initiates the cable leak detection alarm.

The SAL tank is equipped with a conductivity probe for leak detection within the annulus of this double-shelled tank. The tank also is equipped with a high-liquid-level alarm. In the event of an interstitial leak or overfilling, audible alarms sound at the SAL tank's main control panel in Room 201.

The PA system speakers are located in Rooms 200, 201, and 203. An intercommunication system supplies two-way voice communications between Rooms 32, 200, 201, and 201a.

F.1.1.2 External Communications

As mentioned in Section F.1.1.1, a fire alarm system and telephone network system are in place at the 325 HWTUs. Both systems can be used to summon emergency assistance. The fire alarm system summons direct response from the 300 Area Fire Station. The telephone system can be used to access the PNNL Single Point Contact directly by dialing 375-2400 or by dialing the emergency number 911. For DOE-RL and other non-PNNL contractor personnel dialing 911 from onsite phones, the call goes directly to the Hanford Patrol, which calls the PNNL Single Point Contact. Locations of fire alarm pull boxes and telephones are given in Figures F.1 through F.3. Personnel on the premises have access to these external communication devices.

F.1.1.3 Emergency Equipment

Emergency equipment available for trained 325 HWTUs personnel includes portable fire extinguishers, a fire suppression system, spill response equipment, and decontamination equipment.

With the exception of the hot cells, the entire building also is equipped with automatic sprinkler protection consisting of Schedule 40 steel pipe per ASTM A120 (ASTM 1991) and 150-pound malleable iron fittings per ANSI B16.3 (ANSI 1992). All components are UL-listed or FM-approved. The fire sprinkler system was designed and installed in accordance with NFPA 13 for 'ordinary hazard' (NFPA 1996).

Absorbent pillows are capable of absorbing small quantities of spilled inorganic and organic liquids and can be used to contain temporarily any spills of these materials. Their rated absorption capacities range from 250 to 4,000 milliliters.

Mercury spill kits are capable of cleaning up to 25 milliliter of spilled mercury. Acid, caustic, and solvent spill kits contain the materials necessary to clean up small spills of acids, bases, and organic solvents.

The absorbent kits in the SAL contain absorbent pads and other materials needed to temporarily contain and clean up small chemical spills.

The appropriate spill kits can be applied, respectively, to small acid and base spills for neutralization during cleanup efforts. The caustic neutralizer has similar capabilities for neutralizing small quantities of spilled bases. If needed, the Hanford Fire Department provides additional emergency equipment.

Hazardous Waste Treatment Unit. Two portable 4.5 kilogram ABC fire extinguishers are available adjacent to the HWTU as shown in Figure F.1. The portable fire extinguishers are located in the hall outside the entrance to Room 524 and in the hall south of the south entrance to Room 520.

For chemical contamination needs, an emergency shower is located in the hall outside the entrance to Room 524 (Figure F.2). Emergency eyewashes are located in Rooms 520 and 528. Any contaminated water will be contained and cleaned up in accordance with the Addendum J, Contingency Plan.

Shielded Analytical Laboratory. Four 9.0-kilogram ABC portable fire extinguishers are located in the SAL. A portable fire extinguisher is located in Room 201 and Rooms 200 and 203 each have one portable fire extinguisher. The fourth is located just outside Room 32. Additionally, ABC dry chemical fire extinguishers are provided for each of the six large interconnected hot cells in Room 201. These extinguishers are mounted on the outside of each cell with the distribution system within the cells. The cell manipulator arms are used to direct the discharge at a fire within the cell.

Two emergency eye wash/showers are located in Rooms 200 and 201 (Figure F.2). Any contaminated water will be contained and cleaned up in accordance with the Addendum J, Contingency Plan.

F.1.1.4 Water for Fire Control

The five water pipelines that service the 325 Building for fire protection supply adequate water volume and pressure. Each of these lines is 15.2 centimeters in diameter.

Three fire hydrants are located in immediate proximity to the 325 Building; one is approximately 30.4 meters east of the southeast corner of the 325 Building; one is approximately 21.3 meters directly north of the northwest corner of the 325 Building, and one is 33.5 meters west of the southwest corner of the 325 Building. In addition, the 300 Area Fire Station is located within 0.4-kilometer of the building.

F.1.2 Aisle Space Requirements

Aisle spacing is sufficient to allow the movement of personnel and fire protection equipment in and around the containers. This storage arrangement also meets the requirements of the National Fire Protection Association and the Life Safety Code (NFPA 1994) for the protection of personnel and the environment. A minimum 76.0-centimeter aisle space is maintained between rows of containers as required by WAC 173-303-630(5)(c).

F.2 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT

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

F.2.1 Unloading Operations

Procedures have been developed to prevent hazards and to minimize the potential for breakage, punctures, or the accidental opening of containers during the transfer of waste to the 325 HWTUs. All waste is inspected before acceptance to ensure that the waste is in appropriate containers and that the containers are in good condition. Inspection of containers before acceptance minimizes the potential for spills during unloading operations. The potential for spills during waste handling also is minimized using appropriate container handling equipment; small waste items can be unloaded by hand.

The volumes of dangerous waste entering and exiting the SAL are in relatively small containers (Addendum C, Process Information) and, have secondary containment because of the packaging

requirements for the mixed waste materials. Any spill from such containers will be contained and not released to the environment.

F.2.2 Run-off

The 325 HWTU and SAL were designed to eliminate the likelihood of waste migration via run-off. Because the 325 HWTUs are enclosed completely (i.e., complete roof and no open walls), run-off of precipitation is not a factor. The following paragraphs address additional design features provided to eliminate the likelihood of run-off.

Hazardous Waste Treatment Unit._The concrete floor in Rooms 520 and 528 of the HWTU is provided with a chemical resistant polypropylene coating. The coating covers the entire floor and extends approximately 10 centimeters up on each perimeter wall in each room. The rooms also are provided with floor drains and floor trenches at each entrance. The trenches and floor drains flow into the firewater containment tank located in the basement of the 325 Building. The management of any mixed waste that might accumulate in the tank because of a fire is discussed in Addendum C, Process Information.

Shielded Analytical Laboratory._ The secondary containment in the SAL is divided into three systems based on three designated areas of the SAL. These areas are the six large, interconnected hot cells, the front face (Room 201), and the back face (Rooms 200, 202, and 203).

The secondary containment system for the six large, interconnected hot cells consists of the stainless steel base of the cell. All waste requiring it is stored in secondary containment consisting of larger containers (e.g. "paint cans" as noted in Addendum C, Section C.1.2.2) and/or pans/trays.

Typically, the use of the secondary containment system is enough to ensure that waste is safely contained. If there were to be a larger scale failure of secondary containment, however, the cell base and trough would collect any spilled waste within the cell. The trough drains by gravity through openings in the bottom of the trough and stainless steel piping to the SAL tank.

Specially designed, shielded, 208-liter containers are used as the secondary containment system for the back face of the SAL. The back face of the SAL is used to store mainly solid mixed waste in cans, which are packed in the containers. Any liquids stored here are placed in compatible secondary containment. The secondary containment system for the front face of the SAL, which is only used minimally to store mixed waste, consists of the same practice of using the plastic, pan type containers described previously.

The secondary containment system for the HWTU and SAL is described in detail in Addendum C.

F.2.3 Water Supplies

The 325 Building is designed and operated to contain safely waste and to prevent any contamination of water supplies. The secondary containment systems, described in Addendum C, prevent releases to the environment and infiltration of waste that could contaminate groundwater. The containment systems also prevent waste run-off that could contaminate surface water. The nearest water supply is the 300 Area water intake located on the Columbia River, which is less than 0.8 kilometers from the 325 HWTUs.

F.2.4 Equipment and Power Failure

The 325 Building is provided with an emergency power system that initiates upon failure of the primary power system, thereby minimizing the likelihood of the release of dangerous waste or mixed waste during a power failure or equipment failure. The 325 HWTUs have emergency lighting systems that operate automatically during power failure incidents. For actions to be taken in the event of power failure to unit systems or equipment, refer to Addendum J, Contingency Plan.

F.2.5 Personal Protection Equipment

Protective clothing and equipment are provided to employees during normal and emergency operations. Protection levels for emergencies are determined either in consultation with an industrial hygienist, or applicable control work permits or applicable operating procedure.

Per the identified work requirements, protective clothing and equipment is available for all staff working at the SAL. Protective clothing and equipment available at the SAL include, but are not limited to, the following:

Shielded Analytical Laboratory

- Safety glasses (Room 201)
- Chemical protective suits (Rooms 200 and 201) (part of absorbent kits)
- Goggles (Rooms 200 and 201) (part of absorbent kits)
- Gloves (Rooms 200 and 201) (part of absorbent kits).

Storage and treatment of dangerous waste can occur in Room 520, 524, and 528 of the HWTU. Personal protective equipment is required for personnel working these areas of the HWTU. Protective clothing and equipment available at the HWTU include, but are not limited to, the following:

Hazardous Waste Treatment Unit

- Laboratory coats (325 Building – Men's/women's change room)
- Shoe covers (325 Building – Men's/women's change room)
- Surgeon gloves (Rooms 520, 524 and 528)
- Chemical resistant gloves (Rooms 520, 524 and 528)
- Chemical resistant aprons (Rooms 520, 524 and 528)
- Face shields (Rooms 520, 524 and 528)
- Hard hats (Room 528)
- Safety glasses (Rooms 520, 524 and 528).

The protective equipment storage areas are well stocked at all times. This equipment is replaced periodically as it is used. The above inventory reflects each type of personal protective equipment that typically is present at the 325 HWTUs. Additional personal protective equipment can be obtained, as needed, from storage locations and sources outside of the 325 HWTUs. These areas include the personal protective equipment storage area in the 700 hall men's and women's change rooms, Room 529, and the men's and women's change rooms in the south end (first floor) of the 325 Building. This personal protective equipment also can be obtained from onsite suppliers for the 325 HWTUs.

Respiratory protective equipment (air purifying, full-face/negative pressure respirators) that can be used by personnel is managed by the 325 Building Manager and must be checked out. This equipment is stored within the 325 Building. In addition, the 700 hall men's and women's change rooms normally contain a 1-week supply of coveralls, laboratory coats, hoods, skull caps, cloth shoe covers, rubber shoe covers, and gloves (canvas, surgeon's, and canner's).

F.3 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND/OR INCOMPATIBLE WASTE

The following sections describe prevention of reaction of ignitable, reactive, and incompatible waste.

F.3.1 Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste

The 325 HWTUs are used to store a variety of ignitable waste. Precautions to prevent ignition of ignitable waste involve separation of waste from sources of ignition and use of procedures to minimize the potential for accidental ignition. There are no routine sources of ignition or open flame in the 325 HWTUs. Work with ignition or heat sources, if required, is limited and controlled in the following ways by management and is performed in compliance with internal requirements for elimination of ignition sources.

- Use of open flame equipment when working with flammable liquids is prohibited.
- Smoking is prohibited around flammable liquids (no smoking is allowed in the 325 Building).

- Electrical equipment used in flammable or explosive atmospheres is required to comply with the National Electrical Code, NFPA 70.
- Use of equipment with automatic, adjustable temperature controls and high temperature limit switches is required to prevent overheating.
- Placement of flammable liquids on hot surfaces is prohibited.
- All static electricity sources require grounding in areas where ignitable vapors might be present.
- Bonding of conductive containers is required when transferring flammable liquids.
- Use of nonsparking tools is required in flammable waste storage areas.

All maintenance or modifications in the 325 HWTUs that require work with ignition sources must receive prior approval by a safety engineer. This approval is documented in the Hanford Facility Operating Record, 325 HWTUs File. Smoking is not allowed in the 325 Building at any time, and the interior and exterior of the building are clearly posted with 'No Smoking' signs. Waste storage areas are not heated by any radiant heat source. All tools used to open ignitable waste containers are constructed of nonsparking materials.

A fire safety engineer familiar with the Uniform Fire Code inspects ignitable waste storage areas annually. This inspection is documented in the Hanford Facility Operating Record, 325 HWTUs File. There also are storage restrictions at the 325 HWTUs for combustible waste as part of fire safety requirements. The storage restrictions defined in the Uniform Building Code for Class B Occupancy apply to the 325 Building (ICBO 1991).

F.3.2 Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste

As described in Section F.3.1, ignitable waste is managed to protect the waste from sources of ignition or open flame. Ignitable waste containers are maintained in good condition and inspected weekly to minimize the potential for releases that could result in fire. Containers of ignitable waste are protected from high temperatures to prevent the potential for pressurization and buildup of ignitable vapors. Containers of ignitable waste are stored in flammable material storage cabinets within waste storage areas (Addendum C). Limitations on sizes of containers and amount of storage in cabinets are discussed in Addendum C.

Small quantities of reactive waste are accepted for storage in the 325 HWTUs. Information on all reactive and other waste accepted by the HWTU and SAL is documented on a waste tracking form, which is reviewed carefully by personnel before accepting the waste. This form contains information on the unique handling requirements of the waste. Any reactive waste requiring special handling and storage to prevent unwanted reactions is appropriately packaged before arriving at the 325 HWTUs. This packaging safeguards against reactions resulting from air or water contact, shock, and other causes. Reactive waste is handled and stored in a manner commensurate with the specific reaction hazards posed by the waste. This includes segregating the waste from other waste and reagent chemicals with which the waste potentially could react.

Because a wide variety of waste can be accepted at the 325 HWTUs, the potential exists for storage of incompatible waste. Mixing of incompatible waste is prevented through waste segregation and storage procedures. Chemical waste stored in the 325 HWTUs is separated by compatibility and hazard class and stored in separate storage areas. Separate storage shelves and cabinets are used within the storage areas (Addendum C) to provide further waste segregation. Before accepting waste from generating units, waste management staff determines the DOT hazard class for each waste (see Addendum B) so that waste can be stored with compatible materials. The following general guidance is used to segregate and separate chemicals:

- Store acids on a low storage shelf or in acid storage cabinets
- Separate acids from bases and alkaline metals such as potassium or sodium

- Separate oxidizing acids from organic acids and flammable or combustible materials
- Store bases away from acids and store solutions of inorganic hydroxides in polyethylene containers
- Store oxidizers away from flammable or combustible materials and reducing agents such as zinc, alkaline metals, and formic acid
- Store peroxide forming chemicals in air-tight containers in a dark, cool, and dry place (inside of cabinets)
- Store flammable materials in approved containers or cabinets
- Separate flammable materials from oxidizing acids and oxidizers and keep them away from sources of ignition
- Clearly, mark cabinets to identify the hazards associated with their contents.

The potential for waste ignition or reaction at the 325 HWTUs also is minimized through storage restrictions on hazardous materials quantities. The storage restrictions defined in the Uniform Building Code for Class B Occupancy apply to the 325 HWTUs (ICBO 1991). The weekly inspection of the 325 HWTUs includes checking to see if waste inventories are below these limits. These inspections are documented in the Hanford Facility Operating Record, 325 HWTUs File.

In the unlikely event the fire sprinkler system in Rooms 520, 524, and 528 is activated, the resulting run-off will be contained in the firewater collection tank located in the basement of the 325 Building. This tank is described in detail in Addendum C.

F.3.3 Management of Incompatible Waste in Tank Systems

Waste discharged to the SAL tank from the hot cells typically consists of the same type of waste managed in the hot cells. Sampling and analysis would be used if sufficient process knowledge were not available to characterize the waste for waste acceptance criteria purposes. The waste is treated in the SAL tank, if necessary.

F.3.4 Management of Incompatible Waste in Containers or Tanks

Incompatible waste and other materials are handled as described in Section F.3.2 and in accordance with established operating methods. Storage restrictions that ensure proper separation of containers of incompatible material in the 325 HWTUs are described in Section F.3.2.

Ignitable or reactive waste is not placed in the tank systems unless the waste has been treated, rendered, or mixed so that the waste no longer meets the definition of ignitable or reactive waste under WAC 173-303-090 (Addendum B).

Drawings of the 325 HWTUs are available to ensure that ignitable and/or reactive waste is located at least 15 meters from the unit's property line.

Figure F.1. Locations of Emergency Equipment at the Hazardous Waste Treatment Units

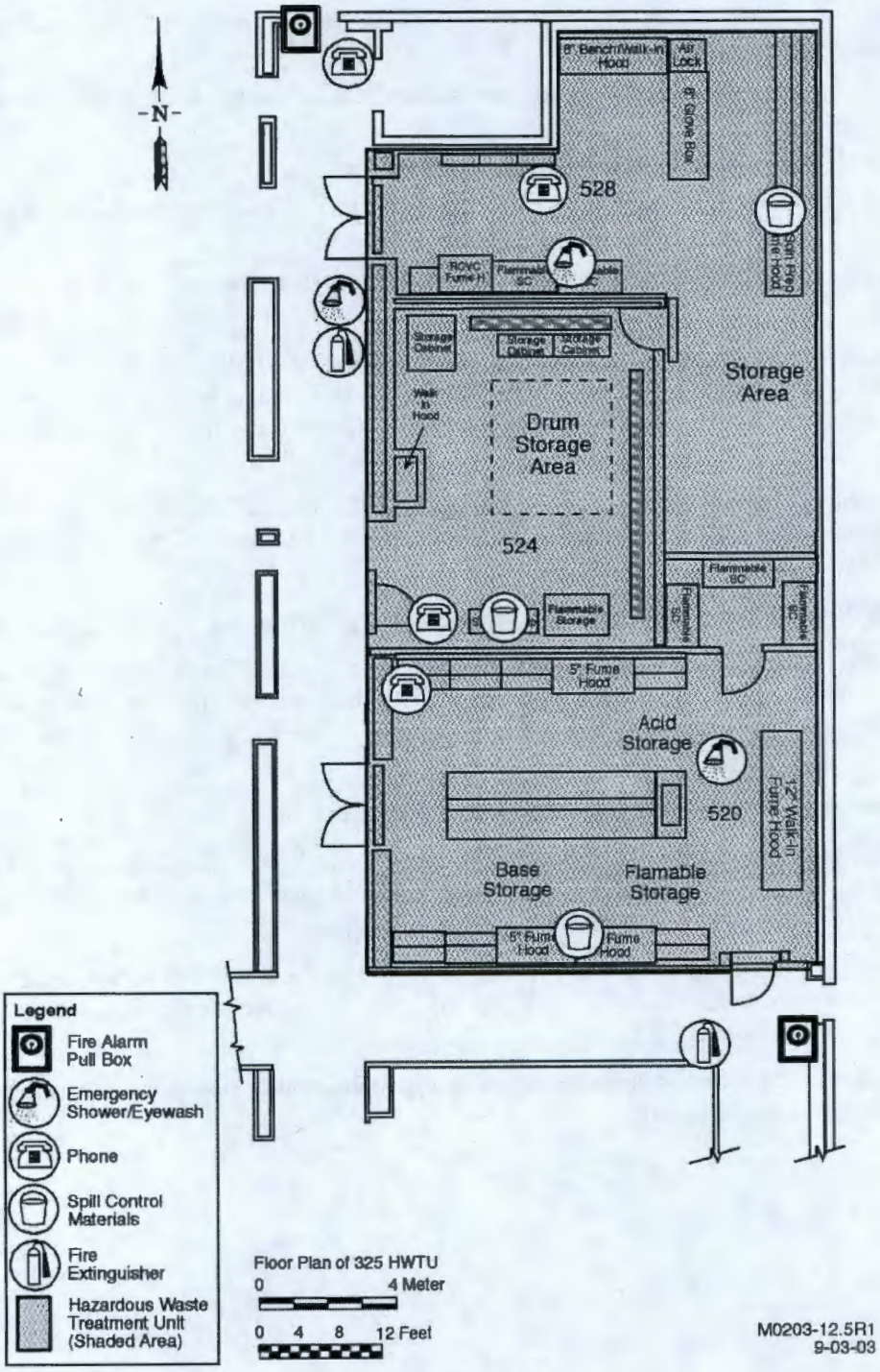
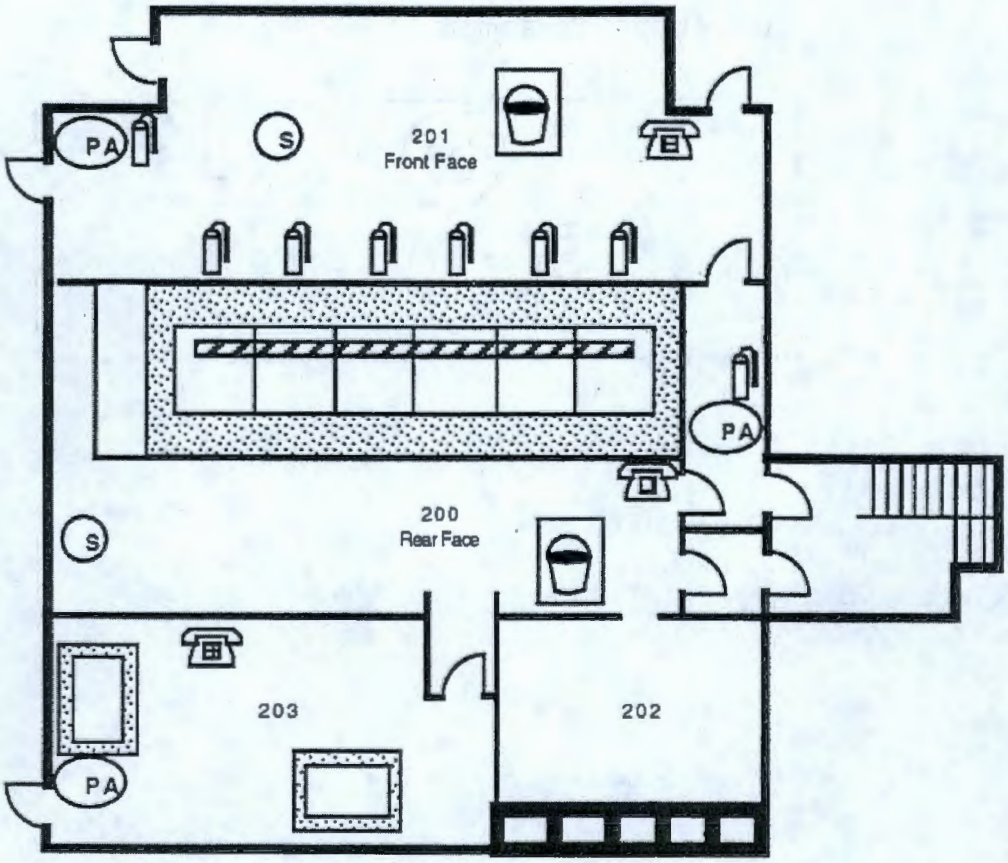


Figure F.2. Locations of Emergency Equipment at the Shielded Analytical Laboratory (First Floor)



First Floor

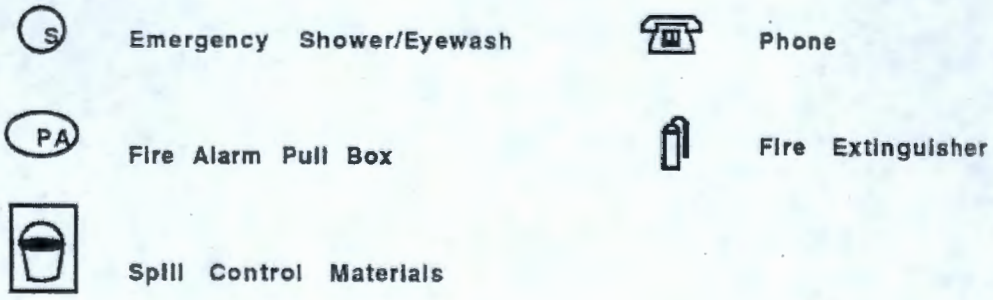
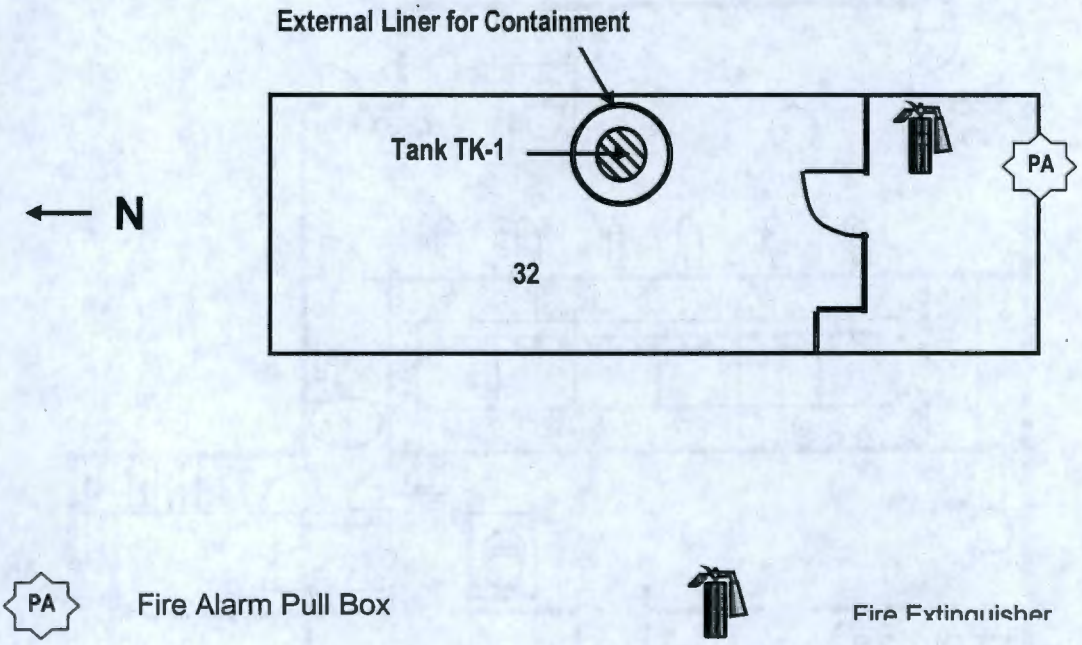


Figure F.3. Locations of Emergency Equipment at the Shielded Analytical Laboratory (Basement)



Addendum H — Closure Plan

H. CLOSURE PLAN H.1

H.1 CLOSURE PLAN H.1
H.1.1 Closure Performance Standard H.1
H.1.2 Closure Activities H.2
H.1.3 Maximum Extent of Operation H.2

H.2 CLOSURE OF THE HAZARDOUS WASTE TREATMENT UNIT H.2
H.2.1 Removing of Dangerous Waste, Disposal, or Decontamination of Equipment, Structures, and Soils H.2
H.2.2 Removing Dangerous Waste H.2
H.2.3 Decontaminating Structures, Equipment, and Soil H.3
H.2.4 Management of Decontamination Waste from HWTU H.5
H.2.5 Inspection to Identify Extent of Decontamination/Removal and to Verify Achievement of Closure Standard H.5

H.3 CLOSURE OF THE SHIELDED ANALYTICAL LABORATORY H.5
H.3.1 Removing Dangerous Waste, Disposal and Decontamination of Equipment, Structures, and Soils H.6
H.3.2 Removing Dangerous Waste H.6
H.3.3 Decontaminating Equipment, Structures, and Soils H.6
H.3.4 Decontamination of Hot Cell Trough H.8
H.3.5 Decontamination of the Shielded Analytical Laboratory Tank System H.8
H.3.6 Management of Decontamination Waste from SAL H.8
H.3.7 Inspection to Identify Extent of Decontamination/Removal and to Verify Achievement of Closure Standard H.8

H.4 MAXIMUM WASTE INVENTORY H.8

H.5 SCHEDULE FOR CLOSURE H.9

H.6 EXTENSION FOR CLOSURE TIME H.9

H.7 CLOSURE COST ESTIMATE H.9

Tables

Table H.1. Analysis Parameters for Closure of the 325 Hazardous Waste Treatment Units H.10
Table H.2. Summary of Closure Activities for the 325 Hazardous Waste Treatment Units H.10
Table H.3. Closure Schedule for the 325 Hazardous Waste Treatment Units H.11

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H. CLOSURE PLAN

This addendum discusses the planned activities and performance standards for closure of the 325 HWTUs in accordance with the requirements of WAC 173-303-610. No post closure activities currently are applicable or required because the 325 HWTUs are proposed to be clean closed.

To clean close the 325 HWTUs, it will be demonstrated that dangerous waste has not been left onsite at levels above the closure performance standard for removal and decontamination. Regulations and laws will be reviewed periodically and the closure plan modified as necessary. If it is determined that clean closure is not possible or is environmentally impractical, the closure plan will be modified to address required post closure activities.

H.1 CLOSURE PLAN

The 325 HWTUs are planned to be clean closed.

H.1.1 Closure Performance Standard

The 325 HWTUs will be clean closed in a manner that will minimize the need for further maintenance and will eliminate post closure release of dangerous waste or dangerous waste constituents. This standard will be met by removing dangerous waste and any dangerous waste residues from the units.

If the 325 Building ceases operations (i.e., utilities are disconnected and routine personnel access is not allowed), a decision will be made whether to implement this closure plan, or if continued operating authority will be sought.

After closure, the building areas formerly occupied by the HWTUs will be in a condition suitable for use in support of ongoing or future research and development activities. This use will be consistent with other land use activities in the 300 Area.

If there is any evidence of spills or leaks from the unit into the environment, further remediation will be deferred to the final disposition of the 325 Building. A post closure monitoring plan will then be developed.

Clean closure decontamination standards for structures, equipment, bases, liners, etc., will be those specified for hazardous debris in 40 CFR 268.45, Table 1. The 'clean debris surface' will be the performance standard for metal and concrete surfaces. This standard is consistent with Ecology guidance (Ecology 1994b) for achieving clean closure.

Attainment of a 'clean debris surface' will be verified by a visual inspection 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 percent of each square inch of surface area. (40 CFR 268.45, Table 1)*

Some unit equipment such as pumps, cartridge filters, and pipes may not be sufficiently visible for in-place contamination evaluation and waste designation. Equipment that cannot be designated in-place must be removed and then designated.

Equipment and structures will be decontaminated using the procedures in Sections H.2.3 and H.3.3. If decontamination is impracticable, components will be removed, designated, and disposed of. All residues resulting from decontamination will be sampled and analyzed as described in Sections H.2.4 and H.3.6 to determine whether they are dangerous waste. Residues containing listed waste, having dangerous waste characteristics, or exceeding dangerous waste designation limits will be managed in accordance with all applicable requirements of WAC 173-303-170 through WAC 173-303-230. [WAC 173-303-610(5)].

H.1.2 Closure Activities

This closure plan describes the steps necessary to perform final closure of the 325 HWTUs. Closure activities will involve removing dangerous waste from the units and decontaminating associated structures and equipment in the units as necessary. These activities, which are discussed in subsequent sections, could be implemented at any point during the life of the 325 HWTUs.

Partial closure could involve closing the SAL or the HWTU individually or closing a portion of a unit, such as the SAL tank system, which includes the tank, associated piping, valves and pumps, and the secondary containment. Except for the timing of the closure activities, these closure activities would remain identical to those described in this closure plan.

H.1.3 Maximum Extent of Operation

The 325 HWTUs consist of two units within the 325 Building, located in the 300 Area on the Hanford Facility. The SAL is located in Rooms 32, 200, 201, 202, and 203. The HWTU is located in Rooms 520, 524 and 528, and the firewater containment tank located in the basement beneath Room 520. The SAL represents the maximum extent of operations for the 325 HWTUs as indicated in Addendum A, Part A Form. If additional operations are added to the unit, the closure plan will be modified to reflect closure of the new areas.

H.2 CLOSURE OF THE HAZARDOUS WASTE TREATMENT UNIT

The following sections address the activities required to conduct closure of the HWTU.

H.2.1 Removing of Dangerous Waste, Disposal, or Decontamination of Equipment, Structures, and Soils

Steps for inventory removal, decontamination, and disposal of all dangerous waste containers, residues, and contaminated equipment are described in the following sections.

H.2.2 Removing Dangerous Waste

Closure or partial closure activities will be initiated by removal of the dangerous waste inventory present at the HWTU at the time of closure or partial closure. Inventory removal procedures will be identical to the waste handling, treating, packaging, and manifesting activities associated with normal permitted operations at the HWTU.

All dangerous waste will be placed in containers that meet specifications stated in Addendum C. To the extent possible, waste will be bulked into larger containers. If waste is bulked, containers will be emptied in compliance with WAC 173-303-160 so that the containers can be considered a solid nondangerous waste. Small-quantity laboratory chemicals that can't be bulked will be packaged in lab pack containers in compliance with the requirements of WAC 173-303-161. All containers of dangerous waste will be manifested and transferred to the custody of a dangerous waste transporter having a proper dangerous waste identification number. All containers of dangerous waste will be transferred to an appropriate onsite unit permitted to manage the waste and that will ensure proper handling and disposal.

Equipment and structural components in the HWTU requiring decontamination will be decontaminated using the methods described in Section H.2.3. All waste residues resulting from decontamination will be sampled and analyzed as described in Section H.2.4 to determine whether the residue is mixed waste, dangerous, or nonhazardous waste and to discern how to dispose of the waste properly. All residues will be removed from the units and transferred to a TSD unit having the necessary permits for proper treatment, storage, and/or disposal. Residues containing listed waste, having dangerous characteristics, or exceeding dangerous waste designation limits will be managed in accordance with all applicable requirements of WAC 173-303-170 through WAC 173-303-230. [Reference WAC 173-303-610(5)].

H.2.3 Decontaminating Structures, Equipment, and Soil

All equipment and structures in dangerous waste storage and treatment areas will be decontaminated at the time of closure or partial closure except equipment and structures that exhibit a 'clean debris surface' before starting closure activities. These will be considered decontaminated and receive no further decontamination. Initial closure activities will entail decontamination of all piping and equipment that is known to have contacted the waste. Equipment and structures to be decontaminated include the following:

- Waste handling and treatment equipment
- Glove boxes
- Open-face hoods
- Storage cabinets
- Floors, walls, and ceilings of Rooms 520, 524 and 528
- Firewater containment tank (beneath Room 520)

Decontamination methods for equipment and structures will be selected from appropriate technologies (40 CFR 268.45, Table 1) such as washing with water, high-pressure water jet scarifiers, abrasive blasting, aquablasting, or mechanical concrete scrubbers and scarifiers. Following the decontamination process, a visual inspection will be conducted for monitoring the effectiveness of the decontamination work.

All equipment used for decontamination will be used exclusively within the HWTU during closure activities. When all structural and equipment decontamination is complete, and when the equipment is no longer necessary, the equipment will be decontaminated before final closure of the units. All cleaning and decontamination waste will be collected and analyzed as described in Section H.2.4. Any disposable equipment will be placed in a container and disposed at an appropriate unit based on the status of the waste as dangerous, mixed waste, or nonhazardous. Dangerous waste placed in containers will be managed in accordance with Addendum C.

All waste-handling equipment in the HWTU will be decontaminated by washing with water or a solvent to a 'clean debris surface' as defined in Section H.1.1. If additional decontamination is necessary, a decontamination technique will be selected from appropriate technologies (40 CFR 268.45, Table 1) such as high-pressure water wash. If adequate cleaning is not possible, the equipment will be disposed of as dangerous waste. The decision to dispose or decontaminate equipment will be made at the time of closure. The option that is the most environmentally and economically feasible will be chosen. Adequate decontamination will be determined by a visual inspection for a 'clean debris surface' as described in Section H.1.1. All wastewater will be collected in sumps or portable containers, pumped to chemically compatible, closed-top containers, and transported and managed as described in Section H.2.4.

The time required for decontamination of waste-handling equipment and the amount of wastewater generated by these methods will depend on the amount of equipment that needs to be decontaminated. At this time, minimal time and effort are anticipated. The wastewater to be generated through decontamination is not anticipated to exceed approximately 378 liters. The volume of solid waste generated will depend on the extent of decontamination necessary.

If a 'clean debris surface' is present at the time that closure activities are started, the area will be considered clean closed. In this case, housekeeping measures may be undertaken and could include sweeping, dusting, vacuuming, and wiping with soap and water. Brushing or sweeping will be used to clean up coarse debris. Vacuuming will be performed using a commercial or industrial vacuum equipped with a high-efficiency particulate air (HEPA) filter. The vacuum cleaner bag containing captured particulates will be disposed appropriately. Dust wiping will be done with a damp cloth or wipe (soaked with water) to remove dust from surfaces that cannot be decontaminated with a vacuum. The cloth or wipe also will be disposed appropriately. HEPA filters from installed equipment and vacuum cleaners will be designated and managed as described in Section H.2.4. The volume of solid waste (e.g., personal

protective clothing/equipment, wipes, HEPA filters, vacuum bags) generated will depend on the extent of decontamination necessary.

Minimal time will be required for setup of the decontamination equipment. Labor requirements for the process should be moderate. Minimal time also will be required for packaging debris, dismantling, and removing cleaning equipment. Small quantities of wastewater (only the contents of buckets used in the decontamination procedure) will be generated. However, if a clean debis surface is not present, more sophisticated decontamination methods will be implemented. The surfaces in the HWTU that do not have a 'clean debris surface' will be treated extensively using an appropriate decontamination technology such as water washing (40 CFR 268.45, Table 1). The contaminated surfaces will be decontaminated to remove all residues from the surfaces. The contaminated waste generated by this activity will be contained by the designed spill controls already in place for the unit (i.e., fire water containment tank and associated drain lines/sumps) or by disposable absorbent pads that might be placed around the area to be water washed. Pumps or vacuums will be used to empty the wastewater from the containment area into chemically compatible, closed-top containers. Containers of wastewater will be managed as described in Section H.2.4.

Although this method will require more time than the dusting, vacuuming, and wiping procedures outlined previously, time requirements are still considered minimal for the water washing approach. Wastewater generated by this method is not anticipated to exceed 500 liters.

If necessary, further decontamination methods such as sandblasting or other appropriate technologies could be used effectively to clean contaminated structure surfaces. All residues from the decontamination effort will be collected for sampling and proper subsequent disposal as described in Section H.2.5.4. Following completion of decontamination, additional visual inspections will be performed to determine that the 'clean debris surface' standard has been achieved. In the unlikely event that structures cannot be cleaned using the methods described, these structures might be demolished, removed, and managed as dangerous waste.

The collection sumps and secondary containment system will be decontaminated by water washing. Wastewater collected from the cleaning process in each sump and containment system will be pumped into chemically compatible, closed-top containers and analyzed as described in Section H.2.4 to determine if the wastewater is a dangerous waste under WAC 173-303-070. If the wastewater is determined to be a dangerous waste, the wastewater will be managed and disposed at an appropriate permitted unit. If the wastewater is not a dangerous waste, the wastewater will be discharged to the 300 Area retention process sewer system. The water washing of all sumps should take minimal time and should generate less than 500 liters of wastewater. Additional decontamination techniques such as grit blasting, scabbling, or chipping might be used if necessary. The volume of solid waste generated will depend on the extent of decontamination necessary.

The internal surface of the firewater containment tank will be visually inspected. If a 'clean debris surface' is present at the beginning of the closure process, the firewater containment tank will be considered clean closed. If the surface of the liner does not meet the 'clean debris surface' standard then the firewater containment tank for the HWTU and ancillary equipment could be flushed with water, and if flushed, the water could be tested for dangerous waste constituents. Detergents, solvents, or a dilute acid wash could be required to remove constituents from the tank. In all cases, the final decontamination rinse water will be tested. To demonstrate decontamination, the interior surface of the tank liner will be visually inspected to determine if the 'clean debris surface' standard has been achieved. If this proves to be impractical or impossible, the tank liner will be removed and disposed. Runoff of decontamination solutions and wastewater will be prevented either by performing cleaning activities within existing containment structures or within portable containment pans or by surrounding the decontamination area with plastic and absorbent pads.

If water flushing is unsuccessful at removing dangerous waste and dangerous waste constituents, other decontamination processes will be employed, including appropriate technologies such as aquablasting and

high-pressure water jet scarifiers. The actual equipment used will consist of an appropriate combination of equipment that will be the most effective as determined by sampling results. Following the decontamination process, a visual inspection for a 'clean debris surface' will be conducted to monitor the effectiveness of the decontamination work.

Management of decontamination residues is provided in Section H.2.4. The time requirements for decontamination of the tank are expected to be minimal, and wastewater generated by this procedure is not expected to exceed 757 liters.

All dangerous waste storage and treatment operations at the 325 HWTUs will be conducted indoors, which will minimize potential contamination of the soil and groundwater. Unit design and administrative controls minimize the possibility of loss of waste to the soil and contamination of the groundwater. The potential for degradation of surface water quality also is very low due to the building design and administrative controls employed. Additional details on spill prevention and emergency response are provided in Addendum J.

H.2.4 Management of Decontamination Waste from HWTU

Decontamination waste from the HWTU will be placed in containers and sampled to determine disposal requirements. Samples from each container will be analyzed for the following:

- Corrosivity using the methods described in EPA SW-846 (Methods 9040/9045)
- Ignitability using methods described in EPA SW-846 (Methods 1010/1020)
- Toxicity characteristic using the Toxicity Characteristic Leaching Procedure (TCLP) described in 40 CFR 261 Appendix II (Method 1311) [including analysis for metals; volatile organics; and semivolatile organics, which includes chlorinated pesticides, using methods identified in the waste analysis plan (Addendum B).

Other analyses might be performed based on process knowledge to determine the presence of a listed waste. The results of sample analyses will be used to determine how to dispose of decontamination waste. (Background levels will be determined by analysis of the tap water used for makeup of the decontamination solutions.) The results of the ignitability, corrosivity, and toxicity characteristic analyses will be used to determine if the waste is characteristic dangerous waste (WAC 173-303-090). Depending on designation, decontamination waste will be managed as follows:

- Dangerous waste – Manifested and shipped and/or transferred to a permitted TSD unit
- Mixed waste – Manifested and shipped to a TSD unit as available, or treated and disposed onsite

H.2.5 Inspection to Identify Extent of Decontamination/Removal and to Verify Achievement of Closure Standard

Attainment of a 'clean debris surface' will be verified by a visual inspection 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 percent of each square inch of surface area. (40 CFR 268.45, Table 1).

Areas of degraded surface material, such as significant concrete cracking or heavily gouged steel, will be evaluated by non-destructive or destructive means to determine depth of significant surface defects, amount of contamination present in the defects, and to determine if environmental contamination has resulted from the material defect.

H.3 CLOSURE OF THE SHIELDED ANALYTICAL LABORATORY

The activities required for the closure of the SAL are described in the following sections.

H.3.1 Removing Dangerous Waste, Disposal and Decontamination of Equipment, Structures, and Soils

Steps for inventory removal, decontamination, or removal of all dangerous waste containers, residues, and contaminated equipment are described in the following sections.

H.3.2 Removing Dangerous Waste

Closure or partial closure activities will be initiated by removal of the dangerous waste inventory present at the SAL at the time of closure or partial closure. Inventory removal procedures will be identical to the waste handling, treating, packaging, and manifesting activities associated with normal permitted operations at the SAL.

At the SAL, liquid waste will be treated and packaged to meet requirements for disposal in onsite units. The contents of the SAL tank will be loaded into containers and managed in accordance with Section H.2.2. Any other suitable RCRA-permitted units that might exist when the SAL tank is closed could be used as a storage alternative. Liquid waste handling, packaging, transportation, and manifesting procedures will follow those used during normal operation of the SAL.

Equipment and structural components in the 325 HWTUs will be decontaminated using appropriate methods described in Sections H.2.3 and H.3.3. If decontamination is impracticable, components will be removed, designated, and disposed of. All waste residues resulting from decontamination will be sampled and analyzed as described in Section H.3.6 to determine whether the residue is mixed waste, dangerous, or nonhazardous waste and to discern how to dispose of the waste properly. All residues will be removed from the units and transferred to a TSD unit having the necessary permits for proper treatment, storage, and/or disposal. Residues containing listed waste, having dangerous characteristics, or exceeding dangerous waste designation limits will be disposed of properly.

H.3.3 Decontaminating Equipment, Structures, and Soils

All equipment and structures in dangerous waste storage and treatment areas will be decontaminated at the time of closure or partial closure except equipment and structures that exhibit a 'clean debris surface' before starting closure activities. These will be considered decontaminated and receive no further decontamination. Initial closure activities will entail decontamination of all piping and equipment that is known to have contacted the waste. Equipment and structures to be decontaminated include the following:

- Floors, walls, and ceilings of the SAL front face (Room 201), hot cells, back face (Rooms 200, 202, and 203), and associated airlocks
- Floors, walls, and ceiling of the basement of Room 32 in the SAL
- SAL tank and ancillary equipment
- Secondary containment pans
- Interior surfaces of all secondary containment trenches

Decontamination methods for equipment and structures will be selected from appropriate technologies such as washing with water, high-pressure water jet scarifiers, abrasive blasting, aquablasting, or mechanical concrete scrubbers and scarifiers. Following the decontamination process, a visual inspection for a 'clean debris surface' will be conducted to monitor the effectiveness of the decontamination work.

All equipment used for decontamination will be used exclusively within the units during closure activities. When all structural and equipment decontamination is complete, and when the equipment is no longer necessary, the equipment will be decontaminated before final closure of the units. All cleaning and decontamination waste will be collected and packaged as described in Section H.3.6. Any disposable equipment will be containerized and disposed of based on the status of the waste as dangerous, nondangerous, or mixed waste.

Initial gross decontamination of the hot cells will be necessary before entry of personnel into the hot cells for the visual inspection of the cell liners. ALARA concerns in the cells will preclude personnel entry into the cells, and configuration of the cells precludes thorough visual inspection of the interior surfaces of the cells. This decontamination will be accomplished using high-pressure water sprays or other appropriate decontamination techniques operated by means of the manipulators.

If a 'clean debris surface' is present at the time that closure activities are started, decontamination procedures will consist of sweeping, dusting, vacuuming, and wiping with soap and water. Brushing or sweeping will be used to clean up coarse debris. Vacuuming will be performed using a commercial or industrial vacuum equipped with a HEPA filter. The vacuum cleaner bag containing captured particulates will be appropriately disposed. Dust wiping will be done with a damp cloth or wipe (soaked with water) to remove dust from surfaces that cannot be decontaminated with a vacuum. The cloth or wipe also will be appropriately disposed. The volume of solid waste generated will depend on the extent of decontamination necessary.

Moderate time will be required for setup of the decontamination equipment. However, labor requirements for the process will be extensive for areas with ALARA concerns, and will, at least initially, require remote operations. Moderate time also will be required for packaging debris, dismantling, and removing cleaning equipment. Moderate quantities of wastewater will be generated by this procedure. However, if a 'clean debris surface' is not present, more sophisticated decontamination methods will be implemented. The dangerous waste management portions of the SAL will be treated extensively using an appropriate decontamination technique (40 CFR 268.45, Table 1). The ceiling, walls, and floor will be treated by applying the decontamination technique to remove all residues from the surfaces. The contaminated waste generated by this activity will be collected in the SAL and will be managed as described in Section H.3.6. The volume of waste generated by this procedure is anticipated to be on the order of 2,000 liters.

If necessary, more aggressive decontamination methods, such as sandblasting or other appropriate technologies, could be used effectively to clean contaminated structure surfaces. All residues from the decontamination effort will be collected for sampling and proper subsequent disposal as described in Section H.3.6. Following completion of decontamination, additional visual inspections will be performed to determine that the 'clean debris surface' standard has been achieved. In the unlikely event that structures cannot be cleaned using the methods described, these structures might be demolished, removed, and managed as dangerous waste.

The hot cells in the SAL also include two other areas that might require decontamination. These are the storage rooms 200, 202 and 203 in the backside of SAL and the front face (Room 201). It is expected that the level of contamination will be minimal based on the operations performed. Accordingly, the level of the decontamination effort also is expected to be minimal. For example, decontamination efforts in the operating gallery might be limited to decontamination and removal of the fume hood. If a 'clean debris surface' is present at the time that closure activities are started, decontamination procedures will consist of sweeping, dusting, vacuuming, and wiping with soap and water.

All dangerous waste storage and treatment operations at the 325 HWTUs will be conducted indoors, which will minimize potential contamination of the soil and groundwater. Unit design and administrative controls minimize the possibility of loss of waste to the soil and contamination of the groundwater. The potential for degradation of surface water quality also is very low due to the building design and administrative controls employed. Additional details on spill prevention and emergency response are provided in Addendum J.

If contaminated soil is found and if practical, it may be excavated, removed, and disposed as dangerous waste. Extensive soil contamination may be deferred to the closure of the 325 Building and to the CERCLA RI/FS process for the 300-FF-2 and 300-FF-5 operable units.

H.3.4 Decontamination of Hot Cell Trough

The collection trough in the interconnected SAL hot cells will be decontaminated using an appropriate decontamination technique (40 CFR 268.45, Table 1). Any wastewater collected in each sump from the cleaning process will be collected in the SAL waste tank system and analyzed to determine if the wastewater is a dangerous waste. If the wastewater is a dangerous waste, it will be managed and disposed at an appropriate permitted facility. If the wastewater is not a dangerous waste, the wastewater will be discharged to an appropriate disposal facility. The decontamination of the hot cell collection trough should take moderate time and should generate less than 500 liters of waste. Additional decontamination techniques, such as grit blasting or chemical cleaning, could be used if necessary. The volume of solid waste generated will depend on the extent of decontamination necessary.

H.3.5 Decontamination of the Shielded Analytical Laboratory Tank System

The SAL tank and ancillary equipment, tank secondary containment pan, and associated tank piping will be flushed with water; the water will then be tested for dangerous waste constituents. Detergents, solvents, or a dilute acid wash could be required to remove constituents. In all cases, the final decontamination rinse water will be tested to determine whether cleaning activities are effective. Run-off of decontamination solutions and wastewater will be prevented either by performing cleaning activities within existing containment structures or within portable containment pans or by surrounding the decontamination area with plastic and absorbent pads.

If water flushing is unsuccessful at removing dangerous waste and dangerous waste constituents, other decontamination processes will be employed, including appropriate technologies such as, aquablasting, sandblasting, and high-pressure water jet scarifiers. The actual equipment used will be selected based on what the sampling results indicate will be the most effective. Following the decontamination process, a visual inspection for a 'clean debris surface' will be conducted to monitor the effectiveness of the decontamination work.

Management of decontamination residues is provided in Section H.3.6. The time requirements for decontamination of the SAL tank system are expected to be moderate, and wastewater generated by this procedure is not expected to exceed 1,200 liters. The volume of solid waste generated will depend on the extent of decontamination necessary.

On completion of decontamination activities, the SAL tank either will remain in place for other uses within the 325 Building, will be moved for other uses on the Hanford Facility, or will be demolished and disposed as scrap (if its usefulness is determined to be complete).

H.3.6 Management of Decontamination Waste from SAL

Decontamination liquid from the SAL hot cells will be accumulated in cell or in the tank and sent to a permitted facility. All nonliquid waste generated during decontamination operations and the equipment used (e.g., sandblast grit, personnel protective equipment and clothing, disposable equipment) will be collected in 208-liter, open-head containers and stored onsite. Samples of the waste could be collected and analyzed as described in Section H.2.4.

H.3.7 Inspection to Identify Extent of Decontamination/Removal and to Verify Achievement of Closure Standard

Methods to demonstrate success of decontamination will be the same as described in Section H.2.5 for the HWTU.

H.4 MAXIMUM WASTE INVENTORY

The 325 HWTUs are used to store and treat a variety of different research-and-operations-related dangerous waste. The maximum inventory of waste that could be present at any one time in the 325 HWTUs is constrained by the following factors.

- The maximum inventory of dangerous waste stored in containers will not exceed the limits listed in Addendum A
- The maximum inventory of dangerous waste in tank storage in the SAL will not exceed 1,218 liters in accordance with the design capacity of the SAL and Addendum A
- The total amount of dangerous waste at any one time will not exceed Uniform Building Code hazardous material quantity restrictions (Addendum C).

H.5 SCHEDULE FOR CLOSURE

Completion of closure activities is expected to take up to two years from the date of receipt of the final volume of waste at the units. This extended time for closure is necessary due to ALARA concerns present in the facility, particularly the six interconnected hot cells. Safety systems needed to protect the environment will continue to operate during the closure process. Ecology personnel will be notified by the DOE-RL at least 45 days before the final closure activities are to begin. Closure activities are summarized in Table 11.2, and a detailed schedule of closure activities is provided in Table 11.3.

H.6 EXTENSION FOR CLOSURE TIME

An extension of the time for removal of the inventory of dangerous waste from the unit designated for closure is requested for the 325 HWTUs. The ALARA concerns that are present, particularly in the six interconnected hot cells, necessitate this extension. The expected time needed to remove all waste from the units is two years.

The extended period for removal of the inventory of dangerous waste is needed to accomplish the procedures that are needed to safely work with the ALARA concerns that are present in the SAL. All activities required to remove the inventory of dangerous waste will be conducted in accordance with applicable Permit conditions and all safety systems will continue to be operated. The removal of the inventory of dangerous waste will be conducted following procedures that are designed to be protective of the workers and the environment.

An extension of the closure time is requested for the 325 HWTUs. The ALARA concerns that are present, particularly in the six interconnected hot cells, necessitate this extension. The expected time needed to close the units is two years.

Decontamination of hot cells is a slow and labor-intensive operation, complicated by the fact that most of the work must be done remotely using manipulators because of ALARA concerns that are present in the hot cells. Even after ALARA concerns have been reduced enough to allow personnel entry, work is hampered by the extensive personal protective equipment that staff are required to wear, and the strict procedures that are enforced to ensure that both workers and the environment are protected from contamination.

Most equipment located in the hot cells must be packaged in shielded containers. Typically, this requires extensive remotely operated size reduction of the equipment. Removal of hot cell equipment, such as is located in the SAL, usually takes many months to a year or more to complete.

The extended closure period is needed to accomplish the procedures that are needed to safely work with ALARA concerns that are present in the SAL. All closure activities will be conducted in accordance with applicable Permit conditions and all safety systems will continue to be operated. The closure activities will be conducted following procedures that are designed to be protective of the workers and the environment.

H.7 CLOSURE COST ESTIMATE

An annual report outlining updated projections of anticipated closure costs for the Hanford Facility TSD units having final status is not required per Permit Condition II.H.

Table H.1. Analysis Parameters for Closure of the 325 Hazardous Waste Treatment Units

Parameter and EPA SW-846[a] Analytical Method	Equipment and Structures Wipe Samples	Decontamination Waste Water Samples	Soil Samples (if determined to be contaminated)
pH for corrosivity (Method 9040 or 9045)		X	
Ignitability (Method 1010 or 1020)		X	
TCLP (Extraction Method 1311) • Metals (Method 6000 and/or 7000 series) • Volatile organics (Method 8240) • Semivolatile organics (Method 8270) • Chlorinated pesticides (Method 8080)		X	
Total metals: antimony, arsenic, beryllium, boron, cadmium, chromium, lead, mercury, nickel, selenium, silver, and thallium (Method 6000 and/or 7000 series)	X		X
Volatile organics (Method 8240)	X		X
Semivolatile organics (Method 8270)	X		X
Radioactivity [b] • Gross alpha (Method 9310) • Gross beta (Method 9310)	X	X	X

[a] SW-846 = EPA Test Methods for Evaluating Solid Wastes (Third Edition, latest update, 1986).
[b] Characterization of radionuclides is provided for general knowledge where appropriate.

Table H.2. Summary of Closure Activities for the 325 Hazardous Waste Treatment Units

Closure Activity Description	Expected Duration (a)
Receive final volume of dangerous waste	N/A
Notify Ecology that closure activities will commence (at least 45 days before final closure activities begin)	N/A
Remove waste inventory and package, manifest, and transport all dangerous waste for treatment, storage, and/or disposal	80 days
Initial decontamination of the hot cells	120 days
Remove equipment from hot cells	270 days
Visual inspection of structural surfaces, equipment, troughs, and tanks in the HWTU and SAL to identify areas of contamination and to determine levels and methods of decontamination required	30 days
Decontaminate structural surfaces, equipment, troughs, and tanks at the HWTU and SAL using methods determined after visual inspection	180 days
Decontaminate front face and rear face	120 days
Reinspect surfaces to verify thoroughness of decontamination	2 days
Evaluate best methods for treatment and disposal of waste resulting from decontamination	25 days
Dispose of waste resulting from decontamination	80 days
Submit certification of closure to Ecology (within 60 days of completion of final closure activities)	N/A

(a) Some activities are performed concurrently.

Table H.3. Closure Schedule for the 325 Hazardous Waste Treatment Units

Action	Schedule
Date of receipt of last volume of waste	Day 0
Waste inventory removal	Day 90
Equipment decontamination or disposal and visual inspection of structural surfaces to identify areas of contamination and to determine level of decontamination needed	Day 530
HWTU and SAL structural decontamination	Day 635
HWTU sump and fire water containment tank and SAL hot cells trough decontamination	Day 650
Visual inspection to determine effectiveness of decontamination	Day 690
Further decontamination and visual inspection, if necessary, and disposal of all decontamination waste based on results of waste analyses	Day 720
Clean closure certification	Day 780

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Addendum I — Inspection Requirements

I. INSPECTION REQUIREMENTS I.1

I.1 INSPECTION PLAN I.1
I.1.1 General Inspection Requirements I.1
I.1.2 Specific Process Inspection Requirements I.2
I.1.3 Inspection Log I.3

Table

Table I.1. Remedial Actions for Major Problems I.4

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I. INSPECTION REQUIREMENTS

I.1 INSPECTION PLAN

The purpose and intent of implementing inspection procedures at the 325 HWTUs are to prevent malfunctions, deterioration, operator errors, and/or discharges that might cause or lead to the release of regulated waste to the environment or threats to human health. A system of daily and weekly inspections involving various PNNL departments and levels of management has been implemented at the 325 HWTUs. The Hanford Facility 300 Area Fire Department performs inspection once-every-four months of the fire suppressant and notification systems and annually an inspection of the sprinkler systems.

I.1.1 General Inspection Requirements

The content and frequency of inspections performed at the 325 HWTUs are described in this section. Also described is maintenance of inspection records.

Observations made and deficiencies and corrective actions noted during an inspection are recorded on the inspection checklist. The checklist includes the inspector's printed name, signature, date, and time. Once approved, the checklist is placed in the 325 HWTUs unit-specific operating record. The inspection records and dates are used to help determine any necessary corrective actions. Problems identified during the inspections are prioritized and addressed in a timely fashion as appropriate to mitigate health risks to workers, and to maintain integrity of waste management units.

I.1.1.1 Types of Problems

Inspections are performed at the 325 HWTUs daily, weekly, quarterly, once every four months, and annual. The types of problems addressed by each of these inspections are described as follows.

I.1.1.2 Daily Inspections

The 325 HWTUs staff performs daily inspections whenever waste packaging, transfer, shipping, or movement operations are conducted. Unit personnel monitor container condition and integrity, the containment system, and other building areas daily where waste is handled. Specific inspection points include, but are not limited, to the following:

- Container integrity
- Mislabeled or opened containers
- Improper storage (e.g., incompatible waste storage)
- Disorderliness or uncleanliness of storage unit
- Accumulation of waste in containment systems

Results of these daily inspections are documented as part of the 325 HWTUs operating record.

I.1.1.3 Weekly Inspections

The 325 HWTUs personnel conduct weekly inspections of both safety and operating equipment in the 325 HWTUs. Safety and emergency equipment are inspected for functionality and adequacy of supply. The weekly and daily inspections are usually conducted on or before the last working day of each week, and have the same inspection points. Results of these weekly inspections are documented as a part of the 325 HWTUs operating record.

I.1.1.4 Quarterly, Once Every Four Months, and Annual Inspections

The Hanford Facility 300 Area Fire Department performs a once-every-four-months inspection of fire suppressant and notification systems (i.e., sprinkler system and fire alarm pull boxes). This inspection includes flow tests of the sprinklers to ensure that there is no blockage in the system lines; the alarm system is activated to ensure proper pull box operation. Annually, the Fire Department performs a full inspection of the sprinkler system, smoke detectors, heat detectors, and pull boxes. A complete flow test

of the sprinkler system is performed from the furthest valve to ensure proper flow through the entire system. Fire extinguishers also are checked for proper pressure and function. The Hanford Fire Department retains these records.

Additional documented inspections are performed quarterly of the emergency eyewash/shower units, the fume hoods, and other ventilation system components. Records of these safety equipment inspections and the results, as well as documentation of any required corrective actions, are maintained by the appropriate facilities and operations staff.

I.1.1.5 Frequency of Inspections

The frequency of inspections is based on specific regulatory requirements and on the rate of possible deterioration of equipment and probability of environmental or human health incidents.

Areas where dangerous and mixed waste are actively handled, including all of the hot cells, the front and back face of the SAL, and Rooms 520, 524 and 528 in the HWTU are considered to be areas subject to spills. These areas are given daily inspections when in use as required by WAC 173-303-320(2)(c).

The primary and secondary containment systems (i.e., floors, troughs, and sumps) are inspected daily when in use for accumulation of spilled material. The containment systems are inspected weekly for structural integrity (i.e., no cracks, gaps, leaks that could result in environmental release of waste in the event of a spill). This frequency is based on the need to perform timely corrective actions in the event that problems are noted.

Aisle space between containers is inspected weekly when applicable. As the objective of the aisle space requirements is to allow for unobstructed movement of personnel and equipment in case of an emergency, the aisle space requirements do not apply to the hot cells, shielded cubicles, or storage cabinets. If quantities of waste are packaged in large containers or drums, temporarily stored before a transfer, a minimum aisle space of 76 centimeters is maintained in accordance with WAC 173-303-340(3), As-Low-As-Reasonably-Achievable (ALARA) concerns, and with applicable standards of the Uniform Building Code and Life Safety Code. Weekly inspections, where applicable, allow container spacing problems to be identified and corrected.

Emergency and safety equipment and personal protective equipment are inspected weekly. Weekly inspections will assure this equipment is available and in adequate supply.

I.1.2 Specific Process Inspection Requirements

The following sections detail the inspections to be performed at the 325 HWTUs.

I.1.2.1 Container Inspection

Dangerous and mixed waste containers stored in the 325 HWTUs are inspected daily where waste handling activities are performed for leakage, evidence of damage or deterioration, proper and legible labeling, and proper lid and bung closure. Any observations made during the inspections, including any repairs or remedial actions taken, are documented in the logbook with the date, time, and printed name and signature of the inspectors. This logbook is maintained in the 325 HWTUs for at least 5 years from the dates of the inspections. All areas subject to spills are inspected daily when in use. Structural integrity of the containment systems is checked weekly.

I.1.2.2 Tank System Inspection

The Shielded Analytical Laboratory (SAL) tank located in Room 32 is used to store mixed waste generated because of waste treatment activities. Routine inspections of the SAL tank system are conducted in accordance with WAC 173-303-640. Inspections involve a combination of visual, mechanical, and electronic means. Due to ALARA considerations, visual inspections of the tank system are conducted by remotely operated cameras mounted in Room 32. These visual inspections are limited to areas of the tank system that can be observed by the camera. In the event of a camera system malfunction, the tank system will be visually inspected from the doorway of Room 32 until the

malfunction has been corrected. A mirror is mounted on the back wall of Room 32 to allow viewing the rear of the tank from the window in the door. A logbook or inspection sheet of all inspections is maintained in the operating record for at least 5 years from the date of the inspection.

I.1.2.2.1 Tank System External Corrosion and Releases

Aboveground portions of the SAL tank are inspected each operating day to detect corrosion or releases of waste.

I.1.2.2.2 Tank System Construction Material and Surrounding Area

The SAL tank is double walled and constructed of corrosion resistant stainless steel, with a capacity of 1,218 liters. The outer wall is a cylindrical stainless steel tank that provides containment sufficient to contain 100 percent of the inner tank volume. The construction materials of the tank and the area immediately surrounding the externally accessible portion of the tank system, including the secondary containment systems, are inspected during use to detect erosion or signs of releases of mixed waste (e.g., wet spots).

Any deteriorations or malfunctions observed during inspection of the tank system will be corrected. Any release to the environment is reported immediately to Ecology, as required by WAC 173-303-640(7)(d)(i), and to the National Response Center as required by 40 CFR 302.

I.1.2.2.3 Tank System Overfilling Control Equipment

The tank controls for the SAL tank include two high-level alarm systems that respond to overfill conditions. The initial tank high-level alarm is activated by a conductivity probe, the second by a capacitance probe. The conductivity probe high-level alarm and associated functions can be tested electrically by depressing a button on the main control panel in Room 201. Activation of this alarm results in a visible red light and audible alarm on the main control panel in Room 201, an alarm condition on the annunciator panel on the second floor of the 325 Building, and closure of electric solenoid valves on all inlet water supply lines to the hot cell area and tank system. Activation of the capacitance probe alarm results in a red light and audible alarm.

I.1.2.2.4 Tank System Monitoring and Leak Detection Equipment

The leak detection conductivity probe for the SAL tank is located between the primary and secondary shells of the double walled tank. The leak detection probe signal activates if any liquids collect in the annulus between the two walls of the tank. The leak detection probe can be functionally tested electrically by depressing a test button on the main control panel in Room 201. A leak detection sensor is also installed in the secondary containment pan underneath the SAL tank and activates if liquids are detected in the pan.

I.1.3 Inspection Log

Copies of the completed inspection checklists are provided to operations personnel and maintained in the 325 HWTUs files. Any corrective actions noted or deterioration or malfunctions in equipment discovered by the inspector are delegated to responsible individuals in the operations group. Corrective actions identified must be completed within 2 weeks unless there is documentation and reason for further delay. Examples of problems that could be identified and the corresponding remedial action are listed in Table I.1. Inspection reports and corrective action response documentation are retained at the 325 HWTUs for a minimum of 5 years.

1 **Table I.1. Remedial Actions for Major Problems**

Major Problems	Remedial Actions
Containment system failures	
Cracks in floor of container storage area	Remove containers from area and cease use until cracks are repaired.
Cracks in floor of SAL cell liner	Remove containers from area and cease use until cracks are repaired, or provide secondary containment for containers holding liquid waste.
Leaking container in container storage area	Transfer waste to another container. Clean up spill.
Leaking tank or ancillary equipment	For minor leaks or drips, conduct inspection of affected equipment every 12 hours. For major leaks, immediately remove all waste from tank system. Prevent addition of waste to tank system until repaired. Notify Building Emergency Director. Initiate contingency plan if appropriate.
Spills	
Minor spills in container storage area	Clean up spill according to contingency plan.
Major spills in container storage areas	Notify Building Emergency Director. Initiate contingency plan if appropriate.

2

Hanford Facility RCRA Permit Modification Notification Forms

Part III, Operating Unit 10
Waste Treatment and Immobilization Plant (WTP)

PCNs for quarter ending June 30, 2009:

PCN Number	Modification Form Approval Date	Facility
24590-PTF-PCN-ENV-06-017	05-28-09	PTF
24590-PTF-PCN-ENV-08-007	05-06-09	PTF
24590-PTF-PCN-ENV-08-018	04-16-09	PTF
24590-PTF-PCN-ENV-08-032	06-03-09	PTF
24590-PTF-PCN-ENV-08-033	04-16-09	PTF
24590-WTP-PCN-ENV-08-003	04-20-09	WTP

Quarter Ending June 30, 2009 24590-PTF-PCN-ENV-06-017

Hanford Facility RCRA Permit Modification Notification Form

Part III, Operating Unit 10

Waste Treatment and Immobilization Plant

Index

Page 2 of 2: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant
Replace Mechanical Data Sheets for Pretreatment Facility Treated LAW Evaporator Inter- and After-Condensers in Appendix 8.6 of the Dangerous Waste Permit.

Submitted by Co-Operator:		Reviewed by ORP Program Office:	
D. A. Klein	4/6/09	S. J. Olinger	4/27/09
D. A. Klein	Date	S. J. Olinger	Date

Quarter Ending June 30, 2009 24590-PTF-PCN-ENV-06-017

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part:
Waste Treatment and Immobilization Plant	**Part III, Operating Unit 10**

Description of Modification:

The purpose of this Class 1 modification is to replace permit versions of Mechanical Data Sheets 24590-PTF-MED-TLP-P0002 and 24590-PTF-MED-TLP-P0003 with the current source documents.

The following Mechanical Data Sheets are being submitted to replace the permit versions currently in Appendix 8.6:

Appendix 8.6			
Replace:	24590-PTF-MED-TLP-P0002, Rev 0	With:	24590-PTF-MED-TLP-00002, Rev 4
Replace:	24590-PTF-MED-TLP-P0003, Rev 0	With:	24590-PTF-MED-TLP-00003, Rev 4

This modification requests Ecology approval and incorporation into the permit the specific changes to these Mechanical Data Sheets that incorporate updated descriptions and vendor design data that have been issued since the last revision of the permit version of the Mechanical Data Sheets. Revisions are the result of ongoing design (changes from vendor preliminary data to vendor detailed design). The following identifies the significant changes that have been revised on the attached Mechanical Data Sheets:

24590-PTF-MED-TLP-00002, Rev 4 and 24590-PTF-MED-TLP-00003, Rev 4

- Manufacturer name changed from Northwest Copper Works, Inc. to Graham Manufacturing.
- General Data was updated to incorporate data for flow type, heat exchanger duty, heat exchanger area, and delta temperature; quality level and seismic category were modified.
- Thermal/Hydraulic Data was updated to incorporate fluid quantities, temperatures, pressures, etc. for both shell side and tube side.
- Mechanical Data was updated to incorporate updated design temperatures, dimensions, and number of tubes.
- Material Data was updated to incorporate a revision to the shell, tube gasket, and bolting materials.
- Construction Data was updated to supply data on cross baffle type, tube support type and operating weights.
- Notes were updated to remove the provision to allow all welded construction on process side only, and to provide the reference for nozzle load estimates.
- Equipment Qualification Datasheet (EQD) was added.
- Seismic In-Structure Response Spectra (ISRS) were added.

The following is a list of outstanding change documents that have not been incorporated into this modification:
None

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

Enter relevant WAC 173-303-830, Appendix I Modification citation number: A.1 and A.3

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

A.1 - Administrative and informational changes.

A.3 - Equipment replacement or upgrading with functionally equivalent components (e.g., pipes, valves, pumps, conveyors, controls).

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

Reason for denial:

Approved ~~Reviewed~~ by Ecology:

E Fredenburg 5/28/2009

Ed Fredenburg Date

MECHANICAL DATA SHEET

SHELL AND TUBE HEAT EXCHANGER

PLANT ITEM No.
24590-PTF-ME-TLP-COND-00002
Data Sheet No.
24590-PTF-MED-TLP-00002

Project:	RPP-WTP	Description:	Treated LAW Evaporator Inter-Condenser
Project No:	24590	P&ID:	24590-PTF-M6-TLP-00002
Site:	Hanford	Process Data Sht:	N/A
Process flow diagram:	24590-PTF-M5-V17T-00005	Manufacturer Name	Framatome ANP / Graham Manufacturing

ALG 12/22/08

R11042838

General Data

Quality Level	Q (9)	TEMA (Class/Type)		B
Seismic Category	SC-I	Flow Type (Counter current, etc)		8 PASS
Design Code	ASME VIII Div 1	Heat Exchanger Duty	Btu/hr	436,064
Code Stamp	ISSUED	Heat Exchanger Area	ft^2	50.7
NB Registration	RPP-WTP PDC	ΔT (LMTD/Corrected LMTD)	°F	59.8

Thermal/Hydraulic Data

		Shell Side		Tube Side	
Fluid Name		IN STEAM	OUT	IN Cooling Water	OUT
Fluid Quantities: Total	lbm/hr	448.3		32,500	
Condensable Vapor (In/Out)		404.6	6.4	"	"
Liquid		N/A	398.2	32,500	32,500
Noncondensable		43.7	43.7	N/A	N/A
Temperature (In/Out)	°F	4 "	90 " 4	75.0	4 "
Specific Gravity		N/A	N/A	1.000	0.998
Viscosity	Cp	N/A	N/A	2.209	1.875
Molecular Weight		18.02	18.02	N/A	N/A
Molecular Weight, Noncondensable		29	29	N/A	N/A
Specific Heat	Btu/lbm-°F	N/A	N/A	1.000	0.999
Thermal Conductivity	Btu/hr-ft-°F	N/A	N/A	0.350	0.357
Latent Heat	Btu/lbm @ °F	N/A		N/A	
Inlet pressure		200 Torr		4 "	
Tube side Velocity	ft/s	N/A		3.2	
Pressure Drop (Allowed)		10 mm Hg		1.2 psi	
Fouling Resistance (Min)	$hr\text{-}ft^2\text{-}°F/Btu$	0.002			

Mechanical Design Data

		Shell Side		Tube Side	
Design Pressure (Max/Min)	psig	50	Full Vacuum	100	Full Vacuum
Design Temperature (Max/Min)	°F	378	0	150	0
Corrosion Allowance	inch	0.04		0.04	
Erosion Allowance	inch	N/A		N/A	
Shell OD / ID		8 5/8"		Overall Dimensions (HxWxL) inch	20 x 13-1/2 x 95-1/8
Total No. of Tubes		43		Tube OD inch	0.750

Material Data

Shell	SA 240 316L SS	Shell Cover	SA 240 316L SS
Channel/Bonnet	SA 240 316L SS	Channel Cover	SA 240 316L SS
Tube	SA 213 316L SS	Floating Head Cover	N/A
Stationary Tube Sheet	316L SS	Floating Tube Sheet	N/A
Shell Side Gaskets	N/A	Tube Side Gaskets	316 SS Spiral Wound w/ PTFE Filler
Partition Seals	N/A	Baffles/Supports	SA 240 316L SS
Insulation	N/A	Forgings (Shell side)	SA 182 F316L
Bolting	SA 193 B8M & SA 194 2HM	Forgings (Channel)	SA 182 F316L

MECHANICAL DATA SHEET

SHELL AND TUBE HEAT EXCHANGER

PLANT ITEM No.
24590-PTF-ME-TLP-COND-00002

Data Sheet No.
24590-PTF-MED-TLP-00002

Construction Data *(To be determined by the supplier when not specified by the buyer)*

Cross Baffle Type	*Up & Over*	% Baffle Cut (Dia.)	---	Spacing (c/c) inch	---
Bypass Seal Arrangement	*N/A*	Longitudinal Seal Type	*N/A*	Expansion Joint Type	*N/A*
Inlet Nozzle ρV^2	---	Bundle Entrance ρV^2	---	Bundle Exit ρV^2	---
Tube Support Type	*Vertical Cut*	U-bend Support Type	*N/A*	Weight of Bundle lbf	*
Operating Weight lbf	*600*	Full of Water lbf	*680*	Empty Wieght lbf	*540*

Notes

To be determined by Seller.

Notes:

(1) All welds are continuous to avoid crevices, weld surface finish is descaled as laid.
(2) Tube to tubesheet joint shall be strength welded.
(3) Graham size 8x6 BEM.
(4) Deleted.
4 ***(5) For Nozzle loads, see 24590-PTF-3PS-MEVV-T0001.***
(6) Deleted.
(7) Deleted.
(8) Deleted. 4
(9) Component will be manufactured to Bechtel quality level Q, which corresponds with Vendor quality level QL-2.
(10) Vendor design information is from document 24590-QL-POA-MEVV-00001-02-00056.
(11) Equipment cyclic data is from document 24590-QL-POA-MEVV-00001-04-03.
(12) Contents of this drawing are dangerous waste permit affecting. 4
(13) The physical design parameters shall be determined by the seller based on TEMA and HEI standards.
4 ***(14) Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.***

(Safety screening/evaluation required? ☒Yes ☐No If yes per 24590-WTP-GPP-SREG-002, E&NS signature required below.)

Rev.	Description	By	Checked	E&NS	Approved	Date
4	Updated to reflect WSGM analysis, 24590-PTF-U0N-W16T-00003 and incorporate DOE AEA note (14). * ADDED TO SHOW VALUES TO BE UPDATED	D. Tate	R. Rickenbach	B. Hall	J. Julyk	2/19/09
3	Incorporated Vendor Design and Equipment Qualification Data	R. Rickenbach	E. Le	S. Woolfolk	J. Julyk	07/14/2008
2	Incorporated Vendor Design	E. Le	R. Nowak	N/A	J. Julyk	04/04/2005
1	Updated Descrition	G. Butt	D. Reinemann	N/A	J. Julyk	03/22/2004
0	Issued for Procurement	E. Le	S. Shah	N/A	J. Julyk	04/30/2003

EQUIPMENT QUALIFICATION DATASHEET (EQD)

Equipment Identification			
Component Tag Number	24590-PTF-ME-TLP-COND-00002	Safety Classification	☒ SC ☐ SS ☐ APC ☐ SDC ☐ SDS ☐ RRC Note 10 4
Manufacturer / Supplier	UST&D / AREVA NP, INC.		
Requisition Number	24590-QL-POA-MEVV-00001		
Model	TBD	Seismic Category	☒ SC-I ☐ SC-II ☐ SC-III ☐ SC-IV Note 10 4
Description (Include descriptive text [e.g., location, elevation])	Treated LAW Evaporator Inter-Condensor, room P-0325, Elevation 56'-0"		
Safety Function(s)	Confinement (ref. 1) 4		

Seismic Safety Function	☒ Yes ☐ No	Room Number(s): P-0325	
Maintenance Accessible	☒ Yes ☐ No	Method of Maintenance Access:	☐ Remote ☒ Hands On ☐ None
Seismic Operability Requirements: 4	☐ During Seismic Event 4	☐ After Seismic Event	
ITS Equipment Type:	☒ Passive Mechanical	☐ Active Mechanical	☐ Electrical

Equipment Environmental Qualification (EEQ) 4

Environment ☐ Mild ☒ Harsh Contamination Class: C3 Radiation Class: R3	Hi Rad Service ☐ Yes ☒ No	Design Life (yrs) ☒ 40 ☐ Other _____

Parameter Type/Units	Parameter Value	Time Duration (number)	Time Units	WTP Document Number (BUYER)	Submittal Number (SELLER)
Normal					
Normal High Temperature (°F)	95	40	yrs	24590-PTF-U0D-W16T-00001, Note 7	Note 1
Normal Low Temperature (°F)	59	40	yrs	24590-PTF-U0D-W16T-00001, Note 7	Note 1
Normal High Relative Humidity (%RH)	100	40	yrs	24590-PTF-U0D-W16T-00001	Note 1
Normal Low Relative Humidity (%RH)	10	40	yrs	24590-PTF-U0D-W16T-00001	Note 1
Normal High Pressure (in.-w.g.)	0	40	yrs	24590-PTF-U0D-W16T-00001	Note 1
Normal Low Pressure (in.-w.g.)	-0.4	40	yrs	24590-PTF-U0D-W16T-00001	Note 1
Normal Radiation Dose Rate (mR/hr)	10	40	yrs	24590-PTF-U0D-W16T-00001	Note 1
Vibration Magnitude (g)	N/A	N/A	N/A	N/A	Note 1
Vibration Frequency (Hz)	N/A	N/A	N/A	N/A	Note 1
Additional Normal Information:	See Note 2 for Pressure Units.				

4

Equipment Environmental Qualification (EEQ) *(continued)*

Parameter Type/Units	Parameter Value	Time Duration (number)	Time units	WTP Document Number (BUYER)	Submittal Number (SELLER)
Abnormal					
Abnormal High Temperature (°F)	126	8	hr/yr	24590-PTF-U0D-W16T-00001, Note 7 & 9 4	Note 1
Abnormal Low Temperature (°F)	59	8	hr/yr	24590-WTP-DB-01-001, Notes 7 & 8	Note 1
Abnormal High Relative Humidity (%RH)	100	24	hr/yr	24590-PTF-U0D-W16T-00001	Note 1
Abnormal Low Relative Humidity (%RH)	2	22	hr/yr	24590-PTF-U0D-W16T-00001, Note 9 4	Note 1
Abnormal High Pressure (in.-w.g.)	4	8	hr/yr	24590-PTF-U0D-W16T-00001	Note 1
Abnormal Low Pressure (in.-w.g.)	-7.3	8	hr/yr	24590-PTF-U0D-W16T-00001	Note 1
Abnormal Radiation Dose Rate (mR/hr)	10, Note 3	0	hr/yr	24590-PTF-U0D-W16T-00001	Note 1
Wet Sprinkler System Present	YES	2	hr 4	24590-PTF-U0D-W16T-00001	Note 1
Additional Abnormal Information	See Note 2 for Pressure Units				
Design Basis Events (DBE)					
DBE High Temperature (°F)	128	1000	hrs	24590-PTF-U0D-W16T-00001, Note 7 & 9 4	Note 1
DBE Low Temperature (°F)	40	1000	hrs	24590-PTF-U0D-W16T-00001, Note 7	Note 1
DBE High Relative Humidity (%RH)	100	482	hrs	24590-PTF-U0D-W16T-00001	Note 1
DBE Low Relative Humidity (%RH)	6	1000	hrs	24590-PTF-U0D-W16T-00001, Note 9 4	Note 1
DBE High Pressure (in.-w.g.)	4	1000	hrs	24590-PTF-U0D-W16T-00001	Note 1
DBE Low Pressure (in.-w.g.)	-7.3	1000	hrs	24590-PTF-U0D-W16T-00001	Note 1
DBE Radiation Dose Rate (mR/hr)	10 Note 3	0	hrs	24590-PTF-U0D-W16T-00001	Note 1
Flood Height (ft)	1.58	1000	hrs	24590-PTF-U0D-W16T-00001	Note 1
Submergence (ft)	0 Note 5	N/A	hrs	24590-PTF-U0D-W16T-00001 24590-QL-POA-MEVV-00001-01-00817 4	Note 1
Chemical/Spray Exposure	YES	12.5	hrs	24590-PTF-U0D-W16T-00001	Note 1
Additional DBE Information	See Note 2 for Pressure Units				

EQUIPMENT QUALIFICATION DATASHEET (EQD)

DBE Chemical Exposure Details	
DBE Chemical Types/Concentrations	Sodium Hydroxide, 5M

Interfaces (Electrical)	
Power Supply Voltage (VAC, VDC)	N/A
Power Supply Frequency (Hz)	N/A
Power Connection Method	N/A
I/O Signals to/from Equipment	N/A
I/O Connection Method	N/A

Interfaces (Mechanical)	
Mounting Configuration (orientation)	See dwg. 24590-QL-POA-MEVV-00001-01-00817
Mounting Method (bolts, welds, etc.)	Anchor Bolts, TLP-SKID-00001, 24590-PTF-DB-S13T-00056
Auxiliary Devices	N/A

Equipment Seismic Qualification (ESQ)

Parameter	Title	Reference/Document Number	Version / Revision	Remarks
WTP Seismic Design Specification (BUYER)	Engineering Specification for Seismic Qualification Criteria for Pressure Vessels	24590-WTP-3PS-MV00-T0002	002	N/A
Specified Seismic Load (BUYER)	Seismic Analysis of Pretreatment Building - WSGM In-Structure Response Spectre (ISRS) 4	24590-PTF-S0C-S15T-00057 4	00A 4	Calculation is not included in MR, see attached figures 37, 38, 40, 41 and 115 per CCN 185267. 4
Design Seismic Load (SELLER	Calculation - HEP 1 FEP and TLP Condenser Skids Seismic Qualification	24590-QL-POA-MEVV-00001-04-00027	00D	
Qualification Method (SELLER)	Calculation - HEP 1 FEP and TLP Condenser Skids Seismic Qualification	24590-QL-POA-MEVV-00001-04-00027	00D	
Qualification Report Number (SELLER)	Calculation - HEP 1 FEP and TLP Condenser Skids Seismic Qualification	24590-QL-POA-MEVV-00001-04-00027	00D	
Submittal Number (BUYER)	Calculation - HEP 1 FEP and TLP Condenser Skids Seismic Qualification	24590-QL-POA-MEVV-00001-04-00027	00D	

Notes and Additional Information

Notes:

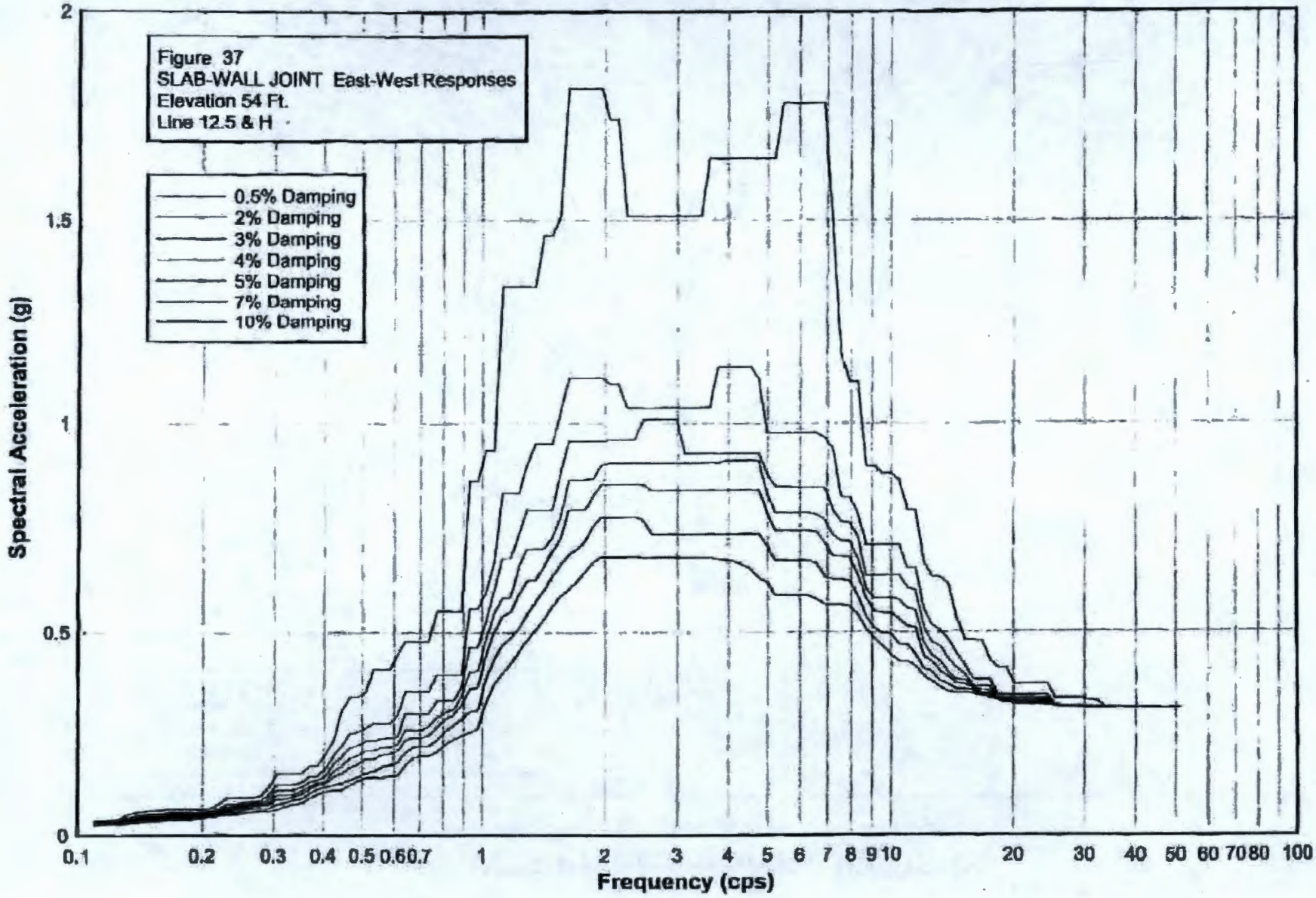
1. Data to be provided by SELLER through the submittal process as required on the G-321-E form.
2. Where pressure is given in inches of water column (in.-w.c.) in the source document, it is generally assumed that this is in reference to atmospheric pressure and is therefore equivalent to inches of water gage (in.-w.g.).
3. Abnormal and DBE radiation dose rates are set equal to normal dose rate and do not contribute to the total integrated dose.
4. The equipment qualification will be documented in accordance with the requirements in Appendix D of Engineering Specification for Environmental Qualification of Mechanical Equipment, document number 24590-WTP-3PS-G000-T0015 for the passive and active safety functions.
5. Submergence is determined from the lowest point of the vessel in relation to the flood height above the floor.
6. Environmental data given document 24590-PTF-U0D-W16T-00001 is for room environment only.
7. For application of AISC N690, the normal temperatures are not used. Abnormal temperatures shall be applied as Normal Operation Temperature, T_O, with seismic effects, E_S. The Design basis event temperature shall be applied as a Thermal Load generated by a postulated accident, T_A, without seismic effects, E_s or E_e.
8. Abnormal low temperature, as calculated in reference 2, is based on a Loss of Heating Accident (LOHA) which occurs when steam supply to the building is lost. Since the evaporators are run on steam, this would cause the evaporators to go off-line. Abnormal low temperature will be based on reference 3 at 59°F.
9. Parameter value used on data sheet has been previously established and determined more conservative than values derived from the reference document noted. 4
10. For commercial reasons, safety and seismic classification may be higher than elsewhere documented, and therefore conservative. 4

References:

1. 24590-WTP-WTP-PSAR-ESH-01-002-02, Rev. 04A, Preliminary documented safety analysis to support construction authorization; PT facility specific information. 4
2. 24590-PTF-U0D-W16T-00001, Rev. 0, PTF Room Environment Datasheet.
3. 24590-WTP-DB-ENG-01-001, Rev. 1M, Basis of Design. 4
4. 24590-PTF-U0N-W16T-00001, Add data for room p-0427. Incorporate additional steam break analysis. 4
5. 24590-PTF-U0N-W16T-00003, Revised temperature & relative humidity data for PTF rooms. 4

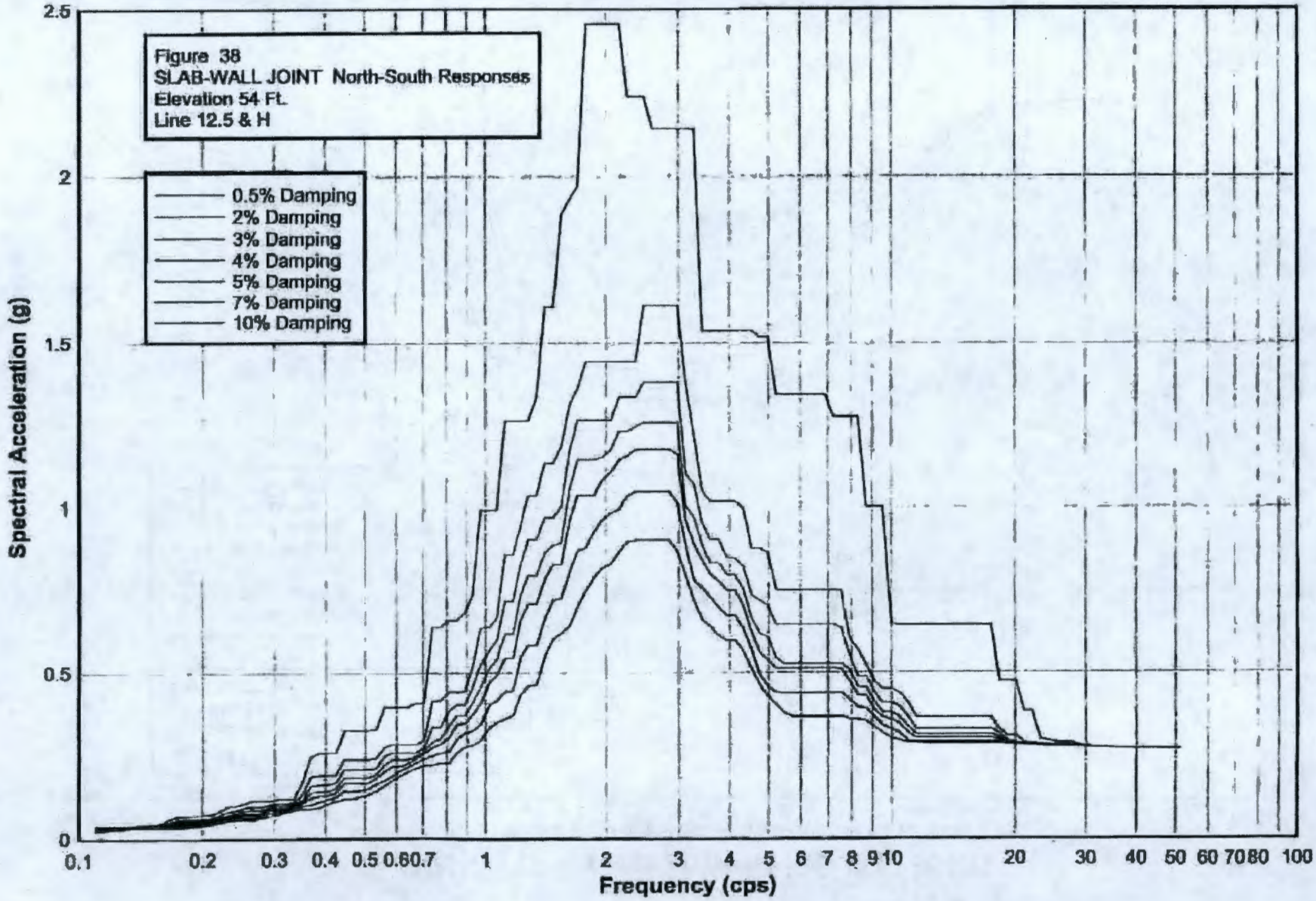
RPP-WTP Pretreatment Facility ISRS

Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A



RPP-WTP Pretreatment Facility ISRS

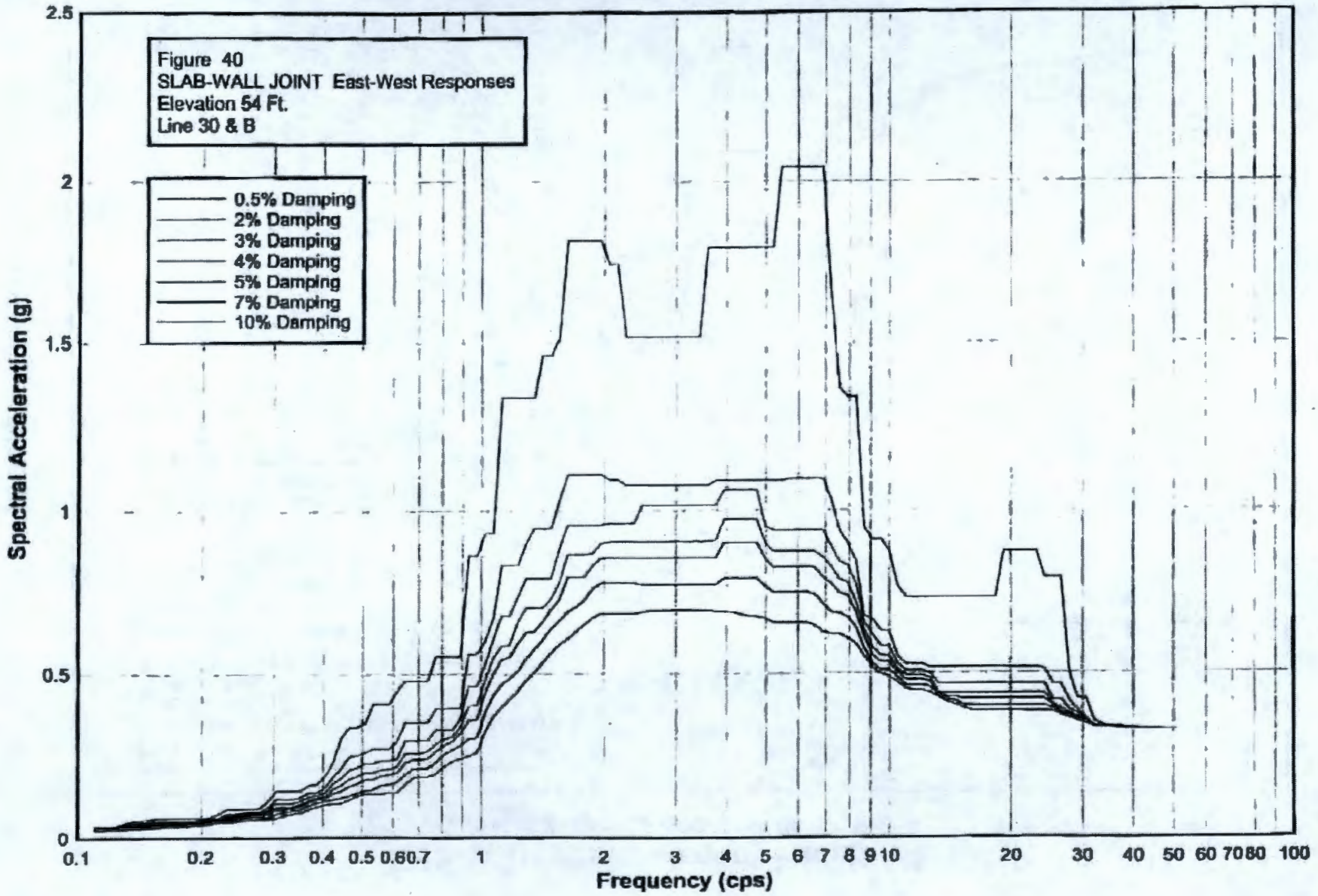
Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A



RPP-WTP Pretreatment Facility ISRS

4

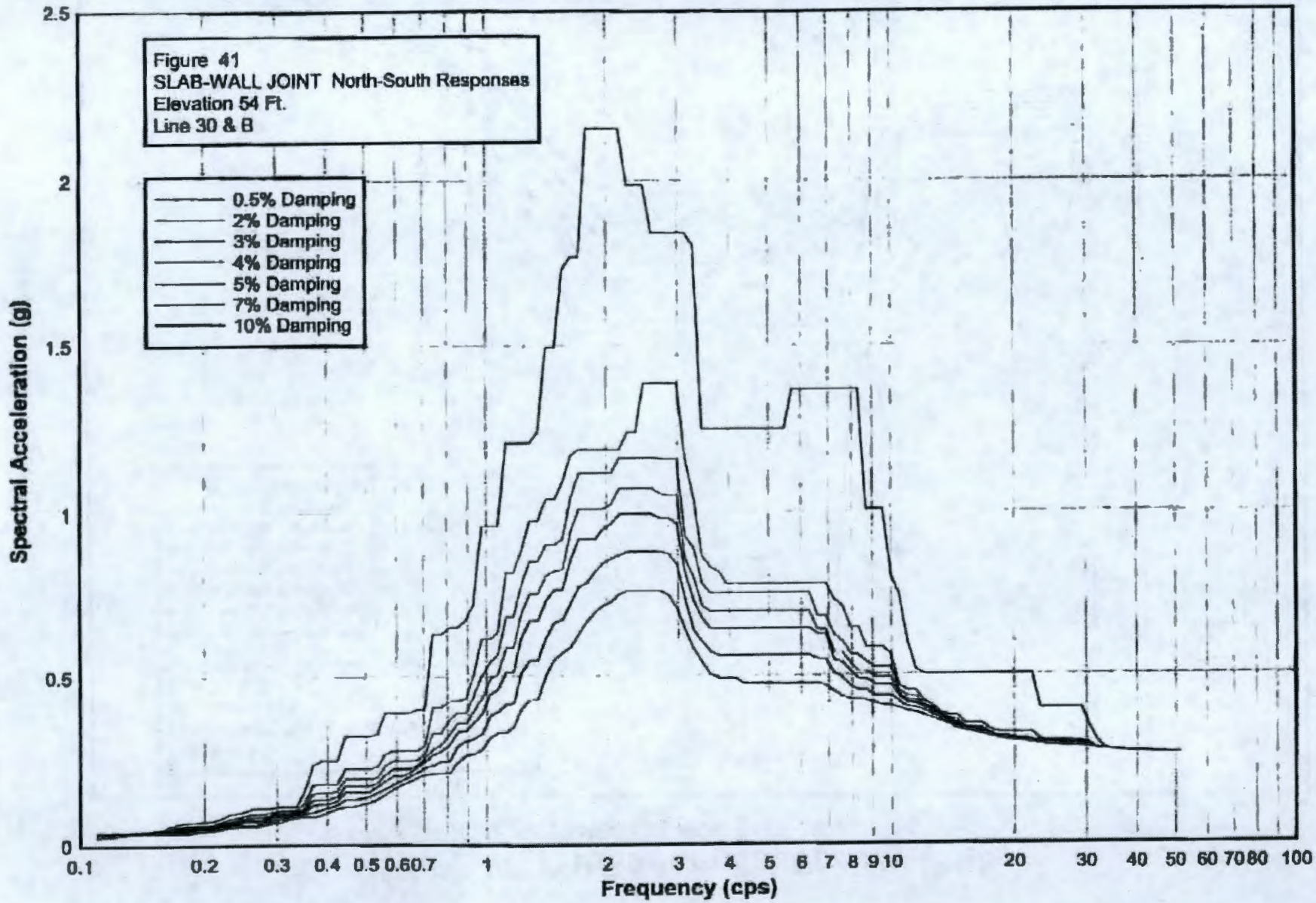
Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A



4

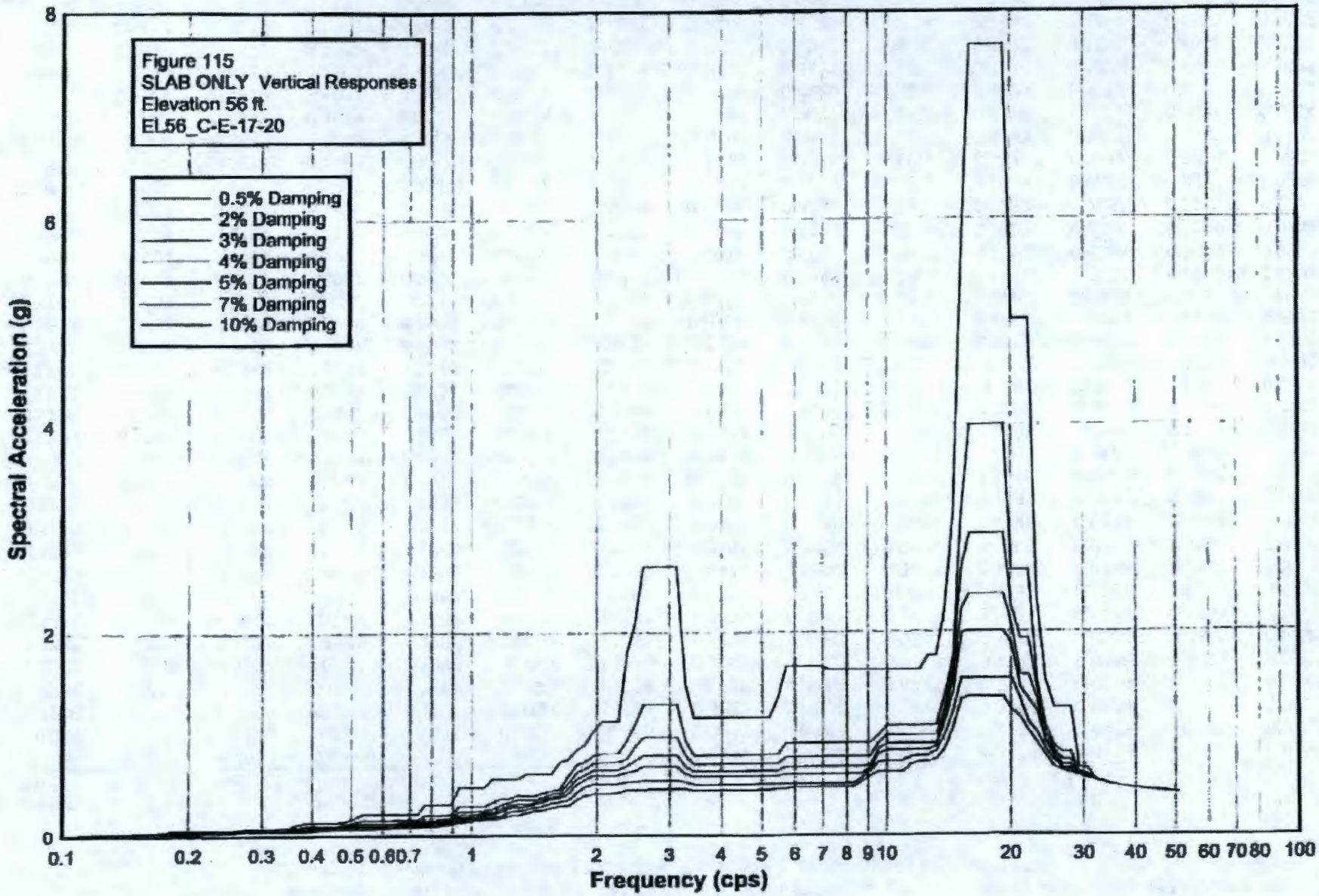
RPP-WTP Pretreatment Facility ISRS

Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A



RPP-WTP Pretreatment Facility ISRS

Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A



PTWW037.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 37 ~ SLAB-WALL JOINT East-West Responses ~ Elevation 54 Ft. ~ Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.1098	0.0375	0.1098	0.0344	0.1098	0.0327	0.1098	0.0312	0.1098	0.0298	0.1098	0.0274	0.1098	0.0252
0.115	0.0375	0.115	0.0344	0.115	0.0327	0.115	0.0312	0.115	0.0299	0.115	0.0277	0.115	0.0258
0.1204	0.0375	0.1204	0.0344	0.1204	0.0331	0.1204	0.0322	0.1204	0.0312	0.1204	0.0294	0.1204	0.0269
0.1262	0.0431	0.1262	0.0397	0.1262	0.0378	0.1262	0.036	0.1262	0.0343	0.1262	0.0314	0.1262	0.0278
0.1322	0.0504	0.1322	0.045	0.1322	0.042	0.1322	0.0393	0.1322	0.0369	0.1322	0.0328	0.1322	0.0281
0.1385	0.056	0.1385	0.0489	0.1385	0.0449	0.1385	0.0414	0.1385	0.0384	0.1385	0.0344	0.1385	0.0303
0.1451	0.058	0.1451	0.0509	0.1451	0.0475	0.1451	0.0445	0.1451	0.0419	0.1451	0.0375	0.1451	0.0325
0.152	0.0616	0.152	0.0546	0.152	0.0506	0.152	0.0472	0.152	0.0442	0.152	0.0391	0.152	0.0338
0.1592	0.062	0.1592	0.0546	0.1592	0.0506	0.1592	0.0472	0.1592	0.0442	0.1592	0.0396	0.1592	0.0351
0.1668	0.064	0.1668	0.058	0.1668	0.0517	0.1668	0.0481	0.1668	0.0451	0.1668	0.0403	0.1668	0.0356
0.1748	0.064	0.1748	0.058	0.1748	0.0517	0.1748	0.0481	0.1748	0.0451	0.1748	0.0403	0.1748	0.0356
0.1831	0.064	0.1831	0.058	0.1831	0.0517	0.1831	0.0481	0.1831	0.0451	0.1831	0.0403	0.1831	0.0368
0.1918	0.0641	0.1918	0.0561	0.1918	0.0517	0.1918	0.0495	0.1918	0.0477	0.1918	0.0445	0.1918	0.0404
0.2009	0.0642	0.2009	0.0583	0.2009	0.0558	0.2009	0.0535	0.2009	0.0513	0.2009	0.0474	0.2009	0.0424
0.2105	0.0665	0.2105	0.0603	0.2105	0.0575	0.2105	0.0549	0.2105	0.0525	0.2105	0.049	0.2105	0.0448
0.2205	0.078	0.2205	0.0647	0.2205	0.062	0.2205	0.0595	0.2205	0.0573	0.2205	0.0533	0.2205	0.0484
0.231	0.0933	0.231	0.0774	0.231	0.0694	0.231	0.063	0.231	0.0598	0.231	0.0556	0.231	0.0503
0.242	0.0933	0.242	0.0774	0.242	0.0723	0.242	0.0678	0.242	0.0638	0.242	0.0587	0.242	0.0513
0.2535	0.0933	0.2535	0.0817	0.2535	0.0771	0.2535	0.0729	0.2535	0.0692	0.2535	0.0628	0.2535	0.0553
0.2656	0.0933	0.2656	0.0839	0.2656	0.0794	0.2656	0.0754	0.2656	0.0718	0.2656	0.0653	0.2656	0.0575
0.2783	0.0954	0.2783	0.0847	0.2783	0.0794	0.2783	0.0754	0.2783	0.0718	0.2783	0.0653	0.2783	0.058
0.2915	0.1187	0.2915	0.0987	0.2915	0.089	0.2915	0.0813	0.2915	0.0753	0.2915	0.0668	0.2915	0.0592
0.3054	0.1504	0.3054	0.1235	0.3054	0.1097	0.3054	0.0985	0.3054	0.0894	0.3054	0.0758	0.3054	0.0633
0.3199	0.1504	0.3199	0.1235	0.3199	0.1097	0.3199	0.0985	0.3199	0.0894	0.3199	0.0801	0.3199	0.0706
0.3352	0.1504	0.3352	0.1235	0.3352	0.1097	0.3352	0.0985	0.3352	0.0931	0.3352	0.0857	0.3352	0.0762
0.3511	0.1504	0.3511	0.1289	0.3511	0.1172	0.3511	0.107	0.3511	0.0997	0.3511	0.0894	0.3511	0.0788
0.3678	0.168	0.3678	0.1438	0.3678	0.1303	0.3678	0.1186	0.3678	0.1121	0.3678	0.1017	0.3678	0.0898
0.3853	0.168	0.3853	0.1438	0.3853	0.1346	0.3853	0.1279	0.3853	0.1219	0.3853	0.1115	0.3853	0.0992
0.4037	0.194	0.4037	0.1598	0.4037	0.1426	0.4037	0.1306	0.4037	0.1259	0.4037	0.117	0.4037	0.1054
0.4229	0.2368	0.4229	0.1906	0.4229	0.1721	0.4229	0.1558	0.4229	0.1416	0.4229	0.1217	0.4229	0.1092
0.4431	0.3088	0.4431	0.2193	0.4431	0.1881	0.4431	0.1671	0.4431	0.1496	0.4431	0.1273	0.4431	0.1097
0.4642	0.3417	0.4642	0.2524	0.4642	0.2138	0.4642	0.1852	0.4642	0.1637	0.4642	0.1345	0.4642	0.1211
0.4863	0.3417	0.4863	0.256	0.4863	0.2208	0.4863	0.1928	0.4863	0.1701	0.4863	0.1409	0.4863	0.1323
0.5094	0.3522	0.5094	0.2656	0.5094	0.2325	0.5094	0.2054	0.5094	0.1831	0.5094	0.1497	0.5094	0.1391

PTWW037.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 37 – SLAB-WALL JOINT East-West Responses – Elevation 54 Ft. – Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.5337	0.4096	0.5337	0.2771	0.5337	0.2325	0.5337	0.2054	0.5337	0.1831	0.5337	0.1539	0.5337	0.1396
0.5591	0.4096	0.5591	0.2771	0.5591	0.2398	0.5591	0.2148	0.5591	0.1949	0.5591	0.1654	0.5591	0.1396
0.5857	0.4096	0.5857	0.2771	0.5857	0.2404	0.5857	0.2159	0.5857	0.1975	0.5857	0.1686	0.5857	0.1441
0.6136	0.4475	0.6136	0.2969	0.6136	0.2444	0.6136	0.2234	0.6136	0.2051	0.6136	0.1751	0.6136	0.1441
0.6428	0.478	0.6428	0.3547	0.6428	0.3006	0.6428	0.2612	0.6428	0.2347	0.6428	0.1988	0.6428	0.168
0.6734	0.478	0.6734	0.3547	0.6734	0.3006	0.6734	0.2612	0.6734	0.2413	0.6734	0.2165	0.6734	0.1872
0.7055	0.478	0.7055	0.3547	0.7055	0.3006	0.7055	0.2612	0.7055	0.2413	0.7055	0.2186	0.7055	0.1922
0.7391	0.478	0.7391	0.3547	0.7391	0.3006	0.7391	0.2692	0.7391	0.2483	0.7391	0.2188	0.7391	0.1922
0.7743	0.5518	0.7743	0.3958	0.7743	0.3332	0.7743	0.2918	0.7743	0.268	0.7743	0.2351	0.7743	0.2018
0.8111	0.5518	0.8111	0.3958	0.8111	0.3332	0.8111	0.3035	0.8111	0.2874	0.8111	0.2587	0.8111	0.2236
0.8497	0.5518	0.8497	0.3958	0.8497	0.3332	0.8497	0.3117	0.8497	0.2984	0.8497	0.2723	0.8497	0.2373
0.8902	0.5518	0.8902	0.3958	0.8902	0.3656	0.8902	0.3431	0.8902	0.3226	0.8902	0.2873	0.8902	0.2462
0.9326	0.8605	0.9326	0.5585	0.9326	0.4629	0.9326	0.4023	0.9326	0.3602	0.9326	0.3049	0.9326	0.2549
0.977	0.8605	0.977	0.5585	0.977	0.4629	0.977	0.4045	0.977	0.3644	0.977	0.3083	0.977	0.2637
1.0235	0.9315	1.0235	0.5965	1.0235	0.5261	1.0235	0.4814	1.0235	0.4436	1.0235	0.3837	1.0235	0.3277
1.0723	0.9315	1.0723	0.6885	1.0723	0.603	1.0723	0.5467	1.0723	0.4995	1.0723	0.4355	1.0723	0.3729
1.1233	1.3398	1.1233	0.8315	1.1233	0.6788	1.1233	0.5837	1.1233	0.5408	1.1233	0.4681	1.1233	0.3987
1.1768	1.3398	1.1768	0.8315	1.1768	0.6788	1.1768	0.5855	1.1768	0.5505	1.1768	0.4858	1.1768	0.4238
1.2328	1.3398	1.2328	0.8315	1.2328	0.7369	1.2328	0.6596	1.2328	0.5925	1.2328	0.5105	1.2328	0.452
1.2916	1.3398	1.2916	0.9002	1.2916	0.7926	1.2916	0.7024	1.2916	0.6263	1.2916	0.5455	1.2916	0.4806
1.353	1.3398	1.353	0.9485	1.353	0.7926	1.353	0.7024	1.353	0.6282	1.353	0.574	1.353	0.5058
1.4175	1.4626	1.4175	0.9485	1.4175	0.7926	1.4175	0.7024	1.4175	0.6579	1.4175	0.6026	1.4175	0.5321
1.485	1.4626	1.485	0.9485	1.485	0.7926	1.485	0.7282	1.485	0.6958	1.485	0.636	1.485	0.5624
1.5557	1.5113	1.5557	1.0297	1.5557	0.8797	1.5557	0.7754	1.5557	0.726	1.5557	0.6634	1.5557	0.5886
1.6298	1.8158	1.6298	1.1086	1.6298	0.9552	1.6298	0.8627	1.6298	0.7931	1.6298	0.6875	1.6298	0.6064
1.7074	1.8158	1.7074	1.1086	1.7074	0.9552	1.7074	0.8627	1.7074	0.7931	1.7074	0.7024	1.7074	0.6246
1.7887	1.8158	1.7887	1.1086	1.7887	0.9552	1.7887	0.8627	1.7887	0.7931	1.7887	0.7213	1.7887	0.6476
1.8738	1.8158	1.8738	1.1086	1.8738	0.9552	1.8738	0.8651	1.8738	0.8263	1.8738	0.7567	1.8738	0.6698
1.963	1.8158	1.963	1.1086	1.963	0.9552	1.963	0.8972	1.963	0.8525	1.963	0.7755	1.963	0.683
2.0565	1.7414	2.0565	1.0948	2.0565	0.9593	2.0565	0.9017	2.0565	0.8525	2.0565	0.7755	2.0565	0.683
2.1544	1.7414	2.1544	1.0948	2.1544	0.9593	2.1544	0.9017	2.1544	0.8525	2.1544	0.7755	2.1544	0.683
2.257	1.5091	2.257	1.0367	2.257	0.9593	2.257	0.9017	2.257	0.8525	2.257	0.7755	2.257	0.683
2.3645	1.5091	2.3645	1.0367	2.3645	0.9593	2.3645	0.9017	2.3645	0.8525	2.3645	0.7755	2.3645	0.683
2.4771	1.5091	2.4771	1.0367	2.4771	1.009	2.4771	0.9017	2.4771	0.852	2.4771	0.7697	2.4771	0.6811
2.595	1.5091	2.595	1.0367	2.595	1.009	2.595	0.9017	2.595	0.8387	2.595	0.7357	2.595	0.6811

PTWW037.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 37 ~ SLAB-WALL JOINT East-West Responses ~ Elevation 54 Ft. ~ Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
2.7186	1.5091	2.7186	1.0367	2.7186	1.009	2.7186	0.9017	2.7186	0.8387	2.7186	0.7357	2.7186	0.6811
2.848	1.5091	2.848	1.0367	2.848	1.009	2.848	0.9017	2.848	0.8387	2.848	0.7357	2.848	0.6811
2.9836	1.5091	2.9836	1.0367	2.9836	1.009	2.9836	0.9017	2.9836	0.8387	2.9836	0.7357	2.9836	0.6811
3.1257	1.5091	3.1257	1.0367	3.1257	0.9237	3.1257	0.9017	3.1257	0.8387	3.1257	0.7357	3.1257	0.6811
3.2745	1.5091	3.2745	1.0367	3.2745	0.9237	3.2745	0.9017	3.2745	0.8387	3.2745	0.7357	3.2745	0.6811
3.4305	1.5091	3.4305	1.0367	3.4305	0.9237	3.4305	0.9017	3.4305	0.8387	3.4305	0.7357	3.4305	0.6801
3.5938	1.6472	3.5938	1.0367	3.5938	0.9237	3.5938	0.9017	3.5938	0.8387	3.5938	0.7357	3.5938	0.6801
3.7649	1.6472	3.7649	1.1356	3.7649	0.9237	3.7649	0.9017	3.7649	0.8387	3.7649	0.7357	3.7649	0.6768
3.9442	1.6472	3.9442	1.1356	3.9442	0.9237	3.9442	0.906	3.9442	0.8387	3.9442	0.7357	3.9442	0.6759
4.132	1.6472	4.132	1.1356	4.132	0.9237	4.132	0.906	4.132	0.8387	4.132	0.7357	4.132	0.6712
4.3288	1.6472	4.3288	1.1356	4.3288	0.9237	4.3288	0.906	4.3288	0.8387	4.3288	0.7357	4.3288	0.6626
4.5349	1.6472	4.5349	1.1356	4.5349	0.9237	4.5349	0.906	4.5349	0.8387	4.5349	0.7357	4.5349	0.6525
4.7508	1.6472	4.7508	1.1048	4.7508	0.9237	4.7508	0.906	4.7508	0.8387	4.7508	0.7357	4.7508	0.6316
4.977	1.6472	4.977	0.9746	4.977	0.8757	4.977	0.829	4.977	0.7851	4.977	0.7083	4.977	0.6208
5.214	1.6472	5.214	0.9746	5.214	0.8463	5.214	0.785	5.214	0.7434	5.214	0.6732	5.214	0.5898
5.4623	1.7798	5.4623	0.9746	5.4623	0.8463	5.4623	0.785	5.4623	0.7434	5.4623	0.6732	5.4623	0.5898
5.7224	1.7798	5.7224	0.9746	5.7224	0.8463	5.7224	0.785	5.7224	0.7434	5.7224	0.6732	5.7224	0.5898
5.9948	1.7798	5.9948	0.9746	5.9948	0.8438	5.9948	0.785	5.9948	0.7434	5.9948	0.6732	5.9948	0.5898
6.2803	1.7798	6.2803	0.9746	6.2803	0.8438	6.2803	0.785	6.2803	0.7434	6.2803	0.6732	6.2803	0.5898
6.5793	1.7798	6.5793	0.9746	6.5793	0.8438	6.5793	0.7804	6.5793	0.7393	6.5793	0.6657	6.5793	0.5795
6.8926	1.7798	6.8926	0.983	6.8926	0.8429	6.8926	0.7674	6.8926	0.7128	6.8926	0.6345	6.8926	0.5677
7.2208	1.4914	7.2208	0.935	7.2208	0.7922	7.2208	0.7331	7.2208	0.6844	7.2208	0.6283	7.2208	0.5677
7.5646	1.168	7.5646	0.822	7.5646	0.7632	7.5646	0.7188	7.5646	0.6833	7.5646	0.6283	7.5646	0.5677
7.9248	1.0987	7.9248	0.8201	7.9248	0.7623	7.9248	0.7176	7.9248	0.6811	7.9248	0.6237	7.9248	0.5627
8.3022	1.0987	8.3022	0.7845	8.3022	0.7283	8.3022	0.6777	8.3022	0.6364	8.3022	0.5884	8.3022	0.5417
8.6975	0.8935	8.6975	0.7092	8.6975	0.6368	8.6975	0.6061	8.6975	0.5819	8.6975	0.5373	8.6975	0.5059
9.1116	0.8935	9.1116	0.7092	9.1116	0.6368	9.1116	0.5827	9.1116	0.5505	9.1116	0.5085	9.1116	0.4846
9.5455	0.8763	9.5455	0.7092	9.5455	0.6368	9.5455	0.5827	9.5455	0.5459	9.5455	0.4951	9.5455	0.4643
10	0.8763	10	0.7092	10	0.6368	10	0.5827	10	0.5459	10	0.4934	10	0.4429
10.4762	0.8603	10.4762	0.7092	10.4762	0.6368	10.4762	0.5774	10.4762	0.5297	10.4762	0.4688	10.4762	0.4271
10.975	0.791	10.975	0.6543	10.975	0.6067	10.975	0.5582	10.975	0.5137	10.975	0.4674	10.975	0.4271
11.4976	0.791	11.4976	0.6543	11.4976	0.6014	11.4976	0.5519	11.4976	0.5094	11.4976	0.4435	11.4976	0.4142
12.045	0.6677	12.045	0.5543	12.045	0.5086	12.045	0.4716	12.045	0.4394	12.045	0.4081	12.045	0.3915
12.6186	0.6325	12.6186	0.5145	12.6186	0.4727	12.6186	0.4409	12.6186	0.4251	12.6186	0.4004	12.6186	0.3774
13.2194	0.6325	13.2194	0.5025	13.2194	0.4639	13.2194	0.4269	13.2194	0.4021	13.2194	0.379	13.2194	0.3634

PTWW037.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 37 ~ SLAB-WALL JOINT East-West Responses ~ Elevation 54 Ft. ~ Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
13.8489	0.6152	13.8489	0.4815	13.8489	0.433	13.8489	0.3995	13.8489	0.3896	13.8489	0.3705	13.8489	0.3527
14.5083	0.5318	14.5083	0.4455	14.5083	0.4096	14.5083	0.381	14.5083	0.3726	14.5083	0.3575	14.5083	0.3484
15.1991	0.4787	15.1991	0.4141	15.1991	0.3936	15.1991	0.3795	15.1991	0.3697	15.1991	0.3575	15.1991	0.3484
15.9228	0.4787	15.9228	0.3815	15.9228	0.3644	15.9228	0.3609	15.9228	0.358	15.9228	0.3528	15.9228	0.3467
16.681	0.4787	16.681	0.3815	16.681	0.3644	16.681	0.3544	16.681	0.3483	16.681	0.3439	16.681	0.3416
17.4753	0.4307	17.4753	0.3815	17.4753	0.3644	17.4753	0.3544	17.4753	0.3483	17.4753	0.3418	17.4753	0.337
18.3074	0.4095	18.3074	0.3431	18.3074	0.3367	18.3074	0.3354	18.3074	0.3336	18.3074	0.3315	18.3074	0.3305
19.1791	0.4095	19.1791	0.3431	19.1791	0.3349	19.1791	0.3293	19.1791	0.3262	19.1791	0.3251	19.1791	0.325
20.0923	0.3708	20.0923	0.3431	20.0923	0.3349	20.0923	0.3293	20.0923	0.3262	20.0923	0.3243	20.0923	0.323
21.049	0.3708	21.049	0.3431	21.049	0.3349	21.049	0.3293	21.049	0.3262	21.049	0.3236	21.049	0.3215
22.0513	0.3708	22.0513	0.3431	22.0513	0.3349	22.0513	0.3293	22.0513	0.3262	22.0513	0.323	22.0513	0.3199
23.1013	0.3708	23.1013	0.3431	23.1013	0.3349	23.1013	0.3293	23.1013	0.3262	23.1013	0.323	23.1013	0.3199
24.2013	0.3708	24.2013	0.3431	24.2013	0.3349	24.2013	0.3293	24.2013	0.3255	24.2013	0.3206	24.2013	0.3186
25.3536	0.3358	25.3536	0.3197	25.3536	0.3192	25.3536	0.3187	25.3536	0.3181	25.3536	0.317	25.3536	0.3164
26.5609	0.3358	26.5609	0.3169	26.5609	0.3159	26.5609	0.3158	26.5609	0.3158	26.5609	0.3155	26.5609	0.3148
27.8256	0.3358	27.8256	0.3169	27.8256	0.3159	27.8256	0.3153	27.8256	0.3149	27.8256	0.3143	27.8256	0.3137
29.1505	0.3358	29.1505	0.3165	29.1505	0.3153	29.1505	0.3142	29.1505	0.3137	29.1505	0.3132	29.1505	0.313
30.5386	0.3312	30.5386	0.3165	30.5386	0.3153	30.5386	0.3142	30.5386	0.3133	30.5386	0.3131	30.5386	0.313
31.9927	0.3297	31.9927	0.3163	31.9927	0.3146	31.9927	0.3138	31.9927	0.3132	31.9927	0.3131	31.9927	0.313
33.516	0.3144	33.516	0.3134	33.516	0.3133	33.516	0.3132	33.516	0.3132	33.516	0.3131	33.516	0.313
35.1119	0.3135	35.1119	0.3134	35.1119	0.3133	35.1119	0.3132	35.1119	0.3132	35.1119	0.3131	35.1119	0.313
36.7838	0.3134	36.7838	0.3133	36.7838	0.3132	36.7838	0.3132	36.7838	0.3132	36.7838	0.3131	36.7838	0.313
38.5353	0.3132	38.5353	0.3132	38.5353	0.3131	38.5353	0.3131	38.5353	0.3131	38.5353	0.3131	38.5353	0.313
40.3702	0.3131	40.3702	0.3131	40.3702	0.3131	40.3702	0.313	40.3702	0.313	40.3702	0.313	40.3702	0.3129
42.2924	0.313	42.2924	0.3129	42.2924	0.3129	42.2924	0.3129	42.2924	0.3129	42.2924	0.3129	42.2924	0.3129
44.3062	0.3128	44.3062	0.3128	44.3062	0.3128	44.3062	0.3128	44.3062	0.3128	44.3062	0.3128	44.3062	0.3128
46.4159	0.3127	46.4159	0.3127	46.4159	0.3127	46.4159	0.3127	46.4159	0.3127	46.4159	0.3127	46.4159	0.3127
48.626	0.3126	48.626	0.3126	48.626	0.3126	48.626	0.3126	48.626	0.3126	48.626	0.3126	48.626	0.3126
50.9414	0.3125	50.9414	0.3125	50.9414	0.3125	50.9414	0.3125	50.9414	0.3125	50.9414	0.3125	50.9414	0.3125

PTWW038.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 38 – SLAB-WALL JOINT North-South Responses – Elevation 54 Ft. – Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.1098	0.0405	0.1098	0.0365	0.1098	0.0342	0.1098	0.0322	0.1098	0.0303	0.1098	0.0272	0.1098	0.0235
0.115	0.0405	0.115	0.0365	0.115	0.0342	0.115	0.0322	0.115	0.0303	0.115	0.0272	0.115	0.0259
0.1204	0.0405	0.1204	0.0365	0.1204	0.0342	0.1204	0.0322	0.1204	0.031	0.1204	0.0297	0.1204	0.028
0.1262	0.0405	0.1262	0.0365	0.1262	0.0352	0.1262	0.0342	0.1262	0.0334	0.1262	0.0318	0.1262	0.0297
0.1322	0.0405	0.1322	0.0382	0.1322	0.037	0.1322	0.0359	0.1322	0.0349	0.1322	0.0333	0.1322	0.0316
0.1385	0.0411	0.1385	0.0392	0.1385	0.0382	0.1385	0.0372	0.1385	0.0363	0.1385	0.0348	0.1385	0.0328
0.1451	0.0417	0.1451	0.0398	0.1451	0.0387	0.1451	0.0377	0.1451	0.0368	0.1451	0.0352	0.1451	0.0332
0.152	0.0439	0.152	0.0401	0.152	0.0387	0.152	0.0377	0.152	0.0368	0.152	0.0352	0.152	0.0332
0.1592	0.0462	0.1592	0.0416	0.1592	0.0396	0.1592	0.0377	0.1592	0.0368	0.1592	0.0352	0.1592	0.0332
0.1668	0.0584	0.1668	0.0506	0.1668	0.0463	0.1668	0.0426	0.1668	0.0395	0.1668	0.0352	0.1668	0.0332
0.1748	0.0645	0.1748	0.0566	0.1748	0.0522	0.1748	0.0484	0.1748	0.045	0.1748	0.0394	0.1748	0.0332
0.1831	0.0668	0.1831	0.0583	0.1831	0.0541	0.1831	0.0504	0.1831	0.0471	0.1831	0.0415	0.1831	0.0354
0.1918	0.0678	0.1918	0.0586	0.1918	0.0543	0.1918	0.0507	0.1918	0.0474	0.1918	0.0418	0.1918	0.038
0.2009	0.0697	0.2009	0.0596	0.2009	0.0543	0.2009	0.0514	0.2009	0.0487	0.2009	0.0438	0.2009	0.0411
0.2105	0.0722	0.2105	0.062	0.2105	0.0582	0.2105	0.0547	0.2105	0.0516	0.2105	0.0482	0.2105	0.0446
0.2205	0.0819	0.2205	0.0709	0.2205	0.0651	0.2205	0.06	0.2205	0.0574	0.2205	0.0531	0.2205	0.0475
0.231	0.0959	0.231	0.0792	0.231	0.0703	0.231	0.0665	0.231	0.063	0.231	0.0578	0.231	0.0525
0.242	0.0984	0.242	0.0845	0.242	0.0774	0.242	0.0721	0.242	0.0681	0.242	0.0618	0.242	0.0551
0.2535	0.1059	0.2535	0.0913	0.2535	0.0833	0.2535	0.0763	0.2535	0.0702	0.2535	0.0618	0.2535	0.0551
0.2656	0.1138	0.2656	0.0944	0.2656	0.084	0.2656	0.0763	0.2656	0.0702	0.2656	0.0618	0.2656	0.0551
0.2783	0.1138	0.2783	0.0944	0.2783	0.084	0.2783	0.0779	0.2783	0.074	0.2783	0.0677	0.2783	0.0611
0.2915	0.1138	0.2915	0.1008	0.2915	0.0946	0.2915	0.0892	0.2915	0.0843	0.2915	0.0764	0.2915	0.0677
0.3054	0.1179	0.3054	0.1056	0.3054	0.0987	0.3054	0.0926	0.3054	0.0872	0.3054	0.0785	0.3054	0.0706
0.3199	0.1179	0.3199	0.1056	0.3199	0.0987	0.3199	0.0926	0.3199	0.0894	0.3199	0.0844	0.3199	0.0786
0.3352	0.1179	0.3352	0.1098	0.3352	0.1056	0.3352	0.1017	0.3352	0.0982	0.3352	0.0921	0.3352	0.0848
0.3511	0.1654	0.3511	0.129	0.3511	0.1133	0.3511	0.1075	0.3511	0.1035	0.3511	0.0964	0.3511	0.088
0.3678	0.2415	0.3678	0.1832	0.3678	0.1565	0.3678	0.1364	0.3678	0.1213	0.3678	0.1006	0.3678	0.088
0.3853	0.2549	0.3853	0.187	0.3853	0.1595	0.3853	0.1387	0.3853	0.1269	0.3853	0.1092	0.3853	0.091
0.4037	0.2549	0.4037	0.187	0.4037	0.1595	0.4037	0.1387	0.4037	0.1279	0.4037	0.1163	0.4037	0.1034
0.4229	0.2549	0.4229	0.187	0.4229	0.1651	0.4229	0.1485	0.4229	0.1344	0.4229	0.1233	0.4229	0.1111
0.4431	0.3288	0.4431	0.2339	0.4431	0.2038	0.4431	0.1813	0.4431	0.1641	0.4431	0.1399	0.4431	0.1181
0.4642	0.3288	0.4642	0.2339	0.4642	0.2038	0.4642	0.1813	0.4642	0.1641	0.4642	0.1399	0.4642	0.1181
0.4863	0.3288	0.4863	0.2339	0.4863	0.2038	0.4863	0.1813	0.4863	0.1641	0.4863	0.1421	0.4863	0.1246
0.5094	0.3288	0.5094	0.2339	0.5094	0.2038	0.5094	0.1813	0.5094	0.1641	0.5094	0.1472	0.5094	0.1295

PTWW038.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 38 ~ SLAB-WALL JOINT North-South Responses ~ Elevation 54 FL ~ Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.5337	0.3356	0.5337	0.2387	0.5337	0.2081	0.5337	0.19	0.5337	0.1796	0.5337	0.1614	0.5337	0.1401
0.5591	0.3997	0.5591	0.2762	0.5591	0.244	0.5591	0.2179	0.5591	0.1971	0.5591	0.1724	0.5591	0.1556
0.5857	0.3997	0.5857	0.2863	0.5857	0.2573	0.5857	0.2332	0.5857	0.2128	0.5857	0.1853	0.5857	0.1724
0.6136	0.3997	0.6136	0.2863	0.6136	0.2573	0.6136	0.2332	0.6136	0.2128	0.6136	0.1998	0.6136	0.1858
0.6428	0.3997	0.6428	0.2863	0.6428	0.2573	0.6428	0.2332	0.6428	0.2219	0.6428	0.2115	0.6428	0.1969
0.6734	0.411	0.6734	0.2863	0.6734	0.2574	0.6734	0.2449	0.6734	0.2378	0.6734	0.2244	0.6734	0.2072
0.7055	0.411	0.7055	0.301	0.7055	0.2757	0.7055	0.2638	0.7055	0.2534	0.7055	0.2357	0.7055	0.2156
0.7391	0.6367	0.7391	0.4169	0.7391	0.3404	0.7391	0.2927	0.7391	0.2746	0.7391	0.2445	0.7391	0.217
0.7743	0.6367	0.7743	0.4169	0.7743	0.3404	0.7743	0.3038	0.7743	0.2858	0.7743	0.2555	0.7743	0.2218
0.8111	0.6596	0.8111	0.4428	0.8111	0.386	0.8111	0.3422	0.8111	0.3081	0.8111	0.2598	0.8111	0.2218
0.8497	0.6596	0.8497	0.4428	0.8497	0.4051	0.8497	0.3738	0.8497	0.347	0.8497	0.3034	0.8497	0.256
0.8902	0.6828	0.8902	0.4451	0.8902	0.4051	0.8902	0.3738	0.8902	0.3511	0.8902	0.3194	0.8902	0.2761
0.9326	0.737	0.9326	0.5191	0.9326	0.4567	0.9326	0.411	0.9326	0.3766	0.9326	0.328	0.9326	0.2821
0.977	0.9914	0.977	0.6358	0.977	0.525	0.977	0.4553	0.977	0.408	0.977	0.3484	0.977	0.2994
1.0235	0.9914	1.0235	0.6358	1.0235	0.5662	1.0235	0.5139	1.0235	0.4702	1.0235	0.4041	1.0235	0.3384
1.0723	0.9914	1.0723	0.6668	1.0723	0.5976	1.0723	0.5399	1.0723	0.4914	1.0723	0.4166	1.0723	0.3541
1.1233	1.2606	1.1233	0.8561	1.1233	0.7168	1.1233	0.6174	1.1233	0.5433	1.1233	0.4431	1.1233	0.3633
1.1768	1.2606	1.1768	0.8561	1.1768	0.7168	1.1768	0.6174	1.1768	0.5433	1.1768	0.4467	1.1768	0.3729
1.2328	1.2606	1.2328	0.935	1.2328	0.8202	1.2328	0.7293	1.2328	0.6556	1.2328	0.5433	1.2328	0.4321
1.2916	1.2606	1.2916	1.0351	1.2916	0.8991	1.2916	0.793	1.2916	0.708	1.2916	0.5814	1.2916	0.4586
1.353	1.3319	1.353	1.0351	1.353	0.8991	1.353	0.793	1.353	0.708	1.353	0.5814	1.353	0.4631
1.4175	1.6092	1.4175	1.1325	1.4175	0.9683	1.4175	0.8621	1.4175	0.7817	1.4175	0.6627	1.4175	0.5486
1.485	1.6092	1.485	1.1325	1.485	0.9683	1.485	0.885	1.485	0.8264	1.485	0.7199	1.485	0.6006
1.5557	1.8872	1.5557	1.1818	1.5557	1.0008	1.5557	0.892	1.5557	0.8264	1.5557	0.7265	1.5557	0.6185
1.6298	1.9322	1.6298	1.3084	1.6298	1.1683	1.6298	1.0534	1.6298	0.9565	1.6298	0.8016	1.6298	0.6401
1.7074	1.9702	1.7074	1.3601	1.7074	1.2627	1.7074	1.1415	1.7074	1.0371	1.7074	0.8692	1.7074	0.7006
1.7887	2.4552	1.7887	1.4456	1.7887	1.2629	1.7887	1.1415	1.7887	1.0371	1.7887	0.8773	1.7887	0.7486
1.8738	2.4552	1.8738	1.4456	1.8738	1.2629	1.8738	1.1415	1.8738	1.0371	1.8738	0.9259	1.8738	0.788
1.963	2.4552	1.963	1.4456	1.963	1.2629	1.963	1.1498	1.963	1.0818	1.963	0.9626	1.963	0.8157
2.0565	2.4552	2.0565	1.4456	2.0565	1.2629	2.0565	1.1701	2.0565	1.1049	2.0565	0.9829	2.0565	0.8288
2.1544	2.4552	2.1544	1.4456	2.1544	1.3316	2.1544	1.2297	2.1544	1.1411	2.1544	0.9932	2.1544	0.8645
2.257	2.2367	2.257	1.4456	2.257	1.3316	2.257	1.2297	2.257	1.1534	2.257	1.0344	2.257	0.8939
2.3645	2.2367	2.3645	1.4456	2.3645	1.3316	2.3645	1.2422	2.3645	1.1724	2.3645	1.0471	2.3645	0.898
2.4771	2.2367	2.4771	1.6143	2.4771	1.3804	2.4771	1.2551	2.4771	1.1724	2.4771	1.0471	2.4771	0.898
2.595	2.138	2.595	1.6143	2.595	1.3804	2.595	1.2551	2.595	1.1724	2.595	1.0471	2.595	0.898

PTWW038.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 38 ~ SLAB-WALL JOINT North-South Responses ~ Elevation 54 Ft. ~ Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
2.7186	2.138	2.7186	1.6143	2.7186	1.3804	2.7186	1.2551	2.7186	1.1724	2.7186	1.0471	2.7186	0.898
2.848	2.138	2.848	1.6143	2.848	1.3804	2.848	1.2551	2.848	1.1724	2.848	1.0471	2.848	0.898
2.9836	2.138	2.9836	1.6143	2.9836	1.3804	2.9836	1.2551	2.9836	1.1568	2.9836	1.0114	2.9836	0.8645
3.1257	2.138	3.1257	1.3773	3.1257	1.0882	3.1257	1.0035	3.1257	0.9573	3.1257	0.8829	3.1257	0.7931
3.2745	2.138	3.2745	1.2119	3.2745	1.0686	3.2745	0.9673	3.2745	0.886	3.2745	0.778	3.2745	0.7168
3.4305	1.5368	3.4305	1.0471	3.4305	0.9495	3.4305	0.8824	3.4305	0.8379	3.4305	0.7547	3.4305	0.6598
3.5938	1.5368	3.5938	1.0165	3.5938	0.898	3.5938	0.8299	3.5938	0.7946	3.5938	0.7273	3.5938	0.6376
3.7649	1.5368	3.7649	1.0165	3.7649	0.898	3.7649	0.8299	3.7649	0.7769	3.7649	0.6958	3.7649	0.6089
3.9442	1.5368	3.9442	1.0165	3.9442	0.8472	3.9442	0.7941	3.9442	0.7477	3.9442	0.6723	3.9442	0.5955
4.132	1.5368	4.132	1.0165	4.132	0.845	4.132	0.7941	4.132	0.7477	4.132	0.6723	4.132	0.5955
4.3288	1.5368	4.3288	0.9973	4.3288	0.8194	4.3288	0.7522	4.3288	0.7017	4.3288	0.6303	4.3288	0.5622
4.5349	1.5368	4.5349	0.8745	4.5349	0.7347	4.5349	0.6652	4.5349	0.6197	4.5349	0.5656	4.5349	0.5097
4.7508	1.518	4.7508	0.8745	4.7508	0.7183	4.7508	0.6169	4.7508	0.5587	4.7508	0.4909	4.7508	0.4618
4.977	1.518	4.977	0.8614	4.977	0.7025	4.977	0.6052	4.977	0.5367	4.977	0.4572	4.977	0.4284
5.214	1.3404	5.214	0.7497	5.214	0.6443	5.214	0.5421	5.214	0.5109	5.214	0.4398	5.214	0.4021
5.4623	1.3404	5.4623	0.7497	5.4623	0.6443	5.4623	0.5254	5.4623	0.5109	5.4623	0.438	5.4623	0.3783
5.7224	1.3404	5.7224	0.7497	5.7224	0.6443	5.7224	0.5254	5.7224	0.5109	5.7224	0.438	5.7224	0.3681
5.9948	1.3404	5.9948	0.7497	5.9948	0.6443	5.9948	0.5254	5.9948	0.5109	5.9948	0.438	5.9948	0.3681
6.2803	1.3404	6.2803	0.7497	6.2803	0.6443	6.2803	0.5254	6.2803	0.5109	6.2803	0.438	6.2803	0.3681
6.5793	1.3404	6.5793	0.7497	6.5793	0.6443	6.5793	0.5254	6.5793	0.5109	6.5793	0.438	6.5793	0.3681
6.8926	1.3404	6.8926	0.7497	6.8926	0.6443	6.8926	0.5254	6.8926	0.5109	6.8926	0.438	6.8926	0.3681
7.2208	1.274	7.2208	0.7497	7.2208	0.6443	7.2208	0.5254	7.2208	0.5109	7.2208	0.438	7.2208	0.3681
7.5646	1.274	7.5646	0.7455	7.5646	0.6309	7.5646	0.5254	7.5646	0.5092	7.5646	0.438	7.5646	0.3681
7.9248	1.274	7.9248	0.6003	7.9248	0.5494	7.9248	0.5064	7.9248	0.471	7.9248	0.4168	7.9248	0.3609
8.3022	1.274	8.3022	0.5659	8.3022	0.4849	8.3022	0.454	8.3022	0.4288	8.3022	0.394	8.3022	0.3594
8.6975	1.0027	8.6975	0.521	8.6975	0.4849	8.6975	0.454	8.6975	0.4288	8.6975	0.3913	8.6975	0.3538
9.1116	1.0027	9.1116	0.4701	9.1116	0.4386	9.1116	0.4105	9.1116	0.3865	9.1116	0.3654	9.1116	0.3376
9.5455	1.0027	9.5455	0.4494	9.5455	0.4069	9.5455	0.3794	9.5455	0.3652	9.5455	0.3418	9.5455	0.3167
10	0.6463	10	0.4494	10	0.4069	10	0.3794	10	0.3585	10	0.3293	10	0.3015
10.4762	0.6411	10.4762	0.4371	10.4762	0.3959	10.4762	0.3648	10.4762	0.347	10.4762	0.3169	10.4762	0.2936
10.975	0.6411	10.975	0.4085	10.975	0.3688	10.975	0.3387	10.975	0.3179	10.975	0.2923	10.975	0.2891
11.4976	0.6411	11.4976	0.3647	11.4976	0.3304	11.4976	0.3133	11.4976	0.3024	11.4976	0.2893	11.4976	0.2857
12.045	0.6411	12.045	0.3647	12.045	0.3304	12.045	0.3133	12.045	0.3024	12.045	0.2893	12.045	0.2839
12.6186	0.6411	12.6186	0.3647	12.6186	0.3304	12.6186	0.3133	12.6186	0.3024	12.6186	0.2893	12.6186	0.2831
13.2194	0.6411	13.2194	0.3647	13.2194	0.3304	13.2194	0.3133	13.2194	0.3024	13.2194	0.2893	13.2194	0.2831

PTWW038.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 38 – SLAB-WALL JOINT North-South Responses – Elevation 54 Ft. – Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
13.8489	0.6411	13.8489	0.3647	13.8489	0.3304	13.8489	0.3133	13.8489	0.3024	13.8489	0.2893	13.8489	0.2831
14.5083	0.6411	14.5083	0.3647	14.5083	0.3304	14.5083	0.3133	14.5083	0.3024	14.5083	0.2893	14.5083	0.2831
15.1991	0.6411	15.1991	0.3647	15.1991	0.3304	15.1991	0.3133	15.1991	0.3024	15.1991	0.2893	15.1991	0.2831
15.9228	0.6411	15.9228	0.3647	15.9228	0.3304	15.9228	0.3133	15.9228	0.3024	15.9228	0.2893	15.9228	0.2831
16.681	0.6411	16.681	0.3647	16.681	0.3304	16.681	0.3133	16.681	0.3024	16.681	0.2893	16.681	0.2831
17.4753	0.6411	17.4753	0.3647	17.4753	0.3304	17.4753	0.3133	17.4753	0.3024	17.4753	0.2893	17.4753	0.2831
18.3074	0.4714	18.3074	0.3284	18.3074	0.3152	18.3074	0.3052	18.3074	0.298	18.3074	0.2893	18.3074	0.2831
19.1791	0.4714	19.1791	0.3088	19.1791	0.2936	19.1791	0.2872	19.1791	0.2851	19.1791	0.2842	19.1791	0.2825
20.0923	0.4714	20.0923	0.3088	20.0923	0.2886	20.0923	0.2865	20.0923	0.2851	20.0923	0.2833	20.0923	0.2814
21.049	0.3824	21.049	0.2877	21.049	0.2842	21.049	0.2843	21.049	0.2836	21.049	0.2819	21.049	0.2801
22.0513	0.3824	22.0513	0.2873	22.0513	0.2834	22.0513	0.2816	22.0513	0.2806	22.0513	0.2795	22.0513	0.2783
23.1013	0.2973	23.1013	0.2832	23.1013	0.2814	23.1013	0.2802	23.1013	0.2793	23.1013	0.2779	23.1013	0.2765
24.2013	0.2947	24.2013	0.2805	24.2013	0.2788	24.2013	0.2776	24.2013	0.2768	24.2013	0.2763	24.2013	0.2756
25.3536	0.288	25.3536	0.2805	25.3536	0.2788	25.3536	0.2776	25.3536	0.2768	25.3536	0.2757	25.3536	0.2749
26.5609	0.288	26.5609	0.2805	26.5609	0.2788	26.5609	0.2776	26.5609	0.2768	26.5609	0.2757	26.5609	0.2747
27.8256	0.2867	27.8256	0.28	27.8256	0.2782	27.8256	0.2771	27.8256	0.2762	27.8256	0.2751	27.8256	0.2741
29.1505	0.2773	29.1505	0.2753	29.1505	0.2749	29.1505	0.2745	29.1505	0.2742	29.1505	0.2738	29.1505	0.2732
30.5386	0.2773	30.5386	0.2727	30.5386	0.2726	30.5386	0.2725	30.5386	0.2724	30.5386	0.2723	30.5386	0.2721
31.9927	0.2707	31.9927	0.271	31.9927	0.271	31.9927	0.2711	31.9927	0.2711	31.9927	0.2712	31.9927	0.2712
33.516	0.2707	33.516	0.2707	33.516	0.2706	33.516	0.2706	33.516	0.2706	33.516	0.2706	33.516	0.2706
35.1119	0.27	35.1119	0.27	35.1119	0.27	35.1119	0.2701	35.1119	0.2701	35.1119	0.2701	35.1119	0.2701
36.7838	0.2695	36.7838	0.2696	36.7838	0.2696	36.7838	0.2696	36.7838	0.2697	36.7838	0.2697	36.7838	0.2697
38.5353	0.2693	38.5353	0.2693	38.5353	0.2693	38.5353	0.2693	38.5353	0.2693	38.5353	0.2693	38.5353	0.2693
40.3702	0.269	40.3702	0.269	40.3702	0.269	40.3702	0.269	40.3702	0.269	40.3702	0.269	40.3702	0.269
42.2924	0.2687	42.2924	0.2687	42.2924	0.2687	42.2924	0.2687	42.2924	0.2687	42.2924	0.2687	42.2924	0.2688
44.3062	0.2685	44.3062	0.2685	44.3062	0.2685	44.3062	0.2685	44.3062	0.2685	44.3062	0.2685	44.3062	0.2685
46.4159	0.2683	46.4159	0.2683	46.4159	0.2683	46.4159	0.2683	46.4159	0.2683	46.4159	0.2683	46.4159	0.2683
48.626	0.2681	48.626	0.2681	48.626	0.2681	48.626	0.2681	48.626	0.2681	48.626	0.2681	48.626	0.2681
50.9414	0.2679	50.9414	0.2679	50.9414	0.2679	50.9414	0.2679	50.9414	0.2679	50.9414	0.2679	50.9414	0.2679

PTWW040.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g)
– Figure 40 – SLAB-WALL JOINT East-West Responses – Elevation 54 Ft. – Line 30 B

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.1098	0.0375	0.1098	0.0344	0.1098	0.0327	0.1098	0.0312	0.1098	0.0298	0.1098	0.0274	0.1098	0.0252
0.115	0.0375	0.115	0.0344	0.115	0.0327	0.115	0.0312	0.115	0.0299	0.115	0.0277	0.115	0.0258
0.1204	0.0375	0.1204	0.0344	0.1204	0.0331	0.1204	0.0322	0.1204	0.0312	0.1204	0.0294	0.1204	0.0269
0.1262	0.0431	0.1262	0.0397	0.1262	0.0378	0.1262	0.036	0.1262	0.0343	0.1262	0.0314	0.1262	0.0278
0.1322	0.0504	0.1322	0.045	0.1322	0.042	0.1322	0.0393	0.1322	0.0369	0.1322	0.0328	0.1322	0.0281
0.1385	0.056	0.1385	0.0489	0.1385	0.0449	0.1385	0.0414	0.1385	0.0384	0.1385	0.0345	0.1385	0.0303
0.1451	0.0581	0.1451	0.0509	0.1451	0.0475	0.1451	0.0445	0.1451	0.0419	0.1451	0.0375	0.1451	0.0326
0.152	0.0616	0.152	0.0546	0.152	0.0507	0.152	0.0472	0.152	0.0441	0.152	0.0391	0.152	0.0338
0.1592	0.062	0.1592	0.0546	0.1592	0.0507	0.1592	0.0472	0.1592	0.0442	0.1592	0.0397	0.1592	0.0351
0.1668	0.064	0.1668	0.0561	0.1668	0.0518	0.1668	0.0481	0.1668	0.0451	0.1668	0.0403	0.1668	0.0355
0.1748	0.064	0.1748	0.0561	0.1748	0.0518	0.1748	0.0481	0.1748	0.0451	0.1748	0.0403	0.1748	0.0355
0.1831	0.064	0.1831	0.0561	0.1831	0.0518	0.1831	0.0481	0.1831	0.0451	0.1831	0.0403	0.1831	0.0368
0.1918	0.0641	0.1918	0.0562	0.1918	0.0518	0.1918	0.0494	0.1918	0.0476	0.1918	0.0445	0.1918	0.0404
0.2009	0.0642	0.2009	0.0583	0.2009	0.0558	0.2009	0.0534	0.2009	0.0513	0.2009	0.0474	0.2009	0.0424
0.2105	0.0665	0.2105	0.0603	0.2105	0.0575	0.2105	0.0549	0.2105	0.0525	0.2105	0.049	0.2105	0.0449
0.2205	0.078	0.2205	0.0646	0.2205	0.0619	0.2205	0.0595	0.2205	0.0573	0.2205	0.0533	0.2205	0.0484
0.231	0.0933	0.231	0.0774	0.231	0.0694	0.231	0.063	0.231	0.0598	0.231	0.0556	0.231	0.0503
0.242	0.0933	0.242	0.0774	0.242	0.0722	0.242	0.0678	0.242	0.0637	0.242	0.0566	0.242	0.0512
0.2535	0.0933	0.2535	0.0817	0.2535	0.0771	0.2535	0.0729	0.2535	0.0692	0.2535	0.0628	0.2535	0.0552
0.2656	0.0933	0.2656	0.0839	0.2656	0.0794	0.2656	0.0754	0.2656	0.0717	0.2656	0.0653	0.2656	0.0575
0.2783	0.0953	0.2783	0.0846	0.2783	0.0794	0.2783	0.0754	0.2783	0.0717	0.2783	0.0653	0.2783	0.0581
0.2915	0.1186	0.2915	0.0985	0.2915	0.0889	0.2915	0.0814	0.2915	0.0754	0.2915	0.0668	0.2915	0.0594
0.3054	0.1503	0.3054	0.1233	0.3054	0.1096	0.3054	0.0984	0.3054	0.0894	0.3054	0.0758	0.3054	0.0632
0.3199	0.1503	0.3199	0.1233	0.3199	0.1096	0.3199	0.0984	0.3199	0.0894	0.3199	0.0802	0.3199	0.0706
0.3352	0.1503	0.3352	0.1233	0.3352	0.1096	0.3352	0.0984	0.3352	0.0932	0.3352	0.0857	0.3352	0.0762
0.3511	0.1503	0.3511	0.129	0.3511	0.1173	0.3511	0.107	0.3511	0.0997	0.3511	0.0894	0.3511	0.0786
0.3678	0.168	0.3678	0.1438	0.3678	0.1303	0.3678	0.1186	0.3678	0.1121	0.3678	0.1017	0.3678	0.0897
0.3853	0.168	0.3853	0.1438	0.3853	0.1345	0.3853	0.1278	0.3853	0.1218	0.3853	0.1114	0.3853	0.0992
0.4037	0.1939	0.4037	0.1599	0.4037	0.1426	0.4037	0.1306	0.4037	0.1259	0.4037	0.117	0.4037	0.1053
0.4229	0.2367	0.4229	0.1905	0.4229	0.172	0.4229	0.1557	0.4229	0.1416	0.4229	0.1217	0.4229	0.1092
0.4431	0.3089	0.4431	0.2194	0.4431	0.1882	0.4431	0.1671	0.4431	0.1496	0.4431	0.1274	0.4431	0.1099
0.4642	0.3417	0.4642	0.2524	0.4642	0.2138	0.4642	0.1852	0.4642	0.1637	0.4642	0.1345	0.4642	0.1215
0.4863	0.3417	0.4863	0.2561	0.4863	0.221	0.4863	0.1929	0.4863	0.1703	0.4863	0.1411	0.4863	0.1326
0.5094	0.3521	0.5094	0.2655	0.5094	0.2324	0.5094	0.2053	0.5094	0.1831	0.5094	0.15	0.5094	0.1394

PTWW040.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 40 ~ SLAB-WALL JOINT East-West Responses ~ Elevation 54 Ft. ~ Line 30 B

Damping Freq.	0.50% Accel.	Freq.	2% Accel.	Freq.	3% Accel.	Freq.	4% Accel.	Freq.	5% Accel.	Freq.	7% Accel.	Freq.	10% Accel.
0.5337	0.4094	0.5337	0.277	0.5337	0.2324	0.5337	0.2053	0.5337	0.1831	0.5337	0.1539	0.5337	0.1399
0.5591	0.4094	0.5591	0.277	0.5591	0.2399	0.5591	0.2149	0.5591	0.195	0.5591	0.1656	0.5591	0.1399
0.5857	0.4094	0.5857	0.277	0.5857	0.2401	0.5857	0.2157	0.5857	0.1974	0.5857	0.1686	0.5857	0.144
0.6136	0.4473	0.6136	0.2968	0.6136	0.2443	0.6136	0.2233	0.6136	0.205	0.6136	0.175	0.6136	0.144
0.6428	0.478	0.6428	0.3546	0.6428	0.3004	0.6428	0.2612	0.6428	0.2347	0.6428	0.1989	0.6428	0.1683
0.6734	0.478	0.6734	0.3546	0.6734	0.3004	0.6734	0.2612	0.6734	0.2416	0.6734	0.2168	0.6734	0.1875
0.7055	0.478	0.7055	0.3546	0.7055	0.3004	0.7055	0.2612	0.7055	0.2416	0.7055	0.2187	0.7055	0.1922
0.7391	0.478	0.7391	0.3546	0.7391	0.3004	0.7391	0.2693	0.7391	0.2464	0.7391	0.2187	0.7391	0.1922
0.7743	0.5516	0.7743	0.3957	0.7743	0.3328	0.7743	0.2914	0.7743	0.2681	0.7743	0.2353	0.7743	0.2016
0.8111	0.5516	0.8111	0.3957	0.8111	0.3328	0.8111	0.3036	0.8111	0.2876	0.8111	0.2588	0.8111	0.2241
0.8497	0.5516	0.8497	0.3957	0.8497	0.3328	0.8497	0.312	0.8497	0.2986	0.8497	0.2726	0.8497	0.2377
0.8902	0.5516	0.8902	0.3957	0.8902	0.3658	0.8902	0.3432	0.8902	0.3226	0.8902	0.2872	0.8902	0.2459
0.9326	0.86	0.9326	0.5582	0.9326	0.4625	0.9326	0.4018	0.9326	0.3596	0.9326	0.3042	0.9326	0.2543
0.977	0.86	0.977	0.5582	0.977	0.4625	0.977	0.4042	0.977	0.3641	0.977	0.3081	0.977	0.2635
1.0235	0.9305	1.0235	0.596	1.0235	0.5259	1.0235	0.4813	1.0235	0.4435	1.0235	0.3836	1.0235	0.3273
1.0723	0.9305	1.0723	0.6881	1.0723	0.6026	1.0723	0.5463	1.0723	0.4991	1.0723	0.435	1.0723	0.3728
1.1233	1.3364	1.1233	0.8307	1.1233	0.678	1.1233	0.5832	1.1233	0.5403	1.1233	0.4675	1.1233	0.3994
1.1768	1.3364	1.1768	0.8307	1.1768	0.678	1.1768	0.5853	1.1768	0.5503	1.1768	0.486	1.1768	0.4233
1.2328	1.3364	1.2328	0.8307	1.2328	0.7352	1.2328	0.6585	1.2328	0.5916	1.2328	0.5089	1.2328	0.45
1.2916	1.3364	1.2916	0.8976	1.2916	0.7903	1.2916	0.7004	1.2916	0.6246	1.2916	0.5436	1.2916	0.479
1.353	1.3364	1.353	0.9456	1.353	0.7903	1.353	0.7004	1.353	0.6262	1.353	0.5719	1.353	0.5034
1.4175	1.4619	1.4175	0.9456	1.4175	0.7903	1.4175	0.7004	1.4175	0.6574	1.4175	0.6019	1.4175	0.5319
1.485	1.4619	1.485	0.9456	1.485	0.7903	1.485	0.7263	1.485	0.6958	1.485	0.6359	1.485	0.562
1.5557	1.5117	1.5557	1.0299	1.5557	0.8804	1.5557	0.7761	1.5557	0.7253	1.5557	0.6625	1.5557	0.5874
1.6298	1.815	1.6298	1.1102	1.6298	0.9568	1.6298	0.8641	1.6298	0.7943	1.6298	0.6883	1.6298	0.605
1.7074	1.815	1.7074	1.1102	1.7074	0.9568	1.7074	0.8641	1.7074	0.7943	1.7074	0.703	1.7074	0.6249
1.7887	1.815	1.7887	1.1102	1.7887	0.9568	1.7887	0.8641	1.7887	0.7943	1.7887	0.7234	1.7887	0.6496
1.8738	1.815	1.8738	1.1102	1.8738	0.9568	1.8738	0.8669	1.8738	0.8279	1.8738	0.7584	1.8738	0.6712
1.963	1.815	1.963	1.1102	1.963	0.9568	1.963	0.8979	1.963	0.8532	1.963	0.7761	1.963	0.6839
2.0565	1.7425	2.0565	1.0955	2.0565	0.961	2.0565	0.9033	2.0565	0.8536	2.0565	0.7761	2.0565	0.6839
2.1544	1.7425	2.1544	1.0955	2.1544	0.961	2.1544	0.9033	2.1544	0.8536	2.1544	0.7761	2.1544	0.6839
2.257	1.515	2.257	1.0774	2.257	0.961	2.257	0.9033	2.257	0.8536	2.257	0.7761	2.257	0.6839
2.3645	1.515	2.3645	1.0774	2.3645	0.961	2.3645	0.9033	2.3645	0.8536	2.3645	0.7761	2.3645	0.6839
2.4771	1.515	2.4771	1.0774	2.4771	1.0152	2.4771	0.9033	2.4771	0.8536	2.4771	0.7713	2.4771	0.6886
2.595	1.515	2.595	1.0774	2.595	1.0152	2.595	0.9033	2.595	0.8536	2.595	0.7713	2.595	0.6927

PTWW040.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 40 – SLAB-WALL JOINT East-West Responses – Elevation 54 Ft. – Line 30 B

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
2.7186	1.515	2.7186	1.0774	2.7186	1.0152	2.7186	0.9033	2.7186	0.8536	2.7186	0.7713	2.7186	0.6934
2.848	1.515	2.848	1.0774	2.848	1.0152	2.848	0.9033	2.848	0.8536	2.848	0.7713	2.848	0.6934
2.9836	1.515	2.9836	1.0774	2.9836	1.0152	2.9836	0.9033	2.9836	0.8536	2.9836	0.7713	2.9836	0.6934
3.1257	1.515	3.1257	1.0774	3.1257	1.0152	3.1257	0.9033	3.1257	0.8536	3.1257	0.7713	3.1257	0.6934
3.2745	1.515	3.2745	1.0774	3.2745	1.0152	3.2745	0.9033	3.2745	0.8536	3.2745	0.7713	3.2745	0.6934
3.4305	1.515	3.4305	1.0774	3.4305	1.0152	3.4305	0.9033	3.4305	0.8536	3.4305	0.7713	3.4305	0.692
3.5938	1.7924	3.5938	1.0774	3.5938	1.0152	3.5938	0.9033	3.5938	0.8536	3.5938	0.7713	3.5938	0.6916
3.7649	1.7924	3.7649	1.0921	3.7649	1.0152	3.7649	0.9076	3.7649	0.8536	3.7649	0.7713	3.7649	0.6893
3.9442	1.7924	3.9442	1.0921	3.9442	1.0628	3.9442	0.9721	3.9442	0.9001	3.9442	0.7901	3.9442	0.6893
4.132	1.7924	4.132	1.0921	4.132	1.0628	4.132	0.9721	4.132	0.9001	4.132	0.7901	4.132	0.6876
4.3288	1.7924	4.3288	1.0921	4.3288	1.0628	4.3288	0.9721	4.3288	0.9001	4.3288	0.7901	4.3288	0.6805
4.5349	1.7924	4.5349	1.0921	4.5349	1.0628	4.5349	0.9721	4.5349	0.9001	4.5349	0.7901	4.5349	0.676
4.7508	1.7924	4.7508	1.0921	4.7508	1.0628	4.7508	0.9721	4.7508	0.9001	4.7508	0.7901	4.7508	0.6736
4.977	1.7924	4.977	1.0921	4.977	0.9506	4.977	0.8979	4.977	0.8494	4.977	0.7652	4.977	0.6688
5.214	1.7924	5.214	1.0921	5.214	0.9383	5.214	0.8718	5.214	0.8233	5.214	0.7464	5.214	0.654
5.4623	2.0429	5.4623	1.0921	5.4623	0.9383	5.4623	0.8718	5.4623	0.8233	5.4623	0.7464	5.4623	0.654
5.7224	2.0429	5.7224	1.0974	5.7224	0.9383	5.7224	0.8718	5.7224	0.8233	5.7224	0.7464	5.7224	0.654
5.9948	2.0429	5.9948	1.0974	5.9948	0.9383	5.9948	0.8718	5.9948	0.8233	5.9948	0.7464	5.9948	0.654
6.2803	2.0429	6.2803	1.0974	6.2803	0.9383	6.2803	0.8718	6.2803	0.8233	6.2803	0.7464	6.2803	0.654
6.5793	2.0429	6.5793	1.0974	6.5793	0.9383	6.5793	0.8718	6.5793	0.8218	6.5793	0.7401	6.5793	0.6457
6.8926	2.0429	6.8926	1.0974	6.8926	0.9383	6.8926	0.852	6.8926	0.7921	6.8926	0.7107	6.8926	0.6236
7.2208	1.6443	7.2208	1.0312	7.2208	0.8872	7.2208	0.8236	7.2208	0.7712	7.2208	0.6856	7.2208	0.6178
7.5646	1.3629	7.5646	0.9367	7.5646	0.8389	7.5646	0.785	7.5646	0.7436	7.5646	0.6831	7.5646	0.6178
7.9248	1.3378	7.9248	0.8974	7.9248	0.827	7.9248	0.7757	7.9248	0.7347	7.9248	0.6707	7.9248	0.604
8.3022	1.3378	8.3022	0.8407	8.3022	0.7713	8.3022	0.7153	8.3022	0.6828	8.3022	0.6374	8.3022	0.5873
8.6975	0.9422	8.6975	0.6767	8.6975	0.6523	8.6975	0.6296	8.6975	0.6076	8.6975	0.5724	8.6975	0.5488
9.1116	0.9081	9.1116	0.6623	9.1116	0.6141	9.1116	0.5759	9.1116	0.551	9.1116	0.5261	9.1116	0.5145
9.5455	0.9081	9.5455	0.6266	9.5455	0.5795	9.5455	0.5505	9.5455	0.5315	9.5455	0.5085	9.5455	0.4961
10	0.8734	10	0.6266	10	0.5795	10	0.5505	10	0.5315	10	0.5083	10	0.4875
10.4762	0.7653	10.4762	0.5513	10.4762	0.528	10.4762	0.5125	10.4762	0.5017	10.4762	0.4862	10.4762	0.4714
10.975	0.7298	10.975	0.5252	10.975	0.5066	10.975	0.4911	10.975	0.479	10.975	0.4624	10.975	0.4529
11.4976	0.7298	11.4976	0.5252	11.4976	0.5066	11.4976	0.4911	11.4976	0.479	11.4976	0.4624	11.4976	0.4475
12.045	0.7298	12.045	0.5252	12.045	0.5066	12.045	0.4911	12.045	0.479	12.045	0.4624	12.045	0.4475
12.6186	0.7298	12.6186	0.516	12.6186	0.4966	12.6186	0.483	12.6186	0.4727	12.6186	0.4569	12.6186	0.4415
13.2194	0.7298	13.2194	0.516	13.2194	0.4659	13.2194	0.4393	13.2194	0.438	13.2194	0.4349	13.2194	0.4272

PTWW040.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g)
~ Figure 40 ~ SLAB-WALL JOINT East-West Responses ~ Elevation 54 Ft. ~ Line 30 B

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
13.8489	0.7298	13.8489	0.516	13.8489	0.4659	13.8489	0.4388	13.8489	0.4278	13.8489	0.4202	13.8489	0.4132
14.5083	0.7298	14.5083	0.516	14.5083	0.4659	14.5083	0.4388	14.5083	0.4278	14.5083	0.4164	14.5083	0.4056
15.1991	0.7298	15.1991	0.516	15.1991	0.4659	15.1991	0.4388	15.1991	0.4209	15.1991	0.4033	15.1991	0.3946
15.9228	0.7298	15.9228	0.516	15.9228	0.4659	15.9228	0.4388	15.9228	0.4209	15.9228	0.4007	15.9228	0.3861
16.681	0.7298	16.681	0.516	16.681	0.4659	16.681	0.4388	16.681	0.4209	16.681	0.4007	16.681	0.3861
17.4753	0.7298	17.4753	0.516	17.4753	0.4659	17.4753	0.4388	17.4753	0.4209	17.4753	0.4007	17.4753	0.3861
18.3074	0.7298	18.3074	0.516	18.3074	0.4659	18.3074	0.4388	18.3074	0.4209	18.3074	0.4007	18.3074	0.3861
19.1791	0.8702	19.1791	0.516	19.1791	0.4659	19.1791	0.4388	19.1791	0.4209	19.1791	0.4007	19.1791	0.3861
20.0923	0.8702	20.0923	0.516	20.0923	0.4659	20.0923	0.4388	20.0923	0.4209	20.0923	0.4007	20.0923	0.3861
21.049	0.8702	21.049	0.516	21.049	0.4659	21.049	0.4388	21.049	0.4209	21.049	0.4007	21.049	0.3861
22.0513	0.8702	22.0513	0.516	22.0513	0.4659	22.0513	0.4388	22.0513	0.4209	22.0513	0.4007	22.0513	0.3835
23.1013	0.8702	23.1013	0.516	23.1013	0.4659	23.1013	0.4388	23.1013	0.4209	23.1013	0.4007	23.1013	0.3835
24.2013	0.7893	24.2013	0.5109	24.2013	0.4659	24.2013	0.4388	24.2013	0.4209	24.2013	0.3995	24.2013	0.3836
25.3536	0.7893	25.3536	0.4648	25.3536	0.4175	25.3536	0.405	25.3536	0.4012	25.3536	0.3926	25.3536	0.3817
26.5609	0.7893	26.5609	0.4648	26.5609	0.4175	26.5609	0.3899	26.5609	0.38	26.5609	0.3779	26.5609	0.3729
27.8256	0.4998	27.8256	0.4141	27.8256	0.3879	27.8256	0.3762	27.8256	0.3726	27.8256	0.3682	27.8256	0.3643
29.1505	0.4217	29.1505	0.3866	29.1505	0.3763	29.1505	0.3678	29.1505	0.3612	29.1505	0.3558	29.1505	0.3554
30.5386	0.4217	30.5386	0.3633	30.5386	0.3554	30.5386	0.3517	30.5386	0.3499	30.5386	0.3485	30.5386	0.348
31.9927	0.3545	31.9927	0.3404	31.9927	0.3386	31.9927	0.3376	31.9927	0.3374	31.9927	0.3399	31.9927	0.3417
33.516	0.3442	33.516	0.3404	33.516	0.3386	33.516	0.3376	33.516	0.3371	33.516	0.3365	33.516	0.3379
35.1119	0.3392	35.1119	0.3385	35.1119	0.338	35.1119	0.3376	35.1119	0.3371	35.1119	0.3365	35.1119	0.3359
36.7838	0.3368	36.7838	0.3366	36.7838	0.3364	36.7838	0.3362	36.7838	0.336	36.7838	0.3356	36.7838	0.3352
38.5353	0.3351	38.5353	0.335	38.5353	0.3349	38.5353	0.3348	38.5353	0.3347	38.5353	0.3345	38.5353	0.3343
40.3702	0.3338	40.3702	0.3337	40.3702	0.3336	40.3702	0.3336	40.3702	0.3336	40.3702	0.3334	40.3702	0.3333
42.2924	0.3326	42.2924	0.3326	42.2924	0.3325	42.2924	0.3325	42.2924	0.3325	42.2924	0.3324	42.2924	0.3323
44.3062	0.3316	44.3062	0.3316	44.3062	0.3316	44.3062	0.3316	44.3062	0.3315	44.3062	0.3315	44.3062	0.3315
46.4159	0.3307	46.4159	0.3307	46.4159	0.3307	46.4159	0.3307	46.4159	0.3307	46.4159	0.3307	46.4159	0.3307
48.626	0.3299	48.626	0.3299	48.626	0.3299	48.626	0.3299	48.626	0.3299	48.626	0.3299	48.626	0.3299
50.9414	0.3291	50.9414	0.3291	50.9414	0.3291	50.9414	0.3291	50.9414	0.3291	50.9414	0.3291	50.9414	0.3292

PTWW041.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 41 – SLAB-WALL JOINT North-South Responses – Elevation 54 Ft. – Line 30 B

Damping	0.50%-		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.1098	0.0404	0.1098	0.0365	0.1098	0.0342	0.1098	0.0321	0.1098	0.0303	0.1098	0.0271	0.1098	0.0235
0.115	0.0404	0.115	0.0365	0.115	0.0342	0.115	0.0321	0.115	0.0303	0.115	0.0271	0.115	0.0256
0.1204	0.0404	0.1204	0.0365	0.1204	0.0342	0.1204	0.0321	0.1204	0.0309	0.1204	0.0295	0.1204	0.0277
0.1262	0.0404	0.1262	0.0365	0.1262	0.0351	0.1262	0.0342	0.1262	0.0332	0.1262	0.0315	0.1262	0.0295
0.1322	0.0404	0.1322	0.0381	0.1322	0.0369	0.1322	0.0357	0.1322	0.0347	0.1322	0.0331	0.1322	0.0315
0.1385	0.0409	0.1385	0.039	0.1385	0.0379	0.1385	0.037	0.1385	0.0361	0.1385	0.0346	0.1385	0.0327
0.1451	0.0416	0.1451	0.0397	0.1451	0.0386	0.1451	0.0376	0.1451	0.0367	0.1451	0.0352	0.1451	0.0332
0.152	0.0439	0.152	0.0401	0.152	0.0386	0.152	0.0378	0.152	0.0367	0.152	0.0352	0.152	0.0332
0.1592	0.0462	0.1592	0.0416	0.1592	0.0395	0.1592	0.0376	0.1592	0.0367	0.1592	0.0352	0.1592	0.0332
0.1668	0.0584	0.1668	0.0505	0.1668	0.0462	0.1668	0.0426	0.1668	0.0394	0.1668	0.0352	0.1668	0.0332
0.1748	0.0644	0.1748	0.0566	0.1748	0.0521	0.1748	0.0483	0.1748	0.045	0.1748	0.0394	0.1748	0.0332
0.1831	0.0667	0.1831	0.0582	0.1831	0.0541	0.1831	0.0504	0.1831	0.047	0.1831	0.0414	0.1831	0.0353
0.1918	0.0678	0.1918	0.0585	0.1918	0.0542	0.1918	0.0506	0.1918	0.0473	0.1918	0.0417	0.1918	0.0379
0.2009	0.0697	0.2009	0.0595	0.2009	0.0542	0.2009	0.0511	0.2009	0.0484	0.2009	0.0434	0.2009	0.041
0.2105	0.0721	0.2105	0.0618	0.2105	0.0579	0.2105	0.0545	0.2105	0.0514	0.2105	0.0481	0.2105	0.0444
0.2205	0.0818	0.2205	0.0709	0.2205	0.0651	0.2205	0.0599	0.2205	0.0573	0.2205	0.053	0.2205	0.0474
0.231	0.0958	0.231	0.0791	0.231	0.0703	0.231	0.0666	0.231	0.0631	0.231	0.0572	0.231	0.0519
0.242	0.098	0.242	0.0843	0.242	0.0773	0.242	0.0714	0.242	0.0675	0.242	0.0613	0.242	0.0546
0.2535	0.1056	0.2535	0.091	0.2535	0.083	0.2535	0.0759	0.2535	0.0699	0.2535	0.0613	0.2535	0.0546
0.2656	0.1138	0.2656	0.0945	0.2656	0.0842	0.2656	0.0759	0.2656	0.0699	0.2656	0.0613	0.2656	0.0546
0.2783	0.1138	0.2783	0.0945	0.2783	0.0842	0.2783	0.0778	0.2783	0.0737	0.2783	0.067	0.2783	0.06
0.2915	0.1138	0.2915	0.1001	0.2915	0.0939	0.2915	0.0884	0.2915	0.0835	0.2915	0.0753	0.2915	0.0664
0.3054	0.1172	0.3054	0.1049	0.3054	0.0979	0.3054	0.0918	0.3054	0.0864	0.3054	0.0776	0.3054	0.0687
0.3199	0.1172	0.3199	0.1049	0.3199	0.0979	0.3199	0.0918	0.3199	0.0881	0.3199	0.0829	0.3199	0.0766
0.3352	0.1172	0.3352	0.1085	0.3352	0.1042	0.3352	0.1003	0.3352	0.0967	0.3352	0.0904	0.3352	0.083
0.3511	0.1645	0.3511	0.128	0.3511	0.1118	0.3511	0.1081	0.3511	0.102	0.3511	0.095	0.3511	0.0868
0.3678	0.2408	0.3678	0.1827	0.3678	0.1561	0.3678	0.1359	0.3678	0.1205	0.3678	0.0995	0.3678	0.0869
0.3853	0.2539	0.3853	0.1862	0.3853	0.1588	0.3853	0.138	0.3853	0.1255	0.3853	0.1079	0.3853	0.0897
0.4037	0.2539	0.4037	0.1862	0.4037	0.1588	0.4037	0.138	0.4037	0.1261	0.4037	0.1142	0.4037	0.102
0.4229	0.2539	0.4229	0.1862	0.4229	0.1641	0.4229	0.1478	0.4229	0.1338	0.4229	0.122	0.4229	0.1107
0.4431	0.3276	0.4431	0.2318	0.4431	0.2019	0.4431	0.1796	0.4431	0.1626	0.4431	0.1389	0.4431	0.1174
0.4642	0.3276	0.4642	0.2318	0.4642	0.2019	0.4642	0.1796	0.4642	0.1626	0.4642	0.1389	0.4642	0.1174
0.4863	0.3276	0.4863	0.2318	0.4863	0.2019	0.4863	0.1796	0.4863	0.1626	0.4863	0.1415	0.4863	0.1242
0.5094	0.3276	0.5094	0.2318	0.5094	0.2019	0.5094	0.1796	0.5094	0.1626	0.5094	0.1475	0.5094	0.1293
0.5337	0.3338	0.5337	0.2366	0.5337	0.2061	0.5337	0.1882	0.5337	0.1776	0.5337	0.1596	0.5337	0.1387
0.5591	0.3945	0.5591	0.2731	0.5591	0.2401	0.5591	0.2143	0.5591	0.1954	0.5591	0.171	0.5591	0.1533
0.5857	0.3945	0.5857	0.2819	0.5857	0.2531	0.5857	0.229	0.5857	0.2088	0.5857	0.1825	0.5857	0.1694

PTWW041.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 41 – SLAB-WALL JOINT North-South Responses ~ Elevation 54 Ft. – Line 30 B

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.6136	0.3945	0.6136	0.2819	0.6136	0.2531	0.6136	0.229	0.6136	0.2088	0.6136	0.1962	0.6136	0.1818
0.6428	0.3945	0.6428	0.2819	0.6428	0.2531	0.6428	0.229	0.6428	0.2176	0.6428	0.2071	0.6428	0.1923
0.6734	0.4051	0.6734	0.2819	0.6734	0.2545	0.6734	0.2401	0.6734	0.2329	0.6734	0.2199	0.6734	0.2038
0.7055	0.4051	0.7055	0.2964	0.7055	0.271	0.7055	0.2595	0.7055	0.2495	0.7055	0.2325	0.7055	0.2132
0.7391	0.6253	0.7391	0.4092	0.7391	0.3339	0.7391	0.2852	0.7391	0.2678	0.7391	0.2386	0.7391	0.2148
0.7743	0.6253	0.7743	0.4092	0.7743	0.3339	0.7743	0.2977	0.7743	0.2799	0.7743	0.2506	0.7743	0.2178
0.8111	0.6459	0.8111	0.4284	0.8111	0.373	0.8111	0.3304	0.8111	0.2973	0.8111	0.2507	0.8111	0.2178
0.8497	0.6459	0.8497	0.4295	0.8497	0.3929	0.8497	0.3623	0.8497	0.3363	0.8497	0.2936	0.8497	0.2475
0.8902	0.6685	0.8902	0.436	0.8902	0.3929	0.8902	0.3623	0.8902	0.3395	0.8902	0.3086	0.8902	0.2662
0.9326	0.715	0.9326	0.5019	0.9326	0.4411	0.9326	0.3968	0.9326	0.3633	0.9326	0.3158	0.9326	0.2706
0.977	0.9571	0.977	0.6109	0.977	0.5027	0.977	0.4349	0.977	0.3889	0.977	0.3313	0.977	0.2835
1.0235	0.9571	1.0235	0.6109	1.0235	0.5406	1.0236	0.4899	1.0235	0.4478	1.0235	0.3835	1.0235	0.3191
1.0723	0.9571	1.0723	0.629	1.0723	0.5623	1.0723	0.5069	1.0723	0.4603	1.0723	0.3954	1.0723	0.3351
1.1233	1.2112	1.1233	0.8095	1.1233	0.677	1.1233	0.5824	1.1233	0.5124	1.1233	0.4175	1.1233	0.3358
1.1768	1.2112	1.1768	0.8095	1.1768	0.877	1.1768	0.5824	1.1768	0.5124	1.1768	0.42	1.1768	0.3616
1.2328	1.2112	1.2328	0.8776	1.2328	0.7698	1.2328	0.6846	1.2328	0.6149	1.2328	0.5095	1.2328	0.4049
1.2916	1.2112	1.2916	0.9725	1.2916	0.8448	1.2916	0.7451	1.2916	0.6651	1.2916	0.5458	1.2916	0.4303
1.353	1.2406	1.353	0.9725	1.353	0.8448	1.353	0.7451	1.353	0.6651	1.353	0.5458	1.353	0.4328
1.4175	1.4927	1.4175	1.0398	1.4175	0.8977	1.4175	0.7987	1.4175	0.7236	1.4175	0.6126	1.4175	0.5041
1.485	1.4927	1.485	1.0398	1.485	0.8977	1.485	0.8136	1.485	0.7581	1.485	0.6601	1.485	0.5488
1.5557	1.7257	1.5557	1.093	1.5557	0.9164	1.5557	0.8185	1.5557	0.7581	1.5557	0.6679	1.5557	0.5679
1.6298	1.7649	1.6298	1.1715	1.6298	1.0429	1.6298	0.9398	1.6298	0.8509	1.6298	0.7168	1.6298	0.5845
1.7074	1.7649	1.7074	1.1911	1.7074	1.1181	1.7074	1.0082	1.7074	0.9156	1.7074	0.7654	1.7074	0.6266
1.7887	2.1543	1.7887	1.1911	1.7887	1.1181	1.7887	1.0082	1.7887	0.9156	1.7887	0.7791	1.7887	0.663
1.8738	2.1543	1.8738	1.1911	1.8738	1.1181	1.8738	1.0082	1.8738	0.9156	1.8738	0.8133	1.8738	0.691
1.963	2.1543	1.963	1.1911	1.963	1.1181	1.963	1.0086	1.963	0.9459	1.963	0.8387	1.963	0.7107
2.0565	2.1543	2.0565	1.1911	2.0565	1.1181	2.0565	1.0239	2.0565	0.9641	2.0565	0.8545	2.0565	0.7208
2.1544	2.1543	2.1544	1.1911	2.1544	1.1641	2.1544	1.0719	2.1544	0.993	2.1544	0.8646	2.1544	0.7434
2.257	1.9859	2.257	1.2401	2.257	1.1641	2.257	1.0719	2.257	0.993	2.257	0.8753	2.257	0.7534
2.3645	1.9859	2.3645	1.2401	2.3645	1.1641	2.3645	1.0719	2.3645	0.993	2.3645	0.8753	2.3645	0.7534
2.4771	1.9859	2.4771	1.3882	2.4771	1.1641	2.4771	1.0719	2.4771	0.993	2.4771	0.8753	2.4771	0.7534
2.595	1.838	2.595	1.3882	2.595	1.1641	2.595	1.0719	2.595	0.993	2.595	0.8753	2.595	0.7534
2.7186	1.838	2.7186	1.3882	2.7186	1.1614	2.7186	1.0549	2.7186	0.9795	2.7186	0.8753	2.7186	0.7534
2.848	1.838	2.848	1.3882	2.848	1.1614	2.848	1.0498	2.848	0.9795	2.848	0.8675	2.848	0.7386
2.9836	1.838	2.9836	1.3882	2.9836	1.1614	2.9836	1.0498	2.9836	0.9618	2.9836	0.8311	2.9836	0.6992
3.1257	1.838	3.1257	1.1633	3.1257	0.9244	3.1257	0.8554	3.1257	0.8062	3.1257	0.728	3.1257	0.6368
3.2745	1.7993	3.2745	1.0437	3.2745	0.8857	3.2745	0.7926	3.2745	0.7237	3.2745	0.6347	3.2745	0.5767
3.4305	1.2506	3.4305	0.8608	3.4305	0.774	3.4305	0.7077	3.4305	0.6696	3.4305	0.5994	3.4305	0.5377

PTWW041.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 41 ~ SLAB-WALL JOINT North-South Responses ~ Elevation 54 Ft. ~ Line 30 B

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
3.5938	1.2506	3.5938	0.826	3.5938	0.7467	3.5938	0.6903	3.5938	0.6397	3.5938	0.5691	3.5938	0.503
3.7649	1.2506	3.7649	0.8108	3.7649	0.7467	3.7649	0.6903	3.7649	0.6397	3.7649	0.5581	3.7649	0.4924
3.9442	1.2506	3.9442	0.7736	3.9442	0.7467	3.9442	0.6903	3.9442	0.6397	3.9442	0.5581	3.9442	0.4924
4.132	1.2506	4.132	0.7736	4.132	0.7467	4.132	0.6903	4.132	0.6397	4.132	0.5581	4.132	0.4924
4.3288	1.2506	4.3288	0.7736	4.3288	0.7467	4.3288	0.6903	4.3288	0.6397	4.3288	0.5581	4.3288	0.4759
4.5349	1.2506	4.5349	0.7736	4.5349	0.7467	4.5349	0.6903	4.5349	0.6397	4.5349	0.5581	4.5349	0.4759
4.7508	1.2506	4.7508	0.7736	4.7508	0.7467	4.7508	0.6903	4.7508	0.6397	4.7508	0.5581	4.7508	0.4759
4.977	1.2506	4.977	0.7736	4.977	0.7467	4.977	0.6903	4.977	0.6397	4.977	0.5581	4.977	0.4759
5.214	1.2506	5.214	0.7736	5.214	0.7467	5.214	0.6903	5.214	0.6397	5.214	0.5581	5.214	0.4759
5.4623	1.2506	5.4623	0.7736	5.4623	0.7467	5.4623	0.6903	5.4623	0.6397	5.4623	0.5581	5.4623	0.4759
5.7224	1.3691	5.7224	0.7736	5.7224	0.7467	5.7224	0.6903	5.7224	0.6397	5.7224	0.5581	5.7224	0.4759
5.9948	1.3691	5.9948	0.7736	5.9948	0.7467	5.9948	0.6903	5.9948	0.6397	5.9948	0.5581	5.9948	0.4759
6.2803	1.3691	6.2803	0.7736	6.2803	0.7467	6.2803	0.6903	6.2803	0.6397	6.2803	0.5581	6.2803	0.4759
6.5793	1.3691	6.5793	0.7736	6.5793	0.6755	6.5793	0.6357	6.5793	0.6231	6.5793	0.5476	6.5793	0.4759
6.8926	1.3691	6.8926	0.7736	6.8926	0.6755	6.8926	0.6357	6.8926	0.6231	6.8926	0.5452	6.8926	0.4683
7.2208	1.3691	7.2208	0.7253	7.2208	0.6201	7.2208	0.5644	7.2208	0.5427	7.2208	0.503	7.2208	0.4505
7.5646	1.3691	7.5646	0.7085	7.5646	0.6004	7.5646	0.5644	7.5646	0.5365	7.5646	0.4909	7.5646	0.436
7.9248	1.3691	7.9248	0.6416	7.9248	0.5698	7.9248	0.5335	7.9248	0.509	7.9248	0.4859	7.9248	0.4264
8.3022	1.3691	8.3022	0.6416	8.3022	0.556	8.3022	0.5083	8.3022	0.486	8.3022	0.454	8.3022	0.4264
8.6975	1.0067	8.6975	0.5785	8.6975	0.5365	8.6975	0.5083	8.6975	0.486	8.6975	0.454	8.6975	0.4229
9.1116	1.0067	9.1116	0.5785	9.1116	0.5203	9.1116	0.4813	9.1116	0.4686	9.1116	0.4364	9.1116	0.4147
9.5455	1.0067	9.5455	0.5785	9.5455	0.5203	9.5455	0.4913	9.5455	0.4686	9.5455	0.4364	9.5455	0.4101
10	0.7958	10	0.5553	10	0.5203	10	0.4913	10	0.4686	10	0.4364	10	0.4073
10.4762	0.7386	10.4762	0.4651	10.4762	0.4518	10.4762	0.4415	10.4762	0.4329	10.4762	0.4181	10.4762	0.3995
10.975	0.5938	10.975	0.4522	10.975	0.4338	10.975	0.4223	10.975	0.4154	10.975	0.4045	10.975	0.3897
11.4976	0.5139	11.4976	0.4522	11.4976	0.4338	11.4976	0.422	11.4976	0.4137	11.4976	0.4011	11.4976	0.3868
12.045	0.5	12.045	0.4195	12.045	0.4106	12.045	0.4049	12.045	0.4002	12.045	0.3914	12.045	0.3794
12.6186	0.5	12.6186	0.4087	12.6186	0.4008	12.6186	0.3948	12.6186	0.3897	12.6186	0.3812	12.6186	0.3708
13.2194	0.5	13.2194	0.3855	13.2194	0.3801	13.2194	0.3771	13.2194	0.3744	13.2194	0.3688	13.2194	0.3604
13.8489	0.5	13.8489	0.3777	13.8489	0.3691	13.8489	0.3663	13.8489	0.3634	13.8489	0.3575	13.8489	0.3497
14.5083	0.5	14.5083	0.3777	14.5083	0.3639	14.5083	0.3557	14.5083	0.3504	14.5083	0.3441	14.5083	0.3379
15.1991	0.5	15.1991	0.3523	15.1991	0.3413	15.1991	0.3407	15.1991	0.3396	15.1991	0.3366	15.1991	0.3315
15.9228	0.5	15.9228	0.3523	15.9228	0.3412	15.9228	0.3382	15.9228	0.3365	15.9228	0.3326	15.9228	0.3271
16.681	0.5	16.681	0.3523	16.681	0.3412	16.681	0.3355	16.681	0.3317	16.681	0.3266	16.681	0.3214
17.4753	0.5	17.4753	0.3351	17.4753	0.325	17.4753	0.321	17.4753	0.319	17.4753	0.3167	17.4753	0.3142
18.3074	0.5	18.3074	0.3274	18.3074	0.315	18.3074	0.3103	18.3074	0.3078	18.3074	0.3085	18.3074	0.3079
19.1791	0.5	19.1791	0.3274	19.1791	0.315	19.1791	0.3103	19.1791	0.3078	19.1791	0.3055	19.1791	0.3039
20.0923	0.5	20.0923	0.3274	20.0923	0.308	20.0923	0.3058	20.0923	0.3038	20.0923	0.302	20.0923	0.3007

PTWW041.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 41 – SLAB-WALL JOINT North-South Responses – Elevation 54 Ft. – Line 30 B

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
21.049	0.5	21.049	0.3274	21.049	0.308	21.049	0.3058	21.049	0.3038	21.049	0.3009	21.049	0.2981
22.0513	0.5	22.0513	0.3274	22.0513	0.304	22.0513	0.3018	22.0513	0.3	22.0513	0.2973	22.0513	0.2949
23.1013	0.3991	23.1013	0.3036	23.1013	0.2994	23.1013	0.297	23.1013	0.2955	23.1013	0.2936	23.1013	0.2918
24.2013	0.3991	24.2013	0.3007	24.2013	0.294	24.2013	0.2912	24.2013	0.2902	24.2013	0.2896	24.2013	0.2887
25.3536	0.3991	25.3536	0.3007	25.3536	0.294	25.3536	0.2912	25.3536	0.2902	25.3536	0.2886	25.3536	0.2871
26.5609	0.3991	26.5609	0.3007	26.5609	0.294	26.5609	0.2907	26.5609	0.2888	26.5609	0.2868	26.5609	0.2852
27.8256	0.3991	27.8256	0.2989	27.8256	0.2931	27.8256	0.2896	27.8256	0.2872	27.8256	0.2843	27.8256	0.2831
29.1505	0.3991	29.1505	0.2989	29.1505	0.2931	29.1505	0.2896	29.1505	0.2872	29.1505	0.2843	29.1505	0.282
30.5386	0.3399	30.5386	0.2901	30.5386	0.2875	30.5386	0.2855	30.5386	0.284	30.5386	0.2817	30.5386	0.2798
31.9927	0.2956	31.9927	0.2753	31.9927	0.2743	31.9927	0.2755	31.9927	0.2761	31.9927	0.2765	31.9927	0.2762
33.516	0.2753	33.516	0.2729	33.516	0.2727	33.516	0.2728	33.516	0.2729	33.516	0.2732	33.516	0.2734
35.1119	0.2708	35.1119	0.2709	35.1119	0.271	35.1119	0.2711	35.1119	0.2711	35.1119	0.2712	35.1119	0.2714
36.7838	0.2688	36.7838	0.2691	36.7838	0.2692	36.7838	0.2693	36.7838	0.2694	36.7838	0.2696	36.7838	0.2697
38.5353	0.2675	38.5353	0.2677	38.5353	0.2679	38.5353	0.268	38.5353	0.268	38.5353	0.2682	38.5353	0.2684
40.3702	0.2666	40.3702	0.2668	40.3702	0.2669	40.3702	0.2669	40.3702	0.267	40.3702	0.2672	40.3702	0.2673
42.2924	0.2659	42.2924	0.266	42.2924	0.2661	42.2924	0.2661	42.2924	0.2662	42.2924	0.2663	42.2924	0.2664
44.3062	0.2653	44.3062	0.2654	44.3062	0.2654	44.3062	0.2654	44.3062	0.2655	44.3062	0.2655	44.3062	0.2657
46.4159	0.2648	46.4159	0.2648	46.4159	0.2648	46.4159	0.2648	46.4159	0.2648	46.4159	0.2649	46.4159	0.265
48.626	0.2643	48.626	0.2643	48.626	0.2643	48.626	0.2643	48.626	0.2643	48.626	0.2643	48.626	0.2644
50.9414	0.2638	50.9414	0.2638	50.9414	0.2638	50.9414	0.2638	50.9414	0.2638	50.9414	0.2638	50.9414	0.2638

PTWW115.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 115 – SLAB ONLY Vertical Responses – Elevation 56 ft. – EL56_C-E-17-20

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.1098	0.0291	0.1098	0.026	0.1098	0.0244	0.1098	0.023	0.1098	0.0221	0.1098	0.0214	0.1098	0.0205
0.115	0.0309	0.115	0.026	0.115	0.0244	0.115	0.0234	0.115	0.023	0.115	0.0222	0.115	0.0212
0.1204	0.0313	0.1204	0.0263	0.1204	0.0246	0.1204	0.0241	0.1204	0.0236	0.1204	0.0228	0.1204	0.0218
0.1262	0.0313	0.1262	0.0269	0.1262	0.0257	0.1262	0.0245	0.1262	0.024	0.1262	0.0233	0.1262	0.0224
0.1322	0.0313	0.1322	0.0271	0.1322	0.0258	0.1322	0.0248	0.1322	0.0244	0.1322	0.0236	0.1322	0.0226
0.1385	0.0313	0.1385	0.0277	0.1385	0.0265	0.1385	0.0255	0.1385	0.0246	0.1385	0.0236	0.1385	0.0226
0.1451	0.0316	0.1451	0.0295	0.1451	0.0283	0.1451	0.0271	0.1451	0.0261	0.1451	0.0241	0.1451	0.0226
0.152	0.032	0.152	0.0299	0.152	0.0286	0.152	0.0274	0.152	0.0262	0.152	0.0241	0.152	0.0226
0.1592	0.033	0.1592	0.0311	0.1592	0.0299	0.1592	0.0288	0.1592	0.0278	0.1592	0.0261	0.1592	0.0243
0.1668	0.0367	0.1668	0.0323	0.1668	0.0312	0.1668	0.0302	0.1668	0.0293	0.1668	0.0277	0.1668	0.0257
0.1748	0.0507	0.1748	0.0427	0.1748	0.0385	0.1748	0.035	0.1748	0.0321	0.1748	0.0285	0.1748	0.0265
0.1831	0.0586	0.1831	0.0493	0.1831	0.0442	0.1831	0.0399	0.1831	0.0362	0.1831	0.0305	0.1831	0.0288
0.1918	0.0586	0.1918	0.0493	0.1918	0.0442	0.1918	0.0399	0.1918	0.0362	0.1918	0.0305	0.1918	0.0269
0.2009	0.0586	0.2009	0.0493	0.2009	0.0442	0.2009	0.0399	0.2009	0.0362	0.2009	0.0326	0.2009	0.0299
0.2105	0.0586	0.2105	0.0493	0.2105	0.0442	0.2105	0.0401	0.2105	0.0386	0.2105	0.0361	0.2105	0.0327
0.2205	0.0586	0.2205	0.0493	0.2205	0.0454	0.2205	0.0427	0.2205	0.0409	0.2205	0.038	0.2205	0.0341
0.231	0.0586	0.231	0.0493	0.231	0.0457	0.231	0.0438	0.231	0.042	0.231	0.0388	0.231	0.0354
0.242	0.0586	0.242	0.0509	0.242	0.0486	0.242	0.0465	0.242	0.0445	0.242	0.041	0.242	0.0368
0.2535	0.0649	0.2535	0.0574	0.2535	0.0531	0.2535	0.0491	0.2535	0.0457	0.2535	0.041	0.2535	0.0371
0.2656	0.0731	0.2656	0.0586	0.2656	0.0536	0.2656	0.0491	0.2656	0.0457	0.2656	0.0424	0.2656	0.0401
0.2783	0.0817	0.2783	0.0599	0.2783	0.0536	0.2783	0.05	0.2783	0.0484	0.2783	0.0458	0.2783	0.0425
0.2915	0.0817	0.2915	0.0618	0.2915	0.0581	0.2915	0.0547	0.2915	0.0516	0.2915	0.0479	0.2915	0.0436
0.3054	0.0817	0.3054	0.0663	0.3054	0.0622	0.3054	0.0585	0.3054	0.0551	0.3054	0.0492	0.3054	0.045
0.3199	0.0817	0.3199	0.0701	0.3199	0.0659	0.3199	0.0623	0.3199	0.0589	0.3199	0.0536	0.3199	0.0474
0.3352	0.0873	0.3352	0.0767	0.3352	0.0709	0.3352	0.0662	0.3352	0.0629	0.3352	0.0571	0.3352	0.0501
0.3511	0.0906	0.3511	0.0806	0.3511	0.0749	0.3511	0.0698	0.3511	0.0653	0.3511	0.0577	0.3511	0.0502
0.3678	0.1215	0.3678	0.095	0.3678	0.0823	0.3678	0.0722	0.3678	0.0653	0.3678	0.0577	0.3678	0.0502
0.3853	0.1361	0.3853	0.1057	0.3853	0.0919	0.3853	0.0808	0.3853	0.0718	0.3853	0.0587	0.3853	0.0505
0.4037	0.1361	0.4037	0.1057	0.4037	0.0919	0.4037	0.0821	0.4037	0.0762	0.4037	0.0664	0.4037	0.0568
0.4229	0.1361	0.4229	0.1057	0.4229	0.0919	0.4229	0.0852	0.4229	0.0801	0.4229	0.0711	0.4229	0.0615
0.4431	0.1361	0.4431	0.1057	0.4431	0.0935	0.4431	0.0889	0.4431	0.0843	0.4431	0.0761	0.4431	0.0657
0.4642	0.1373	0.4642	0.1057	0.4642	0.0976	0.4642	0.0916	0.4642	0.086	0.4642	0.0763	0.4642	0.0674
0.4863	0.1479	0.4863	0.1238	0.4863	0.1108	0.4863	0.0997	0.4863	0.0904	0.4863	0.0827	0.4863	0.0733
0.5094	0.1814	0.5094	0.1384	0.5094	0.1218	0.5094	0.1085	0.5094	0.0977	0.5094	0.0867	0.5094	0.0754

PTWW115.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 115 ~ SLAB ONLY Vertical Responses ~ Elevation 56 ft. ~ EL56_C-E-17-20

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.5337	0.2216	0.5337	0.1605	0.5337	0.1343	0.5337	0.1149	0.5337	0.1023	0.5337	0.0867	0.5337	0.0754
0.5591	0.2216	0.5591	0.1605	0.5591	0.1343	0.5591	0.1149	0.5591	0.1023	0.5591	0.088	0.5591	0.0754
0.5857	0.2216	0.5857	0.1605	0.5857	0.1343	0.5857	0.1149	0.5857	0.1023	0.5857	0.0937	0.5857	0.0821
0.6136	0.2216	0.6136	0.1605	0.6136	0.1343	0.6136	0.1178	0.6136	0.1111	0.6136	0.1003	0.6136	0.0874
0.6428	0.2257	0.6428	0.1621	0.6428	0.1356	0.6428	0.1179	0.6428	0.1131	0.6428	0.103	0.6428	0.0901
0.6734	0.2257	0.6734	0.1621	0.6734	0.1389	0.6734	0.1291	0.6734	0.1211	0.6734	0.1084	0.6734	0.0936
0.7055	0.2257	0.7055	0.1621	0.7055	0.1389	0.7055	0.1291	0.7055	0.1211	0.7055	0.1095	0.7055	0.0952
0.7391	0.2257	0.7391	0.1621	0.7391	0.1413	0.7391	0.1328	0.7391	0.1244	0.7391	0.1097	0.7391	0.0952
0.7743	0.3175	0.7743	0.2132	0.7743	0.1805	0.7743	0.1581	0.7743	0.1421	0.7743	0.1211	0.7743	0.1032
0.8111	0.3175	0.8111	0.2132	0.8111	0.1805	0.8111	0.1581	0.8111	0.1421	0.8111	0.1211	0.8111	0.1065
0.8497	0.3175	0.8497	0.2132	0.8497	0.1805	0.8497	0.166	0.8497	0.1535	0.8497	0.134	0.8497	0.1129
0.8902	0.3175	0.8902	0.2132	0.8902	0.1869	0.8902	0.1713	0.8902	0.1583	0.8902	0.1378	0.8902	0.1175
0.9326	0.4866	0.9326	0.2993	0.9326	0.2464	0.9326	0.215	0.9326	0.1926	0.9326	0.1632	0.9326	0.1377
0.977	0.4866	0.977	0.2993	0.977	0.2464	0.977	0.215	0.977	0.1926	0.977	0.1712	0.977	0.1493
1.0235	0.4866	1.0235	0.2993	1.0235	0.2464	1.0235	0.215	1.0235	0.1926	1.0235	0.1775	1.0235	0.1586
1.0723	0.4866	1.0723	0.2993	1.0723	0.2574	1.0723	0.2363	1.0723	0.2193	1.0723	0.1933	1.0723	0.1665
1.1233	0.5744	1.1233	0.3387	1.1233	0.2663	1.1233	0.2363	1.1233	0.2193	1.1233	0.1933	1.1233	0.1665
1.1768	0.5744	1.1768	0.3781	1.1768	0.3127	1.1768	0.2762	1.1768	0.247	1.1768	0.2076	1.1768	0.1828
1.2328	0.5744	1.2328	0.3801	1.2328	0.3429	1.2328	0.3128	1.2328	0.2874	1.2328	0.2483	1.2328	0.2091
1.2916	0.5744	1.2916	0.4124	1.2916	0.3638	1.2916	0.3237	1.2916	0.295	1.2916	0.2539	1.2916	0.2139
1.353	0.6253	1.353	0.4124	1.353	0.3638	1.353	0.3237	1.353	0.3026	1.353	0.2724	1.353	0.2369
1.4175	0.6253	1.4175	0.4124	1.4175	0.3638	1.4175	0.3419	1.4175	0.3245	1.4175	0.2933	1.4175	0.2571
1.485	0.6253	1.485	0.4371	1.485	0.3975	1.485	0.3717	1.485	0.3478	1.485	0.3068	1.485	0.2662
1.5557	0.6253	1.5557	0.456	1.5557	0.426	1.5557	0.3995	1.5557	0.376	1.5557	0.3358	1.5557	0.2867
1.6298	0.7362	1.6298	0.4726	1.6298	0.4349	1.6298	0.4101	1.6298	0.3877	1.6298	0.3499	1.6298	0.3051
1.7074	0.7659	1.7074	0.5983	1.7074	0.5291	1.7074	0.4732	1.7074	0.428	1.7074	0.3634	1.7074	0.3086
1.7887	0.8581	1.7887	0.7092	1.7887	0.635	1.7887	0.5721	1.7887	0.5184	1.7887	0.4408	1.7887	0.3653
1.8738	0.9071	1.8738	0.7382	1.8738	0.6675	1.8738	0.6084	1.8738	0.5648	1.8738	0.4905	1.8738	0.4072
1.963	1.0464	1.963	0.7997	1.963	0.7215	1.963	0.6607	1.963	0.6081	1.963	0.5225	1.963	0.4276
2.0565	1.1387	2.0565	0.8196	2.0565	0.732	2.0565	0.661	2.0565	0.6081	2.0565	0.5225	2.0565	0.4276
2.1544	1.1387	2.1544	0.8196	2.1544	0.732	2.1544	0.661	2.1544	0.6081	2.1544	0.5225	2.1544	0.4276
2.257	1.1387	2.257	0.8196	2.257	0.732	2.257	0.6622	2.257	0.6085	2.257	0.5225	2.257	0.439
2.3645	1.8015	2.3645	0.9555	2.3645	0.7668	2.3645	0.6987	2.3645	0.6389	2.3645	0.5434	2.3645	0.4598
2.4771	2.0921	2.4771	1.1123	2.4771	0.8901	2.4771	0.7484	2.4771	0.6503	2.4771	0.5434	2.4771	0.4618
2.595	2.6286	2.595	1.3049	2.595	0.9786	2.595	0.8001	2.595	0.6919	2.595	0.5515	2.595	0.4636

PTWW115.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 115 – SLAB ONLY Vertical Responses – Elevation 56 ft. – EL56_C-E-17-20

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
2.7186	2.6286	2.7186	1.3049	2.7186	0.9786	2.7186	0.8001	2.7186	0.6919	2.7186	0.5515	2.7186	0.4669
2.848	2.6286	2.848	1.3049	2.848	0.9786	2.848	0.8001	2.848	0.6919	2.848	0.5515	2.848	0.4669
2.9836	2.6286	2.9836	1.3049	2.9836	0.9786	2.9836	0.8001	2.9836	0.6919	2.9836	0.5515	2.9836	0.4669
3.1257	2.6286	3.1257	1.3049	3.1257	0.9786	3.1257	0.8001	3.1257	0.6919	3.1257	0.5515	3.1257	0.4669
3.2745	1.4875	3.2745	0.9429	3.2745	0.7973	3.2745	0.6916	3.2745	0.6178	3.2745	0.5384	3.2745	0.4669
3.4305	1.1706	3.4305	0.7986	3.4305	0.7066	3.4305	0.6392	3.4305	0.589	3.4305	0.5099	3.4305	0.4525
3.5938	1.1706	3.5938	0.7986	3.5938	0.7066	3.5938	0.6392	3.5938	0.589	3.5938	0.5097	3.5938	0.4525
3.7649	1.1706	3.7649	0.7986	3.7649	0.7066	3.7649	0.6392	3.7649	0.589	3.7649	0.5097	3.7649	0.4525
3.9442	1.1706	3.9442	0.7986	3.9442	0.7066	3.9442	0.6392	3.9442	0.589	3.9442	0.5097	3.9442	0.4525
4.132	1.1706	4.132	0.7986	4.132	0.7066	4.132	0.6392	4.132	0.589	4.132	0.5097	4.132	0.4525
4.3288	1.1706	4.3288	0.7986	4.3288	0.7066	4.3288	0.6392	4.3288	0.589	4.3288	0.5097	4.3288	0.4525
4.5349	1.1706	4.5349	0.7986	4.5349	0.7066	4.5349	0.6392	4.5349	0.589	4.5349	0.5097	4.5349	0.4525
4.7508	1.1706	4.7508	0.7986	4.7508	0.7066	4.7508	0.6392	4.7508	0.589	4.7508	0.5097	4.7508	0.4525
4.977	1.1706	4.977	0.7986	4.977	0.7066	4.977	0.6392	4.977	0.589	4.977	0.5097	4.977	0.4525
5.214	1.1706	5.214	0.7986	5.214	0.7066	5.214	0.6392	5.214	0.589	5.214	0.5097	5.214	0.4525
5.4623	1.3551	5.4623	0.7986	5.4623	0.7066	5.4623	0.6392	5.4623	0.589	5.4623	0.5097	5.4623	0.4599
5.7224	1.6638	5.7224	0.9095	5.7224	0.7723	5.7224	0.6766	5.7224	0.6048	5.7224	0.5097	5.7224	0.4637
5.9948	1.6638	5.9948	0.9095	5.9948	0.7723	5.9948	0.6766	5.9948	0.6048	5.9948	0.5097	5.9948	0.4734
6.2803	1.6638	6.2803	0.9095	6.2803	0.7723	6.2803	0.6766	6.2803	0.6048	6.2803	0.5097	6.2803	0.4734
6.5793	1.6638	6.5793	0.9095	6.5793	0.7723	6.5793	0.6766	6.5793	0.6048	6.5793	0.5097	6.5793	0.4734
6.8926	1.6638	6.8926	0.9095	6.8926	0.7723	6.8926	0.6766	6.8926	0.6048	6.8926	0.5097	6.8926	0.4734
7.2208	1.6308	7.2208	0.9095	7.2208	0.7723	7.2208	0.6766	7.2208	0.6048	7.2208	0.5097	7.2208	0.4734
7.5646	1.6308	7.5646	0.9095	7.5646	0.7723	7.5646	0.6766	7.5646	0.6048	7.5646	0.5097	7.5646	0.4734
7.9248	1.6308	7.9248	0.9095	7.9248	0.7723	7.9248	0.6766	7.9248	0.6048	7.9248	0.5097	7.9248	0.4734
8.3022	1.6308	8.3022	0.9095	8.3022	0.7723	8.3022	0.6766	8.3022	0.6048	8.3022	0.5116	8.3022	0.4743
8.6975	1.6308	8.6975	0.9095	8.6975	0.7723	8.6975	0.6766	8.6975	0.6048	8.6975	0.5831	8.6975	0.528
9.1116	1.6308	9.1116	0.9095	9.1116	0.7723	9.1116	0.6822	9.1116	0.665	9.1116	0.6322	9.1116	0.5799
9.5455	1.6308	9.5455	0.9835	9.5455	0.9073	9.5455	0.848	9.5455	0.7987	9.5455	0.7177	9.5455	0.625
10	1.6308	10	1.0819	10	0.9829	10	0.9016	10	0.8346	10	0.7301	10	0.625
10.4762	1.6308	10.4762	1.0819	10.4762	0.9829	10.4762	0.9016	10.4762	0.8346	10.4762	0.7301	10.4762	0.625
10.975	1.6308	10.975	1.0819	10.975	0.9829	10.975	0.9016	10.975	0.8346	10.975	0.7301	10.975	0.6298
11.4976	1.6308	11.4976	1.0819	11.4976	0.9829	11.4976	0.9016	11.4976	0.8378	11.4976	0.7712	11.4976	0.6955
12.045	1.6308	12.045	1.0819	12.045	0.9829	12.045	0.9016	12.045	0.8378	12.045	0.7828	12.045	0.7206
12.6186	1.7655	12.6186	1.0819	12.6186	0.9829	12.6186	0.9016	12.6186	0.8378	12.6186	0.7828	12.6186	0.7274
13.2194	1.7655	13.2194	1.0819	13.2194	0.9829	13.2194	0.9016	13.2194	0.8748	13.2194	0.823	13.2194	0.7439

PTWW115.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 115 – SLAB ONLY Vertical Responses – Elevation 56 ft. – EL56_C-E-17-20

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
13.8489	2.1962	13.8489	1.3794	13.8489	1.2634	13.8489	1.1839	13.8489	1.1151	13.8489	0.9858	13.8489	0.8419
14.5083	3.099	14.5083	1.7518	14.5083	1.6507	14.5083	1.5281	14.5083	1.3976	14.5083	1.2195	14.5083	1.0605
15.1991	5.721	15.1991	3.1594	15.1991	2.5932	15.1991	2.2035	15.1991	1.9756	15.1991	1.5418	15.1991	1.3364
15.9228	7.6802	15.9228	3.9908	15.9228	2.9281	15.9228	2.3497	15.9228	1.998	15.9228	1.5418	15.9228	1.3585
16.681	7.6802	16.681	3.9908	16.681	2.9281	16.681	2.3497	16.681	1.998	16.681	1.5418	16.681	1.3585
17.4753	7.6802	17.4753	3.9908	17.4753	2.9281	17.4753	2.3497	17.4753	1.998	17.4753	1.5418	17.4753	1.3585
18.3074	7.6802	18.3074	3.9908	18.3074	2.9281	18.3074	2.3497	18.3074	1.998	18.3074	1.5418	18.3074	1.3585
19.1791	7.6802	19.1791	3.9908	19.1791	2.9281	19.1791	2.3497	19.1791	1.998	19.1791	1.5418	19.1791	1.3585
20.0923	5.0233	20.0923	2.5698	20.0923	2.2318	20.0923	2.0531	20.0923	1.8683	20.0923	1.5418	20.0923	1.2323
21.049	5.0233	21.049	2.5698	21.049	1.9224	21.049	1.5699	21.049	1.4464	21.049	1.3294	21.049	1.1577
22.0513	5.0233	22.0513	2.5698	22.0513	1.9224	22.0513	1.5699	22.0513	1.3278	22.0513	1.1117	22.0513	1.0269
23.1013	2.3419	23.1013	1.5377	23.1013	1.433	23.1013	1.3325	23.1013	1.2262	23.1013	1.0197	23.1013	0.9065
24.2013	1.5293	24.2013	1.0859	24.2013	1.0006	24.2013	0.9426	24.2013	0.9155	24.2013	0.8472	24.2013	0.7881
25.3536	1.2574	25.3536	0.8767	25.3536	0.8421	25.3536	0.8119	25.3536	0.7853	25.3536	0.7362	25.3536	0.6758
26.5609	1.2574	26.5609	0.8155	26.5609	0.7384	26.5609	0.6923	26.5609	0.6871	26.5609	0.6573	26.5609	0.6403
27.8256	1.2574	27.8256	0.8155	27.8256	0.7384	27.8256	0.6864	27.8256	0.6534	27.8256	0.6229	27.8256	0.6093
29.1505	0.6647	29.1505	0.618	29.1505	0.6094	29.1505	0.5972	29.1505	0.5935	29.1505	0.5904	29.1505	0.5816
30.5386	0.6591	30.5386	0.6039	30.5386	0.5896	30.5386	0.581	30.5386	0.5752	30.5386	0.5671	30.5386	0.5581
31.9927	0.5376	31.9927	0.5492	31.9927	0.5493	31.9927	0.5479	31.9927	0.546	31.9927	0.5418	31.9927	0.5355
33.516	0.5125	33.516	0.5181	33.516	0.5192	33.516	0.5192	33.516	0.5188	33.516	0.5173	33.516	0.5142
35.1119	0.4954	35.1119	0.4964	35.1119	0.4969	35.1119	0.4972	35.1119	0.4973	35.1119	0.4971	35.1119	0.4958
36.7838	0.4806	36.7838	0.481	36.7838	0.4812	36.7838	0.4813	36.7838	0.4814	36.7838	0.4813	36.7838	0.4807
38.5353	0.468	38.5353	0.4683	38.5353	0.4684	38.5353	0.4684	38.5353	0.4685	38.5353	0.4684	38.5353	0.4681
40.3702	0.4573	40.3702	0.4574	40.3702	0.4575	40.3702	0.4575	40.3702	0.4576	40.3702	0.4575	40.3702	0.4574
42.2924	0.4479	42.2924	0.448	42.2924	0.448	42.2924	0.4481	42.2924	0.4481	42.2924	0.4481	42.2924	0.4481
44.3062	0.4396	44.3062	0.4396	44.3062	0.4397	44.3062	0.4397	44.3062	0.4397	44.3062	0.4398	44.3062	0.4398
46.4159	0.4321	46.4159	0.4321	46.4159	0.4322	46.4159	0.4322	46.4159	0.4322	46.4159	0.4323	46.4159	0.4325
48.626	0.4252	48.626	0.4252	48.626	0.4253	48.626	0.4253	48.626	0.4254	48.626	0.4255	48.626	0.4258
50.9414	0.4188	50.9414	0.4188	50.9414	0.4188	50.9414	0.4189	50.9414	0.4189	50.9414	0.4191	50.9414	0.4195

MECHANICAL DATA SHEET

SHELL AND TUBE HEAT EXCHANGER

PLANT ITEM No.
24590-PTF-ME-TLP-COND-00003
Data Sheet No.
24590-PTF-MED-TLP-00003

Project:	RPP-WTP	Description:	Treated LAW Evaporator After-Condenser
Project No:	24590	P&ID:	24590-PTF-M6-TLP-00002
Site:	Hanford	Process Data Sht	N/A
Process flow diagram:	24590-PTF-M5-V17T-00005	Manufacturer Name	Framatome ANP / Graham Manufacturing

R11042837

General Data

Quality Level	Q (9)	TEMA (Class/Type)		B
Seismic Category	SC-I	Flow Type (Counter current, etc)		8 PASS
Design Code	ASME VIII Div 1	Heat Exchanger Duty	Btu/hr	167,838
Code Stamp	Yes	Heat Exchanger Area	ft^2	14.9
NB Registration	Yes	ΔT (LMTD/Corrected LMTD)	°F	111.0

ISSUED BY RPP-WTP PDC

Thermal/Hydraulic Data

		Shell Side		Tube Side	
Fluid Name		IN STEAM	OUT	IN Cooling Water	OUT
Fluid Quantities: Total	lbm/hr	200.4		15,000	
Condensable Vapor (In/Out)		156.7	3.4	N/A	N/A
Liquid		N/A	153.3	15,000	15,000
Noncondensable		43.7	43.7	N/A	N/A
Temperature (In/Out)	°F	4 *	120.0	75.0	4 *
Specific Gravity		N/A	N/A	1.000	0.999
Viscosity	Cp	N/A	N/A	2.209	1.924
Molecular Weight		18.02	18.02	N/A	N/A
Molecular Weight, Noncondensable		29	29	N/A	N/A
Specific Heat	Btu/lbm-°F	N/A	N/A	1.000	0.999
Thermal Conductivity	Btu/hr-ft-°F	N/A	*	0.350	0.356
Latent Heat	Btu/lbm @ °F	N/A		N/A	
Inlet pressure		810.0 Torr		4 *	
Tube side Velocity	ft/s	N/A		3.4	
Pressure Drop (Allowed)		25 mm Hg		0.8 psi	
Fouling Resistance (Min)	$hr\text{-}ft^2\text{-}°F/Btu$	0.0020			

Mechanical Design Data

		Shell Side		Tube Side	
Design Pressure (Max/Min)	psig	50	Full Vacuum	100	Full Vacuum
Design Temperature (Max/Min)	°F	378	0	150	0
Corrosion Allowance	inch	0.04		0.04	
Erosion Allowance	inch	N/A		N/A	
Shell OD / ID		6 5/8"		Overall Dimensions (HxWxL) inch	18 x 11 x 69
Total No. of Tubes		19		Tube OD inch	0.750

Material Data

Shell	SA 312, SA 182 316L SS	Shell Cover	N/A
Channel/Bonnet	SA 312, SA 182, SA 403 316L SS	Channel Cover	316L SS
Tube	SA 213 316L SS (SMLS)	Floating Head Cover	N/A
Stationary Tube Sheet	SA 240 316L SS	Floating Tube Sheet	N/A
Shell Side Gaskets	N/A	Tube Side Gaskets	316 SS Spiral Wound w/ PTFE Filler
Partition Seals	N/A	Baffles/Supports	SA 240 316L SS
Insulation	N/A	Forgings (Shell side)	SA 182 F316L
Bolting	SA 193 B8M & SA 194 2HM	Forgings (Channel)	SA 182 F316L

4

MECHANICAL DATA SHEET

SHELL AND TUBE HEAT EXCHANGER

PLANT ITEM No.
24590-PTF-ME-TLP-COND-00003

Data Sheet No.
24590-PTF-MED-TLP-00003

Construction Data *(To be determined by the supplier when not specified by the buyer)*

Cross Baffle Type	***Up & Over***	% Baffle Cut (Dia.)	---	Spacing (c/c) inch	---
Bypass Seal Arrangement	***N/A***	Longitudinal Seal Type	***N/A***	Expansion Joint Type	***N/A***
Inlet Nozzle ρV^2	---	Bundle Entrance ρV^2	---	Bundle Exit ρV^2	---
Tube Support Type	***Vertical Cut***	U-bend Support Type	***N/A***	Weight of Bundle lbf	*
Operating Weight lbf	***330***	Full of Water lbf	***360***	Empty Wieght lbf	***300***

Notes

**** To be determined by Seller.***

Notes:

(1) All welds are continuous to avoid crevices, weld surface finish is descaled as laid.
(2) Tube to tubesheet joint shall be strength welded.
(3) Graham size 6x4 BEM. 4
(4) Deleted.
4 ***(5) For Nozzle loads, see 24590-PTF-3PS-MEVV-T0001.***
(6) Deleted.
(7) Deleted.
(8) Deleted. 4
(9) Component will be manufactured to Bechtel quality level Q, which corresponds with Vendor quality level QL-2.
(10) Vendor design information is from document 24590-QL-POA-MEVV-00001-02-00056.
(11) Equipment cyclic data is from document 24590-QL-POA-MEVV-00001-04-03.
(12) Contents of this drawing are dangerous waste permit affecting.
(13) The physical design parameters shall be determined by the seller based on TEMA and HEI standards.
(14) Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA),
4 ***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 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.***

(Safety screening/evaluation required? ☒Yes ☐No If yes per 24590-WTP-GPP-SREG-002, E&NS signature required below.)

Rev.	Description	By	Checked	E&NS	Approved	Date
4	Updated to reflect WSGM analysis, 24590-PTF-U0N-W16T-00003 and incorporate DOE AEA note (14). * ADDED TO SHOW VALUES TO BE UPDATED	D. Tate	R. Rickenbach	B. Hall	J. Julyk	2/19/09
3	Updated Quality Level and Incorporated Equipment Qualification Data	R. Rickenbach	E. Le	S. Woolfulk	J. Julyk	07/14/2008
2	Incorporated Vendor Design	E. Le	R. Nowak	N/A	J. Julyk	04/04/2005
1	Updated Description	G. Bull	D. Reinemann	N/A	J. Julyk	03/22/2004
0	Issued for Procurement	E. Le	S. Shah	N/A	J. Julyk	04/30/2003

4

EQUIPMENT QUALIFICATION DATASHEET (EQD)

4

Equipment Identification			
Component Tag Number	24590-PTF-ME-TLP-COND-00003	Safety Classification	☒ SC ☐ SS ☐ APC ☐ SDC ☐ SDS ☐ RRC Note 10 4
Manufacturer / Supplier	UST&D / AREVA NP, INC.		
Requisition Number	24590-QL-POA-MEVV-00001		
Model	N/A	Seismic Category	☒ SC-I ☐ SC-II ☐ SC-III ☐ SC-IV Note 10 4
Description (Include descriptive text [e.g., location, elevation])	Treated LAW Evaporator After-Condensor, room P-0325, Elevation 56'-0"		
Safety Function(s)	Confinement (ref. 1) 4		

Seismic Safety Function	☒ Yes ☐ No	Room Number(s): P-0325	
Maintenance Accessible	☒ Yes ☐ No	Method of Maintenance Access:	☐ Remote ☒ Hands On ☐ None
Seismic Operability Requirements: 4	☐ During Seismic Event 4	☐ After Seismic Event	
ITS Equipment Type:	☒ Passive Mechanical	☐ Active Mechanical	☐ Electrical

Equipment Environmental Qualification (EEQ) 4

Environment ☐ Mild ☒ Harsh Contamination Class: C3 Radiation Class: R3	Hi Rad Service ☐ Yes ☒ No	Design Life (yrs) ☒ 40 ☒ Other 4 Design life to include 7,001,950 normal process expansion cycles.

Parameter Type/Units	Parameter Value	Time Duration (number)	Time Units	WTP Document Number (BUYER)	Submittal Number (SELLER)
Normal					
Normal High Temperature (°F)	95	40	yrs	24590-PTF-U0D-W16T-00001, Note 7	Note 1
Normal Low Temperature (°F)	59	40	yrs	24590-PTF-U0D-W16T-00001, Note 7	Note 1
Normal High Relative Humidity (%RH)	100	40	yrs	24590-PTF-U0D-W16T-00001	Note 1
Normal Low Relative Humidity (%RH)	10	40	yrs	24590-PTF-U0D-W16T-00001	Note 1
Normal High Pressure (in.-w.g.)	0	40	yrs	24590-PTF-U0D-W16T-00001	Note 1
Normal Low Pressure (in. w.g.)	-0.4	40	yrs	24590-PTF-U0D-W16T-00001	Note 1
Normal Radiation Dose Rate (mR/hr)	10	40	yrs	24590-PTF-U0D-W16T-00001	Note 1
Vibration Magnitude (g)	N/A	N/A	N/A	N/A	Note 1
Vibration Frequency (Hz)	N/A	N/A	N/A	N/A	Note 1
Additional Normal Information:	See Note 2 for Pressure Units.				

4

Equipment Environmental Qualification (EEQ) *(continued)*

Parameter Type/Units	Parameter Value	Time Duration (number)	Time units	WTP Document Number (BUYER)	Submittal Number (SELLER)
Abnormal					
Abnormal High Temperature (°F)	126	8	hr/yr	24590-PTF-U0D-W16T-00001, Note 7 & 9 4	Note 1
Abnormal Low Temperature (°F)	59	8	hr/yr	24590-WTP-DB-01-001, Notes 7 & 8	Note 1
Abnormal High Relative Humidity (%RH)	100	24	hr/yr	24590-PTF-U0D-W16T-00001	Note 1
Abnormal Low Relative Humidity (%RH)	2	22	hr/yr	24590-PTF-U0D-W16T-00001, Note 9 4	Note 1
Abnormal High Pressure (in.-w.g.)	4	8	hr/yr	24590-PTF-U0D-W16T-00001	Note 1
Abnormal Low Pressure (in.-w.g.)	-7.3	8	hr/yr	24590-PTF-U0D-W16T-00001	Note 1
Abnormal Radiation Dose Rate (mR/hr)	10 Note 3	0	hr/yr	24590-PTF-U0D-W16T-00001	Note 1
Wet Sprinkler System Present	YES	2	hr 4	24590-PTF-U0D-W16T-00001	Note 1
Additional Abnormal Information	See Note 2 for Pressure Units				
Design Basis Events (DBE)					
DBE High Temperature (°F)	128	1000	hrs	24590-PTF-U0D-W16T-00001, Note 7 & 9 4	Note 1
DBE Low Temperature (°F)	40	1000	hrs	24590-PTF-U0D-W16T-00001, Note 7	Note 1
DBE High Relative Humidity (%RH)	100	482	hrs	24590-PTF-U0D-W16T-00001	Note 1
DBE Low Relative Humidity (%RH)	6	1000	hrs	24590-PTF-U0D-W16T-00001, Note 9 4	Note 1
DBE High Pressure (in.-w.g.)	4	1000	hrs	24590-PTF-U0D-W16T-00001	Note 1
DBE Low Pressure (in.-w.g.)	-7.3	1000	hrs	24590-PTF-U0D-W16T-00001	Note 1
DBE Radiation Dose Rate (mR/hr)	10 Note 3	0	hrs	24590-PTF-U0D-W16T-00001	Note 1
Flood Height (ft)	1.58	1000	hrs	24590-PTF-U0D-W16T-00001	Note 1
Submergence (ft)	0 Note 5	N/A	hrs	24590-PTF-U0D-W16T-00001 24590-QL-POA-MEVV-00001-01-00817 4	Note 1
Chemical/Spray Exposure	YES	12.5	hrs	24590-PTF-U0D-W16T-00001	Note 1
Additional DBE Information	See Note 2 for Pressure Units				

EQUIPMENT QUALIFICATION DATASHEET (EQD)

DBE Chemical Exposure Details	
DBE Chemical Types/Concentrations	Sodium Hydroxide, 5M

Interfaces (Electrical)	
Power Supply Voltage (VAC, VDC)	N/A
Power Supply Frequency (Hz)	N/A
Power Connection Method	N/A
I/O Signals to/from Equipment	N/A
I/O Connection Method	N/A

Interfaces (Mechanical)	
Mounting Configuration (orientation)	See dwg. 24590-QL-POA-MEVV-00001-01-00817
Mounting Method (bolts, welds, etc.)	Anchor Bolts, TLP-SKID-00001, 24590-PTF-DB-S13T-00056
Auxiliary Devices	N/A

Equipment Seismic Qualification (ESQ)

Parameter	Title	Reference/Document Number	Version / Revision	Remarks
WTP Seismic Design Specification (BUYER)	Engineering Specification for Seismic Qualification Criteria for Pressure Vessels	24590-WTP-3PS-MV00-T0002	002	N/A
Specified Seismic Load (BUYER)	Seismic Analysis of Pretreatment Building - WSGM In-Structure Response Spectre (ISRS)	24590-PTF-S0C-S15T-00057	00A	Calculation is not included in MR, see attached figures 37, 38, 40, 41 and 115 per CCN 185267.
Design Seismic Load (SELLER	Calculation - HEP 1 FEP and TLP Condenser Skids Seismic Qualification	24590-QL-POA-MEVV-00001-04-00027	00D	N/A
Qualification Method (SELLER)	Calculation - HEP 1 FEP and TLP Condenser Skids Seismic Qualification	24590-QL-POA-MEVV-00001-04-00027	00D	N/A
Qualification Report Number (SELLER)	Calculation - HEP 1 FEP and TLP Condenser Skids Seismic Qualification	24590-QL-POA-MEVV-00001-04-00027	00D	N/A
Submittal Number (BUYER)	Calculation - HEP 1 FEP and TLP Condenser Skids Seismic Qualification	24590-QL-POA-MEVV-00001-04-00027	00D	N/A

Notes and Additional Information

Notes:

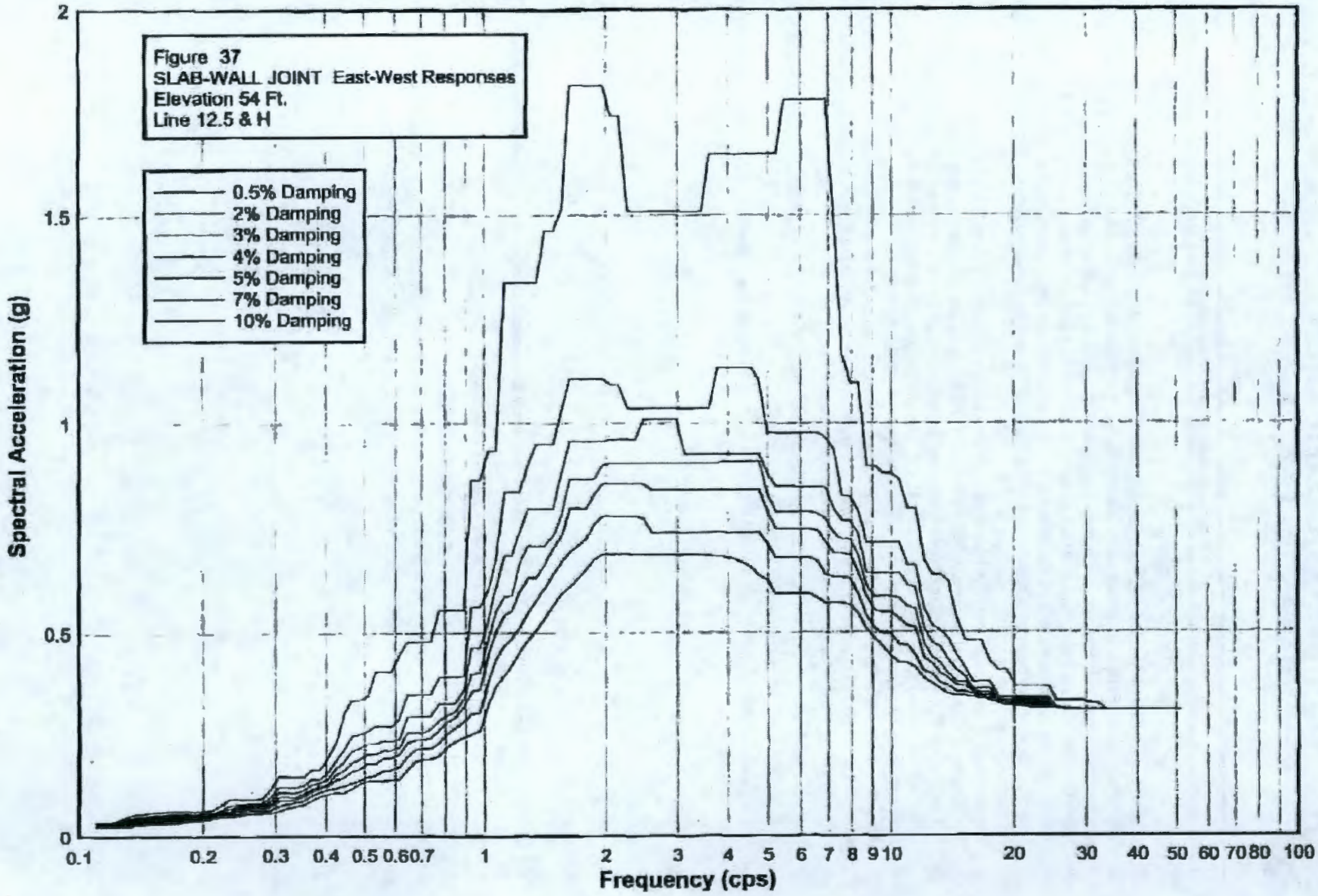
1. Data to be provided by SELLER through the submittal process as required on the G-321-E form.
2. Where pressure is given in inches of water column (in.-w.c.) in the source document, it is generally assumed that this is in reference to atmospheric pressure and is therefore equivalent to inches of water gage (in.-w.g.).
3. Abnormal and DBE radiation dose rates are set equal to normal dose rate and do not contribute to the total integrated dose.
4. The equipment qualification will be documented in accordance with the requirements in Appendix D of Engineering Specification for Environmental Qualification of Mechanical Equipment, document number 24590-WTP-3PS-G000-T0015 for the passive and active safety functions.
5. Submergence is determined from the lowest point of the vessel in relation to the flood height above the floor.
6. Environmental data given document 24590-PTF-U0D-W16T-00001 is for room environment only.
7. For application of AISC N690, the normal temperatures are not used. Abnormal temperatures shall be applied as Normal Operation Temperature, T_D, with seismic effects, E_S. The Design basis event temperature shall be applied as a Thermal Load generated by a postulated accident, T_A, without seismic effects, E_T or E_o.
8. Abnormal low temperature, as calculated in reference 2, is based on a Loss of Heating Accident (LOHA) which occurs when steam supply to the building is lost. Since the evaporators are run on steam, this would cause the evaporators to go off-line. Abnormal low temperature will be based on reference 3 at 59°F.
9. Parameter value used on data sheet has been previously established and determined more conservative than values derived from the reference document noted. 4
10. For commercial reasons, safety and seismic classification may be higher than elsewhere documented, and therefore conservative. 4

References:

1. 24590-WTP-PSAR-ESH-01-002-02, Rev. 04A, Preliminary documented safety analysis to support construction authorization; PT facility specific information. 4
2. 24590-PTF-U0D-W16T-00001, Rev. 0, PTF Room Environment Datasheet.
3. 24590-WTP-DB-ENG-01-001, Rev. 1M, Basis of Design. 4
4. 24590-PTF-U0N-W16T-00001, Add data for room p-0427, Incorporate additional steam break analysis 4
5. 24590-PTF-U0N-W16T-00003, Revised temperature & relative humidity data for PTF rooms. 4

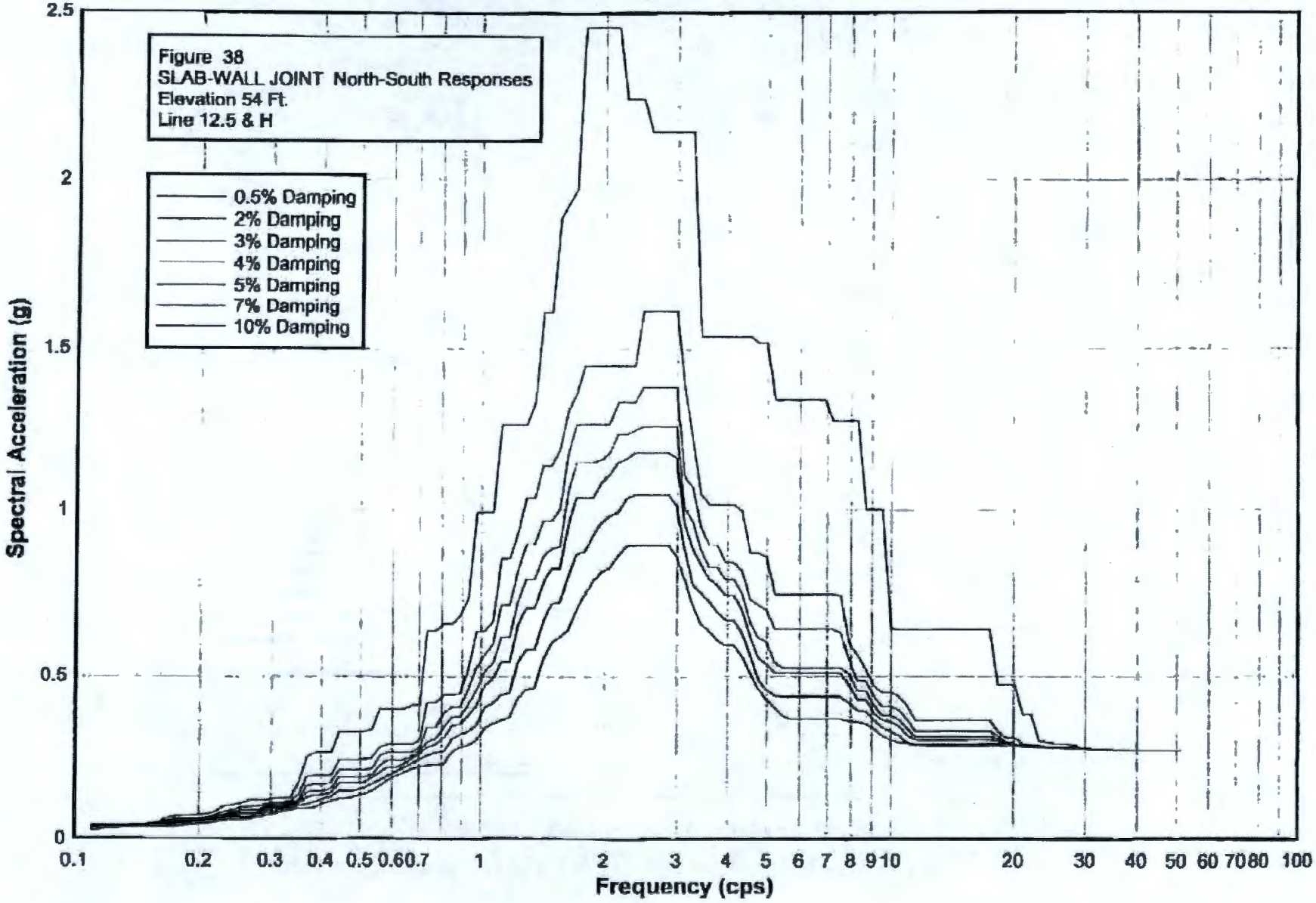
RPP-WTP Pretreatment Facility ISRS

Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A



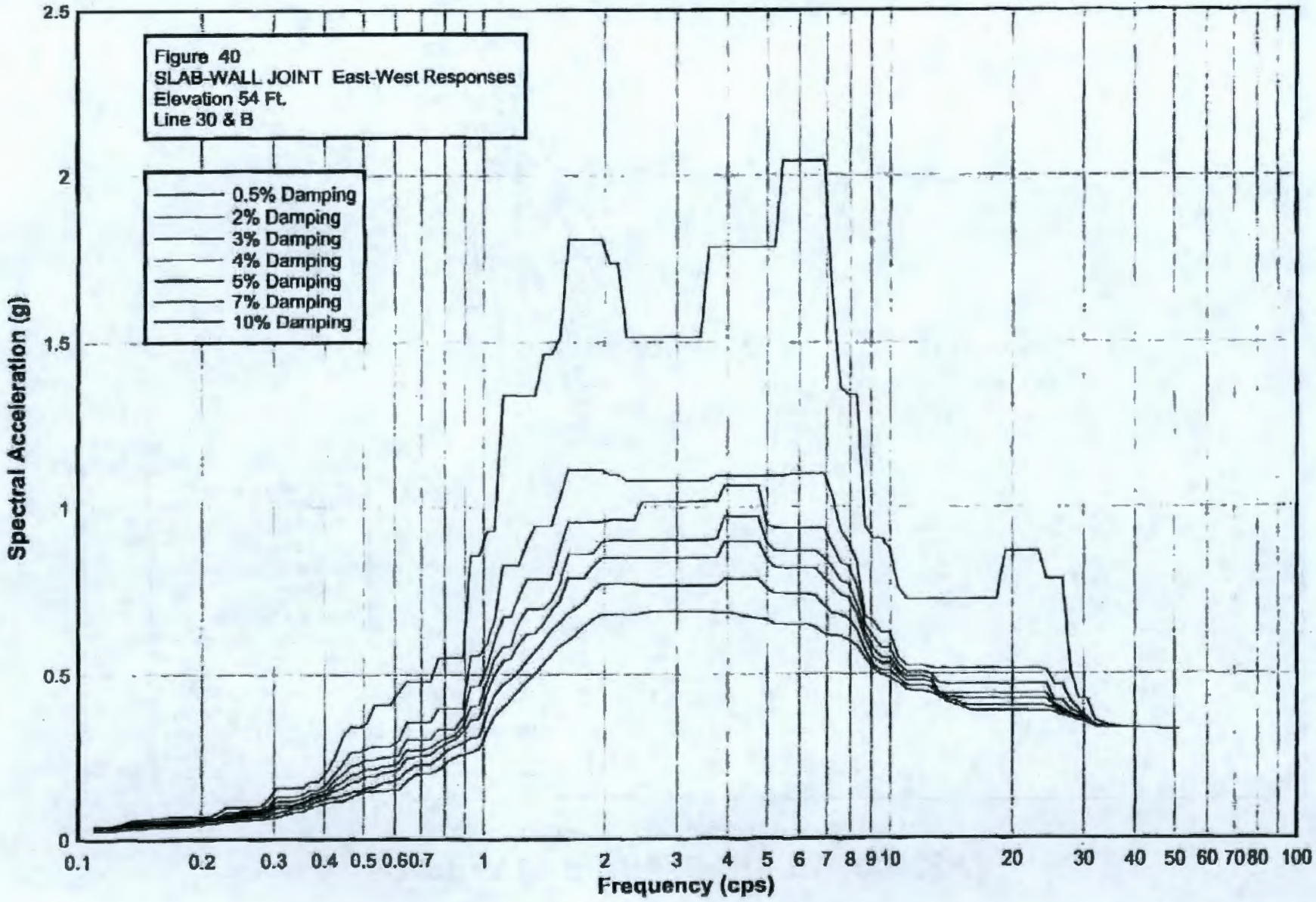
RPP-WTP Pretreatment Facility ISRS

Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A



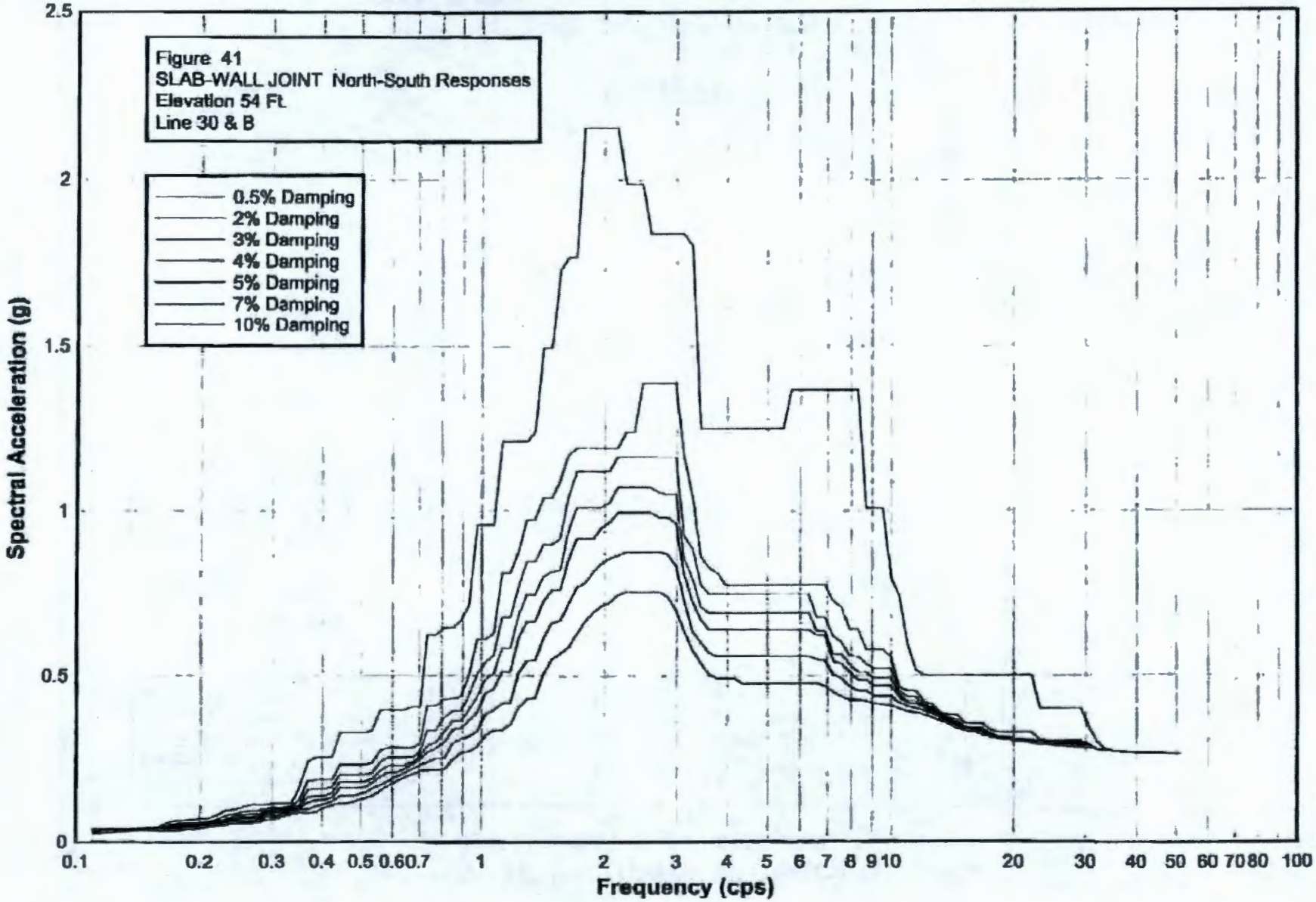
RPP-WTP Pretreatment Facility ISRS

Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A



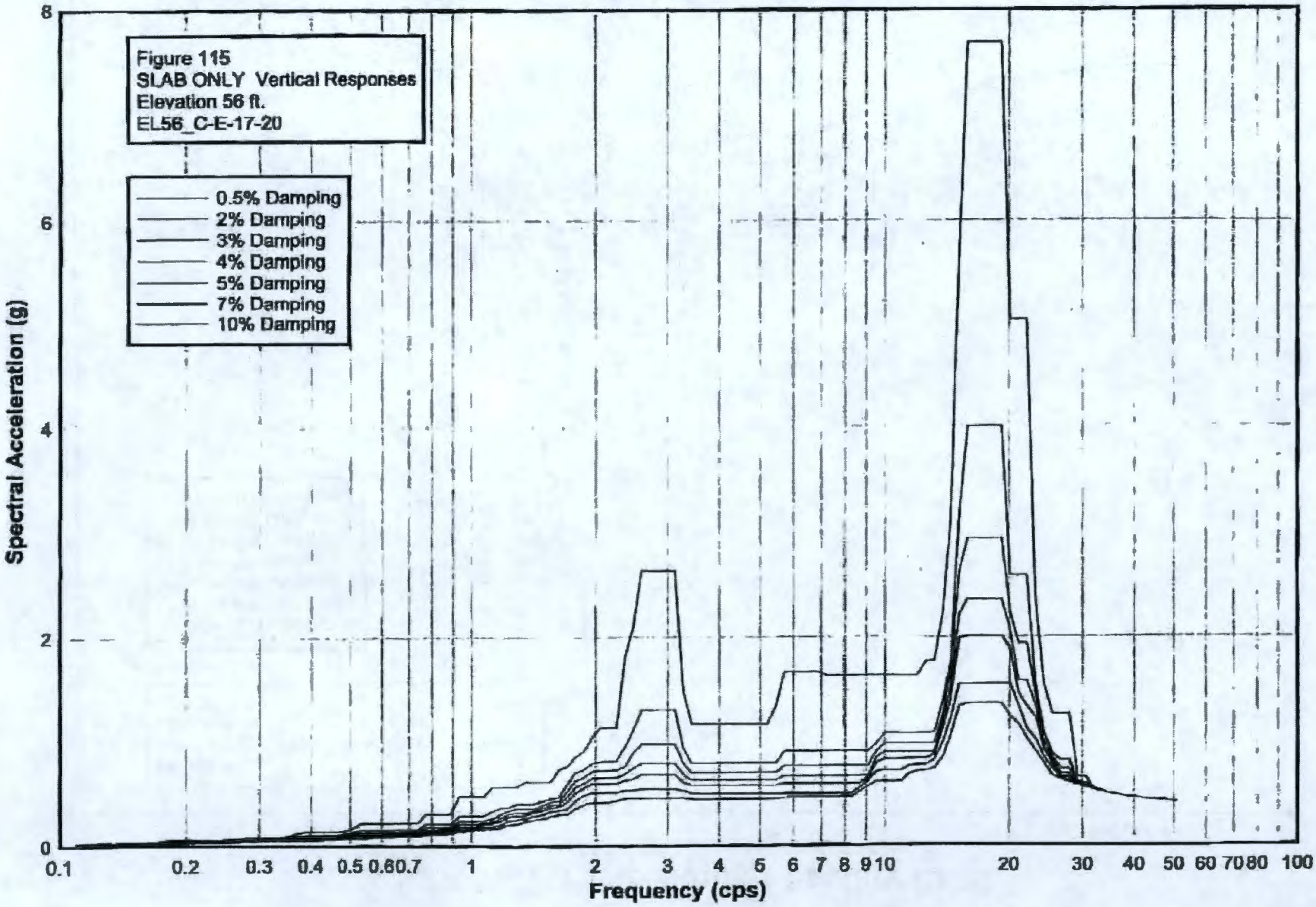
RPP-WTP Pretreatment Facility ISRS

Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A



RPP-WTP Pretreatment Facility ISRS

Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A



PTWW037.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 37 ~ SLAB-WALL JOINT East-West Responses ~ Elevation 54 Ft. ~ Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.1098	0.0375	0.1098	0.0344	0.1098	0.0327	0.1098	0.0312	0.1098	0.0298	0.1098	0.0274	0.1098	0.0252
0.115	0.0375	0.115	0.0344	0.115	0.0327	0.115	0.0312	0.115	0.0299	0.115	0.0277	0.115	0.0258
0.1204	0.0375	0.1204	0.0344	0.1204	0.0331	0.1204	0.0322	0.1204	0.0312	0.1204	0.0294	0.1204	0.0269
0.1262	0.0431	0.1262	0.0397	0.1262	0.0378	0.1262	0.036	0.1262	0.0343	0.1262	0.0314	0.1262	0.0278
0.1322	0.0504	0.1322	0.045	0.1322	0.042	0.1322	0.0393	0.1322	0.0369	0.1322	0.0328	0.1322	0.0281
0.1385	0.056	0.1385	0.0489	0.1385	0.0449	0.1385	0.0414	0.1385	0.0384	0.1385	0.0344	0.1385	0.0303
0.1451	0.058	0.1451	0.0509	0.1451	0.0475	0.1451	0.0445	0.1451	0.0419	0.1451	0.0375	0.1451	0.0325
0.152	0.0616	0.152	0.0546	0.152	0.0506	0.152	0.0472	0.152	0.0442	0.152	0.0391	0.152	0.0338
0.1592	0.062	0.1592	0.0546	0.1592	0.0506	0.1592	0.0472	0.1592	0.0442	0.1592	0.0396	0.1592	0.0351
0.1668	0.064	0.1668	0.056	0.1668	0.0517	0.1668	0.0481	0.1668	0.0451	0.1668	0.0403	0.1668	0.0356
0.1748	0.064	0.1748	0.056	0.1748	0.0517	0.1748	0.0481	0.1748	0.0451	0.1748	0.0403	0.1748	0.0356
0.1831	0.064	0.1831	0.056	0.1831	0.0517	0.1831	0.0481	0.1831	0.0451	0.1831	0.0403	0.1831	0.0368
0.1918	0.0641	0.1918	0.0561	0.1918	0.0517	0.1918	0.0495	0.1918	0.0477	0.1918	0.0445	0.1918	0.0404
0.2009	0.0642	0.2009	0.0583	0.2009	0.0558	0.2009	0.0535	0.2009	0.0513	0.2009	0.0474	0.2009	0.0424
0.2105	0.0665	0.2105	0.0603	0.2105	0.0575	0.2105	0.0549	0.2105	0.0525	0.2105	0.049	0.2105	0.0448
0.2205	0.078	0.2205	0.0647	0.2205	0.062	0.2205	0.0595	0.2205	0.0573	0.2205	0.0533	0.2205	0.0484
0.231	0.0933	0.231	0.0774	0.231	0.0694	0.231	0.063	0.231	0.0598	0.231	0.0556	0.231	0.0503
0.242	0.0933	0.242	0.0774	0.242	0.0723	0.242	0.0678	0.242	0.0638	0.242	0.0567	0.242	0.0513
0.2535	0.0933	0.2535	0.0817	0.2535	0.0771	0.2535	0.0729	0.2535	0.0692	0.2535	0.0628	0.2535	0.0553
0.2656	0.0933	0.2656	0.0839	0.2656	0.0794	0.2656	0.0754	0.2656	0.0718	0.2656	0.0653	0.2656	0.0575
0.2783	0.0954	0.2783	0.0847	0.2783	0.0794	0.2783	0.0754	0.2783	0.0718	0.2783	0.0653	0.2783	0.058
0.2915	0.1187	0.2915	0.0987	0.2915	0.089	0.2915	0.0813	0.2915	0.0753	0.2915	0.0668	0.2915	0.0592
0.3054	0.1504	0.3054	0.1235	0.3054	0.1097	0.3054	0.0985	0.3054	0.0894	0.3054	0.0758	0.3054	0.0633
0.3199	0.1504	0.3199	0.1235	0.3199	0.1097	0.3199	0.0985	0.3199	0.0894	0.3199	0.0801	0.3199	0.0706
0.3352	0.1504	0.3352	0.1235	0.3352	0.1097	0.3352	0.0985	0.3352	0.0931	0.3352	0.0857	0.3352	0.0762
0.3511	0.1504	0.3511	0.1289	0.3511	0.1172	0.3511	0.107	0.3511	0.0997	0.3511	0.0894	0.3511	0.0786
0.3678	0.168	0.3678	0.1438	0.3678	0.1303	0.3678	0.1186	0.3678	0.1121	0.3678	0.1017	0.3678	0.0898
0.3853	0.168	0.3853	0.1438	0.3853	0.1346	0.3853	0.1279	0.3853	0.1219	0.3853	0.1115	0.3853	0.0992
0.4037	0.194	0.4037	0.1598	0.4037	0.1426	0.4037	0.1306	0.4037	0.1259	0.4037	0.117	0.4037	0.1054
0.4229	0.2368	0.4229	0.1906	0.4229	0.1721	0.4229	0.1558	0.4229	0.1416	0.4229	0.1217	0.4229	0.1092
0.4431	0.3088	0.4431	0.2193	0.4431	0.1881	0.4431	0.1671	0.4431	0.1496	0.4431	0.1273	0.4431	0.1097
0.4642	0.3417	0.4642	0.2524	0.4642	0.2138	0.4642	0.1862	0.4642	0.1637	0.4642	0.1345	0.4642	0.1211
0.4863	0.3417	0.4863	0.256	0.4863	0.2208	0.4863	0.1928	0.4863	0.1701	0.4863	0.1409	0.4863	0.1323
0.5094	0.3522	0.5094	0.2656	0.5094	0.2325	0.5094	0.2054	0.5094	0.1831	0.5094	0.1497	0.5094	0.1391

PTWW037.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 37 – SLAB-WALL JOINT East-West Responses – Elevation 54 Ft. – Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.5337	0.4096	0.5337	0.2771	0.5337	0.2326	0.5337	0.2054	0.5337	0.1831	0.5337	0.1539	0.5337	0.1396
0.5591	0.4096	0.5591	0.2771	0.5591	0.2398	0.5591	0.2148	0.5591	0.1949	0.5591	0.1654	0.5591	0.1396
0.5857	0.4096	0.5857	0.2771	0.5857	0.2404	0.5857	0.2159	0.5857	0.1975	0.5857	0.1686	0.5857	0.1441
0.6136	0.4475	0.6136	0.2969	0.6136	0.2444	0.6136	0.2234	0.6136	0.2051	0.6136	0.1751	0.6136	0.1441
0.6428	0.478	0.6428	0.3547	0.6428	0.3006	0.6428	0.2612	0.6428	0.2347	0.6428	0.1988	0.6428	0.168
0.6734	0.478	0.6734	0.3547	0.6734	0.3006	0.6734	0.2612	0.6734	0.2413	0.6734	0.2165	0.6734	0.1872
0.7055	0.478	0.7055	0.3547	0.7055	0.3006	0.7055	0.2612	0.7055	0.2413	0.7055	0.2186	0.7055	0.1922
0.7391	0.478	0.7391	0.3547	0.7391	0.3006	0.7391	0.2692	0.7391	0.2463	0.7391	0.2186	0.7391	0.1922
0.7743	0.5518	0.7743	0.3958	0.7743	0.3332	0.7743	0.2918	0.7743	0.268	0.7743	0.2351	0.7743	0.2018
0.8111	0.5518	0.8111	0.3958	0.8111	0.3332	0.8111	0.3035	0.8111	0.2874	0.8111	0.2587	0.8111	0.2236
0.8497	0.5518	0.8497	0.3958	0.8497	0.3332	0.8497	0.3117	0.8497	0.2984	0.8497	0.2723	0.8497	0.2373
0.8902	0.5518	0.8902	0.3958	0.8902	0.3656	0.8902	0.3431	0.8902	0.3226	0.8902	0.2873	0.8902	0.2462
0.9326	0.8605	0.9326	0.5585	0.9326	0.4629	0.9326	0.4023	0.9326	0.3602	0.9326	0.3049	0.9326	0.2549
0.977	0.8605	0.977	0.5585	0.977	0.4629	0.977	0.4045	0.977	0.3644	0.977	0.3083	0.977	0.2637
1.0235	0.9315	1.0235	0.5965	1.0235	0.5261	1.0235	0.4814	1.0235	0.4436	1.0235	0.3837	1.0235	0.3277
1.0723	0.9315	1.0723	0.6685	1.0723	0.603	1.0723	0.5467	1.0723	0.4995	1.0723	0.4355	1.0723	0.3729
1.1233	1.3398	1.1233	0.8315	1.1233	0.6788	1.1233	0.5837	1.1233	0.5408	1.1233	0.4681	1.1233	0.3987
1.1768	1.3398	1.1768	0.8315	1.1768	0.6788	1.1768	0.5855	1.1768	0.5505	1.1768	0.4858	1.1768	0.4238
1.2328	1.3398	1.2328	0.8315	1.2328	0.7369	1.2328	0.6596	1.2328	0.5925	1.2328	0.5105	1.2328	0.452
1.2916	1.3398	1.2916	0.9002	1.2916	0.7926	1.2916	0.7024	1.2916	0.6263	1.2916	0.5455	1.2916	0.4808
1.353	1.3398	1.353	0.9485	1.353	0.7926	1.353	0.7024	1.353	0.6282	1.353	0.574	1.353	0.5058
1.4175	1.4626	1.4175	0.9485	1.4175	0.7926	1.4175	0.7024	1.4175	0.6579	1.4175	0.6026	1.4175	0.5321
1.485	1.4626	1.485	0.9485	1.485	0.7926	1.485	0.7282	1.485	0.6956	1.485	0.636	1.485	0.5624
1.5557	1.5113	1.5557	1.0297	1.5557	0.8797	1.5557	0.7754	1.5557	0.726	1.5557	0.6634	1.5557	0.5886
1.6298	1.8158	1.6298	1.1086	1.6298	0.9552	1.6298	0.8627	1.6298	0.7931	1.6298	0.6875	1.6298	0.6064
1.7074	1.8158	1.7074	1.1086	1.7074	0.9552	1.7074	0.8627	1.7074	0.7931	1.7074	0.7024	1.7074	0.6248
1.7887	1.8158	1.7887	1.1086	1.7887	0.9552	1.7887	0.8627	1.7887	0.7931	1.7887	0.7213	1.7887	0.6476
1.8738	1.8158	1.8738	1.1086	1.8738	0.9552	1.8738	0.8651	1.8738	0.8263	1.8738	0.7567	1.8738	0.6698
1.963	1.8158	1.963	1.1086	1.963	0.9552	1.963	0.8972	1.963	0.8525	1.963	0.7755	1.963	0.683
2.0565	1.7414	2.0565	1.0948	2.0565	0.9593	2.0565	0.9017	2.0565	0.8525	2.0565	0.7755	2.0565	0.683
2.1544	1.7414	2.1544	1.0948	2.1544	0.9593	2.1544	0.9017	2.1544	0.8525	2.1544	0.7755	2.1544	0.683
2.257	1.5091	2.257	1.0367	2.257	0.9593	2.257	0.9017	2.257	0.8525	2.257	0.7755	2.257	0.683
2.3645	1.5091	2.3645	1.0367	2.3645	0.9593	2.3645	0.9017	2.3645	0.8525	2.3645	0.7755	2.3645	0.683
2.4771	1.5091	2.4771	1.0367	2.4771	1.009	2.4771	0.9017	2.4771	0.852	2.4771	0.7697	2.4771	0.6811
2.595	1.5091	2.595	1.0367	2.595	1.009	2.595	0.9017	2.595	0.8387	2.595	0.7357	2.595	0.6811

PTWW037.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 37 ~ SLAB-WALL JOINT East-West Responses ~ Elevation 54 FL ~ Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
2.7186	1.5091	2.7186	1.0367	2.7186	1.009	2.7186	0.9017	2.7186	0.8387	2.7186	0.7357	2.7186	0.6811
2.848	1.5091	2.848	1.0367	2.848	1.009	2.848	0.9017	2.848	0.8387	2.848	0.7357	2.848	0.6811
2.9836	1.5091	2.9836	1.0367	2.9836	1.009	2.9836	0.9017	2.9836	0.8387	2.9836	0.7357	2.9836	0.6811
3.1257	1.5091	3.1257	1.0367	3.1257	0.9237	3.1257	0.9017	3.1257	0.8387	3.1257	0.7357	3.1257	0.6811
3.2745	1.5091	3.2745	1.0367	3.2745	0.9237	3.2745	0.9017	3.2745	0.8387	3.2745	0.7357	3.2745	0.6811
3.4305	1.5091	3.4305	1.0367	3.4305	0.9237	3.4305	0.9017	3.4305	0.8387	3.4305	0.7357	3.4305	0.6801
3.5938	1.6472	3.5938	1.0367	3.5938	0.9237	3.5938	0.9017	3.5938	0.8387	3.5938	0.7357	3.5938	0.6801
3.7649	1.6472	3.7649	1.1356	3.7649	0.9237	3.7649	0.9017	3.7649	0.8387	3.7649	0.7357	3.7649	0.6766
3.9442	1.6472	3.9442	1.1356	3.9442	0.9237	3.9442	0.906	3.9442	0.8387	3.9442	0.7357	3.9442	0.6759
4.132	1.6472	4.132	1.1356	4.132	0.9237	4.132	0.906	4.132	0.8387	4.132	0.7357	4.132	0.6712
4.3288	1.6472	4.3288	1.1356	4.3288	0.9237	4.3288	0.906	4.3288	0.8387	4.3288	0.7357	4.3288	0.6626
4.5349	1.6472	4.5349	1.1356	4.5349	0.9237	4.5349	0.906	4.5349	0.8387	4.5349	0.7357	4.5349	0.6525
4.7508	1.6472	4.7508	1.1048	4.7508	0.9237	4.7508	0.906	4.7508	0.8387	4.7508	0.7357	4.7508	0.6316
4.977	1.6472	4.977	0.9746	4.977	0.8757	4.977	0.829	4.977	0.7851	4.977	0.7083	4.977	0.6206
5.214	1.6472	5.214	0.9746	5.214	0.8463	5.214	0.785	5.214	0.7434	5.214	0.6732	5.214	0.5898
5.4623	1.7798	5.4623	0.9746	5.4623	0.8463	5.4623	0.785	5.4623	0.7434	5.4623	0.6732	5.4623	0.5898
5.7224	1.7798	5.7224	0.9746	5.7224	0.8463	5.7224	0.785	5.7224	0.7434	5.7224	0.6732	5.7224	0.5898
5.9948	1.7798	5.9948	0.9746	5.9948	0.8438	5.9948	0.785	5.9948	0.7434	5.9948	0.6732	5.9948	0.5898
6.2803	1.7798	6.2803	0.9746	6.2803	0.8438	6.2803	0.785	6.2803	0.7434	6.2803	0.6732	6.2803	0.5898
6.5793	1.7798	6.5793	0.9746	6.5793	0.8438	6.5793	0.7804	6.5793	0.7393	6.5793	0.6657	6.5793	0.5795
6.8926	1.7798	6.8926	0.963	6.8926	0.8429	6.8926	0.7674	6.8926	0.7128	6.8926	0.6345	6.8926	0.5677
7.2208	1.4914	7.2208	0.935	7.2208	0.7922	7.2208	0.7331	7.2208	0.6844	7.2208	0.6283	7.2208	0.5677
7.5646	1.188	7.5646	0.822	7.5646	0.7832	7.5646	0.7188	7.5646	0.6833	7.5646	0.6283	7.5646	0.5677
7.9248	1.0987	7.9248	0.8201	7.9248	0.7623	7.9248	0.7176	7.9248	0.6811	7.9248	0.6237	7.9248	0.5627
8.3022	1.0987	8.3022	0.7845	8.3022	0.7283	8.3022	0.6777	8.3022	0.6364	8.3022	0.5884	8.3022	0.5417
8.6975	0.8935	8.6975	0.7092	8.6975	0.6368	8.6975	0.6061	8.6975	0.5819	8.6975	0.5373	8.6975	0.5059
9.1116	0.8935	9.1116	0.7092	9.1116	0.6368	9.1116	0.5827	9.1116	0.5505	9.1116	0.5085	9.1116	0.4846
9.5455	0.8763	9.5455	0.7092	9.5455	0.6368	9.5455	0.5827	9.5455	0.5459	9.5455	0.4951	9.5455	0.4643
10	0.8763	10	0.7092	10	0.6368	10	0.5827	10	0.5459	10	0.4934	10	0.4429
10.4762	0.8603	10.4762	0.7092	10.4762	0.6368	10.4762	0.5774	10.4762	0.5297	10.4762	0.4688	10.4762	0.4271
10.975	0.791	10.975	0.6543	10.975	0.6067	10.975	0.5582	10.975	0.5137	10.975	0.4674	10.975	0.4271
11.4976	0.791	11.4976	0.6543	11.4976	0.6014	11.4976	0.5519	11.4976	0.5094	11.4976	0.4435	11.4976	0.4142
12.045	0.6677	12.045	0.5543	12.045	0.5086	12.045	0.4716	12.045	0.4394	12.045	0.4081	12.046	0.3915
12.6186	0.6325	12.6186	0.5145	12.6186	0.4727	12.6186	0.4409	12.6186	0.4251	12.6186	0.4004	12.6186	0.3774
13.2194	0.6325	13.2194	0.5025	13.2194	0.4639	13.2194	0.4269	13.2194	0.4021	13.2194	0.379	13.2194	0.3634

PTWW037.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-SOC-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 37 ~ SLAB-WALL JOINT East-West Responses ~ Elevation 54 Ft. ~ Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
13.8489	0.6152	13.8489	0.4815	13.8489	0.433	13.8489	0.3995	13.8489	0.3896	13.8489	0.3705	13.8489	0.3527
14.5083	0.5318	14.5083	0.4455	14.5083	0.4096	14.5083	0.381	14.5083	0.3726	14.5083	0.3575	14.5083	0.3484
15.1991	0.4787	15.1991	0.4141	15.1991	0.3936	15.1991	0.3795	15.1991	0.3697	15.1991	0.3575	15.1991	0.3484
15.9228	0.4787	15.9228	0.3815	15.9228	0.3644	15.9228	0.3609	15.9228	0.358	15.9228	0.3528	15.9228	0.3467
16.681	0.4787	16.681	0.3815	16.681	0.3644	16.681	0.3544	16.681	0.3483	16.681	0.3439	16.681	0.3416
17.4753	0.4307	17.4753	0.3815	17.4753	0.3644	17.4753	0.3544	17.4753	0.3483	17.4753	0.3418	17.4753	0.337
18.3074	0.4095	18.3074	0.3431	18.3074	0.3367	18.3074	0.3354	18.3074	0.3336	18.3074	0.3315	18.3074	0.3305
19.1791	0.4095	19.1791	0.3431	19.1791	0.3349	19.1791	0.3293	19.1791	0.3262	19.1791	0.3251	19.1791	0.325
20.0923	0.3708	20.0923	0.3431	20.0923	0.3349	20.0923	0.3293	20.0923	0.3262	20.0923	0.3243	20.0923	0.323
21.049	0.3708	21.049	0.3431	21.049	0.3349	21.049	0.3293	21.049	0.3262	21.049	0.3236	21.049	0.3215
22.0513	0.3708	22.0513	0.3431	22.0513	0.3349	22.0513	0.3293	22.0513	0.3262	22.0513	0.323	22.0513	0.3199
23.1013	0.3708	23.1013	0.3431	23.1013	0.3349	23.1013	0.3293	23.1013	0.3262	23.1013	0.323	23.1013	0.3199
24.2013	0.3708	24.2013	0.3431	24.2013	0.3349	24.2013	0.3293	24.2013	0.3255	24.2013	0.3206	24.2013	0.3186
25.3536	0.3358	25.3536	0.3197	25.3536	0.3192	25.3536	0.3187	25.3536	0.3181	25.3536	0.317	25.3536	0.3164
26.5609	0.3358	26.5609	0.3169	26.5609	0.3159	26.5609	0.3158	26.5609	0.3158	26.5609	0.3155	26.5609	0.3148
27.8256	0.3358	27.8256	0.3169	27.8256	0.3159	27.8256	0.3153	27.8256	0.3149	27.8256	0.3143	27.8256	0.3137
29.1505	0.3358	29.1505	0.3165	29.1505	0.3153	29.1505	0.3142	29.1505	0.3137	29.1505	0.3132	29.1505	0.313
30.5386	0.3312	30.5386	0.3165	30.5386	0.3153	30.5386	0.3142	30.5386	0.3133	30.5386	0.3131	30.5386	0.313
31.9927	0.3297	31.9927	0.3163	31.9927	0.3146	31.9927	0.3138	31.9927	0.3132	31.9927	0.3131	31.9927	0.313
33.516	0.3144	33.516	0.3134	33.516	0.3133	33.516	0.3132	33.516	0.3132	33.516	0.3131	33.516	0.313
35.1119	0.3135	35.1119	0.3134	35.1119	0.3133	35.1119	0.3132	35.1119	0.3132	35.1119	0.3131	35.1119	0.313
36.7838	0.3134	36.7838	0.3133	36.7838	0.3132	36.7838	0.3132	36.7838	0.3132	36.7838	0.3131	36.7838	0.313
38.5353	0.3132	38.5353	0.3132	38.5353	0.3131	38.5353	0.3131	38.5353	0.3131	38.5353	0.3131	38.5353	0.313
40.3702	0.3131	40.3702	0.3131	40.3702	0.3131	40.3702	0.313	40.3702	0.313	40.3702	0.313	40.3702	0.3129
42.2924	0.313	42.2924	0.3129	42.2924	0.3129	42.2924	0.3129	42.2924	0.3129	42.2924	0.3129	42.2924	0.3129
44.3062	0.3128	44.3062	0.3128	44.3062	0.3128	44.3062	0.3128	44.3062	0.3128	44.3062	0.3128	44.3062	0.3128
46.4159	0.3127	46.4159	0.3127	46.4159	0.3127	46.4159	0.3127	46.4159	0.3127	46.4159	0.3127	46.4159	0.3127
48.626	0.3126	48.626	0.3126	48.626	0.3126	48.626	0.3126	48.626	0.3126	48.626	0.3126	48.626	0.3126
50.9414	0.3125	50.9414	0.3125	50.9414	0.3125	50.9414	0.3125	50.9414	0.3125	50.9414	0.3125	50.9414	0.3125

PTWW038.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 38 – SLAB-WALL JOINT North-South Responses – Elevation 54 Ft. – Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.1098	0.0405	0.1098	0.0365	0.1098	0.0342	0.1098	0.0322	0.1098	0.0303	0.1098	0.0272	0.1098	0.0235
0.115	0.0405	0.115	0.0365	0.115	0.0342	0.115	0.0322	0.115	0.0303	0.115	0.0272	0.115	0.0259
0.1204	0.0405	0.1204	0.0365	0.1204	0.0342	0.1204	0.0322	0.1204	0.031	0.1204	0.0297	0.1204	0.028
0.1262	0.0405	0.1262	0.0365	0.1262	0.0352	0.1262	0.0342	0.1262	0.0334	0.1262	0.0318	0.1262	0.0297
0.1322	0.0405	0.1322	0.0382	0.1322	0.037	0.1322	0.0359	0.1322	0.0349	0.1322	0.0333	0.1322	0.0316
0.1385	0.0411	0.1385	0.0392	0.1385	0.0382	0.1385	0.0372	0.1385	0.0363	0.1385	0.0348	0.1385	0.0328
0.1451	0.0417	0.1451	0.0398	0.1451	0.0387	0.1451	0.0377	0.1451	0.0368	0.1451	0.0352	0.1451	0.0332
0.152	0.0439	0.152	0.0401	0.152	0.0387	0.152	0.0377	0.152	0.0368	0.152	0.0352	0.152	0.0332
0.1592	0.0462	0.1592	0.0416	0.1592	0.0396	0.1592	0.0377	0.1592	0.0368	0.1592	0.0352	0.1592	0.0332
0.1668	0.0584	0.1668	0.0506	0.1668	0.0463	0.1668	0.0426	0.1668	0.0395	0.1668	0.0352	0.1668	0.0332
0.1748	0.0645	0.1748	0.0566	0.1748	0.0522	0.1748	0.0484	0.1748	0.045	0.1748	0.0394	0.1748	0.0332
0.1831	0.0668	0.1831	0.0583	0.1831	0.0541	0.1831	0.0504	0.1831	0.0471	0.1831	0.0415	0.1831	0.0354
0.1918	0.0678	0.1918	0.0586	0.1918	0.0543	0.1918	0.0507	0.1918	0.0474	0.1918	0.0418	0.1918	0.038
0.2009	0.0697	0.2009	0.0596	0.2009	0.0543	0.2009	0.0514	0.2009	0.0487	0.2009	0.0438	0.2009	0.0411
0.2105	0.0722	0.2105	0.062	0.2105	0.0582	0.2105	0.0547	0.2105	0.0516	0.2105	0.0482	0.2105	0.0448
0.2205	0.0819	0.2205	0.0709	0.2205	0.0651	0.2205	0.06	0.2205	0.0574	0.2205	0.0531	0.2205	0.0475
0.231	0.0959	0.231	0.0792	0.231	0.0703	0.231	0.0665	0.231	0.063	0.231	0.0578	0.231	0.0525
0.242	0.0984	0.242	0.0845	0.242	0.0774	0.242	0.0721	0.242	0.0681	0.242	0.0618	0.242	0.0551
0.2535	0.1059	0.2535	0.0913	0.2535	0.0833	0.2535	0.0763	0.2535	0.0702	0.2535	0.0618	0.2535	0.0551
0.2656	0.1138	0.2656	0.0944	0.2656	0.084	0.2656	0.0763	0.2656	0.0702	0.2656	0.0618	0.2656	0.0551
0.2783	0.1138	0.2783	0.0944	0.2783	0.084	0.2783	0.0779	0.2783	0.074	0.2783	0.0677	0.2783	0.0611
0.2915	0.1138	0.2915	0.1008	0.2915	0.0946	0.2915	0.0892	0.2915	0.0843	0.2915	0.0764	0.2915	0.0677
0.3054	0.1179	0.3054	0.1056	0.3054	0.0987	0.3054	0.0926	0.3054	0.0872	0.3054	0.0785	0.3054	0.0706
0.3199	0.1179	0.3199	0.1056	0.3199	0.0987	0.3199	0.0926	0.3199	0.0894	0.3199	0.0844	0.3199	0.0786
0.3352	0.1179	0.3352	0.1098	0.3352	0.1056	0.3352	0.1017	0.3352	0.0982	0.3352	0.0921	0.3352	0.0848
0.3511	0.1654	0.3511	0.129	0.3511	0.1133	0.3511	0.1075	0.3511	0.1035	0.3511	0.0964	0.3511	0.088
0.3678	0.2415	0.3678	0.1832	0.3678	0.1565	0.3678	0.1364	0.3678	0.1213	0.3678	0.1006	0.3678	0.088
0.3853	0.2549	0.3853	0.187	0.3853	0.1595	0.3853	0.1387	0.3853	0.1269	0.3853	0.1092	0.3853	0.091
0.4037	0.2549	0.4037	0.187	0.4037	0.1595	0.4037	0.1387	0.4037	0.1279	0.4037	0.1163	0.4037	0.1034
0.4229	0.2549	0.4229	0.187	0.4229	0.1651	0.4229	0.1485	0.4229	0.1344	0.4229	0.1233	0.4229	0.1111
0.4431	0.3288	0.4431	0.2339	0.4431	0.2038	0.4431	0.1813	0.4431	0.1641	0.4431	0.1399	0.4431	0.1181
0.4642	0.3288	0.4642	0.2339	0.4642	0.2038	0.4642	0.1813	0.4642	0.1641	0.4642	0.1399	0.4642	0.1181
0.4863	0.3288	0.4863	0.2339	0.4863	0.2038	0.4863	0.1813	0.4863	0.1641	0.4863	0.1421	0.4863	0.1246
0.5094	0.3288	0.5094	0.2339	0.5094	0.2038	0.5094	0.1813	0.5094	0.1641	0.5094	0.1472	0.5094	0.1295

PTWW038.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 38 ~ SLAB-WALL JOINT North-South Responses ~ Elevation 54 Ft. ~ Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.5337	0.3356	0.5337	0.2387	0.5337	0.2081	0.5337	0.19	0.5337	0.1796	0.5337	0.1614	0.5337	0.1401
0.5591	0.3997	0.5591	0.2762	0.5591	0.244	0.5591	0.2179	0.5591	0.1971	0.5591	0.1724	0.5591	0.1556
0.5857	0.3997	0.5857	0.2863	0.5857	0.2573	0.5857	0.2332	0.5857	0.2128	0.5857	0.1853	0.5857	0.1724
0.6136	0.3997	0.6136	0.2863	0.6136	0.2573	0.6136	0.2332	0.6136	0.2128	0.6136	0.1998	0.6136	0.1858
0.6428	0.3997	0.6428	0.2863	0.6428	0.2573	0.6428	0.2332	0.6428	0.2219	0.6428	0.2115	0.6428	0.1969
0.6734	0.411	0.6734	0.2863	0.6734	0.2574	0.6734	0.2449	0.6734	0.2378	0.6734	0.2244	0.6734	0.2072
0.7055	0.411	0.7055	0.301	0.7055	0.2757	0.7055	0.2638	0.7055	0.2534	0.7055	0.2357	0.7055	0.2156
0.7391	0.6367	0.7391	0.4169	0.7391	0.3404	0.7391	0.2927	0.7391	0.2746	0.7391	0.2445	0.7391	0.217
0.7743	0.6367	0.7743	0.4169	0.7743	0.3404	0.7743	0.3038	0.7743	0.2858	0.7743	0.2555	0.7743	0.2218
0.8111	0.6596	0.8111	0.4428	0.8111	0.386	0.8111	0.3422	0.8111	0.3081	0.8111	0.2598	0.8111	0.2218
0.8497	0.6596	0.8497	0.4428	0.8497	0.4051	0.8497	0.3738	0.8497	0.347	0.8497	0.3034	0.8497	0.256
0.8902	0.6828	0.8902	0.4451	0.8902	0.4051	0.8902	0.3738	0.8902	0.3511	0.8902	0.3194	0.8902	0.2761
0.9326	0.737	0.9326	0.5191	0.9326	0.4567	0.9326	0.411	0.9326	0.3766	0.9326	0.328	0.9326	0.2821
0.977	0.9914	0.977	0.6358	0.977	0.525	0.977	0.4553	0.977	0.408	0.977	0.3484	0.977	0.2994
1.0235	0.9914	1.0235	0.6358	1.0235	0.5662	1.0235	0.5139	1.0235	0.4702	1.0235	0.4041	1.0235	0.3384
1.0723	0.9914	1.0723	0.6668	1.0723	0.5976	1.0723	0.5399	1.0723	0.4914	1.0723	0.4166	1.0723	0.3541
1.1233	1.2606	1.1233	0.8561	1.1233	0.7168	1.1233	0.6174	1.1233	0.5433	1.1233	0.4431	1.1233	0.3633
1.1768	1.2606	1.1768	0.8561	1.1768	0.7168	1.1768	0.6174	1.1768	0.5433	1.1768	0.4467	1.1768	0.3729
1.2328	1.2606	1.2328	0.935	1.2328	0.8202	1.2328	0.7293	1.2328	0.6556	1.2328	0.5433	1.2328	0.4321
1.2916	1.2606	1.2916	1.0351	1.2916	0.8991	1.2916	0.793	1.2916	0.708	1.2916	0.5814	1.2916	0.4586
1.353	1.3319	1.353	1.0351	1.353	0.8991	1.353	0.793	1.353	0.708	1.353	0.5814	1.353	0.4631
1.4175	1.6092	1.4175	1.1325	1.4175	0.9683	1.4175	0.8621	1.4175	0.7817	1.4175	0.6627	1.4175	0.5486
1.485	1.6092	1.485	1.1325	1.485	0.9683	1.485	0.885	1.485	0.8264	1.485	0.7199	1.485	0.6006
1.5557	1.8872	1.5557	1.1818	1.5557	1.0008	1.5557	0.892	1.5557	0.8264	1.5557	0.7265	1.5557	0.6185
1.6298	1.9322	1.6298	1.3084	1.6298	1.1683	1.6298	1.0534	1.6298	0.9565	1.6298	0.8016	1.6298	0.6401
1.7074	1.9702	1.7074	1.3601	1.7074	1.2627	1.7074	1.1415	1.7074	1.0371	1.7074	0.8692	1.7074	0.7006
1.7887	2.4552	1.7887	1.4456	1.7887	1.2629	1.7887	1.1415	1.7887	1.0371	1.7887	0.8773	1.7887	0.7486
1.8738	2.4552	1.8738	1.4456	1.8738	1.2629	1.8738	1.1415	1.8738	1.0371	1.8738	0.9259	1.8738	0.788
1.963	2.4552	1.963	1.4456	1.963	1.2629	1.963	1.1498	1.963	1.0818	1.963	0.9626	1.963	0.8157
2.0565	2.4552	2.0565	1.4456	2.0565	1.2629	2.0565	1.1701	2.0565	1.1049	2.0565	0.9829	2.0565	0.8288
2.1544	2.4552	2.1544	1.4456	2.1544	1.3316	2.1544	1.2297	2.1544	1.1411	2.1544	0.9932	2.1544	0.8645
2.257	2.2367	2.257	1.4456	2.257	1.3316	2.257	1.2297	2.257	1.1534	2.257	1.0344	2.257	0.8939
2.3645	2.2367	2.3645	1.4456	2.3645	1.3316	2.3645	1.2422	2.3645	1.1724	2.3645	1.0471	2.3645	0.898
2.4771	2.2367	2.4771	1.6143	2.4771	1.3804	2.4771	1.2551	2.4771	1.1724	2.4771	1.0471	2.4771	0.898
2.595	2.138	2.595	1.6143	2.595	1.3804	2.595	1.2551	2.595	1.1724	2.595	1.0471	2.595	0.898

PTWW038.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 38 – SLAB-WALL JOINT North-South Responses – Elevation 54 Ft. – Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
2.7186	2.138	2.7186	1.6143	2.7186	1.3804	2.7186	1.2551	2.7186	1.1724	2.7186	1.0471	2.7186	0.898
2.848	2.138	2.848	1.6143	2.848	1.3804	2.848	1.2551	2.848	1.1724	2.848	1.0471	2.848	0.898
2.9836	2.138	2.9836	1.6143	2.9836	1.3804	2.9836	1.2551	2.9836	1.1568	2.9836	1.0114	2.9836	0.8645
3.1257	2.138	3.1257	1.3773	3.1257	1.0982	3.1257	1.0035	3.1257	0.9573	3.1257	0.8829	3.1257	0.7931
3.2745	2.138	3.2745	1.2119	3.2745	1.0686	3.2745	0.9673	3.2745	0.886	3.2745	0.778	3.2745	0.7168
3.4305	1.5368	3.4305	1.0471	3.4305	0.9495	3.4305	0.8824	3.4305	0.8379	3.4305	0.7547	3.4305	0.6598
3.5938	1.5368	3.5938	1.0165	3.5938	0.898	3.5938	0.8299	3.5938	0.7946	3.5938	0.7273	3.5938	0.6376
3.7649	1.5368	3.7649	1.0165	3.7649	0.898	3.7649	0.8299	3.7649	0.7769	3.7649	0.6958	3.7649	0.6089
3.9442	1.5368	3.9442	1.0165	3.9442	0.8472	3.9442	0.7941	3.9442	0.7477	3.9442	0.6723	3.9442	0.5955
4.132	1.5368	4.132	1.0165	4.132	0.845	4.132	0.7941	4.132	0.7477	4.132	0.6723	4.132	0.5955
4.3288	1.5368	4.3288	0.9973	4.3288	0.8194	4.3288	0.7522	4.3288	0.7017	4.3288	0.6303	4.3288	0.5622
4.5349	1.5368	4.5349	0.8745	4.5349	0.7347	4.5349	0.6652	4.5349	0.6197	4.5349	0.5656	4.5349	0.5097
4.7508	1.518	4.7508	0.8745	4.7508	0.7183	4.7508	0.6169	4.7508	0.5587	4.7508	0.4909	4.7508	0.4618
4.977	1.518	4.977	0.8614	4.977	0.7025	4.977	0.6052	4.977	0.5367	4.977	0.4572	4.977	0.4284
5.214	1.3404	5.214	0.7497	5.214	0.6443	5.214	0.5421	5.214	0.5109	5.214	0.4398	5.214	0.4021
5.4623	1.3404	5.4623	0.7497	5.4623	0.6443	5.4623	0.5254	5.4623	0.5109	5.4623	0.438	5.4623	0.3783
5.7224	1.3404	5.7224	0.7497	5.7224	0.6443	5.7224	0.5254	5.7224	0.5109	5.7224	0.438	5.7224	0.3681
5.9948	1.3404	5.9948	0.7497	5.9948	0.6443	5.9948	0.5254	5.9948	0.5109	5.9948	0.438	5.9948	0.3681
6.2803	1.3404	6.2803	0.7497	6.2803	0.6443	6.2803	0.5254	6.2803	0.5109	6.2803	0.438	6.2803	0.3681
6.5793	1.3404	6.5793	0.7497	6.5793	0.6443	6.5793	0.5254	6.5793	0.5109	6.5793	0.438	6.5793	0.3681
6.8926	1.3404	6.8926	0.7497	6.8926	0.6443	6.8926	0.5254	6.8926	0.5109	6.8926	0.438	6.8926	0.3681
7.2208	1.274	7.2208	0.7497	7.2208	0.6443	7.2208	0.5254	7.2208	0.5109	7.2208	0.438	7.2208	0.3681
7.5646	1.274	7.5646	0.7455	7.5646	0.6309	7.5646	0.5254	7.5646	0.5092	7.5646	0.438	7.5646	0.3681
7.9248	1.274	7.9248	0.6003	7.9248	0.5494	7.9248	0.5064	7.9248	0.471	7.9248	0.4168	7.9248	0.3609
8.3022	1.274	8.3022	0.5659	8.3022	0.4849	8.3022	0.454	8.3022	0.4288	8.3022	0.394	8.3022	0.3594
8.6975	1.0027	8.6975	0.521	8.6975	0.4849	8.6975	0.454	8.6975	0.4288	8.6975	0.3913	8.6975	0.3536
9.1116	1.0027	9.1116	0.4701	9.1116	0.4386	9.1116	0.4105	9.1116	0.3865	9.1116	0.3654	9.1116	0.3376
9.5455	1.0027	9.5455	0.4494	9.5455	0.4069	9.5455	0.3794	9.5455	0.3652	9.5455	0.3418	9.5455	0.3167
10	0.6463	10	0.4494	10	0.4069	10	0.3794	10	0.3585	10	0.3293	10	0.3015
10.4762	0.6411	10.4762	0.4371	10.4762	0.3959	10.4762	0.3648	10.4762	0.347	10.4762	0.3169	10.4762	0.2936
10.975	0.6411	10.975	0.4085	10.975	0.3668	10.975	0.3387	10.975	0.3179	10.975	0.2923	10.975	0.2691
11.4976	0.6411	11.4976	0.3647	11.4976	0.3304	11.4976	0.3133	11.4976	0.3024	11.4976	0.2893	11.4976	0.2857
12.045	0.6411	12.045	0.3647	12.045	0.3304	12.045	0.3133	12.045	0.3024	12.045	0.2893	12.045	0.2839
12.6186	0.6411	12.6186	0.3647	12.6186	0.3304	12.6186	0.3133	12.6186	0.3024	12.6186	0.2893	12.6186	0.2831
13.2194	0.6411	13.2194	0.3647	13.2194	0.3304	13.2194	0.3133	13.2194	0.3024	13.2194	0.2893	13.2194	0.2831

PTWW038.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 38 – SLAB-WALL JOINT North-South Responses – Elevation 54 Ft. – Line 12.5 H

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
13.8489	0.6411	13.8489	0.3647	13.8489	0.3304	13.8489	0.3133	13.8489	0.3024	13.8489	0.2893	13.8489	0.2831
14.5083	0.6411	14.5083	0.3647	14.5083	0.3304	14.5083	0.3133	14.5083	0.3024	14.5083	0.2893	14.5083	0.2831
15.1991	0.6411	15.1991	0.3647	15.1991	0.3304	15.1991	0.3133	15.1991	0.3024	15.1991	0.2893	15.1991	0.2831
15.9228	0.6411	15.9228	0.3647	15.9228	0.3304	15.9228	0.3133	15.9228	0.3024	15.9228	0.2893	15.9228	0.2831
16.681	0.6411	16.681	0.3647	16.681	0.3304	16.681	0.3133	16.681	0.3024	16.681	0.2893	16.681	0.2831
17.4753	0.6411	17.4753	0.3647	17.4753	0.3304	17.4753	0.3133	17.4753	0.3024	17.4753	0.2893	17.4753	0.2831
18.3074	0.4714	18.3074	0.3284	18.3074	0.3152	18.3074	0.3052	18.3074	0.298	18.3074	0.2893	18.3074	0.2831
19.1791	0.4714	19.1791	0.3088	19.1791	0.2936	19.1791	0.2872	19.1791	0.2851	19.1791	0.2842	19.1791	0.2825
20.0923	0.4714	20.0923	0.3088	20.0923	0.2886	20.0923	0.2865	20.0923	0.2851	20.0923	0.2833	20.0923	0.2814
21.049	0.3824	21.049	0.2877	21.049	0.2842	21.049	0.2843	21.049	0.2836	21.049	0.2819	21.049	0.2801
22.0513	0.3824	22.0513	0.2873	22.0513	0.2834	22.0513	0.2816	22.0513	0.2806	22.0513	0.2795	22.0513	0.2783
23.1013	0.2973	23.1013	0.2832	23.1013	0.2814	23.1013	0.2802	23.1013	0.2793	23.1013	0.2779	23.1013	0.2765
24.2013	0.2947	24.2013	0.2805	24.2013	0.2788	24.2013	0.2776	24.2013	0.2768	24.2013	0.2763	24.2013	0.2756
25.3536	0.288	25.3536	0.2805	25.3536	0.2788	25.3536	0.2776	25.3536	0.2768	25.3536	0.2757	25.3536	0.2749
26.5609	0.288	26.5609	0.2805	26.5609	0.2788	26.5609	0.2776	26.5609	0.2768	26.5609	0.2757	26.5609	0.2747
27.8256	0.2867	27.8256	0.28	27.8256	0.2782	27.8256	0.2771	27.8256	0.2762	27.8256	0.2751	27.8256	0.2741
29.1505	0.2773	29.1505	0.2753	29.1505	0.2749	29.1505	0.2745	29.1505	0.2742	29.1505	0.2738	29.1505	0.2732
30.5386	0.2773	30.5386	0.2727	30.5386	0.2726	30.5386	0.2725	30.5386	0.2724	30.5386	0.2723	30.5386	0.2721
31.9927	0.2707	31.9927	0.271	31.9927	0.271	31.9927	0.2711	31.9927	0.2711	31.9927	0.2712	31.9927	0.2712
33.516	0.2707	33.516	0.2707	33.516	0.2706	33.516	0.2706	33.516	0.2706	33.516	0.2706	33.516	0.2706
35.1119	0.27	35.1119	0.27	35.1119	0.27	35.1119	0.2701	35.1119	0.2701	35.1119	0.2701	35.1119	0.2701
36.7838	0.2695	36.7838	0.2696	36.7838	0.2696	36.7838	0.2696	36.7838	0.2697	36.7838	0.2697	36.7838	0.2697
38.5353	0.2693	38.5353	0.2693	38.5353	0.2693	38.5353	0.2693	38.5353	0.2693	38.5353	0.2693	38.5353	0.2693
40.3702	0.269	40.3702	0.269	40.3702	0.269	40.3702	0.269	40.3702	0.269	40.3702	0.269	40.3702	0.269
42.2924	0.2687	42.2924	0.2687	42.2924	0.2687	42.2924	0.2687	42.2924	0.2687	42.2924	0.2687	42.2924	0.2688
44.3062	0.2685	44.3062	0.2685	44.3062	0.2685	44.3062	0.2685	44.3062	0.2685	44.3062	0.2685	44.3062	0.2685
46.4159	0.2683	46.4159	0.2683	46.4159	0.2683	46.4159	0.2683	46.4159	0.2683	46.4159	0.2683	46.4159	0.2683
48.626	0.2681	48.626	0.2681	48.626	0.2681	48.626	0.2681	48.626	0.2681	48.626	0.2681	48.626	0.2681
50.9414	0.2679	50.9414	0.2679	50.9414	0.2679	50.9414	0.2679	50.9414	0.2679	50.9414	0.2679	50.9414	0.2679

PTWW040.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g)
– Figure 40 – SLAB-WALL JOINT East-West Responses – Elevation 54 Ft. – Line 30 B

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.1098	0.0375	0.1098	0.0344	0.1098	0.0327	0.1098	0.0312	0.1098	0.0298	0.1098	0.0274	0.1098	0.0252
0.115	0.0375	0.115	0.0344	0.115	0.0327	0.115	0.0312	0.115	0.0299	0.115	0.0277	0.115	0.0258
0.1204	0.0375	0.1204	0.0344	0.1204	0.0331	0.1204	0.0322	0.1204	0.0312	0.1204	0.0294	0.1204	0.0269
0.1262	0.0431	0.1262	0.0397	0.1262	0.0378	0.1262	0.036	0.1262	0.0343	0.1262	0.0314	0.1262	0.0278
0.1322	0.0504	0.1322	0.045	0.1322	0.042	0.1322	0.0393	0.1322	0.0369	0.1322	0.0328	0.1322	0.0281
0.1385	0.056	0.1385	0.0489	0.1385	0.0449	0.1385	0.0414	0.1385	0.0384	0.1385	0.0345	0.1385	0.0303
0.1451	0.0581	0.1451	0.0509	0.1451	0.0475	0.1451	0.0445	0.1451	0.0419	0.1451	0.0375	0.1451	0.0326
0.152	0.0616	0.152	0.0546	0.152	0.0507	0.152	0.0472	0.152	0.0441	0.152	0.0391	0.152	0.0338
0.1592	0.062	0.1592	0.0546	0.1592	0.0507	0.1592	0.0472	0.1592	0.0442	0.1592	0.0397	0.1592	0.0351
0.1668	0.064	0.1668	0.0561	0.1668	0.0518	0.1668	0.0481	0.1668	0.0451	0.1668	0.0403	0.1668	0.0355
0.1748	0.064	0.1748	0.0561	0.1748	0.0518	0.1748	0.0481	0.1748	0.0451	0.1748	0.0403	0.1748	0.0355
0.1831	0.064	0.1831	0.0561	0.1831	0.0518	0.1831	0.0481	0.1831	0.0451	0.1831	0.0403	0.1831	0.0368
0.1918	0.0641	0.1918	0.0562	0.1918	0.0518	0.1918	0.0494	0.1918	0.0478	0.1918	0.0445	0.1918	0.0404
0.2009	0.0642	0.2009	0.0583	0.2009	0.0558	0.2009	0.0534	0.2009	0.0513	0.2009	0.0474	0.2009	0.0424
0.2105	0.0665	0.2105	0.0603	0.2105	0.0575	0.2105	0.0549	0.2105	0.0525	0.2105	0.049	0.2105	0.0449
0.2205	0.078	0.2205	0.0646	0.2205	0.0619	0.2205	0.0585	0.2205	0.0573	0.2205	0.0533	0.2205	0.0484
0.231	0.0933	0.231	0.0774	0.231	0.0694	0.231	0.063	0.231	0.0598	0.231	0.0556	0.231	0.0503
0.242	0.0933	0.242	0.0774	0.242	0.0722	0.242	0.0678	0.242	0.0637	0.242	0.0566	0.242	0.0512
0.2535	0.0933	0.2535	0.0817	0.2535	0.0771	0.2535	0.0729	0.2535	0.0692	0.2535	0.0628	0.2535	0.0552
0.2656	0.0933	0.2656	0.0839	0.2656	0.0794	0.2656	0.0754	0.2656	0.0717	0.2656	0.0653	0.2656	0.0575
0.2783	0.0953	0.2783	0.0846	0.2783	0.0794	0.2783	0.0754	0.2783	0.0717	0.2783	0.0653	0.2783	0.0581
0.2915	0.1186	0.2915	0.0985	0.2915	0.0889	0.2915	0.0814	0.2915	0.0754	0.2915	0.0668	0.2915	0.0594
0.3054	0.1503	0.3054	0.1233	0.3054	0.1096	0.3054	0.0984	0.3054	0.0894	0.3054	0.0758	0.3054	0.0632
0.3199	0.1503	0.3199	0.1233	0.3199	0.1096	0.3199	0.0984	0.3199	0.0894	0.3199	0.0802	0.3199	0.0706
0.3352	0.1503	0.3352	0.1233	0.3352	0.1096	0.3352	0.0984	0.3352	0.0932	0.3352	0.0857	0.3352	0.0762
0.3511	0.1503	0.3511	0.129	0.3511	0.1173	0.3511	0.107	0.3511	0.0997	0.3511	0.0894	0.3511	0.0786
0.3678	0.168	0.3678	0.1438	0.3678	0.1303	0.3678	0.1186	0.3678	0.1121	0.3678	0.1017	0.3678	0.0897
0.3853	0.168	0.3853	0.1438	0.3853	0.1345	0.3853	0.1278	0.3853	0.1218	0.3853	0.1114	0.3853	0.0992
0.4037	0.1939	0.4037	0.1599	0.4037	0.1426	0.4037	0.1306	0.4037	0.1259	0.4037	0.117	0.4037	0.1053
0.4229	0.2367	0.4229	0.1905	0.4229	0.172	0.4229	0.1557	0.4229	0.1416	0.4229	0.1217	0.4229	0.1092
0.4431	0.3089	0.4431	0.2194	0.4431	0.1882	0.4431	0.1671	0.4431	0.1496	0.4431	0.1274	0.4431	0.1099
0.4642	0.3417	0.4642	0.2574	0.4642	0.2138	0.4642	0.1852	0.4642	0.1637	0.4642	0.1345	0.4642	0.1215
0.4863	0.3417	0.4863	0.2561	0.4863	0.221	0.4863	0.1929	0.4863	0.1703	0.4863	0.1411	0.4863	0.1326
0.5094	0.3521	0.5094	0.2655	0.5094	0.2324	0.5094	0.2053	0.5094	0.1831	0.5094	0.15	0.5094	0.1394

PTWW040.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 40 – SLAB-WALL JOINT East-West Responses – Elevation 54 Ft. – Line 30 B

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.5337	0.4094	0.5337	0.277	0.5337	0.2324	0.5337	0.2053	0.5337	0.1831	0.5337	0.1539	0.5337	0.1399
0.5591	0.4094	0.5591	0.277	0.5591	0.2399	0.5591	0.2149	0.5591	0.195	0.5591	0.1656	0.5591	0.1399
0.5857	0.4094	0.5857	0.277	0.5857	0.2401	0.5857	0.2157	0.5857	0.1974	0.5857	0.1686	0.5857	0.144
0.6136	0.4473	0.6136	0.2968	0.6136	0.2443	0.6136	0.2233	0.6136	0.205	0.6136	0.175	0.6136	0.144
0.6428	0.478	0.6428	0.3546	0.6428	0.3004	0.6428	0.2612	0.6428	0.2347	0.6428	0.1989	0.6428	0.1683
0.6734	0.478	0.6734	0.3546	0.6734	0.3004	0.6734	0.2612	0.6734	0.2416	0.6734	0.2168	0.6734	0.1875
0.7055	0.478	0.7055	0.3546	0.7055	0.3004	0.7055	0.2612	0.7055	0.2416	0.7055	0.2187	0.7055	0.1922
0.7391	0.478	0.7391	0.3546	0.7391	0.3004	0.7391	0.2693	0.7391	0.2484	0.7391	0.2187	0.7391	0.1922
0.7743	0.5516	0.7743	0.3957	0.7743	0.3328	0.7743	0.2914	0.7743	0.2681	0.7743	0.2353	0.7743	0.2018
0.8111	0.5516	0.8111	0.3957	0.8111	0.3328	0.8111	0.3036	0.8111	0.2876	0.8111	0.2588	0.8111	0.2241
0.8497	0.5516	0.8497	0.3957	0.8497	0.3328	0.8497	0.312	0.8497	0.2986	0.8497	0.2726	0.8497	0.2377
0.8902	0.5516	0.8902	0.3957	0.8902	0.3658	0.8902	0.3432	0.8902	0.3226	0.8902	0.2872	0.8902	0.2459
0.9326	0.66	0.9326	0.5682	0.9326	0.4625	0.9326	0.4018	0.9326	0.3596	0.9326	0.3042	0.9326	0.2543
0.977	0.66	0.977	0.5682	0.977	0.4625	0.977	0.4042	0.977	0.3641	0.977	0.3081	0.977	0.2635
1.0235	0.9305	1.0235	0.596	1.0235	0.5259	1.0235	0.4813	1.0235	0.4435	1.0235	0.3836	1.0235	0.3273
1.0723	0.9305	1.0723	0.6681	1.0723	0.6026	1.0723	0.5463	1.0723	0.4991	1.0723	0.435	1.0723	0.3728
1.1233	1.3364	1.1233	0.8307	1.1233	0.678	1.1233	0.5832	1.1233	0.5403	1.1233	0.4675	1.1233	0.3994
1.1768	1.3364	1.1768	0.8307	1.1768	0.678	1.1768	0.5853	1.1768	0.5503	1.1768	0.486	1.1768	0.4233
1.2328	1.3364	1.2328	0.8307	1.2328	0.7352	1.2328	0.6585	1.2328	0.5916	1.2328	0.5089	1.2328	0.45
1.2916	1.3364	1.2916	0.8976	1.2916	0.7903	1.2916	0.7004	1.2916	0.6246	1.2916	0.5436	1.2916	0.479
1.353	1.3364	1.353	0.9456	1.353	0.7903	1.353	0.7004	1.353	0.6262	1.353	0.5719	1.353	0.5034
1.4175	1.4619	1.4175	0.9456	1.4175	0.7903	1.4175	0.7004	1.4175	0.6574	1.4175	0.6019	1.4175	0.5319
1.485	1.4619	1.485	0.9456	1.485	0.7903	1.485	0.7283	1.485	0.6958	1.485	0.6359	1.485	0.562
1.5557	1.5117	1.5557	1.0299	1.5557	0.8804	1.5557	0.7761	1.5557	0.7253	1.5557	0.6625	1.5557	0.5874
1.6298	1.815	1.6298	1.1102	1.6298	0.9568	1.6298	0.8641	1.6298	0.7943	1.6298	0.6883	1.6298	0.605
1.7074	1.815	1.7074	1.1102	1.7074	0.9568	1.7074	0.8641	1.7074	0.7943	1.7074	0.703	1.7074	0.6249
1.7887	1.815	1.7887	1.1102	1.7887	0.9568	1.7887	0.8641	1.7887	0.7943	1.7887	0.7234	1.7887	0.6496
1.8738	1.815	1.8738	1.1102	1.8738	0.9568	1.8738	0.8669	1.8738	0.8279	1.8738	0.7584	1.8738	0.6712
1.963	1.815	1.963	1.1102	1.963	0.9568	1.963	0.8979	1.963	0.8532	1.963	0.7761	1.963	0.6839
2.0565	1.7425	2.0565	1.0955	2.0565	0.961	2.0565	0.9033	2.0565	0.8536	2.0565	0.7761	2.0565	0.6839
2.1544	1.7425	2.1544	1.0955	2.1544	0.961	2.1544	0.9033	2.1544	0.8536	2.1544	0.7761	2.1544	0.6839
2.257	1.515	2.257	1.0774	2.257	0.961	2.257	0.9033	2.257	0.8536	2.257	0.7761	2.257	0.6839
2.3645	1.515	2.3645	1.0774	2.3645	0.961	2.3645	0.9033	2.3645	0.8536	2.3645	0.7761	2.3645	0.6839
2.4771	1.515	2.4771	1.0774	2.4771	1.0152	2.4771	0.9033	2.4771	0.8536	2.4771	0.7713	2.4771	0.6886
2.595	1.515	2.595	1.0774	2.595	1.0152	2.595	0.9033	2.595	0.8536	2.595	0.7713	2.595	0.6927

PTWW040.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 40 – SLAB-WALL JOINT East-West Responses – Elevation 54 Ft. – Line 30 B

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
2.7186	1.515	2.7186	1.0774	2.7186	1.0152	2.7186	0.9033	2.7186	0.8536	2.7186	0.7713	2.7186	0.6934
2.848	1.515	2.848	1.0774	2.848	1.0152	2.848	0.9033	2.848	0.8536	2.848	0.7713	2.848	0.6934
2.9836	1.515	2.9836	1.0774	2.9836	1.0152	2.9836	0.9033	2.9836	0.8536	2.9836	0.7713	2.9836	0.6934
3.1257	1.515	3.1257	1.0774	3.1257	1.0152	3.1257	0.9033	3.1257	0.8536	3.1257	0.7713	3.1257	0.6934
3.2745	1.515	3.2745	1.0774	3.2745	1.0152	3.2745	0.9033	3.2745	0.8536	3.2745	0.7713	3.2745	0.6934
3.4305	1.515	3.4305	1.0774	3.4305	1.0152	3.4305	0.9033	3.4305	0.8536	3.4305	0.7713	3.4305	0.692
3.5938	1.7924	3.5938	1.0774	3.5938	1.0152	3.5938	0.9033	3.5938	0.8536	3.5938	0.7713	3.5938	0.6916
3.7649	1.7924	3.7649	1.0921	3.7649	1.0152	3.7649	0.9076	3.7649	0.8536	3.7649	0.7713	3.7649	0.6893
3.9442	1.7924	3.9442	1.0921	3.9442	1.0628	3.9442	0.9721	3.9442	0.9001	3.9442	0.7901	3.9442	0.6893
4.132	1.7924	4.132	1.0921	4.132	1.0628	4.132	0.9721	4.132	0.9001	4.132	0.7901	4.132	0.6876
4.3288	1.7924	4.3288	1.0921	4.3288	1.0628	4.3288	0.9721	4.3288	0.9001	4.3288	0.7901	4.3288	0.6805
4.5349	1.7924	4.5349	1.0921	4.5349	1.0628	4.5349	0.9721	4.5349	0.9001	4.5349	0.7901	4.5349	0.676
4.7508	1.7924	4.7508	1.0921	4.7508	1.0628	4.7508	0.9721	4.7508	0.9001	4.7508	0.7901	4.7508	0.6736
4.977	1.7924	4.977	1.0921	4.977	0.9506	4.977	0.8979	4.977	0.8494	4.977	0.7652	4.977	0.6688
5.214	1.7924	5.214	1.0921	5.214	0.9383	5.214	0.8718	5.214	0.8233	5.214	0.7464	5.214	0.654
5.4623	2.0429	5.4623	1.0921	5.4623	0.9383	5.4623	0.8718	5.4623	0.8233	5.4623	0.7464	5.4623	0.654
5.7224	2.0429	5.7224	1.0974	5.7224	0.9383	5.7224	0.8718	5.7224	0.8233	5.7224	0.7464	5.7224	0.654
5.9948	2.0429	5.9948	1.0974	5.9948	0.9383	5.9948	0.8718	5.9948	0.8233	5.9948	0.7464	5.9948	0.654
6.2803	2.0429	6.2803	1.0974	6.2803	0.9383	6.2803	0.8718	6.2803	0.8233	6.2803	0.7464	6.2803	0.654
6.5793	2.0429	6.5793	1.0974	6.5793	0.9383	6.5793	0.8718	6.5793	0.8218	6.5793	0.7401	6.5793	0.6457
6.8926	2.0429	6.8926	1.0974	6.8926	0.9383	6.8926	0.852	6.8926	0.7921	6.8926	0.7107	6.8926	0.6236
7.2208	1.6443	7.2208	1.0312	7.2208	0.8872	7.2208	0.8236	7.2208	0.7712	7.2208	0.6856	7.2208	0.6178
7.5646	1.3629	7.5646	0.9367	7.5646	0.8389	7.5646	0.785	7.5646	0.7436	7.5646	0.6831	7.5646	0.6178
7.9248	1.3378	7.9248	0.8974	7.9248	0.827	7.9248	0.7757	7.9248	0.7347	7.9248	0.6707	7.9248	0.604
8.3022	1.3378	8.3022	0.8407	8.3022	0.7713	8.3022	0.7153	8.3022	0.6828	8.3022	0.6374	8.3022	0.5873
8.6975	0.9422	8.6975	0.6767	8.6975	0.6523	8.6975	0.6296	8.6975	0.6076	8.6975	0.5724	8.6975	0.5488
9.1116	0.9081	9.1116	0.6623	9.1116	0.6141	9.1116	0.5759	9.1116	0.551	9.1116	0.5261	9.1116	0.5145
9.5455	0.9081	9.5455	0.6266	9.5455	0.5795	9.5455	0.5505	9.5455	0.5315	9.5455	0.5085	9.5455	0.4961
10	0.8734	10	0.6266	10	0.5795	10	0.5505	10	0.5315	10	0.5083	10	0.4875
10.4762	0.7653	10.4762	0.5513	10.4762	0.528	10.4762	0.5125	10.4762	0.5017	10.4762	0.4862	10.4762	0.4714
10.975	0.7298	10.975	0.5252	10.975	0.5066	10.975	0.4911	10.975	0.479	10.975	0.4624	10.975	0.4529
11.4976	0.7298	11.4976	0.5252	11.4976	0.5066	11.4976	0.4911	11.4976	0.479	11.4976	0.4624	11.4976	0.4475
12.045	0.7298	12.045	0.5252	12.045	0.5066	12.045	0.4911	12.045	0.479	12.045	0.4624	12.045	0.4475
12.6186	0.7298	12.6186	0.516	12.6186	0.4966	12.6186	0.483	12.6186	0.4727	12.6186	0.4569	12.6186	0.4415
13.2194	0.7298	13.2194	0.516	13.2194	0.4659	13.2194	0.4393	13.2194	0.438	13.2194	0.4349	13.2194	0.4272

PTWW040.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 40 ~ SLAB-WALL JOINT East-West Responses ~ Elevation 54 Ft. ~ Line 30 B

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
13.8489	0.7298	13.8489	0.516	13.8489	0.4659	13.8489	0.4388	13.8489	0.4278	13.8489	0.4202	13.8489	0.4132
14.5083	0.7298	14.5083	0.516	14.5083	0.4659	14.5083	0.4388	14.5083	0.4278	14.5083	0.4164	14.5083	0.4056
15.1991	0.7298	15.1991	0.516	15.1991	0.4659	15.1991	0.4388	15.1991	0.4209	15.1991	0.4033	15.1991	0.3946
15.9228	0.7298	15.9228	0.516	15.9228	0.4659	15.9228	0.4388	15.9228	0.4209	15.9228	0.4007	15.9228	0.3861
16.681	0.7298	16.681	0.516	16.681	0.4659	16.681	0.4388	16.681	0.4209	16.681	0.4007	16.681	0.3861
17.4753	0.7298	17.4753	0.516	17.4753	0.4659	17.4753	0.4388	17.4753	0.4209	17.4753	0.4007	17.4753	0.3861
18.3074	0.7298	18.3074	0.516	18.3074	0.4659	18.3074	0.4388	18.3074	0.4209	18.3074	0.4007	18.3074	0.3861
19.1791	0.8702	19.1791	0.516	19.1791	0.4659	19.1791	0.4388	19.1791	0.4209	19.1791	0.4007	19.1791	0.3861
20.0923	0.8702	20.0923	0.516	20.0923	0.4659	20.0923	0.4388	20.0923	0.4209	20.0923	0.4007	20.0923	0.3861
21.049	0.8702	21.049	0.516	21.049	0.4659	21.049	0.4388	21.049	0.4209	21.049	0.4007	21.049	0.3861
22.0513	0.8702	22.0513	0.516	22.0513	0.4659	22.0513	0.4388	22.0513	0.4209	22.0513	0.4007	22.0513	0.3835
23.1013	0.8702	23.1013	0.516	23.1013	0.4659	23.1013	0.4388	23.1013	0.4209	23.1013	0.4007	23.1013	0.3835
24.2013	0.7893	24.2013	0.5103	24.2013	0.4659	24.2013	0.4388	24.2013	0.4209	24.2013	0.3995	24.2013	0.3835
25.3536	0.7893	25.3536	0.4648	25.3536	0.4175	25.3536	0.405	25.3536	0.4012	25.3536	0.3926	25.3536	0.3817
26.5609	0.7893	26.5609	0.4648	26.5609	0.4175	26.5609	0.3899	26.5609	0.38	26.5609	0.3779	26.5609	0.3729
27.8256	0.4998	27.8256	0.4141	27.8256	0.3879	27.8256	0.3762	27.8256	0.3726	27.8256	0.3682	27.8256	0.3643
29.1505	0.4217	29.1505	0.3866	29.1505	0.3763	29.1505	0.3678	29.1505	0.3612	29.1505	0.3558	29.1505	0.3554
30.5386	0.4217	30.5386	0.3633	30.5386	0.3554	30.5386	0.3517	30.5386	0.3499	30.5386	0.3485	30.5386	0.348
31.9927	0.3545	31.9927	0.3404	31.9927	0.3386	31.9927	0.3376	31.9927	0.3374	31.9927	0.3399	31.9927	0.3417
33.516	0.3442	33.516	0.3404	33.516	0.3386	33.516	0.3376	33.516	0.3371	33.516	0.3365	33.516	0.3379
35.1119	0.3392	35.1119	0.3385	35.1119	0.338	35.1119	0.3376	35.1119	0.3371	35.1119	0.3365	35.1119	0.3359
36.7838	0.3368	36.7838	0.3366	36.7838	0.3364	36.7838	0.3362	36.7838	0.336	36.7838	0.3356	36.7838	0.3352
38.5353	0.3351	38.5353	0.335	38.5353	0.3349	38.5353	0.3348	38.5353	0.3347	38.5353	0.3345	38.5353	0.3343
40.3702	0.3338	40.3702	0.3337	40.3702	0.3336	40.3702	0.3336	40.3702	0.3336	40.3702	0.3334	40.3702	0.3333
42.2924	0.3326	42.2924	0.3326	42.2924	0.3325	42.2924	0.3325	42.2924	0.3325	42.2924	0.3324	42.2924	0.3323
44.3062	0.3316	44.3062	0.3316	44.3062	0.3316	44.3062	0.3316	44.3062	0.3315	44.3062	0.3315	44.3062	0.3315
46.4159	0.3307	46.4159	0.3307	46.4159	0.3307	46.4159	0.3307	46.4159	0.3307	46.4159	0.3307	46.4159	0.3307
48.626	0.3299	48.626	0.3299	48.626	0.3299	48.626	0.3299	48.626	0.3299	48.626	0.3299	48.626	0.3299
50.9414	0.3291	50.9414	0.3291	50.9414	0.3291	50.9414	0.3291	50.9414	0.3291	50.9414	0.3291	50.9414	0.3292

PTWW041.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 41 – SLAB-WALL JOINT North-South Responses – Elevation 54 Ft. – Line 30 B

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.1098	0.0404	0.1098	0.0365	0.1098	0.0342	0.1098	0.0321	0.1098	0.0303	0.1098	0.0271	0.1098	0.0235
0.115	0.0404	0.115	0.0365	0.115	0.0342	0.115	0.0321	0.115	0.0303	0.115	0.0271	0.115	0.0256
0.1204	0.0404	0.1204	0.0365	0.1204	0.0342	0.1204	0.0321	0.1204	0.0309	0.1204	0.0295	0.1204	0.0277
0.1262	0.0404	0.1262	0.0365	0.1262	0.0351	0.1262	0.0342	0.1262	0.0332	0.1262	0.0315	0.1262	0.0295
0.1322	0.0404	0.1322	0.0381	0.1322	0.0369	0.1322	0.0357	0.1322	0.0347	0.1322	0.0331	0.1322	0.0315
0.1385	0.0409	0.1385	0.039	0.1385	0.0379	0.1385	0.037	0.1385	0.0361	0.1385	0.0346	0.1385	0.0327
0.1451	0.0416	0.1451	0.0397	0.1451	0.0386	0.1451	0.0376	0.1451	0.0367	0.1451	0.0352	0.1451	0.0332
0.152	0.0439	0.152	0.0401	0.152	0.0386	0.152	0.0376	0.152	0.0367	0.152	0.0352	0.152	0.0332
0.1592	0.0462	0.1592	0.0416	0.1592	0.0395	0.1592	0.0376	0.1592	0.0367	0.1592	0.0352	0.1592	0.0332
0.1668	0.0584	0.1668	0.0505	0.1668	0.0462	0.1668	0.0426	0.1668	0.0394	0.1668	0.0352	0.1668	0.0332
0.1748	0.0644	0.1748	0.0566	0.1748	0.0521	0.1748	0.0483	0.1748	0.045	0.1748	0.0394	0.1748	0.0332
0.1831	0.0667	0.1831	0.0582	0.1831	0.0541	0.1831	0.0504	0.1831	0.047	0.1831	0.0414	0.1831	0.0353
0.1918	0.0678	0.1918	0.0585	0.1918	0.0542	0.1918	0.0506	0.1918	0.0473	0.1918	0.0417	0.1918	0.0379
0.2009	0.0697	0.2009	0.0595	0.2009	0.0542	0.2009	0.0511	0.2009	0.0484	0.2009	0.0434	0.2009	0.041
0.2105	0.0721	0.2105	0.0618	0.2105	0.0579	0.2105	0.0545	0.2105	0.0514	0.2105	0.0481	0.2105	0.0444
0.2205	0.0818	0.2205	0.0709	0.2205	0.0651	0.2205	0.0599	0.2205	0.0573	0.2205	0.053	0.2205	0.0474
0.231	0.0958	0.231	0.0791	0.231	0.0703	0.231	0.0666	0.231	0.0631	0.231	0.0572	0.231	0.0519
0.242	0.098	0.242	0.0843	0.242	0.0773	0.242	0.0714	0.242	0.0675	0.242	0.0613	0.242	0.0546
0.2535	0.1058	0.2535	0.091	0.2535	0.083	0.2535	0.0759	0.2535	0.0699	0.2535	0.0613	0.2535	0.0546
0.2656	0.1138	0.2656	0.0945	0.2656	0.0842	0.2656	0.0759	0.2656	0.0699	0.2656	0.0613	0.2656	0.0546
0.2783	0.1138	0.2783	0.0945	0.2783	0.0842	0.2783	0.0778	0.2783	0.0737	0.2783	0.067	0.2783	0.06
0.2915	0.1138	0.2915	0.1001	0.2915	0.0939	0.2915	0.0884	0.2915	0.0835	0.2915	0.0753	0.2915	0.0664
0.3054	0.1172	0.3054	0.1049	0.3054	0.0979	0.3054	0.0918	0.3054	0.0864	0.3054	0.0776	0.3054	0.0687
0.3199	0.1172	0.3199	0.1049	0.3199	0.0979	0.3199	0.0918	0.3199	0.0881	0.3199	0.0829	0.3199	0.0766
0.3352	0.1172	0.3352	0.1085	0.3352	0.1042	0.3352	0.1003	0.3352	0.0967	0.3352	0.0904	0.3352	0.083
0.3511	0.1645	0.3511	0.128	0.3511	0.1118	0.3511	0.1061	0.3511	0.102	0.3511	0.095	0.3511	0.0868
0.3678	0.2408	0.3678	0.1827	0.3678	0.1561	0.3678	0.1359	0.3678	0.1205	0.3678	0.0995	0.3678	0.0869
0.3853	0.2539	0.3853	0.1862	0.3853	0.1588	0.3853	0.138	0.3853	0.1255	0.3853	0.1079	0.3853	0.0897
0.4037	0.2539	0.4037	0.1862	0.4037	0.1588	0.4037	0.138	0.4037	0.1261	0.4037	0.1142	0.4037	0.102
0.4229	0.2539	0.4229	0.1862	0.4229	0.1641	0.4229	0.1478	0.4229	0.1338	0.4229	0.122	0.4229	0.1107
0.4431	0.3276	0.4431	0.2318	0.4431	0.2019	0.4431	0.1796	0.4431	0.1626	0.4431	0.1389	0.4431	0.1174
0.4642	0.3276	0.4642	0.2318	0.4642	0.2019	0.4642	0.1796	0.4642	0.1626	0.4642	0.1389	0.4642	0.1174
0.4863	0.3276	0.4863	0.2318	0.4863	0.2019	0.4863	0.1796	0.4863	0.1626	0.4863	0.1415	0.4863	0.1242
0.5094	0.3276	0.5094	0.2318	0.5094	0.2019	0.5094	0.1796	0.5094	0.1626	0.5094	0.1475	0.5094	0.1293
0.5337	0.3338	0.5337	0.2306	0.5337	0.2061	0.5337	0.1862	0.5337	0.1776	0.5337	0.1596	0.5337	0.1387
0.5591	0.3945	0.5591	0.2731	0.5591	0.2401	0.5591	0.2143	0.5591	0.1954	0.5591	0.171	0.5591	0.1533
0.5857	0.3945	0.5857	0.2819	0.5857	0.2531	0.5857	0.229	0.5857	0.2088	0.5857	0.1825	0.5857	0.1694

PTWW041.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 41 – SLAB-WALL JOINT North-South Responses – Elevation 54 Ft. – Line 30 B

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.6136	0.3945	0.6136	0.2819	0.6136	0.2531	0.6136	0.229	0.6136	0.2088	0.6136	0.1962	0.6136	0.1818
0.6428	0.3945	0.6428	0.2819	0.6428	0.2531	0.6428	0.229	0.6428	0.2176	0.6428	0.2071	0.6428	0.1923
0.6734	0.4051	0.6734	0.2819	0.6734	0.2545	0.6734	0.2401	0.6734	0.2329	0.6734	0.2199	0.6734	0.2038
0.7055	0.4051	0.7055	0.2964	0.7055	0.271	0.7055	0.2585	0.7055	0.2495	0.7055	0.2325	0.7055	0.2132
0.7391	0.6253	0.7391	0.4092	0.7391	0.3339	0.7391	0.2852	0.7391	0.2678	0.7391	0.2386	0.7391	0.2148
0.7743	0.6253	0.7743	0.4092	0.7743	0.3339	0.7743	0.2977	0.7743	0.2799	0.7743	0.2506	0.7743	0.2178
0.8111	0.6459	0.8111	0.4264	0.8111	0.373	0.8111	0.3304	0.8111	0.2973	0.8111	0.2507	0.8111	0.2178
0.8497	0.6459	0.8497	0.4295	0.8497	0.3929	0.8497	0.3623	0.8497	0.3363	0.8497	0.2936	0.8497	0.2475
0.8902	0.8685	0.8902	0.436	0.8902	0.3929	0.8902	0.3623	0.8902	0.3395	0.8902	0.3086	0.8902	0.2662
0.9326	0.715	0.9326	0.5019	0.9326	0.4411	0.9326	0.3968	0.9326	0.3633	0.9326	0.3158	0.9326	0.2706
0.977	0.9571	0.977	0.6109	0.977	0.5027	0.977	0.4349	0.977	0.3889	0.977	0.3313	0.977	0.2835
1.0235	0.9571	1.0235	0.6109	1.0235	0.5406	1.0235	0.4899	1.0235	0.4478	1.0235	0.3835	1.0235	0.3191
1.0723	0.9571	1.0723	0.629	1.0723	0.5623	1.0723	0.5069	1.0723	0.4603	1.0723	0.3954	1.0723	0.3351
1.1233	1.2112	1.1233	0.8095	1.1233	0.677	1.1233	0.5824	1.1233	0.5124	1.1233	0.4175	1.1233	0.3358
1.1768	1.2112	1.1768	0.8095	1.1768	0.677	1.1768	0.5824	1.1768	0.5124	1.1768	0.42	1.1768	0.3516
1.2328	1.2112	1.2328	0.8776	1.2328	0.7898	1.2328	0.6846	1.2328	0.6149	1.2328	0.5095	1.2328	0.4049
1.2916	1.2112	1.2916	0.9725	1.2916	0.8448	1.2916	0.7451	1.2916	0.6651	1.2916	0.5458	1.2916	0.4303
1.353	1.2406	1.353	0.9725	1.353	0.8448	1.353	0.7451	1.353	0.6651	1.353	0.5458	1.353	0.4328
1.4175	1.4927	1.4175	1.0398	1.4175	0.8977	1.4175	0.7987	1.4175	0.7236	1.4175	0.6126	1.4175	0.5041
1.485	1.4927	1.485	1.0398	1.485	0.8977	1.485	0.8136	1.485	0.7581	1.485	0.6601	1.485	0.5488
1.5557	1.7257	1.5557	1.093	1.5557	0.9164	1.5557	0.8185	1.5557	0.7581	1.5557	0.6879	1.5557	0.5679
1.6298	1.7649	1.6298	1.1715	1.6298	1.0429	1.6298	0.9398	1.6298	0.8509	1.6298	0.7188	1.6298	0.5845
1.7074	1.7649	1.7074	1.1911	1.7074	1.1181	1.7074	1.0082	1.7074	0.9156	1.7074	0.7654	1.7074	0.6266
1.7887	2.1543	1.7887	1.1911	1.7887	1.1181	1.7887	1.0082	1.7887	0.9156	1.7887	0.7791	1.7887	0.663
1.8738	2.1543	1.8738	1.1911	1.8738	1.1181	1.8738	1.0082	1.8738	0.9156	1.8738	0.8133	1.8738	0.691
1.963	2.1543	1.963	1.1911	1.963	1.1181	1.963	1.0088	1.963	0.9469	1.963	0.8387	1.963	0.7107
2.0565	2.1543	2.0565	1.1911	2.0565	1.1181	2.0565	1.0239	2.0565	0.9641	2.0565	0.8545	2.0565	0.7208
2.1544	2.1543	2.1544	1.1911	2.1544	1.1641	2.1544	1.0719	2.1544	0.993	2.1544	0.8646	2.1544	0.7434
2.257	1.9859	2.257	1.2401	2.257	1.1641	2.257	1.0719	2.257	0.993	2.257	0.8753	2.257	0.7534
2.3645	1.9859	2.3645	1.2401	2.3645	1.1641	2.3645	1.0719	2.3645	0.993	2.3645	0.8753	2.3645	0.7534
2.4771	1.9859	2.4771	1.3882	2.4771	1.1641	2.4771	1.0719	2.4771	0.993	2.4771	0.8753	2.4771	0.7534
2.595	1.838	2.595	1.3882	2.595	1.1641	2.595	1.0719	2.595	0.993	2.595	0.8753	2.595	0.7534
2.7186	1.838	2.7186	1.3882	2.7186	1.1614	2.7186	1.0549	2.7186	0.9795	2.7186	0.8753	2.7186	0.7534
2.848	1.838	2.848	1.3882	2.848	1.1614	2.848	1.0498	2.848	0.9795	2.848	0.8675	2.848	0.7385
2.9836	1.838	2.9836	1.3882	2.9836	1.1614	2.9836	1.0498	2.9836	0.9818	2.9836	0.8311	2.9836	0.6992
3.1257	1.838	3.1257	1.1633	3.1257	0.9244	3.1257	0.8554	3.1257	0.8062	3.1257	0.728	3.1257	0.6366
3.2745	1.7993	3.2745	1.0437	3.2745	0.8857	3.2745	0.7926	3.2745	0.7237	3.2745	0.6347	3.2745	0.5767
3.4305	1.2506	3.4305	0.8608	3.4305	0.774	3.4305	0.7077	3.4305	0.6696	3.4305	0.5994	3.4305	0.5377

PTWW041.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 41 ~ SLAB-WALL JOINT North-South Responses ~ Elevation 54 Ft. ~ Line 30 B

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
3.5938	1.2506	3.5938	0.826	3.5938	0.7467	3.5938	0.6903	3.5938	0.6397	3.5938	0.5691	3.5938	0.503
3.7649	1.2506	3.7649	0.8108	3.7649	0.7467	3.7649	0.6903	3.7649	0.6397	3.7649	0.5581	3.7649	0.4924
3.9442	1.2506	3.9442	0.7736	3.9442	0.7467	3.9442	0.6903	3.9442	0.6397	3.9442	0.5581	3.9442	0.4924
4.132	1.2506	4.132	0.7736	4.132	0.7467	4.132	0.6903	4.132	0.6397	4.132	0.5581	4.132	0.4924
4.3288	1.2506	4.3288	0.7736	4.3288	0.7467	4.3288	0.6903	4.3288	0.6397	4.3288	0.5581	4.3288	0.4759
4.5349	1.2506	4.5349	0.7736	4.5349	0.7467	4.5349	0.6903	4.5349	0.6397	4.5349	0.5581	4.5349	0.4759
4.7508	1.2506	4.7508	0.7736	4.7508	0.7467	4.7508	0.6903	4.7508	0.6397	4.7508	0.5581	4.7508	0.4769
4.977	1.2506	4.977	0.7736	4.977	0.7467	4.977	0.6903	4.977	0.6397	4.977	0.5581	4.977	0.4759
5.214	1.2506	5.214	0.7736	5.214	0.7467	5.214	0.6903	5.214	0.6397	5.214	0.5581	5.214	0.4759
5.4623	1.2506	5.4623	0.7736	5.4623	0.7467	5.4623	0.6903	5.4623	0.6397	5.4623	0.5581	5.4623	0.4759
5.7224	1.3691	5.7224	0.7736	5.7224	0.7467	5.7224	0.6903	5.7224	0.6397	5.7224	0.5581	5.7224	0.4759
5.9948	1.3691	5.9948	0.7736	5.9948	0.7467	5.9948	0.6903	5.9948	0.6397	5.9948	0.5581	5.9948	0.4759
6.2803	1.3691	6.2803	0.7736	6.2803	0.7467	6.2803	0.6903	6.2803	0.6397	6.2803	0.5581	6.2803	0.4759
6.5793	1.3691	6.5793	0.7736	6.5793	0.6755	6.5793	0.6357	6.5793	0.6231	6.5793	0.5476	6.5793	0.4759
6.8926	1.3691	6.8926	0.7736	6.8926	0.6755	6.8926	0.6357	6.8926	0.6231	6.8926	0.5462	6.8926	0.4683
7.2208	1.3691	7.2208	0.7253	7.2208	0.6201	7.2208	0.5644	7.2208	0.5427	7.2208	0.503	7.2208	0.4505
7.5646	1.3691	7.5646	0.7065	7.5646	0.6004	7.5646	0.5644	7.5646	0.5365	7.5646	0.4909	7.5646	0.436
7.9248	1.3691	7.9248	0.6416	7.9248	0.5598	7.9248	0.5335	7.9248	0.509	7.9248	0.4659	7.9248	0.4264
8.3022	1.3691	8.3022	0.6416	8.3022	0.556	8.3022	0.5083	8.3022	0.486	8.3022	0.454	8.3022	0.4264
8.6975	1.0067	8.6975	0.5785	8.6975	0.5365	8.6975	0.5083	8.6975	0.486	8.6975	0.454	8.6975	0.4229
9.1116	1.0067	9.1116	0.5785	9.1116	0.5203	9.1116	0.4913	9.1116	0.4686	9.1116	0.4364	9.1116	0.4147
9.5455	1.0067	9.5455	0.5785	9.5455	0.5203	9.5455	0.4913	9.5455	0.4686	9.5455	0.4364	9.5455	0.4101
10	0.7958	10	0.5553	10	0.5203	10	0.4913	10	0.4686	10	0.4364	10	0.4073
10.4762	0.7386	10.4762	0.4651	10.4762	0.4518	10.4762	0.4415	10.4762	0.4329	10.4762	0.4181	10.4762	0.3995
10.975	0.5938	10.975	0.4522	10.975	0.4338	10.975	0.4223	10.975	0.4154	10.975	0.4045	10.975	0.3897
11.4976	0.5139	11.4976	0.4522	11.4976	0.4338	11.4976	0.422	11.4976	0.4137	11.4976	0.4011	11.4976	0.3866
12.045	0.5	12.045	0.4195	12.045	0.4106	12.045	0.4049	12.045	0.4002	12.045	0.3914	12.045	0.3794
12.6186	0.5	12.6186	0.4087	12.6186	0.4008	12.6186	0.3948	12.6186	0.3897	12.6186	0.3812	12.6186	0.3706
13.2194	0.5	13.2194	0.3855	13.2194	0.3801	13.2194	0.3771	13.2194	0.3744	13.2194	0.3688	13.2194	0.3604
13.8489	0.5	13.8489	0.3777	13.8489	0.3691	13.8489	0.3663	13.8489	0.3634	13.8489	0.3575	13.8489	0.3497
14.5083	0.5	14.5083	0.3777	14.5083	0.3639	14.5083	0.3557	14.5083	0.3504	14.5083	0.3441	14.5083	0.3379
15.1991	0.5	15.1991	0.3523	15.1991	0.3413	15.1991	0.3407	15.1991	0.3396	15.1991	0.3368	15.1991	0.3315
15.9228	0.5	15.9228	0.3523	15.9228	0.3412	15.9228	0.3382	15.9228	0.3365	15.9228	0.3326	15.9228	0.3271
16.681	0.5	16.681	0.3523	16.681	0.3412	16.681	0.3355	16.681	0.3317	16.681	0.3266	16.681	0.3214
17.4753	0.5	17.4753	0.3351	17.4753	0.325	17.4753	0.321	17.4753	0.319	17.4753	0.3167	17.4753	0.3142
18.3074	0.5	18.3074	0.3274	18.3074	0.315	18.3074	0.3103	18.3074	0.3078	18.3074	0.3085	18.3074	0.3079
19.1791	0.5	19.1791	0.3274	19.1791	0.315	19.1791	0.3103	19.1791	0.3078	19.1791	0.3055	19.1791	0.3039
20.0923	0.5	20.0923	0.3274	20.0923	0.308	20.0923	0.3058	20.0923	0.3038	20.0923	0.302	20.0923	0.3007

PTWW041.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 41 ~ SLAB-WALL JOINT North-South Responses ~ Elevation 54 Ft. ~ Line 30 B

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
21.049	0.5	21.049	0.3274	21.049	0.308	21.049	0.3058	21.049	0.3038	21.049	0.3009	21.049	0.2981
22.0513	0.5	22.0513	0.3274	22.0513	0.304	22.0513	0.3018	22.0513	0.3	22.0513	0.2973	22.0513	0.2949
23.1013	0.3991	23.1013	0.3036	23.1013	0.2994	23.1013	0.297	23.1013	0.2955	23.1013	0.2936	23.1013	0.2918
24.2013	0.3991	24.2013	0.3007	24.2013	0.294	24.2013	0.2912	24.2013	0.2902	24.2013	0.2896	24.2013	0.2887
25.3536	0.3991	25.3536	0.3007	25.3536	0.294	25.3536	0.2912	25.3536	0.2902	25.3536	0.2886	25.3536	0.2871
26.5609	0.3991	26.5609	0.3007	26.5609	0.294	26.5609	0.2907	26.5609	0.2888	26.5609	0.2868	26.5609	0.2852
27.8256	0.3991	27.8256	0.2989	27.8256	0.2931	27.8256	0.2896	27.8256	0.2872	27.8256	0.2843	27.8256	0.2831
29.1505	0.3991	29.1505	0.2989	29.1505	0.2931	29.1505	0.2896	29.1505	0.2872	29.1505	0.2843	29.1505	0.282
30.5386	0.3399	30.5386	0.2901	30.5386	0.2875	30.5386	0.2855	30.5386	0.284	30.5386	0.2817	30.5386	0.2796
31.9927	0.2956	31.9927	0.2753	31.9927	0.2743	31.9927	0.2755	31.9927	0.2761	31.9927	0.2765	31.9927	0.2762
33.516	0.2753	33.516	0.2729	33.516	0.2727	33.516	0.2728	33.516	0.2729	33.516	0.2732	33.516	0.2734
35.1119	0.2708	35.1119	0.2709	35.1119	0.271	35.1119	0.2711	35.1119	0.2711	35.1119	0.2712	35.1119	0.2714
36.7838	0.2688	36.7838	0.2691	36.7838	0.2692	36.7838	0.2693	36.7838	0.2694	36.7838	0.2696	36.7838	0.2697
38.5353	0.2675	38.5353	0.2677	38.5353	0.2679	38.5353	0.268	38.5353	0.268	38.5353	0.2682	38.5353	0.2684
40.3702	0.2666	40.3702	0.2668	40.3702	0.2669	40.3702	0.2669	40.3702	0.267	40.3702	0.2672	40.3702	0.2673
42.2924	0.2659	42.2924	0.266	42.2924	0.2661	42.2924	0.2661	42.2924	0.2662	42.2924	0.2663	42.2924	0.2664
44.3062	0.2653	44.3062	0.2654	44.3062	0.2654	44.3062	0.2654	44.3062	0.2655	44.3062	0.2655	44.3062	0.2657
46.4159	0.2648	46.4159	0.2648	46.4159	0.2648	46.4159	0.2648	46.4159	0.2648	46.4159	0.2649	46.4159	0.265
48.626	0.2643	48.626	0.2643	48.626	0.2643	48.626	0.2643	48.626	0.2643	48.626	0.2643	48.626	0.2644
50.9414	0.2638	50.9414	0.2638	50.9414	0.2638	50.9414	0.2638	50.9414	0.2638	50.9414	0.2638	50.9414	0.2638

PTWW115.grf – RPP-WTP Pretreatment Facility ISRS – Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A – Frequency (cps) – Spectral Acceleration (g) – Figure 115 – SLAB ONLY Vertical Responses – Elevation 56 ft. – EL56_C-E-17-20

Damping Freq.	0.50% Accel.	Freq.	2% Accel.	Freq.	3% Accel.	Freq.	4% Accel.	Freq.	5% Accel.	Freq.	7% Accel.	Freq.	10% Accel.
0.1098	0.0291	0.1098	0.026	0.1098	0.0244	0.1098	0.023	0.1098	0.0221	0.1098	0.0214	0.1098	0.0205
0.115	0.0309	0.115	0.026	0.115	0.0244	0.115	0.0234	0.115	0.023	0.115	0.0222	0.115	0.0212
0.1204	0.0313	0.1204	0.0263	0.1204	0.0246	0.1204	0.0241	0.1204	0.0236	0.1204	0.0228	0.1204	0.0218
0.1262	0.0313	0.1262	0.0269	0.1262	0.0257	0.1262	0.0245	0.1262	0.024	0.1262	0.0233	0.1262	0.0224
0.1322	0.0313	0.1322	0.0271	0.1322	0.0258	0.1322	0.0248	0.1322	0.0244	0.1322	0.0236	0.1322	0.0226
0.1385	0.0313	0.1385	0.0277	0.1385	0.0265	0.1385	0.0255	0.1385	0.0246	0.1385	0.0236	0.1385	0.0226
0.1451	0.0316	0.1451	0.0295	0.1451	0.0283	0.1451	0.0271	0.1451	0.0261	0.1451	0.0241	0.1451	0.0226
0.152	0.032	0.152	0.0299	0.152	0.0286	0.152	0.0274	0.152	0.0262	0.152	0.0241	0.152	0.0226
0.1592	0.033	0.1592	0.0311	0.1592	0.0299	0.1592	0.0288	0.1592	0.0278	0.1592	0.0261	0.1592	0.0243
0.1668	0.0367	0.1668	0.0323	0.1668	0.0312	0.1668	0.0302	0.1668	0.0293	0.1668	0.0277	0.1668	0.0257
0.1748	0.0507	0.1748	0.0427	0.1748	0.0385	0.1748	0.035	0.1748	0.0321	0.1748	0.0285	0.1748	0.0265
0.1831	0.0586	0.1831	0.0493	0.1831	0.0442	0.1831	0.0399	0.1831	0.0362	0.1831	0.0305	0.1831	0.0266
0.1918	0.0586	0.1918	0.0493	0.1918	0.0442	0.1918	0.0399	0.1918	0.0362	0.1918	0.0305	0.1918	0.0269
0.2009	0.0586	0.2009	0.0493	0.2009	0.0442	0.2009	0.0399	0.2009	0.0362	0.2009	0.0326	0.2009	0.0299
0.2105	0.0586	0.2105	0.0493	0.2105	0.0442	0.2105	0.0401	0.2105	0.0386	0.2105	0.0361	0.2105	0.0327
0.2205	0.0586	0.2205	0.0493	0.2205	0.0454	0.2205	0.0427	0.2205	0.0409	0.2205	0.038	0.2205	0.0341
0.231	0.0586	0.231	0.0493	0.231	0.0457	0.231	0.0438	0.231	0.042	0.231	0.0388	0.231	0.0354
0.242	0.0586	0.242	0.0509	0.242	0.0486	0.242	0.0465	0.242	0.0445	0.242	0.041	0.242	0.0368
0.2535	0.0649	0.2535	0.0574	0.2535	0.0531	0.2535	0.0491	0.2535	0.0457	0.2535	0.041	0.2535	0.0371
0.2656	0.0731	0.2656	0.0586	0.2656	0.0536	0.2656	0.0491	0.2656	0.0457	0.2656	0.0424	0.2656	0.0401
0.2783	0.0817	0.2783	0.0599	0.2783	0.0536	0.2783	0.05	0.2783	0.0484	0.2783	0.0458	0.2783	0.0425
0.2915	0.0817	0.2915	0.0618	0.2915	0.0581	0.2915	0.0547	0.2915	0.0516	0.2915	0.0479	0.2915	0.0436
0.3054	0.0817	0.3054	0.0663	0.3054	0.0622	0.3054	0.0585	0.3054	0.0551	0.3054	0.0492	0.3054	0.045
0.3199	0.0817	0.3199	0.0701	0.3199	0.0659	0.3199	0.0623	0.3199	0.0589	0.3199	0.0536	0.3199	0.0474
0.3352	0.0873	0.3352	0.0767	0.3352	0.0709	0.3352	0.0662	0.3352	0.0629	0.3352	0.0571	0.3352	0.0501
0.3511	0.0906	0.3511	0.0806	0.3511	0.0749	0.3511	0.0698	0.3511	0.0653	0.3511	0.0577	0.3511	0.0502
0.3678	0.1215	0.3678	0.095	0.3678	0.0823	0.3678	0.0722	0.3678	0.0653	0.3678	0.0577	0.3678	0.0502
0.3853	0.1361	0.3853	0.1057	0.3853	0.0919	0.3853	0.0808	0.3853	0.0718	0.3853	0.0587	0.3853	0.0505
0.4037	0.1361	0.4037	0.1057	0.4037	0.0919	0.4037	0.0821	0.4037	0.0762	0.4037	0.0664	0.4037	0.0568
0.4229	0.1361	0.4229	0.1057	0.4229	0.0919	0.4229	0.0852	0.4229	0.0801	0.4229	0.0711	0.4229	0.0615
0.4431	0.1361	0.4431	0.1057	0.4431	0.0935	0.4431	0.0889	0.4431	0.0843	0.4431	0.0761	0.4431	0.0657
0.4642	0.1373	0.4642	0.1057	0.4642	0.0976	0.4642	0.0916	0.4642	0.086	0.4642	0.0763	0.4642	0.0674
0.4863	0.1479	0.4863	0.1238	0.4863	0.1108	0.4863	0.0997	0.4863	0.0904	0.4863	0.0827	0.4863	0.0733
0.5094	0.1814	0.5094	0.1384	0.5094	0.1218	0.5094	0.1085	0.5094	0.0977	0.5094	0.0867	0.5094	0.0754

PTWW115.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 115 ~ SLAB ONLY Vertical Responses ~ Elevation 56 ft. ~ EL56_C-E-17-20

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
0.5337	0.2216	0.5337	0.1605	0.5337	0.1343	0.5337	0.1149	0.5337	0.1023	0.5337	0.0867	0.5337	0.0754
0.5591	0.2216	0.5591	0.1605	0.5591	0.1343	0.5591	0.1149	0.5591	0.1023	0.5591	0.088	0.5591	0.0754
0.5857	0.2216	0.5857	0.1605	0.5857	0.1343	0.5857	0.1149	0.5857	0.1023	0.5857	0.0937	0.5857	0.0821
0.6136	0.2216	0.6136	0.1605	0.6136	0.1343	0.6136	0.1178	0.6136	0.1111	0.6136	0.1003	0.6136	0.0874
0.6428	0.2257	0.6428	0.1621	0.6428	0.1356	0.6428	0.1179	0.6428	0.1131	0.6428	0.103	0.6428	0.0901
0.6734	0.2257	0.6734	0.1621	0.6734	0.1389	0.6734	0.1291	0.6734	0.1211	0.6734	0.1084	0.6734	0.0936
0.7055	0.2257	0.7055	0.1621	0.7055	0.1389	0.7055	0.1291	0.7055	0.1211	0.7055	0.1095	0.7055	0.0952
0.7391	0.2257	0.7391	0.1621	0.7391	0.1413	0.7391	0.1328	0.7391	0.1244	0.7391	0.1097	0.7391	0.0952
0.7743	0.3175	0.7743	0.2132	0.7743	0.1805	0.7743	0.1581	0.7743	0.1421	0.7743	0.1211	0.7743	0.1032
0.8111	0.3175	0.8111	0.2132	0.8111	0.1805	0.8111	0.1581	0.8111	0.1421	0.8111	0.1211	0.8111	0.1065
0.8497	0.3175	0.8497	0.2132	0.8497	0.1805	0.8497	0.166	0.8497	0.1535	0.8497	0.134	0.8497	0.1129
0.8902	0.3175	0.8902	0.2132	0.8902	0.1869	0.8902	0.1713	0.8902	0.1583	0.8902	0.1378	0.8902	0.1175
0.9326	0.4866	0.9326	0.2993	0.9326	0.2464	0.9326	0.215	0.9326	0.1926	0.9326	0.1632	0.9326	0.1377
0.977	0.4866	0.977	0.2993	0.977	0.2464	0.977	0.215	0.977	0.1926	0.977	0.1712	0.977	0.1493
1.0235	0.4866	1.0235	0.2993	1.0235	0.2464	1.0235	0.215	1.0235	0.1926	1.0235	0.1775	1.0235	0.1586
1.0723	0.4866	1.0723	0.2993	1.0723	0.2574	1.0723	0.2363	1.0723	0.2193	1.0723	0.1933	1.0723	0.1665
1.1233	0.5744	1.1233	0.3387	1.1233	0.2663	1.1233	0.2363	1.1233	0.2193	1.1233	0.1933	1.1233	0.1685
1.1768	0.5744	1.1768	0.3781	1.1768	0.3127	1.1768	0.2762	1.1768	0.247	1.1768	0.2076	1.1768	0.1828
1.2328	0.5744	1.2328	0.3801	1.2328	0.3429	1.2328	0.3128	1.2328	0.2874	1.2328	0.2483	1.2328	0.2091
1.2916	0.5744	1.2916	0.4124	1.2916	0.3638	1.2916	0.3237	1.2916	0.295	1.2916	0.2539	1.2916	0.2139
1.353	0.6253	1.353	0.4124	1.353	0.3638	1.353	0.3237	1.353	0.3026	1.353	0.2724	1.353	0.2369
1.4175	0.6253	1.4175	0.4124	1.4175	0.3638	1.4175	0.3419	1.4175	0.3245	1.4175	0.2933	1.4175	0.2571
1.485	0.6253	1.485	0.4371	1.485	0.3975	1.485	0.3717	1.485	0.3478	1.485	0.3068	1.485	0.2662
1.5557	0.6253	1.5557	0.456	1.5557	0.426	1.5557	0.3995	1.5557	0.376	1.5557	0.3358	1.5557	0.2887
1.6298	0.7362	1.6298	0.4726	1.6298	0.4349	1.6298	0.4101	1.6298	0.3877	1.6298	0.3499	1.6298	0.3051
1.7074	0.7659	1.7074	0.5983	1.7074	0.5291	1.7074	0.4732	1.7074	0.428	1.7074	0.3634	1.7074	0.3086
1.7887	0.8581	1.7887	0.7092	1.7887	0.635	1.7887	0.5721	1.7887	0.5184	1.7887	0.4408	1.7887	0.3653
1.8738	0.9071	1.8738	0.7382	1.8738	0.6675	1.8738	0.6084	1.8738	0.5648	1.8738	0.4905	1.8738	0.4072
1.963	1.0464	1.963	0.7997	1.963	0.7215	1.963	0.6607	1.963	0.6081	1.963	0.5225	1.963	0.4276
2.0565	1.1387	2.0565	0.8196	2.0565	0.732	2.0565	0.661	2.0565	0.6081	2.0565	0.5225	2.0565	0.4276
2.1544	1.1387	2.1544	0.8196	2.1544	0.732	2.1544	0.661	2.1544	0.6081	2.1544	0.5225	2.1544	0.4276
2.257	1.1387	2.257	0.8196	2.257	0.732	2.257	0.6622	2.257	0.6085	2.257	0.5225	2.257	0.439
2.3645	1.8015	2.3645	0.9555	2.3645	0.7668	2.3645	0.6987	2.3645	0.6389	2.3645	0.5434	2.3645	0.4598
2.4771	2.0921	2.4771	1.1123	2.4771	0.8901	2.4771	0.7484	2.4771	0.6503	2.4771	0.5434	2.4771	0.4618
2.595	2.6286	2.595	1.3049	2.595	0.9788	2.595	0.8001	2.595	0.6919	2.595	0.5515	2.595	0.4636

PTWW115.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 115 ~ SLAB ONLY Vertical Responses ~ Elevation 56 ft. ~ EL56_C-E-17-20

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
2.7186	2.6286	2.7186	1.3049	2.7186	0.9786	2.7186	0.8001	2.7186	0.6919	2.7186	0.5515	2.7186	0.4669
2.848	2.6286	2.848	1.3049	2.848	0.9786	2.848	0.8001	2.848	0.6919	2.848	0.5515	2.848	0.4669
2.9836	2.6286	2.9836	1.3049	2.9836	0.9786	2.9836	0.8001	2.9836	0.6919	2.9836	0.5515	2.9836	0.4669
3.1257	2.6286	3.1257	1.3049	3.1257	0.9786	3.1257	0.8001	3.1257	0.6919	3.1257	0.5515	3.1257	0.4669
3.2745	1.4875	3.2745	0.9429	3.2745	0.7973	3.2745	0.6916	3.2745	0.6178	3.2745	0.5384	3.2745	0.4669
3.4305	1.1706	3.4305	0.7986	3.4305	0.7066	3.4305	0.6392	3.4305	0.589	3.4305	0.5099	3.4305	0.4525
3.5938	1.1706	3.5938	0.7986	3.5938	0.7066	3.5938	0.6392	3.5938	0.589	3.5938	0.5097	3.5938	0.4525
3.7649	1.1706	3.7649	0.7986	3.7649	0.7066	3.7649	0.6392	3.7649	0.589	3.7649	0.5097	3.7649	0.4525
3.9442	1.1706	3.9442	0.7986	3.9442	0.7066	3.9442	0.6392	3.9442	0.589	3.9442	0.5097	3.9442	0.4525
4.132	1.1706	4.132	0.7986	4.132	0.7066	4.132	0.6392	4.132	0.589	4.132	0.5097	4.132	0.4525
4.3288	1.1706	4.3288	0.7986	4.3288	0.7066	4.3288	0.6392	4.3288	0.589	4.3288	0.5097	4.3288	0.4525
4.5349	1.1706	4.5349	0.7986	4.5349	0.7066	4.5349	0.6392	4.5349	0.589	4.5349	0.5097	4.5349	0.4525
4.7508	1.1706	4.7508	0.7986	4.7508	0.7066	4.7508	0.6392	4.7508	0.589	4.7508	0.5097	4.7508	0.4525
4.977	1.1706	4.977	0.7986	4.977	0.7066	4.977	0.6392	4.977	0.589	4.977	0.5097	4.977	0.4525
5.214	1.1706	5.214	0.7986	5.214	0.7066	5.214	0.6392	5.214	0.589	5.214	0.5097	5.214	0.4525
5.4623	1.3551	5.4623	0.7986	5.4623	0.7066	5.4623	0.6392	5.4623	0.589	5.4623	0.5097	5.4623	0.4599
5.7224	1.6638	5.7224	0.9095	5.7224	0.7723	5.7224	0.6766	5.7224	0.6048	5.7224	0.5097	5.7224	0.4637
5.9948	1.6638	5.9948	0.9095	5.9948	0.7723	5.9948	0.6766	5.9948	0.6048	5.9948	0.5097	5.9948	0.4734
6.2803	1.6638	6.2803	0.9095	6.2803	0.7723	6.2803	0.6766	6.2803	0.6048	6.2803	0.5097	6.2803	0.4734
6.5793	1.6638	6.5793	0.9095	6.5793	0.7723	6.5793	0.6766	6.5793	0.6048	6.5793	0.5097	6.5793	0.4734
6.8926	1.6638	6.8926	0.9095	6.8926	0.7723	6.8926	0.6766	6.8926	0.6048	6.8926	0.5097	6.8926	0.4734
7.2208	1.6308	7.2208	0.9095	7.2208	0.7723	7.2208	0.6766	7.2208	0.6048	7.2208	0.5097	7.2208	0.4734
7.5646	1.6308	7.5646	0.9095	7.5646	0.7723	7.5646	0.6766	7.5646	0.6048	7.5646	0.5097	7.5646	0.4734
7.9248	1.6308	7.9248	0.9095	7.9248	0.7723	7.9248	0.6766	7.9248	0.6048	7.9248	0.5097	7.9248	0.4734
8.3022	1.6308	8.3022	0.9095	8.3022	0.7723	8.3022	0.6766	8.3022	0.6048	8.3022	0.5116	8.3022	0.4743
8.6975	1 6308	8.6975	0.9095	8.6975	0.7723	8.6975	0.6766	8.6975	0.6048	8.6975	0.5631	8.6975	0.528
9.1116	1.6308	9.1116	0.9095	9.1116	0.7723	9.1116	0.6822	9.1116	0.665	9.1116	0.6322	9.1116	0.5799
9.5455	1.6308	9.5455	0.9835	9.5455	0.9073	9.5455	0.848	9.5455	0.7987	9.5455	0.7177	9.5455	0.625
10	1.6308	10	1.0819	10	0.9829	10	0.9016	10	0.8346	10	0.7301	10	0.625
10.4762	1.6308	10.4762	1.0819	10.4762	0.9829	10.4762	0.9016	10.4762	0.8346	10.4762	0.7301	10.4762	0.625
10.975	1.6308	10.975	1.0819	10.975	0.9829	10.975	0.9016	10.975	0.8346	10.975	0.7301	10.975	0.6298
11.4976	1.6308	11.4976	1.0819	11.4976	0.9829	11.4976	0.9016	11.4976	0.8378	11.4976	0.7712	11.4976	0.6955
12.045	1.6308	12.045	1.0819	12.045	0.9829	12.045	0.9016	12.045	0.8378	12.045	0.7828	12.045	0.7206
12.6186	1.7655	12.6186	1.0819	12.6186	0.9829	12.6186	0.9016	12.6186	0.8378	12.6186	0.7828	12.6186	0.7274
13.2194	1.7655	13.2194	1.0819	13.2194	0.9829	13.2194	0.9016	13.2194	0.8748	13.2194	0.823	13.2194	0.7439

PTWW115.grf ~ RPP-WTP Pretreatment Facility ISRS ~ Calc No.: 24590-PTF-S0C-S15T-00057, Rev. A ~ Frequency (cps) ~ Spectral Acceleration (g) ~ Figure 115 ~ SLAB ONLY Vertical Responses ~ Elevation 56 ft. ~ EL56_C-E-17-20

Damping	0.50%		2%		3%		4%		5%		7%		10%
Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.	Freq.	Accel.
13.8489	2.1962	13.8489	1.3794	13.8489	1.2634	13.8489	1.1839	13.8489	1.1151	13.8489	0.9858	13.8489	0.8419
14.5083	3.099	14.5083	1.7518	14.5083	1.6507	14.5083	1.5281	14.5083	1.3976	14.5083	1.2195	14.5083	1.0605
15.1991	5.721	15.1991	3.1594	15.1991	2.5932	15.1991	2.2035	15.1991	1.9756	15.1991	1.5418	15.1991	1.3364
15.9228	7.6802	15.9228	3.9908	15.9228	2.9281	15.9228	2.3497	15.9228	1.998	15.9228	1.5418	15.9228	1.3585
16.681	7.6802	16.681	3.9908	16.681	2.9281	16.681	2.3497	16.681	1.998	16.681	1.5418	16.681	1.3585
17.4753	7.6802	17.4753	3.9908	17.4753	2.9281	17.4753	2.3497	17.4753	1.998	17.4753	1.5418	17.4753	1.3585
18.3074	7.6802	18.3074	3.9908	18.3074	2.9281	18.3074	2.3497	18.3074	1.998	18.3074	1.5418	18.3074	1.3585
19.1791	7.6802	19.1791	3.9908	19.1791	2.9281	19.1791	2.3497	19.1791	1.998	19.1791	1.5418	19.1791	1.3585
20.0923	5.0233	20.0923	2.5698	20.0923	2.2318	20.0923	2.0531	20.0923	1.8683	20.0923	1.5418	20.0923	1.2323
21.049	5.0233	21.049	2.5698	21.049	1.9224	21.049	1.5699	21.049	1.4464	21.049	1.3294	21.049	1.1577
22.0513	5.0233	22.0513	2.5698	22.0513	1.9224	22.0513	1.5699	22.0513	1.3278	22.0513	1.1117	22.0513	1.0269
23.1013	2.3419	23.1013	1.5377	23.1013	1.433	23.1013	1.3325	23.1013	1.2262	23.1013	1.0197	23.1013	0.9065
24.2013	1.5293	24.2013	1.0859	24.2013	1.0006	24.2013	0.9426	24.2013	0.9155	24.2013	0.8472	24.2013	0.7881
25.3536	1.2574	25.3536	0.8767	25.3536	0.8421	25.3536	0.8119	25.3536	0.7853	25.3536	0.7362	25.3536	0.6758
26.5609	1.2574	26.5609	0.8155	26.5609	0.7384	26.5609	0.6923	26.5609	0.6671	26.5609	0.6573	26.5609	0.6403
27.8256	1.2574	27.8256	0.8155	27.8256	0.7384	27.8256	0.6884	27.8256	0.6534	27.8256	0.6229	27.8256	0.6093
29.1505	0.6647	29.1505	0.618	29.1505	0.6094	29.1505	0.5972	29.1505	0.5935	29.1505	0.5904	29.1505	0.5816
30.5386	0.6591	30.5386	0.6039	30.5386	0.5896	30.5386	0.581	30.5386	0.5752	30.5386	0.5671	30.5386	0.5581
31.9927	0.5376	31.9927	0.5492	31.9927	0.5493	31.9927	0.5479	31.9927	0.546	31.9927	0.5418	31.9927	0.5355
33.516	0.5125	33.516	0.5181	33.516	0.5192	33.516	0.5192	33.516	0.5188	33.516	0.5173	33.516	0.5142
35.1119	0.4954	35.1119	0.4964	35.1119	0.4969	35.1119	0.4972	35.1119	0.4973	35.1119	0.4971	35.1119	0.4958
36.7838	0.4806	36.7838	0.481	36.7838	0.4812	36.7838	0.4813	36.7838	0.4814	36.7838	0.4813	36.7838	0.4807
38.5353	0.468	38.5353	0.4683	38.5353	0.4684	38.5353	0.4684	38.5353	0.4685	38.5353	0.4684	38.5353	0.4681
40.3702	0.4573	40.3702	0.4574	40.3702	0.4575	40.3702	0.4575	40.3702	0.4576	40.3702	0.4575	40.3702	0.4574
42.2924	0.4479	42.2924	0.448	42.2924	0.448	42.2924	0.4481	42.2924	0.4481	42.2924	0.4481	42.2924	0.4481
44.3062	0.4396	44.3062	0.4396	44.3062	0.4397	44.3062	0.4397	44.3062	0.4397	44.3062	0.4398	44.3062	0.4398
46.4159	0.4321	46.4159	0.4321	46.4159	0.4322	46.4159	0.4322	46.4159	0.4322	46.4159	0.4323	46.4159	0.4325
48.626	0.4252	48.626	0.4252	48.626	0.4253	48.626	0.4253	48.626	0.4254	48.626	0.4255	48.626	0.4258
50.9414	0.4188	50.9414	0.4188	50.9414	0.4188	50.9414	0.4189	50.9414	0.4189	50.9414	0.4191	50.9414	0.4195

Quarter Ending June 30, 2009 24590-PTF-PCN-ENV-08-007

Hanford Facility RCRA Permit Modification Notification Form

Part III, Operating Unit 10

Waste Treatment and Immobilization Plant

Index

Page 2 of 2: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant
Update the integrity assessment for the Pretreatment Facility Secondary Containment rooms from Elevation (-) 45' - 0" to Elevation 56' - 0" in Appendix 8.11 of the Dangerous Waste Permit.

Submitted by Co-Operator:

D. A. Klein — Date: 4/10/09

Reviewed by ORP Program Office:

S. J. Olinger — Date: 4/27/09

Quarter Ending June 30, 2009

24590-PTF-PCN-ENV-08-007

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part:
Waste Treatment and Immobilization Plant	**Part III, Operating Unit 10**

Description of Modification:

The purpose of this modification is to update the integrity assessment for the Pretreatment Facility secondary containment rooms from Elevation (-) 45' - 0" to Elevation 56' - 0" currently located in Appendix 8.11 of the Dangerous Waste Permit (DWP).

Appendix 8.11			
Replace:	24590-CM-HC4-HXYG-00138-01-01, Rev 0	With:	CCN: 193196, IA-3001630-000, Rev.0; IQRPE Structural Integrity Assessment Report for PTF Secondary Containment Up To Floor Elevation 56'-0".
	24590-CM-HC4-HXYG-00138-02-01A, Rev 1		
	24590-CM-HC4-HXYG-00138-01-13, Rev 1		
	24590-CM-HC4-HXYG-00138-02-00022, Rev 0		

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

- General Arrangement Drawings
- Structural concrete forming, walls, sections, layouts, reinforcement, and embedments drawings
- Structural steel framing drawings
- Foundation, excavation, and geotechnical investigation, structural design criteria, codes, specifications, calculations, analyses, test reports, and design documents
- Material selection documents for coatings, liner plates, and sumps
- Basis of Design document
- Flooding volume documents

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

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

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

Reason for denial:

Reviewed by Ecology:

E Fredenburg 5/6/09

Ed Fredenburg Date

RPP-WTP
RECEIVED

APR 0 8 2009

BY PDC

CCN 193196

AREVA

R10964647

AFS-09-0140

April 7, 2009

Ms. Jennifer Broadbent
Subcontract Administrator
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Dear Ms. Broadbent:

BECHTEL NATIONAL, INC. CONTRACT NO. 24590-CM-HC4-HXYG-00211 IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR PTF SECONDARY CONTAINMENT UP TO FLOOR ELEV. 56'-0" (IA-3001630-000)

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

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

Sincerely,

Fred R. Renz
Contract Management
AREVA Federal Services LLC
Richland Office

llm

Enclosure (1)

cc: D. C. Pfluger, MS 5-L w/enclosure (2)

AREVA Federal Services LLC
2101 Horn Rapids Road, RC-19, Richland, WA 99354, P. O. Box 840, Richland, WA 99352
Tel.: 509 375 8096 - Fax: 509 375 8495 - www.areva.com

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IA-3001630-000

IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR PTF SECONDARY CONTAINMENT UP TO FLOOR ELEV. 56'-0"

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

IA-3001630-000

IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT
FOR
PTF SECONDARY CONTAINMENT UP TO FLOOR ELEV. 56'-0"

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

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

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

The attached review is fourteen (14) pages numbered one (1) through fourteen (14).

T S Hundal

Signature

4/7/09

Date

Scope	Scope of this Integrity Assessment	This Integrity Assessment addresses the Pretreatment Facility Secondary Containment rooms from Elevation (-) 45'-0" to Elevation 56'-0" as listed in CCN # 184401 and as shown on General Arrangement Drawings listed in References below. The specific rooms at various floor elevations considered in this assessment report are: **Elevation (-) 45'-0":** P-B001A, P-B002, P-B003, and P-B004. **Elevation (-) 21'-0":** P-B001 **Elevation (-) 19'-0":** P-B005 **Elevation 0'-0":** P-0101, P-0101A, P-0102, P-0102A, P-0104, P-0105, P-0105A, P-0105B, P-0105C, P-0106, P-0108, P-0108A, P-0108B, P-0108C, P-0109, P-0110, P-0110A, P-0110B, P-0110C, P-0110D, P-0111, P-0112, P-0113, P-0114, P-0116, P-0117, P-0117A, P-0118, P-0119, P-0121A, P-0122A, P-0123, P-0123A, P-0124, P-0124A, and P-0128A. **Elevation 28'-0";** P-0201, P-0201A, P-0203, P-0203A, P-0203B, P-0204, P-0206, P-0207, P-0208, P-0209, P-0210, P-0212, and P-0223. **Elevation 56'-0";** P-0301, P-0302, P-0303, P-0303B, P-0304, P-0307, P-0311, P-0311A, P-0311B, P-0311C, P-0317, P-0320, P-0324, P-0325, P-0326, P-0328, P-0332B, P-0335, P-0335A, P-0336, and PC0311.
Summary of Assessment		For each item of "Information Assessed" (i.e., Criteria) on the following pages, the items listed under "Source of Information" were reviewed and found to furnish adequate design requirements and controls to ensure that the design fully satisfies the requirements of Washington Administrative Code (WAC), Chapter 173-303 WAC, *Dangerous Waste Regulations*, WAC-173-303-640, *Tank Systems*.

References	Drawings and Correspondence Control Number	Drawings: 24590-PTF- P1- P01T- 00001, Rev. 6, Pretreatment Facility General Arrangement Plan at El. 0'-0"; 24590-PTF- P1- P01T- 00002, Rev. 6, Pretreatment Facility General Arrangement Plan at El. 28'-0"; 24590-PTF- P1- P01T- 00003, Rev. 4, Pretreatment Facility General Arrangement Plan at El. 56'-0"; 24590-PTF- P1- P01T- 00006, Rev. 4, Pretreatment Facility General Arrangement Plan at El. (-) 45'-0"; 24590-PTF- P1- P01T- 00007, Rev. 9, Pretreatment Facility General Arrangement Plan at El. A-A; 24590-PTF-D0-S13T-00008, Rev. 15, Pretreatment Facility Structural Concrete Notes & Legend Sh. 1; 24590-PTF-DB-S13T-00001, Rev. 1, Pretreatment Facility Structural Concrete Forming Overall Pit Plan; 24590-PTF-DB-S13T-00002, Rev. 6, Pretreatment Facility Structural Concrete Forming Main Pit Plan; 24590-PTF-DB-S13T-00005, Rev. 9, Pretreatment Facility Structural Concrete Forming , El. 0'-0" Base Mat; 24590-PTF-DB-S13T-00008, Rev. 5, Pretreatment Facility Structural Concrete Forming , El. 0'-0" & Below Section A; 24590-PTF-DB-S13T-00014, Rev. 2, Pretreatment Facility Structural Concrete Walls Key Plan , El. 0'-0"; 24590-PTF-DB-S13T-00015, Rev. 4, Pretreatment Facility Structural Concrete Wall Forming Partial Plan , El. 0'-0", Sh. 1; 24590-PTF-DB-S13T-00030, Rev. 3, Pretreatment Facility Structural Concrete Forming Key Plan , El. 28'-0"; 24590-PTF-DB-S13T-00034, Rev. 4, Pretreatment Facility Structural Concrete Forming Partial Plan , El. 28'-0", Sh. 4; 24590-PTF-DB-S13T-00045, Rev. 2, Pretreatment Facility Structural Concrete Slab Key Plan , El. 56'-0"; 24590-PTF-DB-S13T-00048, Rev. 11, Pretreatment Facility Structural Concrete Embedments Partial Plan , El. 56'-0", Sh. 3; 24590-PTF-DB-S13T-00055, Rev. 5, Pretreatment Facility Structural Concrete Forming Embed Layout Details , El. 56'-0", Sh. 2, 24590-PTF-DB-S13T-00100, Rev. 17, Pretreatment Facility Structural Concrete Wall Key Plan , Key Plan El. 0'-0" to 56'-0"; 24590-PTF-DB-S13T-00111, Rev. 10, Pretreatment Facility Structural Concrete Walls Section CE-Sh.1; 24590-PTF-DB-S13T-00147, Rev. 7, Pretreatment Facility Structural Concrete Walls Section AN-Sh.1; 24590-PTF-DB-S13T-00183, Rev. 9, Pretreatment Facility Structural Concrete Walls Section CN, HN; 24590-PTF-DB-S13T-00215, Rev. 14, Pretreatment Facility Structural Concrete Walls Layout Details , Sh. 15, 24590-PTF-DB-S13T-00300, Rev. 15, Pretreatment Facility Structural Concrete Walls Key Plan El. 56'-0", 24590-PTF-DB-S13T-00307, Rev. 5, Pretreatment Facility Structural Concrete Walls Section BE-Sh.3; 24590-PTF-SS-S15T-00009, Rev. 0, Pretreatment Facility Structural Steel Framing Key Plan El. 28'-0"; 24590-PTF-SS-S15T-00015, Rev. 5, Pretreatment Facility Structural Steel Framing Plan El. 28'-0", Sh. 6; 24590-PTF-SS-S15T-00049, Rev. 6, Pretreatment Facility Structural Steel Framing El. 56'-0", Partial Plans Sh.1; 24590-PTF-DG-S13T-00001, Rev. 0, Pretreatment Facility Structural Concrete Reinforcement El. 0'-0", Key Plan; 24590-PTF-DG-S13T-00002, Rev. 4, Pretreatment Facility Structural Concrete Reinforcement Main Pit Plan; 24590-PTF-DG-S13T-00006, Rev. 9, Pretreatment Facility Structural Concrete Reinforcement Pit Sections A & B; 24590-PTF-DG-S13T-00025, Rev. 7, Pretreatment Facility Structural Concrete Reinforcement Sections; 24590-PTF-DG-S13T-00026, Rev. 14, Pretreatment Facility Structural Concrete Reinforcing Details Sh.1; 24590-PTF-DG-S13T-00036, Rev. 3, Pretreatment Facility Structural Concrete Reinforcement Partial Plan El. 28'-0", Sh. 6; 24590-PTF-DG-S13T-00046, Rev. 5, Pretreatment Facility Structural Concrete Reinforcement Partial Plan El. 56'-0", Sh. 1; 24590-PTF-DG-S13T-00048, Rev. 3, Pretreatment Facility Structural Concrete Reinforcement Partial Plan El. 56'-0", Sh. 3; 24590-PTF-DG-S13T-00050, Rev. 4, Pretreatment Facility Structural Concrete Reinforcement Partial Plan El. 56'-0", Sh. 5; 24590-PTF-DG-S13T-00051, Rev. 4, Pretreatment Facility Structural Concrete Reinforcement Partial Plan El. 56'-0", Sh. 6; 24590-PTF-DG-S13T-00054, Rev. 3, Pretreatment Facility Structural Concrete Reinforcement Partial Plan & Sections; 24590-PTF-DG-S13T-00140, Rev. 11, Pretreatment Facility Structural Concrete Reinforcement Sections AA, AB, AC, AD. Correspondence Control Number: CCN # 184401, PT Room lists for Elevations (-) 45' to 56' re: secondary containment IQRPE report.

Information Assessed		Source of Information	Assessment
Foundation Design	Description of subsurface conditions and soil bearing capacity are adequate.	24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; 24590-BOF-3PS-CE01-T0001, Rev. 6, Engineering Specification for Excavation and Backfill; 24590-BOF-3PS-C000-T0001, Rev. 4, Engineering Specification for Material Testing Services; 24590-PTF-DGC-S13T-00001, Rev. 0, Verification of PT Basemat Thickness for Purposes of Determining Excavation (Calculations); 24590-PTF-S0C-S15T-00012, Rev. 1B, Structural Analysis for the PT Building (Calculations); 24590-PTF-S0C-S15T-00010, Rev. 1, Pretreatment Building-Soil Springs; WTSC99-1036-42-17, RPP-WTP Final Report Geotechnical Investigation, Shannon & Wilson Inc. (H-1616-51), May 2000; 24590-BOF-3PS-CE00-T0001, Rev. 0, Site Work.	The Structural Design Criteria adequately presents design guidance for both mat and spread footings based on the Geotechnical Investigation report for the site. Bearing capacity and settlement design parameters are furnished for the dense Hanford Upper and Lower Sand Units and Structural Fill. Use of the loose wind blown (dune) sands for foundations is precluded. The Verification of PT Basemat Thickness calculations reviewed indicates that the allowable bearing of subsurface soil below the foundation mat is more than the maximum computed value. The Excavation and Backfill Specification provides structural backfill requirements based on the Geotechnical Investigation report and adequate current codes and standards for selection, placing, and compacting structural backfill including testing of candidate fill materials and completed backfills. The Specification for Material Testing Services provides current adequate codes and standards for testing of candidate structural fill materials and in-situ testing of structural fills as they are constructed. The codes and standards are consistent with those called out in the Excavation and Backfill Specification. The review of the calculations show that appropriate values of the soil parameters including allowable bearing capacity, were used for the secondary containment structures' design.

Information Assessed		Source of Information	Assessment
Foundation Design (cont'd)	Foundation design loads (including full tanks) and estimated settlement are adequately considered.	24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; ASCE 7-98, Minimum Design Loads for Buildings and Other Structures; ACI 349-01, Code Requirements for Nuclear Safety-Related Concrete Structures; ACI 318-99, Building Code Requirements for Structural Concrete; 24590-PTF-DGC-S13T-00001, Rev. 0, Verification of PT Basement Thickness for Purposes of Determining Excavation (Calculations); 24590-PTF-DGC-S13T-00003, Rev. 0, Design of Foundation Basemat for PT Building (Calculations).	The Structural Design Criteria uses current adequate standards to define design loads and load combinations (ASCE 7-98, ACI 349-01 and ACI 318-99). Dead and fluid loads are included in these loads and load combinations. Settlement design parameters are included in the Structural Design Criteria subsection on "geotechnical design parameters and foundation design." Review of the Calculations for various floor elevation slabs shows that the full loads of the tanks and other equipment have been appropriately considered in the foundation design.

Information Assessed		Source of Information	Assessment
Foundation Design (cont'd)	Design calculation approach and design basis of footings with design standard references (e.g., ACI) are adequate.	24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; ACI 349-01, Code Requirements for Nuclear Safety-Related Concrete Structures; ACI 318-99, Building Code Requirements for Structural Concrete; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-PTF-DGC-S13T-00001, Rev. 0, Verification of PT Basemat Thickness for Purposes of Determining Excavation (Calculations); 24590-PTF-DGC-S13T-00003, Rev. 0, Design of Foundation Basemat for PT Building (Calculations); 24590-PTF-SSC-S15T-00004, Rev. C, Pretreatment Bldg-Structural Design of 28'-0" Level Typical Floor Framing; 24590-PTF-SSC-S15T-00005, Rev. E, Design of Steel Framing at Cell-Tops Above Black Cell and Hot Cell Areas; 24590-WTP-VV-ST-01-001, Rev. 5A, Verification and Validation Test Plan and Test Report for GTSTRUDL; 24590-PTF-DBC-S15T-00001, Rev. 0, Structural Drop Load Analysis for PT Building (Calculations).	The Structural Design Criteria references current adequate design criteria for the design of concrete foundations and footings. ACI 349-01 is referenced for design of "safety" grade structures and ACI 318-99 is referenced for the strength design of "commercial grade" structures. The Secondary Containment Design document provides the design approach, basis, and methodology used for the design of the secondary containment foundations/footings. The input parameters used in the GTSTRUDL computer code utilized for this secondary containment design are appropriates and the output results have been appropriately validated via the Verification and Validation Test Plan and Test Report document. The above mentioned codes and standards, design approach, methodology, and basis delineated are appropriate and adequate for the foundations design.

Information Assessed		Source of Information	Assessment
Foundation Design (cont'd)	Foundation material is compatible with the soil.	24590-WTP-3PS-DB01-T0001, Rev. 8, Engineering Specification for Furnishing and Delivering Ready-Mix Concrete; 24590-BOF-3PS-C000-T0001, Rev. 4, Engineering Specification for Material Testing Services; 24590-WTP-DB-ENG-01-001, Rev. 1M, Basis of Design. 24590-WTP-3PS-DG00-T0001, Rev. 4, Engineering Specification for Reinforcing Steel.	The specification for Furnishing and Delivering Ready-Mix Concrete provides adequate current testing requirements for the selection of coarse and fine aggregates and the procurement of cementitious materials. Adequate test procedures are provided in the Material Testing Services specification for testing candidate aggregates for chemical reactivity. Instructions for mixing and delivering Ready-Mix Concrete are adequate and current. As noted in the Basis of Design document (section 4.7), the water table lies about 200 feet below the deepest PTF Facility foundations so there is little reason to expect compatibility problems between the concrete foundations and the site soils.
	Foundation will withstand the effects of frost heave	Drawings listed above under References; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria.	The Structural Design Criteria includes adequate provisions to preclude frost heave in the section addressing lateral earth pressure loads. All structural foundations are required to extend into the soil below the frost line to preclude frost heave. The frost line is 30 inches below the finished grade (@ El. 0'-0"), however, the drawings show that majority of the bottom of PTF foundation mat is at (-) 8'-0" and some sections are even lower than this. Therefore, the secondary containment foundations will not be subjected to frost heave effects.

Information Assessed		Source of Information	Assessment
Seismic Design	Seismic considerations have been adequately addressed.	24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; ACI 349-01, Code Requirements for Nuclear Safety-Related Concrete Structures; ACI 318-99, Building Code Requirements for Structural Concrete; ANSI/AISC N690, Specification for the Design, Fabrication and Erection of Steel Safety-Related Structures for Nuclear Facilities; AISC MO16-89, Manual of Steel Construction - Allowable Stress Design, Ninth Edition; ASCE 4-98, Seismic Analysis of Safety Related Nuclear Structures and Commentary; 24590-PTF-S0C-S15T-00012, Rev. 1B, Structural Analysis for the PT Building (Calculations); 24590-PTF-DGC-S13T-00021, Rev. A, Design of Slab at 28' Elevation (Including ECCN # 00042); 24590-PTF-DGC-S13T-00022, Rev. C, PTF- El. 56' Slab Bounded by Column Lines 1 to 8 - RGM; 24590-PTF-DGC-S13T-00005, Rev. A, Design of Wall at Col. Lines, 1, 4. 6, 7, B, E, H, & L From El. 0 to 28; 24590-PTF-DGC-S13T-00047, Rev. A, PTF-Validation of Placed Concrete for Above Grade and Below Grade Wall for RGM ; 24590-PTF-DGC-S13T-00003, Rev. 0, Design of Foundation Basemat for PT Building. 24590-PTF-SSC-S15T-00004, Rev. C, Pretreatment Bldg-Structural Design of 28'-0" Level Typical Floor Framing; 24590-PTF-SSC-S15T-00005, Rev. E, Design of Steel Framing at Cell-Tops Above Black Cell and Hot Cell Areas.	The Secondary Containment Design document describes and provides references for the design methodology, materials, loads, and load combinations (including seismic loads) for the PTF Building secondary containment. The Structural Design Criteria provides detailed discipline specific codes and standards for the design of Seismic Category (SC-I/II) PTF secondary containment foundations and structures by the design engineers. ACI-349-01 and ACI 318-99 provide the design codes and load combinations for design of the secondary containment reinforced concrete foundations and structures. Structural steel components of the secondary containment structures and stainless steel liners are designed using ANSI/AISC N690 and the AISC Allowable Stress Design code. ASCE 4-98 is used for guidance on seismic analysis of safety-related nuclear structures. These codes and standards listed above are adequate and acceptable for addressing seismic considerations. Review of the sample calculations show that the requirements of the applicable codes and standards are appropriately incorporated in these documents.

Information Assessed		Source of Information	Assessment
Compatibility	The stored waste is compatible with its Secondary Containment and leak detection hardware based on a detailed chemical and physical analysis of the wastes used and other information sources.	24590-WTP-DB-ENG-01-001, Rev. 1M, Basis of Design; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-3PS-AFPS-T0006, Rev. 0, Engineering Specification for Field Applied Special Protective Coatings for Secondary Containment Areas; 24590-PTF-PER-M-03-002, Rev. 0, Sump and Drain Data at 28Ft Level for PT Facility; 24590-PTF-PER-M-04-002, Rev. 0, Sump and Drain Data at 56 Ft Level for PT Facility; 24590-PTF-PER-M-02-006, Rev. 5, Sump Data for PT Facility. 24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates; 24590-PTF-PER-M-02-005, Rev. 8, Flooding Volume for Below Grade and 0 ft Level in PT Facility; 24590-PTF-PER-M-03-001, Rev. 0, Flooding Volume for 28 ft Level in PT Facility. 24590-PTF-PER-M-04-001, Rev. 0, Flooding Volume for 56 ft Level in PT Facility. 24590-PTF-PER-M-04-0005, Rev. 0, Flooding Volume for Room P-0119 in the PT Facility; 24590-PTF-PER-M-04-0007, Rev. 0, Flooding Volume for Room P-0123A in the PT Facility.	The Basis of Design states that cells and sumps are appropriately lined and any spills are removed and flushed within 24-hrs or as timely as possible. Secondary Containment liner design for cells and process areas requires both stainless steel liners and special protective coatings depending on the service conditions. Secondary Containment liner design for various rooms at different elevations requires stainless steel liner or special protective coatings liner. Flood Volume documents provide required specific liner height is various rooms. Based on detailed analysis of the corrosive properties of expected waste process operations and evaluation of potential leak scenarios, the Material Selection report identifies appropriate and adequate corrosion resistant materials requirements for Secondary Containment liners, sumps and leak detection equipment. The Engineering Specification for Field Applied Special Protective Coatings (SPCs) provides the selection test criteria used to determine acceptable approved coating systems. These test criteria include chemical resistance endurance requirements and wear abrasion resistance criteria which provides liners compatibility with the wastes considered. The Secondary Containment Design report provides adequate typical construction details for liners including tank anchorage details, stainless steel liner installation details and SPC installation details to be used for Secondary Containment. Rooms at various elevations are provided with floor drains as itemized in the Sump and Drain Data documents for the PTF. All sumps are equipped with leak detection; however, individual floor drains are not equipped with leak detection.

Information Assessed		Source of Information	Assessment
Strength	The design shows that the Secondary Containment has sufficient strength and thickness to prevent failure owing to pressure gradients, static head during a release, physical contact with the waste, climatic conditions, and the stress of daily operations (e.g., vehicular traffic).	Drawings listed above under References; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection. 24590-PTF-DGC-S13T-00001, Rev. 0, Verification of PT Basemat Thickness for Purposes of Determining Excavation (Calculations); 24590-PTF-DGC-S13T-00003, Rev. 0, Design of Foundation Basemat for PT Building (Calculations); 24590-PTF-DGC-S13T-00005, Rev. A, Design of Walls at Col. Lines 1,4, 6, 7, B, E, H, & L from El. 0 to 28 (Calculations); 24590-PTF-DGC-S13T-00047, Rev. A, PTF-Validation of Placed Concrete for Above Grade and Below Grade Wall for RGM (Calculations); 24590-PTF-SSC-S15T-00005, Rev. E, Design of Steel Framing at Cell -Tops Above the Black Cell and Hot-cell Areas (Calculations); 24590-PTF-DGC-S13T-00021, Rev. A, Design of Slab at 28' Elevation (including ECCN # 00042) - (Calculations); 24590-PTF-DGC-S13T-00022, Rev. C, PTF-El. 56' Slab - Bounded by Column Lines 1 to 8 - RGM (Calculations).	Because the Secondary Containment structures being considered are installed inside the Pretreatment Facility as shown on the general arrangement drawings, climatic conditions and vehicular traffic are not applicable load cases. The Secondary Containment Design requirements document identifies adequate and appropriate design codes and standards and all applicable load cases (operational stresses) from site specific conditions that must be considered in the design. The Engineering Specification for Furnishing Stainless Steel Liner Plates includes specific provisions for protection of and repair of completed liners during the construction process. Review of the referenced sample Calculations shows that the secondary containment structures are designed appropriately with sufficient strength to sustain the applicable loads. Factors that were considered during stainless steel liner material selection and special protective coating (SPC) material selection are adequately discussed in the Material Selections for Building Secondary Containment/Leak Detection document.

Information Assessed		Source of Information	Assessment
Strength (cont'd)	The Secondary Containment system has sufficient strength in the presence of operational stresses from site-specific conditions (i.e., traffic, heavy equipment, precipitation, frost).	Drawings listed above under References; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; 24590-WTP-PER-CSA-02-001, Rev.8, Secondary Containment Design; 24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-PTF-DBC-S15T-00001, Rev. 0, Structural Drop Load Analysis for PT Building. 24590-PTF-DGC-S13T-00003, Rev. 0, Design of Foundation Basemat for PT Building (Calculations); 24590-PTF-DGC-S13T-00005, Rev. A, Design of Walls at Col. Lines 1, 4, 6, 7, B, E, H, & L from El. 0 to 28 (Calculations); 24590-PTF-DGC-S13T-00047, Rev. A, PTF-Validation of Placed Concrete for Above Grade and Below Grade Wall for RGM (Calculations); 24590-PTF-SSC-S15T-00005, Rev. E, Design of Steel Framing at Cell -Tops Above the Black Cell and Hot-cell Areas (Calculations); 24590-PTF-DGC-S13T-00021, Rev. A, Design of Slab at 28' Elevation (including ECCN # 00042) - (Calculations); 24590-PTF-DGC-S13T-00022, Rev. C, PTF-El. 56' Slab - Bounded by Column Lines 1 to 8 - RGM (Calculations).	The Secondary Containment Design requirements document identifies adequate and appropriate design codes and standards and all applicable load cases (operational stresses) from site specific conditions that must be considered in the design. Because the Secondary Containment structures being considered are installed inside the Pretreatment Facility Building as shown on the drawings, therefore, traffic, heavy equipment, precipitation, and frost are not applicable load cases. The Engineering Specification for Furnishing Stainless Steel Liner Plates includes specific provisions for protection of and repair of completed liners during the construction process. Review of the referenced sample Calculations shows that the secondary containment structures are designed appropriately with sufficient strength to sustain the applicable loads from the specific conditions. Factors that were considered during stainless steel liner material selection and SPC material selection are adequately discussed in the Material Selections for Building Secondary Containment/Leak Detection document.

Information Assessed		Source of Information	Assessment
Foundation Integrity	The Secondary Containment is properly supported by a foundation or base in order to prevent failure from settlement, compression, or uplift, including the residual effects of installation.	Drawings listed above under References; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; 24590-BOF-3PS-CE00-T0001, Rev. 0, Site Work. 24590-BOF-3PS-CE01-T0001, Rev. 6, Engineering Specification for Excavation and Backfill; 24590-BOF-3PS-C000-T0001, Rev. 4, Engineering Specification for Material Testing Services; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design. 24590-PTF-DGC-S13T-00001, Rev. 0, Verification of PT Basemat Thickness for Purposes of Determining Excavation (Calculations); 24590-PTF-DGC-S13T-00003, Rev. 0, Design of Foundation Basemat for PT Building (Calculations); 24590-PTF-DGC-S13T-00030, Rev. A, PT Concrete Subsidence Evaluation in the Below Grade Foundation and Walls at Lap Splices (Calculations). 24590-PTF-SSC-S15T-00005, Rev. E, 24590-24590-PTF-DGC-S13T-00021, Rev. A, Design of Slab at 28' Elevation (including ECCN # 00042) - (Calculations); 24590-PTF-DGC-S13T-00022, Rev. C, PTF-El. 56' Slab - Bounded by Column Lines 1 to 8 - RGM (Calculations).	These conditions are fully addressed in the Structural Design Criteria and the Secondary Containment Design requirements documents. The design requirements and codes and standards specified are adequate to satisfy these performance goals. The procurement and construction specifications adequately provide for proper foundation construction and installation of the Secondary Containment. The general arrangement plans and the associated cross-section drawings show the Secondary Containment boundaries. The sample Calculations reviewed show that the foundation slabs are appropriately designed and will not fail when subjected loads such as uplift, installation, settlement or residual effects.

Information Assessed		Source of Information	Assessment
Foundation Integrity (cont'd)	The placement, structural support, and type of material used for backfill around and below the Secondary Containment are appropriate.	Drawings listed above under References; 24590-BOF-3PS-CE01-T0001, Rev. 6, Engineering Specification for Excavation and Backfill; 24590-BOF-3PS-C000-T0001, Rev. 4, Engineering Specification for Material Testing Services. 24590-PTF-DGC-S13T-00001, Rev. 0, Verification of PT Basemat Thickness for Purposes of Determining Excavation (Calculations); 24590-PTF-DGC-S13T-00003, Rev. 0, Design of Foundation Basemat for PT Building (Calculations).	The Excavation and Backfill and Material Testing specifications contain current adequate industry standards for selecting and testing fill materials, placing and compacting backfills, and testing not less than once each lift to assure adequate compaction. Requirements for testing and record keeping are current and adequate for both "safety grade" fills and "commercial grade" fills. Drawings show that backfill requirements are properly applied, tested, documented, and accepted and approved by BNI. Review of sample Calculations shows that appropriate parameters for backfill are used in design.
Infiltration	The design or operation (e.g., diking & curbing) prevents run-on or infiltration of precipitation into the Secondary Containment system unless the collection system has sufficient excess capacity (25 yr rainfall) to contain the run-on precipitation.	Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 1M, Basis of Design.	This requirement is specified in the Basis of Design document. All Secondary Containment structure rooms being reviewed in this Integrity Assessment are located at various levels inside the Pretreatment Facility building where they are protected from precipitation as shown in the general arrangement plans and other associated drawings. Therefore, this requirement is not applicable to these rooms. The Basis of Design document also describes that the ground water table under the WTP site is about 250 ft below the ground surface which makes it unlikely event for water infiltration or intrusion into the building.

Information Assessed		Source of Information	Assessment
Infiltration (cont'd)	The design includes an external moisture barrier or other means to prevent moisture from entering the cell.	Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 1M, Basis of Design. W24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates; 24590-WTP-3PS-AFPS-T0006, Rev. 0, Engineering Specification for Field Applied Special Protective Coatings for Secondary Containment Areas.	The Secondary Containments shown on the general arrangement plans at elevations (-) 45'-0", 0'-0", 28'-0" and 56''-0" are inside the Pretreatment Facility Building which shields them from precipitation and surface water percolation. The ground water table is located about 200 feet below the floors of the inaccessible process cells at elevation (-) 45'-0" as noted in the Basis of Design document, therefore it's not a credible event for infiltration of external moisture into the interior of the building. And furthermore the rooms are lined with stainless steel plates or special protective coating material as an added insurance against moisture infiltration.
Liner System	The containment area is free of cracks or gaps and the design discusses methods of their minimization.	Secondary Containment/Leak Detection; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates; 24590-WTP-3PS-AFPS-T0006, Rev. 0, Engineering Specification for Field Applied Special Protective Coatings for Secondary Containment Areas.	The Secondary Containment Design requirements document provides adequate and appropriate codes and standards for design of leak-tight liners. This report includes appropriate details for design and installation of stainless steel and special protective coating liners and sumps free of cracks and gaps. The Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates provides detailed information on design, fabrication, installation, and inspection of stainless steel liners and sumps. The Engineering Specification for Field Applied Special Protective Coatings provides detailed information on the tested and approved coating systems. This information includes directions for surface preparation, patching materials and application methods, and specific directions for application of multi-layer coatings.

Information Assessed		Source of Information	Assessment
Liner System (cont'd)	The design has considered the compatibility of the concrete liner or coatings and waste and presents information on coatings planning to be used from the manufacturer addressing compatibility with the stored waste. The lining or coating must prevent the waste from migrating into the concrete.	Drawings listed above under References; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates; 24590-WTP-3PS-AFPS-T0006, Rev. 0, Engineering Specification for Field Applied Special Protective Coatings for Secondary Containment Areas.	The Material Selections document contains adequate and appropriate general information on the compatibility of planned Secondary Containment stainless steel and special protective coating liners with the waste. The Secondary Containment Design report provides adequate and appropriate standard details for design and installation of stainless steel and special protective coating liners that will prevent migration of the waste into the concrete. The Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates provides detailed information on design, fabrication, installation, and inspection of stainless steel liners and sumps. The Engineering Specification for Field Applied Special Protective Coatings provides detailed information on the tested and approved coating systems. This information includes directions for surface preparation, patching materials and application methods, and specific directions for application of multi-layer coatings.

Quarter Ending March 31, 2009 24590-PTF-PCN-ENV-08-018

Hanford Facility RCRA Permit Modification Notification Form

Part III, Operating Unit 10

Waste Treatment and Immobilization Plant

Index

Page 2 of 4: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant Update Process Flow Diagrams (PFD) for the PTF Waste Feed Evaporation Process (FEP) System in Appendix 8.1, and Piping and Instrumentation Diagrams (P&ID) for the PTF FEP System in Appendix 8.2 of the Dangerous Waste Permit (DWP).

Submitted by Co-Operator:		Reviewed by ORP Program Office:	
D. A. Klein	3/12/09	S. J. Olinger	3/26/09
D. A. Klein	Date	S. J. Olinger	Date

Quarter Ending March 31, 2009 24590-PTF-PCN-ENV-08-018

Hanford Facility RCRA Permit Modification Notification Form

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

Description of Modification:

The purpose of this Class 1 prime modification is to update the PFDs for the PTF FEP System, in Appendix 8.1 of the DWP, and the P&IDs for the PTF FEP System, in Appendix 8.2 of the DWP. The permit drawings incorporated into the DWP are being replaced with source drawings as indicated in the table below. The new drawings are the result of converting source drawings into multiple sheets that provide a clearer representation of the FEP System, and add space for future instrumentation and logic controls detail.

Appendix 8.1			
Replace:	24590-PTF-M5-V17T-P0004001, Rev 0	With:	24590-PTF-M5-V17T-00004001, Rev 3
	24590-PTF-M5-V17T-P0004002, Rev 0		24590-PTF-M5-V17T-00004002, Rev 3

Appendix 8.2			
	24590-PTF-M6-FEP-P0001, Rev 0	With:	24590-PTF-M6-FEP-00001001, Rev 0
			24590-PTF-M6-FEP-00001002 Rev 0
	24590-PTF-M6-FEP-P0002, Rev 0		24590-PTF-M6-FEP-00002001, Rev 0
			24590-PTF-M6-FEP-00002002 Rev 0
			24590-PTF-M6-FEP-00002003, Rev 0
	24590-PTF-M6-FEP-P0003, Rev 0		24590-PTF-M6-FEP-00003001, Rev 0
			24590-PTF-M6-FEP-00003002, Rev 0
	24590-PTF-M6-FEP-P0004, Rev 0		24590-PTF-M6-FEP-00004001, Rev 0
			24590-PTF-M6-FEP-00004002, Rev 0
			24590-PTF-M6-FEP-00004003, Rev 0
	24590-PTF-M6-FEP-P0005 Rev 0		24590-PTF-M6-FEP-00005001, Rev 0
	24590-PTF-M6-FEP-P0006, Rev 0		24590-PTF-M6-FEP-00006001, Rev 0
			24590-PTF-M6-FEP-00006002 Rev 0
			24590-PTF-M6-HLP-00006003, Rev 0
			24590-PTF-M6-FEP-00006004, Rev 0
	24590-PTF-M6-FEP-P0007, Rev 0		24590-PTF-M6-FEP-00007001, Rev 0
			24590-PTF-M6-FEP-00007002 Rev 0
			24590-PTF-M6-FEP-00007003, Rev 0
			24590-PTF-M6-FEP-P0007004, Rev 0
	24590-PTF-M6-FEP-P0008, Rev 0		24590-PTF-M6-FEP-00008, Rev 0

This modification requests Ecology approval and incorporation into the permit the changes provided in applicable document change forms (e.g., DCNs) and changes associated with the resolution to comments on change documents since the issuance of the last revision of the permitted drawing.

The following identifies the significant changes to the drawings:

- Modified, deleted, and added notes, holds, and references
- Modified, identified, and added support/utility system vessels, lines, valves, in-line components, instruments and logic controls
- Revised piping configuration
- P&ID drawings converted from single sheet to multi-sheet drawings
- Revised, identified, and added quality level and seismic designations
- Revised, identified, and added slope symbols and/or the slope requirement

Outstanding change document 24590-PTF-M6N-M80T-00054 has not been incorporated into this modification and applies to the following P&IDs:

- 24590-PTF-M6-FEP-00001001, Rev 0
- 24590-PTF-M6-FEP-00002001, Rev 0
- 24590-PTF-M6-FEP-00003001, Rev 0
- 24590-PTF-M6-FEP-00004001, Rev 0
- 24590-PTF-M6-FEP-00005001, Rev 0
- 24590-PTF-M6-FEP-00006001, Rev 0
- 24590-PTF-M6-FEP-00007001, Rev 0

Outstanding change document 24590-WTP-M6N-50-00048 has not been incorporated into this modification and applies to the following P&IDs:

- 24590-PTF-M6-FEP-00006001
- 24590-PTF-M6-FEP-00006002
- 24590-PTF-M6-FEP-00006003
- 24590-PTF-M6-FEP-00006004
- 24590-PTF-M6-FEP-00007001
- 24590-PTF-M6-FEP-00007002
- 24590-PTF-M6-FEP-00007003
- 24590-PTF-M6-FEP-00007004

Outstanding change document 24590-PTF-M6N-FEP-00092 has not been incorporated into this modification and applies to the following P&IDs:

- 24590-PTF-M6-FEP-00002002
- 24590-PTF-M6-FEP-00004002
- 24590-PTF-M6-FEP-00008

Outstanding change document 24590-PTF-M6N-FEP-00095 has not been incorporated into this modification and applies to the following P&IDs:

- 24590-PTF-M6-FEP-00002002
- 24590-PTF-M6-FEP-00003002
- 24590-PTF-M6-FEP-00004002
- 24590-PTF-M6-FEP-00005001

The following is a list of outstanding change documents that have not been incorporated into this modification.

- 24590-PTF-M5N-M80T-00001 (on PFD 24590-PTF-M5-V17T-00004001)
- 24590-PTF-M6PN-FEP-00007 (on P&ID 24590-PTF-M6-FEP-00001001)
- 24590-PTF-M6PN-FEP-00008 (on P&ID 24590-PTF-M6-FEP-00001002)
- 24590-PTF-M6PN-FEP-00009 (on P&ID 24590-PTF-M6-FEP-00002001 & 24590-PTF-M6-FEP-00004001)
- 24590-PTF-M6N-FEP-00091 (on P&ID 24590-PTF-M6-FEP-00002002 & 24590-PTF-M6-FEP-00004002)
- 24590-PTF-M6PN-FEP-00010 (on P&ID 24590-PTF-M6-FEP-00003001)
- 24590-PTF-M6PR-10-00002 (on P&ID 24590-PTF-M6-FEP-00006001 & 24590-PTF-M6-FEP-00007001)

Quarter Ending March 31, 2009 24590-PTF-PCN-ENV-08-018

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

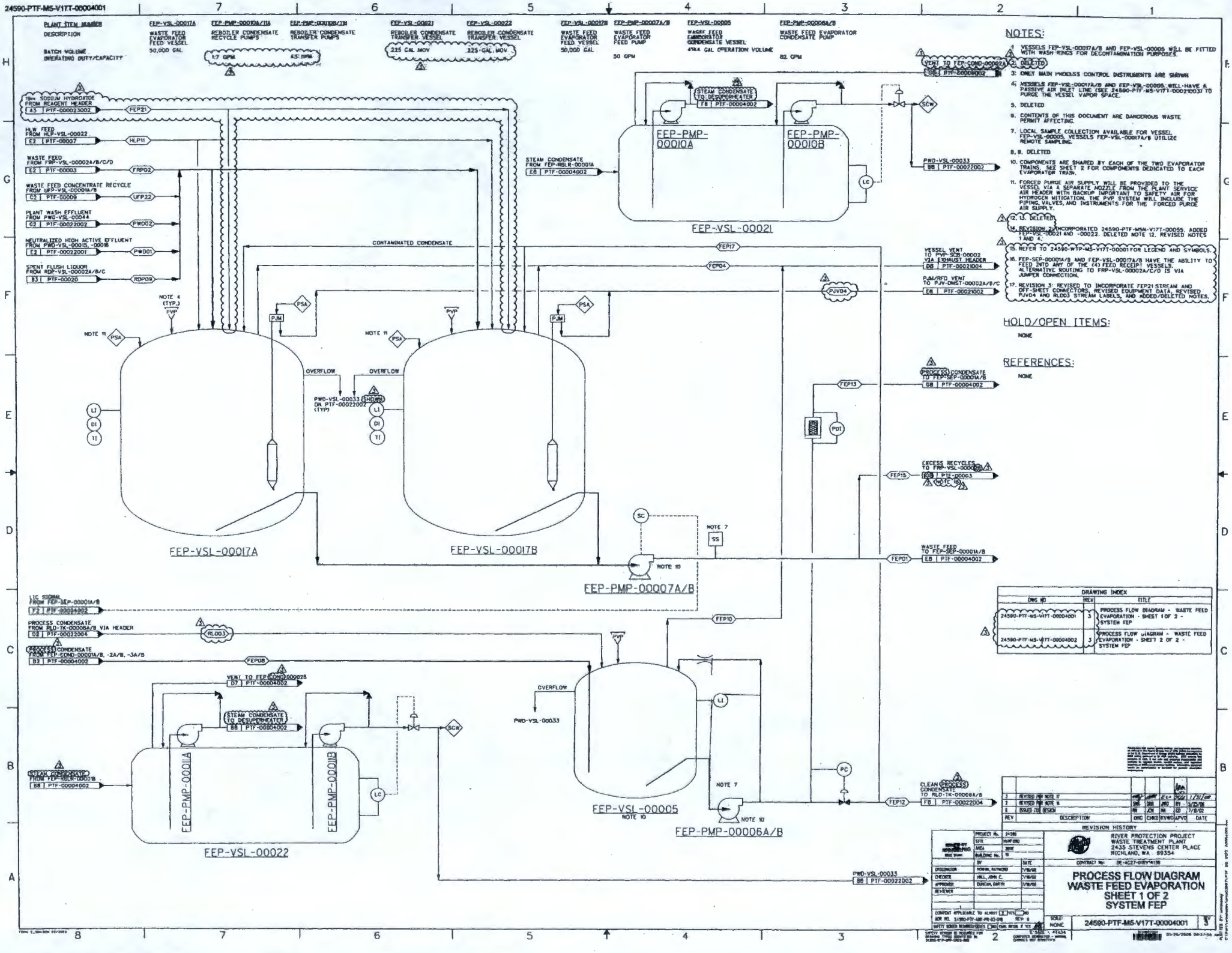
Enter wording of WAC 173-303-830, Appendix I Modification citation:

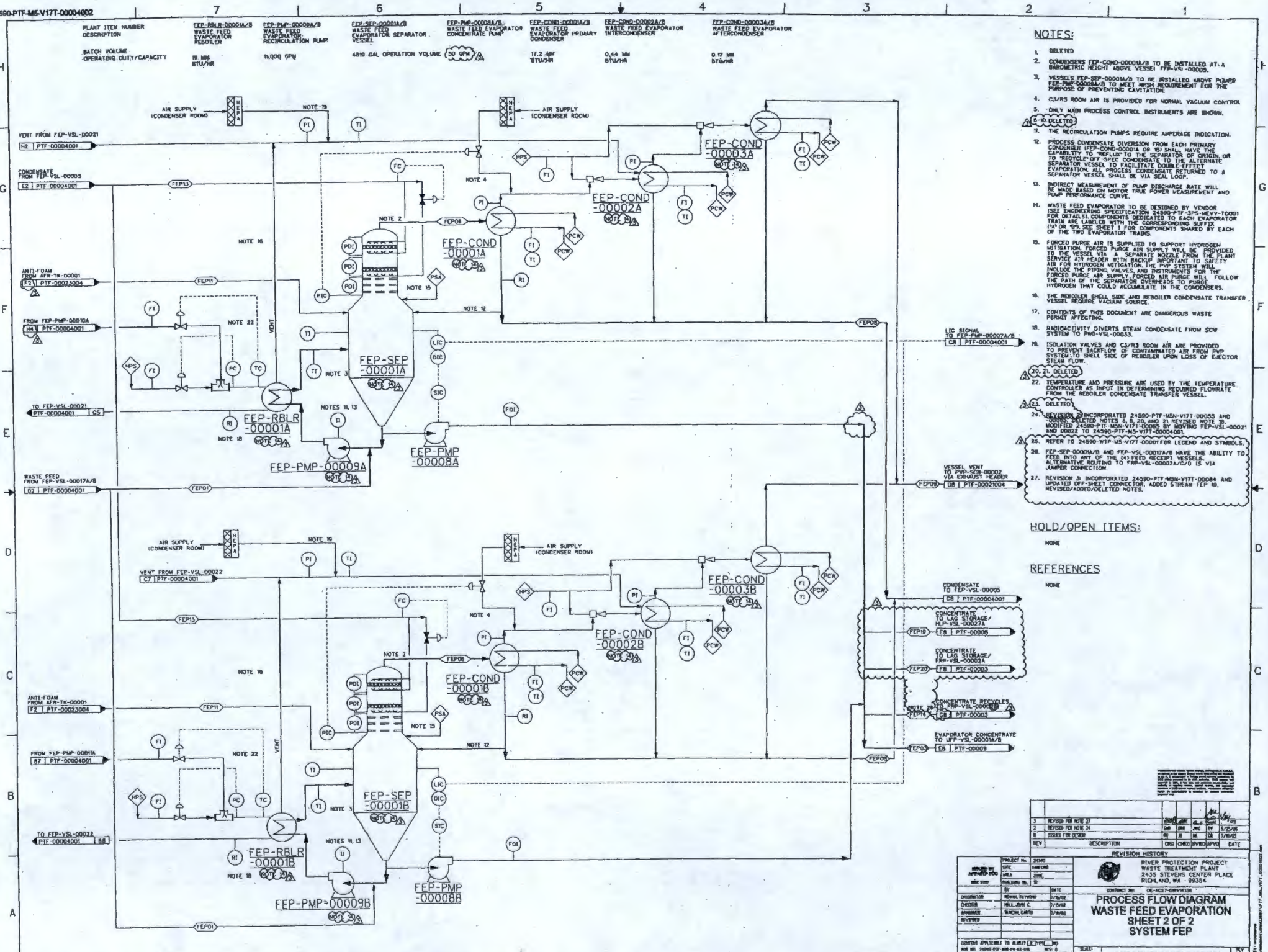
In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class [1]1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its 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: ☑ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology: E Fredenburg 4/16/09 Ed Fredenburg 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 applicable.


PLANT ITEM NUMBER
DESCRIPTION
BATCH VOLUME
OPERATING DUTY/CAPACITY
FEP-VSL-00017A
WASTE FEED EVAPORATOR FEED VESSEL
50,000 GAL
FEP-PMP-00010A/11A
REBOILER CONDENSATE RECYCLE PUMPS
FEP-PMP-00010B/11B
REBOILER CONDENSATE TRANSFER PUMPS
FEP-VSL-00021
REBOILER CONDENSATE TRANSFER VESSEL
225 GAL MOV
FEP-VSL-00022
REBOILER CONDENSATE TRANSFER VESSEL
225 GAL MOV
FEP-VSL-00017B
WASTE FEED EVAPORATOR FEED VESSEL
50,000 GAL
FEP-PMP-00007A/B
WASTE FEED EVAPORATOR FEED PUMP
50 GPM
FEP-VSL-00005
WASTE FEED EVAPORATOR CONDENSATE VESSEL
4944 GAL OPERATION VOLUME
FEP-PMP-00006A/B
WASTE FEED EVAPORATOR CONDENSATE PUMP
82 GPM
NOTES:
1. VESSELS FEP-VSL-00017A/B AND FEP-VSL-00005 WILL BE FITTED WITH WASH RINGS FOR DECONTAMINATION PURPOSES.
2. DELETED
3. ONLY MAIN PROCESS CONTROL INSTRUMENTS ARE SHOWN
4. VESSELS FEP-VSL-00017A/B AND FEP-VSL-00005 WILL HAVE A PASSIVE AIR INLET LINE (SEE 24590-PTF-M5-V17T-00021003) TO PURGE THE VESSEL VAPOR SPACE.
5. DELETED
6. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
7. LOCAL SAMPLE COLLECTION AVAILABLE FOR VESSEL FEP-VSL-00005. VESSELS FEP-VSL-00017A/B UTILIZE REMOTE SAMPLING.
8, 9. DELETED
10. COMPONENTS ARE SHARED BY EACH OF THE TWO EVAPORATOR TRAINS. SEE SHEET 2 FOR COMPONENTS DEDICATED TO EACH EVAPORATOR TRAIN.
11. FORCED PURGE AIR SUPPLY WILL BE PROVIDED TO THE VESSEL VIA A SEPARATE NOZZLE FROM THE PLANT SERVICE AIR HEADER WITH BACKUP IMPORTANT TO SAFETY AIR FOR HYDROGEN MITIGATION. THE PVP SYSTEM WILL INCLUDE THE PIPING, VALVES, AND INSTRUMENTS FOR THE FORCED PURGE AIR SUPPLY.
12. 13. DELETED
14. REVISION 2: INCORPORATED 24590-PTF-MSN-V17T-00055. ADDED FEP-VSL-00021 AND -00022. DELETED NOTE 12. REVISED NOTES 1 AND 4.
15. REFER TO 24590-WTP-M5-V17T-00001 FOR LEGEND AND SYMBOLS.
16. FEP-SEP-00001A/B AND FEP-VSL-00017A/B HAVE THE ABILITY TO FEED INTO ANY OF THE (4) FEED RECEIPT VESSELS. ALTERNATIVE ROUTING TO FRP-VSL-00002A/C/D IS VIA JUMPER CONNECTION.
17. REVISION 3: REVISED TO INCORPORATE FEP21 STREAM AND OFF-SHEET CONNECTORS, REVISED EQUIPMENT DATA, REVISED PJV04 AND RLD03 STREAM LABELS, AND ADDED/DELETED NOTES.
HOLD/OPEN ITEMS:
NONE
REFERENCES:
NONE
10wt SODIUM HYDROXIDE FROM REAGENT HEADER
HLW FEED FROM HLP-VSL-00022
WASTE FEED FROM FRP-VSL-00002A/B/C/D
WASTE FEED CONCENTRATE RECYCLE FROM UFP-VSL-00001A/B
PLANT WASH EFFLUENT FROM PWD-VSL-00044
NEUTRALIZED HIGH ACTIVE EFFLUENT FROM PWD-VSL-00015, -00016
SPENT FLUSH LIQUOR FROM RDF-VSL-00002A/B/C
STEAM CONDENSATE FROM FEP-RBLR-00001A
CONTAMINATED CONDENSATE
VESSEL VENT TO PVP-SCB-00002 VIA EXHAUST HEADER
PJM/RFD VENT TO PJV-DMST-00002A/B/C
PROCESS CONDENSATE TO FEP-SEP-00001A/B
EXCESS RECYCLES TO FRP-VSL-00002
WASTE FEED TO FEP-SEP-00001A/B
LIC SIGNAL FROM FEP-SEP-00001A/B
PROCESS CONDENSATE FROM RLD-TK-00006A/B VIA HEADER
PROCESS CONDENSATE FROM FEP-COND-00001A/B, -2A/B, -3A/B
VENT TO FEP-COND-00002B
STEAM CONDENSATE TO DESUPERHEATER
STEAM CONDENSATE FROM FEP-RBLR-00001B
CLEAN PROCESS CONDENSATE TO RLD-TK-00006A/B
PWD-VSL-00033
FEP-PMP-00010A
FEP-PMP-00010B
FEP-VSL-00021
FEP-VSL-00017A
FEP-VSL-00017B
FEP-PMP-00007A/B
FEP-VSL-00022
FEP-VSL-00005
FEP-PMP-00006A/B
OVERFLOW
NOTE 4 (TYP.)
NOTE 7
NOTE 10
NOTE 11
DRAWING INDEX
24590-PTF-M5-V17T-00004001 3 PROCESS FLOW DIAGRAM - WASTE FEED EVAPORATION - SHEET 1 OF 2 - SYSTEM FEP
24590-PTF-M5-V17T-00004002 3 PROCESS FLOW DIAGRAM - WASTE FEED EVAPORATION - SHEET 2 OF 2 - SYSTEM FEP
REVISION HISTORY
RIVER PROTECTION PROJECT WASTE TREATMENT PLANT 2435 STEVENS CENTER PLACE RICHLAND, WA 99354
PROCESS FLOW DIAGRAM WASTE FEED EVAPORATION SHEET 1 OF 2 SYSTEM FEP
24590-PTF-M5-V17T-00004001
SCALE: NONE



NOTES:

1. DELETED
2. CONDENSERS FEP-COND-00001A/B TO BE INSTALLED AT A BAROMETRIC HEIGHT ABOVE VESSEL FEP-VSL-00005.
3. VESSELS FEP-SEP-00001A/B TO BE INSTALLED ABOVE PUMPS FEP-PMP-00009A/B TO MEET NPSH REQUIREMENT FOR THE PURPOSE OF PREVENTING CAVITATION.
4. C3/R3 ROOM AIR IS PROVIDED FOR NORMAL VACUUM CONTROL
5. ONLY MAIN PROCESS CONTROL INSTRUMENTS ARE SHOWN.
6-10. DELETED
11. THE RECIRCULATION PUMPS REQUIRE AMPERAGE INDICATION.
12. PROCESS CONDENSATE DIVERSION FROM EACH PRIMARY CONDENSER (FEP-COND-00001A OR B) SHALL HAVE THE CAPABILITY TO "REFLUX" TO THE SEPARATOR OF ORIGIN, OR TO "RECYCLE" OFF-SPEC CONDENSATE TO THE ALTERNATE SEPARATOR VESSEL TO FACILITATE DOUBLE-EFFECT EVAPORATION. ALL PROCESS CONDENSATE RETURNED TO A SEPARATOR VESSEL SHALL BE VIA SEAL LOOP.
13. INDIRECT MEASUREMENT OF PUMP DISCHARGE RATE WILL BE MADE BASED ON MOTOR TRUE POWER MEASUREMENT AND PUMP PERFORMANCE CURVE.
14. WASTE FEED EVAPORATOR TO BE DESIGNED BY VENDOR (SEE ENGINEERING SPECIFICATION 24590-PTF-3PS-MEVV-T0001 FOR DETAILS). COMPONENTS DEDICATED TO EACH EVAPORATOR TRAIN ARE LABELED WITH THE CORRESPONDING SUFFIX ("A" OR "B"). SEE SHEET 1 FOR COMPONENTS SHARED BY EACH OF THE TWO EVAPORATOR TRAINS.
15. FORCED PURGE AIR IS SUPPLIED TO SUPPORT HYDROGEN MITIGATION. FORCED PURGE AIR SUPPLY WILL BE PROVIDED TO THE VESSEL VIA A SEPARATE NOZZLE FROM THE PLANT SERVICE AIR HEADER WITH BACKUP IMPORTANT TO SAFETY AIR FOR HYDROGEN MITIGATION. THE PVP SYSTEM WILL INCLUDE THE PIPING, VALVES, AND INSTRUMENTS FOR THE FORCED PURGE AIR SUPPLY. FORCED AIR PURGE WILL FOLLOW THE PATH OF THE SEPARATOR OVERHEADS TO PURGE HYDROGEN THAT COULD ACCUMULATE IN THE CONDENSERS.
16. THE REBOILER SHELL SIDE AND REBOILER CONDENSATE TRANSFER VESSEL REQUIRE VACUUM SOURCE.
17. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
18. RADIOACTIVITY DIVERTS STEAM CONDENSATE FROM SCW SYSTEM TO PWO-VSL-00033.
19. ISOLATION VALVES AND C3/R3 ROOM AIR ARE PROVIDED TO PREVENT BACKFLOW OF CONTAMINATED AIR FROM PVP SYSTEM TO SHELL SIDE OF REBOILER UPON LOSS OF EJECTOR STEAM FLOW.
20, 21. DELETED
22. TEMPERATURE AND PRESSURE ARE USED BY THE TEMPERATURE CONTROLLER AS INPUT IN DETERMINING REQUIRED FLOWRATE FROM THE REBOILER CONDENSATE TRANSFER VESSEL.
23. DELETED
24. REVISION 2: INCORPORATED 24590-PTF-M5N-V17T-00055 AND -00065. DELETED NOTES 6, 8, 20, AND 21. REVISED NOTE 18. MODIFIED 24590-PTF-M5N-V17T-00065 BY MOVING FEP-VSL-00021 AND 00022 TO 24590-PTF-M5-V17T-00004001.
25. REFER TO 24590-WTP-M5-V17T-00001 FOR LEGEND AND SYMBOLS.
26. FEP-SEP-00001A/B AND FEP-VSL-00017A/B HAVE THE ABILITY TO FEED INTO ANY OF THE (4) FEED RECEIPT VESSELS. ALTERNATIVE ROUTING TO FRP-VSL-00002A/B/D IS VIA JUMPER CONNECTION.
27. REVISION 3: INCORPORATED 24590-PTF-M5N-V17T-00084 AND UPDATED OFF-SHEET CONNECTOR, ADDED STREAM FEP 18, REVISED/ADDED/DELETED NOTES.

HOLD/OPEN ITEMS:

NONE

REFERENCES

NONE

REV	DESCRIPTION	DRG	CHKD	RVWD	APVD	DATE
3	REVISED PER NOTE 27					
2	REVISED PER NOTE 24	DRB	DRB	JRD	RV	5/25/06
1	ISSUED FOR DESIGN	RV	JB	MB	DB	7/18/02

REVISION HISTORY

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

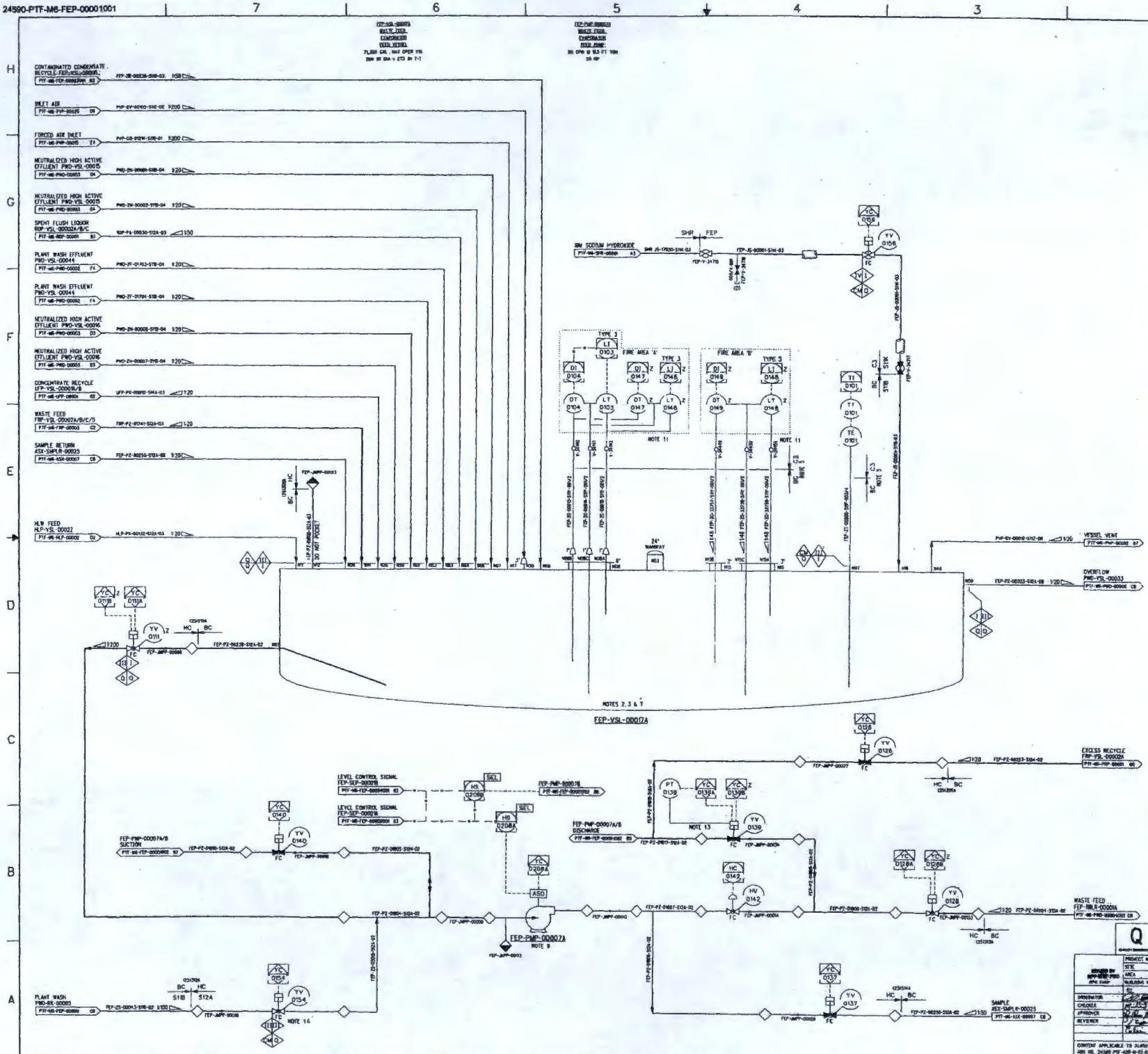
CONTRACT No. DE-AC27-01RV14136

PROCESS FLOW DIAGRAM WASTE FEED EVAPORATION SHEET 2 OF 2 SYSTEM FEP

SCALE: NONE

24590-PTF-M5-V17T-00004002

REV 3



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-SO-00001 THROUGH 24590-WTP-M6-SO-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. SEE DRAWINGS 24590-PTF-M6-FEP-00006001, -00006002, AND, 24590-PTF-M6-FEP-00007006, -00007003 FOR PULSEJET MIXER REPRESENTATION AND NOZZLES UTILIZED.
3. SEE DRAWING 24590-PTF-M6-FEP-00008 FOR UTILITY PLANT WASH REPRESENTATION AND NOZZLES UTILIZED.
4. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES AND COMPONENTS ON THIS DRAWING ARE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
5. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (RS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE OR BE GOOGLED, AS DETERMINED BY ENVIRONMENTAL AND NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
6. CONTENTS OF THIS DRAWING ARE DANGEROUS WASTE PERMIT AFFECTING.
7. ALL INTERNAL SUPPORTS AND WELDS THAT INTERACT WITH THE PRIMARY CONTAINMENT BARRIER (VESSEL) SHALL MAINTAIN EQUAL QUALITY LEVEL AND SEISMIC CATEGORY AS THE PARENT.
8. INDICATED SLOPES ARE CONSIDERED MINIMUM.
9. SEE DRAWING 24590-PTF-M6-PSW-00009 FOR PUMP SEAL WATER CONNECTIONS.
10. SEE DRAWING 24590-PTF-M6-ISA-00008 FOR BUBBLER RACKS AND SYSTEM CONNECTIONS.
11. QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I BACKFLOW PREVENTION IS INSTALLED UPSTREAM OF LEVEL INSTRUMENTATION.
12. SEISMIC CATEGORY AND QUALITY LEVEL SHOWN ON THIS PAID ARE THE MINIMUM REQUIREMENTS. DESIGN, FABRICATION, AND INSTALLATION MAY BE TO HIGHER REQUIREMENTS.
13. PRESSURE TRANSMITTER IS USED TO DETERMINE NON-ITS/APC VALVE POSITION. PRESSURE TRANSMITTER IS LOCATED ON INSTRUMENT RACK IN OUT-CELL AREA. VALVE CONTAINS ITS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III LIMIT SWITCHES FOR ITS VALVE POSITION.
14. VALVE IS USED TO CONTROL WATER COLUMN SEPARATION DURING FLUSHING.
15. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00001 REV 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-M6M-FEP-00089 AND 24590-PTF-M6K-M6DT-00036.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION FOR FEP-WASTE FEED EVAPORATOR PROCESS SYSTEM, 24590-PTF-3PS-FEP-T0001 AND SOFTWARE FUNCTIONAL SPECIFICATION FOR PTF EVAPORATOR TRAIN 24590-PTF-3PS-TLP-T0002.
2. TOR PERMISSIVES AND INTERLOCKS FOR IMPORTANT TO SAFETY SYSTEMS (ITS) REFER TO SAFETY SYSTEM REQUIREMENT SPECIFICATIONS 24590-PTF-3PS-PFJ-T0003, (FUTURE) -T0005, (FUTURE) AND -T0006.

DRAWING INDEX

DWG NO	REV	TITLE
24590-PTF-M6-FEP-00001001	0	WASTE FEED EVAPORATION PROCESS SYSTEM
24590-PTF-M6-FEP-00001002	0	WASTE FEED EVAPORATION PROCESS SYSTEM

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	REVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 15					1/9/03

Q

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

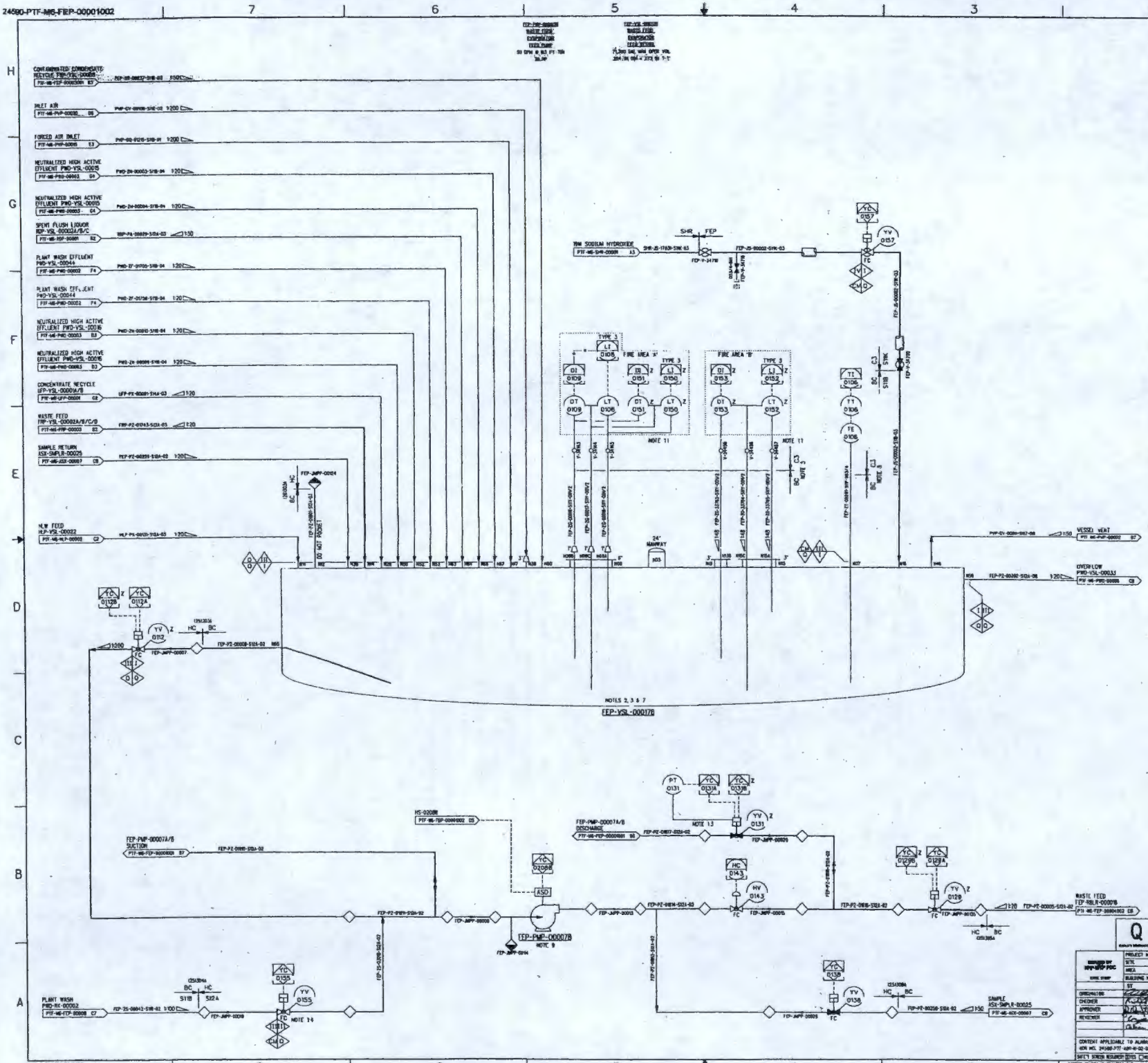
CONTRACT No: DE-AC27-01RV14136

P&ID - PTF
WASTE FEED EVAPORATION PROCESS SYSTEM EVAPORATOR FEED VESSEL FEP-VSL-00017A

SCALE: NONE

24590-PTF-M6-FEP-00001001

REV 0



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. SEE DRAWINGS 24590-PTF-M6-FEP-00007001 AND -00007002 FOR PULSE JET MIXER REPRESENTATION AND NOZZLES UTILIZED.
3. SEE DRAWING 24590-PTF-M6-FEP-00008 FOR UTILITY PLANT WASH REPRESENTATION AND NOZZLES UTILIZED.
4. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES AND COMPONENTS ON THIS DRAWING ARE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
5. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (RSI) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE OR BE JOGGLED, AS DETERMINED BY ENVIRONMENTAL AND NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
6. CONTENTS OF THIS DRAWING ARE DANGEROUS WASTE PERMIT AFFECTING.
7. ALL INTERNAL SUPPORTS AND WELDS THAT INTERACT WITH THE PRIMARY CONTAINMENT BARRIER (VESSEL) SHALL MAINTAIN EQUAL QUALITY LEVEL AND SEISMIC CATEGORY AS THE PARENT.
8. INDICATED SLOPES ARE CONSIDERED MINIMUM.
9. SEE DRAWING 24590-PTF-M6-PSW-00009 FOR PUMP SEAL WATER CONNECTIONS.
10. SEE DRAWING 24590-PTF-M6-ISA-00008 FOR BUBBLER RACKS AND SYSTEM CONNECTIONS.
11. QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I BACKFLOW PREVENTION IS INSTALLED UPSTREAM OF LEVEL INSTRUMENTATION.
12. SEISMIC CATEGORY AND QUALITY LEVEL SHOWN ON THIS P&ID ARE THE MINIMUM REQUIREMENTS. DESIGN, FABRICATION, AND INSTALLATION MAY BE TO HIGHER REQUIREMENTS.
13. PRESSURE TRANSMITTER IS USED TO DETERMINE NON-ITS/APC VALVE POSITION. PRESSURE TRANSMITTER IS LOCATED ON INSTRUMENT RACK IN OUT-CELL AREA. VALVE CONTAINS ITS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III LIMIT SWITCHES FOR ITS VALVE POSITION.
14. VALVE IS USED TO CONTROL WATER COLUMN SEPARATION DURING FLUSHING.
15. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00001 REV 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-M6N-FEP-00009 AND 24590-PTF-M6N-M807-00038.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION FOR FEP-WASTE FEED EVAPORATOR PROCESS SYSTEM, 24590-PTF-SPS-FEP-T0001 AND SOFTWARE FUNCTIONAL SPECIFICATION FOR PTF EVAPORATOR TRAIN 24590-PTF-SPS-TLP-T0002.
2. FOR PERMISSIVES AND INTERLOCKS FOR IMPORTANT TO SAFETY SYSTEMS (ITS) REFER TO SAFETY SYSTEM REQUIREMENT SPECIFICATIONS 24590-PTF-SPS-PPJ-T0003, (FUTURE) -T0005, (FUTURE) AND -T0010.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 15					1-30-08

REVISION HISTORY

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

CONTRACT No. DE-AC27-01RV14136

P&ID - PTF
WASTE FEED EVAPORATION PROCESS SYSTEM
EVAPORATOR FEED VESSEL
FEP-VSL-00017B

SCALE: NONE

24590-PTF-M6-FEP-00001002

REV 0

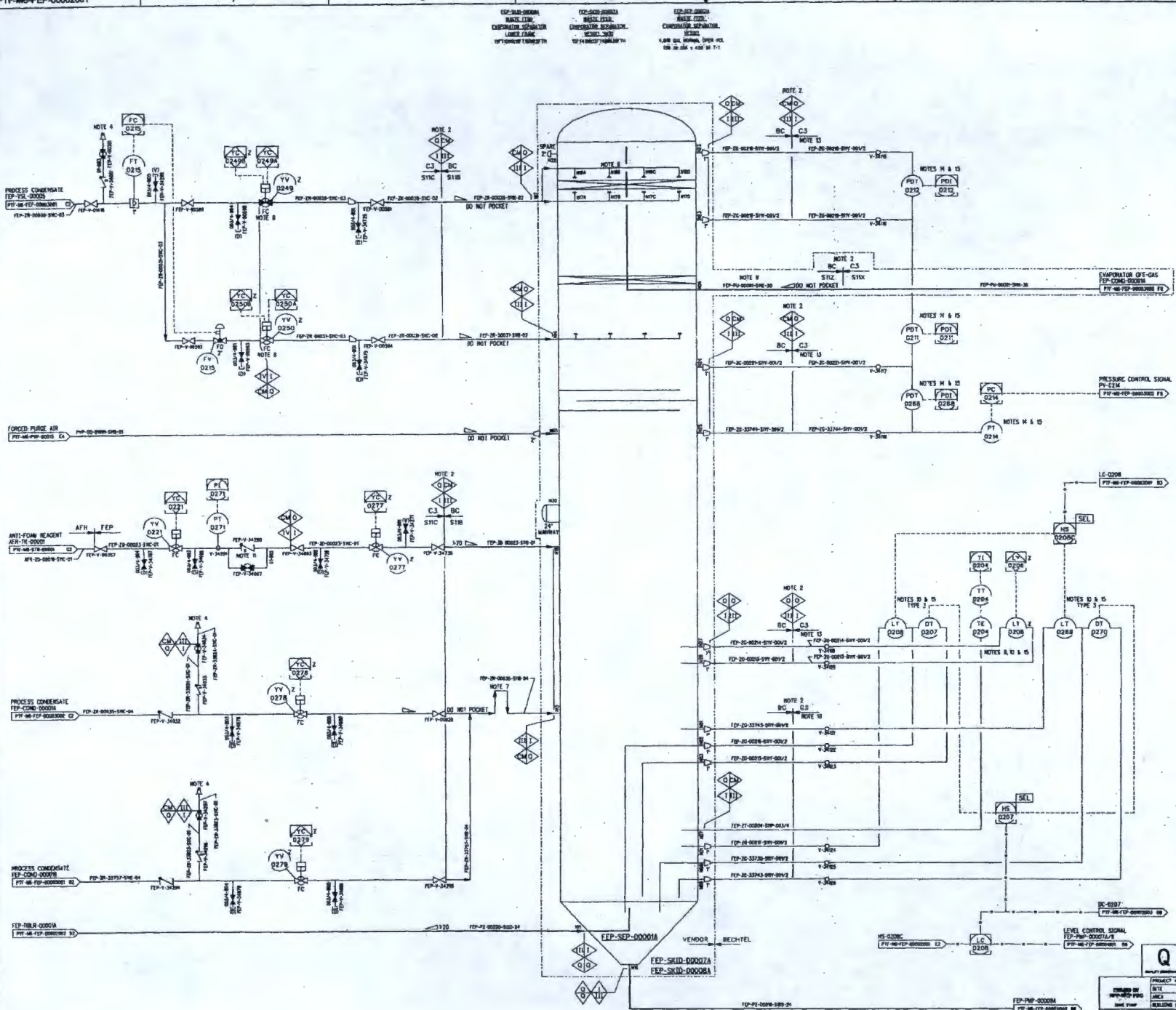
PROJECT No. 24590
SYM. PSYND
AREA 200C
BUILDING No. 10

DESIGNED BY: RPP-WTP PGC

CONTENT APPLICABLE TO ALARMS? YES NO
ADR NO. 24590-PTF-ADR-N-02-030 REV. 2
SAFETY SCREEN REQUIRED? YES NO
SAFETY SCREEN IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-PTF-GPP-MGS-002

SIZE: 44x34
COMPUTER GENERATED - MANUAL CHANGES NOT PERMITTED

EV29-2006 14:43:26



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (RDS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE ON THE PROCESS AS DETERMINED BY ENVIRONMENTAL AND NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
3. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS SHOWN ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
4. REAGENT/PLANT WASH/AIR SERVICES PROVIDED AT LOCAL UTILITY STATION.
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. SPRAY NOZZLES FOR UPPER DEMISTER PAD ARE MOUNTED EXTERNALLY AROUND THE PERIMETER OF THE SEPARATOR SHELL. THESE NOZZLES ARE SHOWN INTERNALLY TO DEPICT THE FUNCTION RATHER THAN LOCATION.
7. MINIMUM HYDRAULIC SEAL HEIGHT IS 3'-8".
8. SEPARATOR HIGH-LEVEL DETECTION INSTRUMENTATION LT-206/LT-208, ASSOCIATED PIPING, AND VALVES YV-0249 AND YV-0250 ARE DESIGNATED QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I.
9. LINE FEP-PU-00001 SHALL BE PROVIDED BY FEP-SKID-00007A VENDOR, SEPARATE FROM SKID.
10. SEE DRAWING 24590-PTF-M6-15A-00008 FOR BUBBLER RACKS AND SYSTEM CONNECTIONS.
11. FCHECK VALVE OPENING PRESSURE 55 PSIG.
12. EQUIPMENT WITHIN VENDOR BOUNDARY IS TO BE SUPPLIED BY VENDOR. PIPING AND PIPE SUPPORT TO BE PROVIDED BY BECHTEL. EQUIPMENT DESIGN DEPENDENT ON VENDOR SYSTEM DESIGN.
13. QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I BACKFLOW PREVENTION TO BE PLACED UPSTREAM OF ALL LEVEL AND PRESSURE INSTRUMENTATION.
14. SEPARATOR PDT AND PT WILL BE AIR PURGED.
15. SENSING LINES UTILIZING AIR TO BE EQUIPPED FOR HUMIDIFICATION AND PERIODIC WATER FLUSH CAPABILITIES.
16. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00002 REV 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-M6PM-FEP-00002.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION FOR FEP-WASTE FEED EVAPORATION PROCESS SYSTEM, 24590-PTF-3PS-FEP-T0001 AND SOFTWARE FUNCTIONAL SPECIFICATION FOR PTF EVAPORATOR TRAIN 24590-PTF-3PS-TLP-T0002 .
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SAFETY SYSTEM REQUIREMENT SPECIFICATIONS 24590-PTF-3PS-PPJ-T0004 (FUTURE), AND -T0018.

DRAWING INDEX

DWG NO	REV	TITLE
24590-PTF-M6-FEP-00002001	0	WASTE FEED EVAPORATION PROCESS SYSTEM
24590-PTF-M6-FEP-00002002	0	WASTE FEED EVAPORATION PROCESS SYSTEM
24590-PTF-M6-FEP-00002003	0	WASTE FEED EVAPORATION PROCESS SYSTEM

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 16					

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

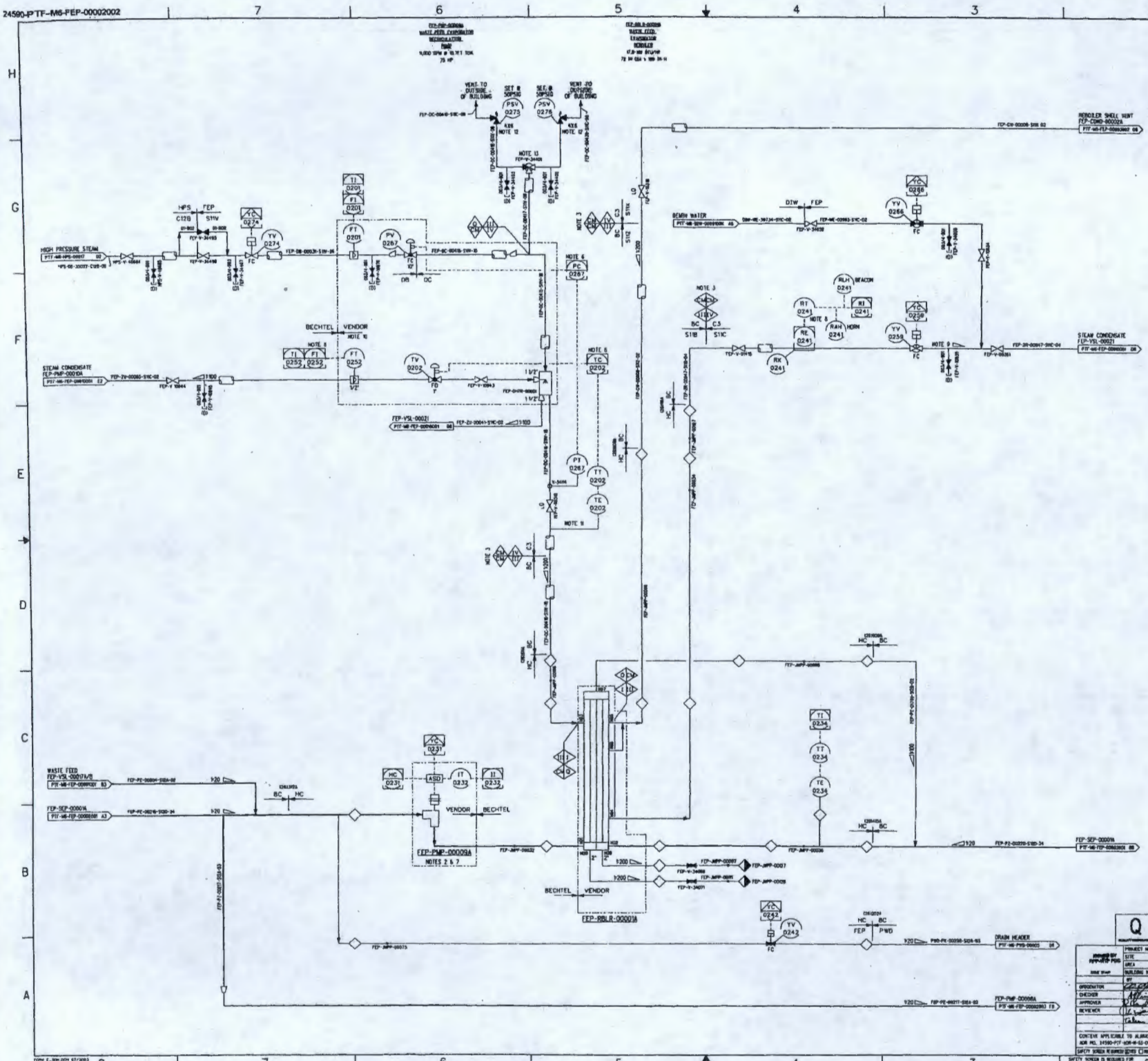
CONTRACT No. DE-AC27-01RV14136

P&ID-PTF
WASTE FEED EVAPORATION PROCESS SYSTEM SEPARATOR FEP-SEP-00001A

SCALE: NONE

24590-PTF-M6-FEP-00002001

REV 0



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. RECIRCULATION PUMP DISCHARGE RATE WILL BE ESTIMATED BASED ON MOTOR AMPERAGE MEASUREMENT AND PUMP PERFORMANCE CURVE.
3. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (RS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE OR BE JOGGLED, AS DETERMINED BY ENVIRONMENTAL AND NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
4. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS SHOWN ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. RECYCLED STEAM CONDENSATE IS INJECTED INTO THE REBOILER STEAM SUPPLY TO REDUCE SUPERHEAT. TEMPERATURE AND PRESSURE ARE USED BY THE TEMPERATURE CONTROLLER AS INPUT IN DETERMINING REQUIRED FLOWRATE FROM THE REBOILER CONDENSATE TRANSFER VESSEL.
7. SEE DRAWING 24590-PTF-M6-PSW-00009 FOR PUMP SEAL WATER CONNECTIONS.
8. RAH-0241 IN LOCAL ROOM AND SUPPLEMENTED WITH A ROTATING BEACON.
9. PLANT DESIGN TO MAXIMIZE SLOPE WITH SPACE AVAILABLE. NO POCKETS.
10. EQUIPMENT WITHIN VENDOR BOUNDARY IS TO BE SUPPLIED BY VENDOR. PIPING, MANUAL VALVES, AND PIPE SUPPORT TO BE PROVIDED BY BECHTEL. EQUIPMENT DESIGN DEPENDENT ON VENDOR SYSTEM DESIGN.
11. THERMOWELL DOWN STREAM OF DESUPERHEATER TO BE SHIELDED TO PREVENT POSSIBLE SATURATED STEAM DURING STARTUP OR LOAD CHANGES FROM CONDENSING ON THE WELL AND PREVENTING CORRECT TEMPERATURE READOUT.
12. MINIMIZE LENGTH OF RELIEF VALVE INLET PIPING AND LOCATE REDUCER AS CLOSE AS POSSIBLE TO THE RELIEF VALVE. MINIMIZE TOTAL LENGTH OF DISCHARGE PIPING AND LOCATE EXPANSION AS CLOSE AS POSSIBLE TO THE RELIEF.
13. ROTOR TYPE SELECTOR VALVE REQUIRED TO MEET INLET PRESSURE DROP REQUIREMENTS.
14. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00002 REV 4.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION FOR FEP-WASTE FEED EVAPORATION PROCESS SYSTEM, 24590-PTF-3PS-FEP-T0001 AND SOFTWARE FUNCTIONAL SPECIFICATION FOR PTF EVAPORATOR TRAIN 24590-PTF-3PS-TLP-T0002.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SAFETY SYSTEM REQUIREMENT SPECIFICATIONS 24590-PTF-3PS-PPJ-T0004 (FUTURE), AND -T0016.

REV	DESCRIPTION	DRG	CHKD	REVIEWED	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 14					1-31-08

REVISION HISTORY

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

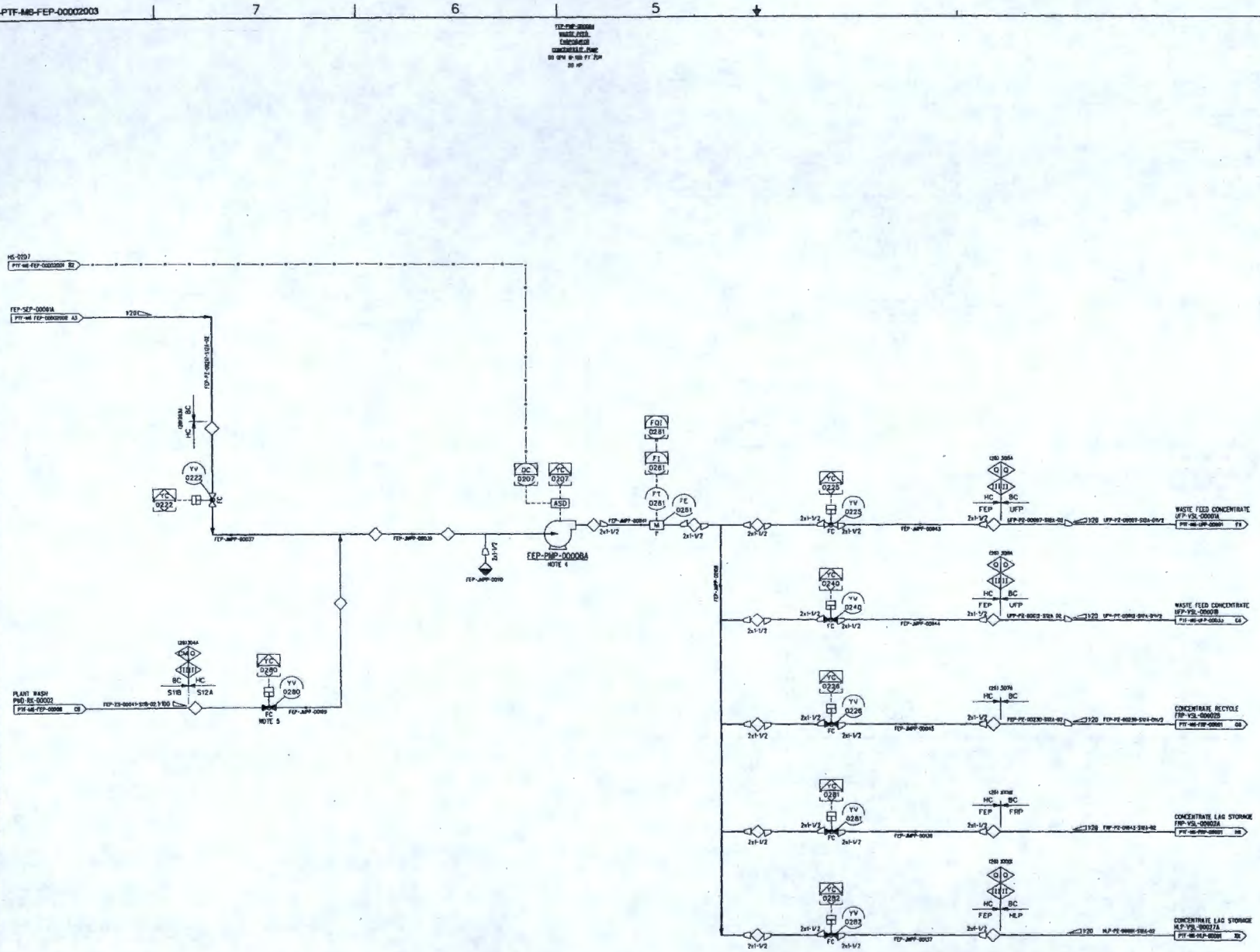
CONTRACT No. DE-AC27-01RV14136

P&ID-PTF
WASTE FEED EVAPORATION PROCESS SYSTEM
REBOILER
FEP-RBLR-00001A

SCALE: NONE

24590-PTF-M6-FEP-00002002

REV 0



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS SHOWN ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
3. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
4. SEE DRAWING 24590-PTF-M6-PSW-00009 FOR PUMP SEAL WATER CONNECTIONS.
5. VALVE TO BE USED TO CONTROL WATER COLUMN SEPARATION DURING FLUSHING.
6. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00002 REV 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-M6H-FEP-00087.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION FOR FEP-WASTE FEED EVAPORATION PROCESS SYSTEM, 24590-PTF-SPS-FEP-T0001 AND SOFTWARE FUNCTIONAL SPECIFICATION FOR PTF EVAPORATOR TRAIN 24590-PTF-SPS-TLP-T0002.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SAFETY SYSTEM REQUIREMENT SPECIFICATIONS 24590-PTF-SPS-PPJ-T0004 (FUTURE) AND -T0018.

REV	DESCRIPTION	ORG	CHKD	REVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 6					1-31-07

REVISION HISTORY

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

CONTRACT NO: DE-AC27-01RV14136

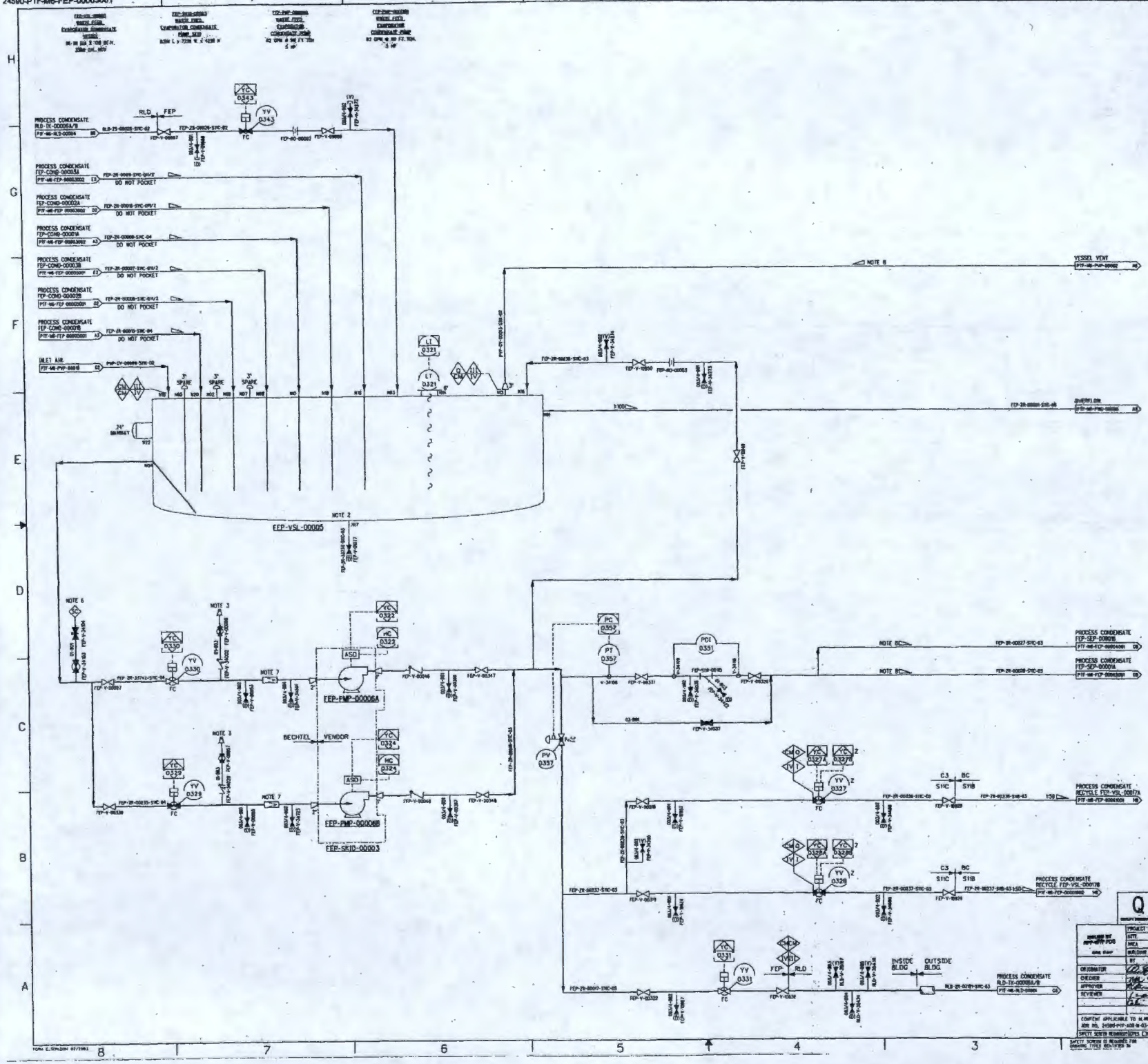
P&ID-PTF
WASTE FEED EVAPORATION PROCESS SYSTEM PUMP
FEP-PMP-00008A

SCALE: NONE

24590-PTF-M6-FEP-00002003

REV 0

24590-PTF-M6-FEP-00003001



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. SEE DRAWING 24590-PTF-M6-EER-00008 FOR PLANT WASH REPRESENTATION AND NOZZLES UTILIZED.
3. REAGENT/PLANT WASH/AIR SERVICES PROVIDED AT LOCAL UTILITY STATION.
4. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
5. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS ARE QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
6. LOCATE THE SAMPLE CONNECTION IN AN ACCESSIBLE AREA AND IN SAFE LOCATION TO FACILITATE SAMPLE COLLECTION. THE BALL VALVE, NEEDLE VALVE, AND SAMPLE CONNECTION POINT SHALL BE WITHIN OPERATOR'S IMMEDIATE REACH WHILE COLLECTING A SAMPLE. PROVIDE A NIPPLE DOWNSTREAM OF THE NEEDLE VALVE WITH A MNPT TERMINUS CLOSED BY A FNPT CAP. DO NOT POCKET THE LINE. DOWNSTREAM OF THE BALL VALVE, THE LINE SHALL BE FREE DRAINING.
7. STRAINERS CAN BE REMOVED AFTER START UP.
8. SLOPE TO BE MAXIMIZED BASED ON SPACE AVAILABILITY. DO NOT POCKET.
9. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00003 REV 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-M6M-FEP-00001 AND -00002.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION, FOR FEP-WASTE FEED EVAPORATION PROCESS SYSTEM, 24590-PTF-3PS-FEP-T0001 AND SOFTWARE FUNCTIONAL SPECIFICATION FOR THE EVAPORATOR TRAIN 24590-PTF-3PS-TLP-T0002.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS) REFER TO SAFETY SYSTEM REQUIREMENT SPECIFICATION, 24590-PTF-3PS-PPJ-T0018.

DRAWING INDEX

DWG NO	REV	TITLE
24590-PTF-M6-FEP-00003001	0	WASTE FEED EVAPORATION PROCESS SYSTEM
24590-PTF-M6-FEP-00003002	0	WASTE FEED EVAPORATION PROCESS SYSTEM

REVISION HISTORY

REV	DESCRIPTION	DRG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION PER NOTE 8					1-31-03

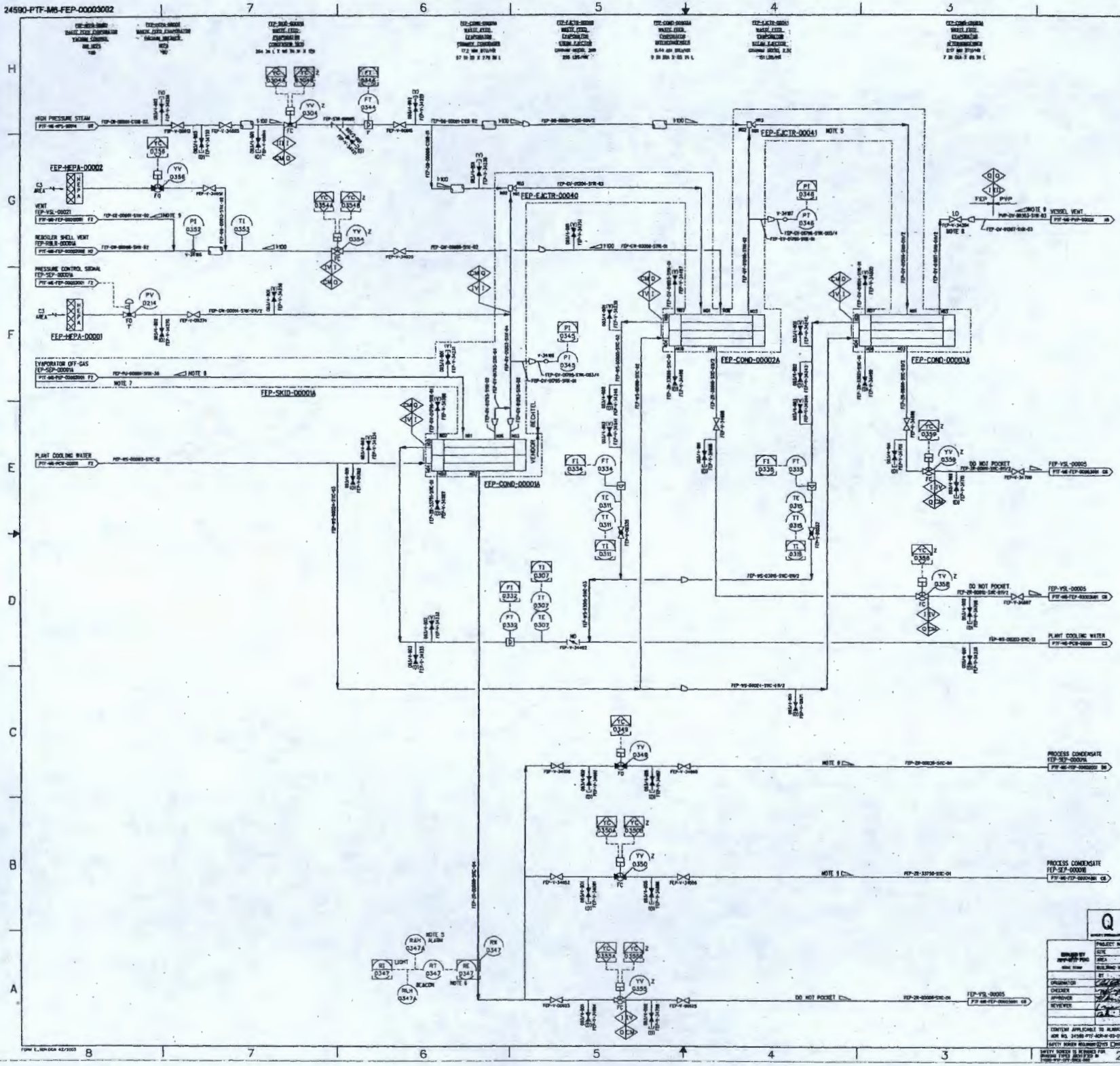
RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No DE-AC27-01RV14136

P&ID - PTF
WASTE FEED EVAPORATION PROCESS SYSTEM CONDENSATE COLLECTION FEP-VSL-00005

SCALE: NONE

24590-PTF-M6-FEP-00003001 REV 0



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00006 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE RECORDING NOTE.
2. SEE DRAWING 24590-PTF-M6-FEP-00008 FOR PLANT SIGN REPRESENTATION AND NOZZLES LOCATED.
3. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
4. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STUCTURES, AND COMPONENTS SHOWN ON THIS DRAWING ARE QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
5. ALARM RAH-03474 TO BE LOCATED NEAR CONDENSER FEP-COND-00001A AND SUPPLEMENTED WITH A ROTATING BEACON.
6. INSTALL RADIATION MONITOR ON HORIZONTAL PIPE SEGMENT THAT WILL INSURE FIXED AND CONSTANT VOLUME.
7. LINE FEP-PU-00001 SHALL BE PROVIDED BY FEP-SKID-00001A VENDOR SEPARATE FROM SKID.
8. VALVE IS MAINTAINED OPEN FOR SAFETY REASONS TO PROVIDE PRIMARY AIR PURGE PATH FOR FEP SEPARATOR VESSEL AND CONDENSERS, FEP-SEP-00001A, FEP-COND-00001A, FEP-COND-00002A, AND FEP-COND-00003A.
9. SLOPE TO BE MAXIMIZED BASED ON SPACE AVAIABILITY. DO NOT POCKET.
10. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00003 REV 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-MEN-FEP-00001, 24590-PTF-M6PN-FEP-00002, AND -00004.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION FOR FEP-WASTE FEED EVAPORATION PROCESS SYSTEM, 24590-PTF-3PS-FEP-T0001 AND SOFTWARE FUNCTIONAL SPECIFICATION FOR THE EVAPORATOR TRAIN 24590-PTF-3PS-TLP-T0002.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SAFETY SYSTEM REQUIREMENT SPECIFICATION 24590-PTF-3PS-PPJ-T0016.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 10					

REVISION HISTORY

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

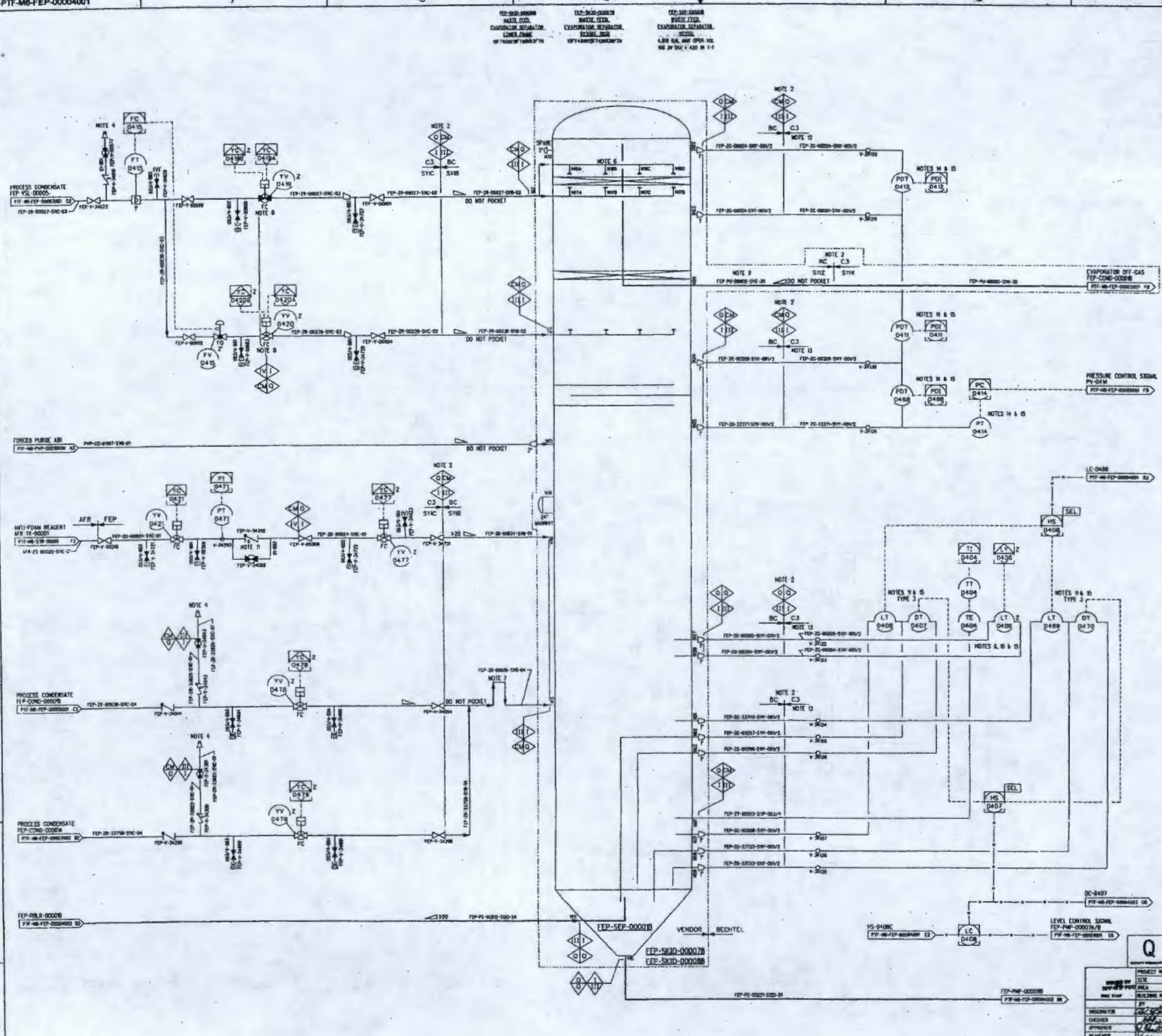
CONTRACT NO. DE-AC27-01RV14136

P&ID - PTF
WASTE FEED EVAPORATION PROCESS SYSTEM CONDENSERS
FEP-COND-00001A/2A/3A

SCALE: NONE

24590-PTF-M6-FEP-00003002

REV 0



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. PIPE/SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (RS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE OR BE JOGGLED, AS DETERMINED BY ENVIRONMENTAL AND NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
3. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS SHOWN ON THIS DRAWING IS QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
4. REAGENT/PLANT WASH/AIR SERVICES PROVIDED AT LOCAL UTILITY STATION.
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. SPRAY NOZZLES FOR UPPER DEMISTER PAD ARE MOUNTED EXTERNALLY AROUND THE PERIMETER OF THE SEPARATOR SHELL. THESE NOZZLES ARE SHOWN INTERNALLY TO DEPICT THE FUNCTION RATHER THAN LOCATION.
7. MINIMUM HYDRAULIC SEAL HEIGHT IS 3'-6".
8. SEPARATOR HIGH-LEVEL DETECTION INSTRUMENTATION LV-0406/LT-0406, ASSOCIATED PIPING, AND VALVES YV-0418 AND YV-0420 ARE DESIGNATED QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-I.
9. LINE FEP-PU-00005 SHALL BE PROVIDED BY FEP-SKID-00007B VENDOR, SEPARATE FROM SKID.
10. SEE DRAWING 24590-PTF-M6-ISA-00008 FOR BUBBLER RACKS AND SYSTEM CONNECTIONS.
11. F CHECK VALVE OPENING PRESSURE 55 PSIG.
12. EQUIPMENT WITHIN VENDOR BOUNDARY IS TO BE SUPPLIED BY VENDOR. PIPING AND PIPE SUPPORT TO BE PROVIDED BY BECHTEL EQUIPMENT DESIGN DEPENDENT ON VENDOR SYSTEM DESIGN.
13. QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-I BACKFLOW PREVENTION TO BE PLACED UPSTREAM OF ALL LEVEL AND PRESSURE INSTRUMENTATION.
14. SEPARATOR PDT AND PT WILL BE AIR PURGED.
15. SENSING LINES UTILIZING AIR TO BE EQUIPPED FOR PURGING/FLUSHING AND PERIODIC WATER FLUSH CAPABILITIES.
16. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00004 REV 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-M6FN-FEP-00002.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION FOR FEP-WASTE FEED EVAPORATION PROCESS SYSTEM, 24590-PTF-3PS-FEP-T0001 AND SOFTWARE FUNCTIONAL SPECIFICATION FOR PTF EVAPORATOR TRAIN 24590-PTF-3PS-TLP-T0002.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SAFETY SYSTEM REQUIREMENT SPECIFICATIONS 24590-PTF-3PS-PPJ-T0004 (FUTURE), AND -T0018.

DRAWING INDEX

DWG NO	REV	TITLE
24590-PTF-M6-FEP-00004001	0	WASTE FEED EVAPORATION PROCESS SYSTEM
24590-PTF-M6-FEP-00004002	0	WASTE FEED EVAPORATION PROCESS SYSTEM
24590-PTF-M6-FEP-00004003	0	WASTE FEED EVAPORATION PROCESS SYSTEM

REVISION HISTORY

REV	DESCRIPTION	DRC	CHKD	RVWD	APVD	DATE
B	ISSUED FOR CONSTRUCTION SEE NOTE 16					1-31-08

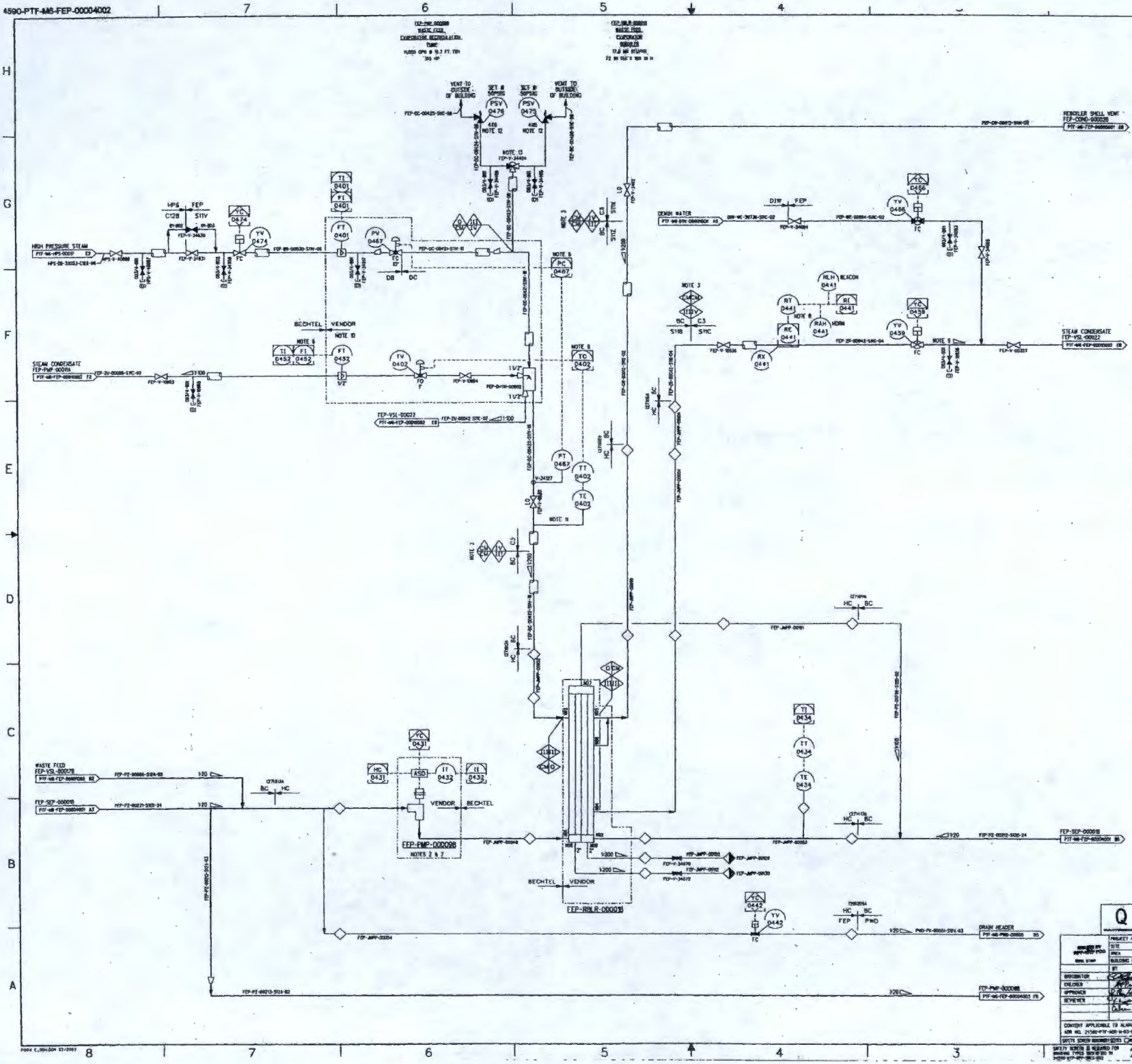
RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT NO DE-AC27-01RV14136

P&ID-PTF
WASTE FEED EVAPORATION PROCESS SYSTEM SEPARATOR
FEP-SEP-00001B

SCALE: NONE

24590-PTF-M6-FEP-00004001 REV 0



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. RECIRCULATION PUMP DISCHARGE RATE WILL BE ESTIMATED BASED ON MOTOR AMPERAGE MEASUREMENT AND PUMP PERFORMANCE CURVE.
3. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (IRS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE OR BE JOGGLED, AS DETERMINED BY ENVIRONMENTAL AND NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
4. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS SHOWN ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. RECYCLED STEAM CONDENSATE IS INJECTED INTO THE REBOILER STEAM SUPPLY TO REDUCE SUPERHEAT. TEMPERATURE AND PRESSURE ARE USED BY THE TEMPERATURE CONTROLLER AS INPUT IN DETERMINING REQUIRED FLOWRATE FROM THE REBOILER CONDENSATE TRANSFER VESSEL.
7. SEE DRAWING 24590-PTF-M6-PSW-00009 FOR PUMP SEAL WATER CONNECTIONS.
8. RAH-0441 IN LOCAL ROOM AND SUPPLEMENTED WITH A ROTATING BEACON.
9. PLANT DESIGN TO MAXIMIZE SLOPE WITH SPACE AVAILABLE. NO POCKETS.
10. EQUIPMENT WITHIN VENDOR BOUNDARY IS TO BE SUPPLIED BY VENDOR PIPING, MANUAL VALVES, AND PIPE SUPPORT TO BE PROVIDED BY BECHTEL. EQUIPMENT DESIGN DEPENDENT ON VENDOR SYSTEM DESIGN.
11. THERMOWELL DOWN STREAM OF DESUPERHEATER TO BE SHIELDED TO PREVENT POSSIBLE SATURATED STEAM DURING STARTUP OR LOAD CHANGES FROM CONDENSING ON THE WELL AND PREVENTING CORRECT TEMPERATURE READOUT.
12. MINIMIZE LENGTH OF RELIEF VALVE INLET PIPING AND LOCATE REDUCER AS CLOSE AS POSSIBLE TO THE RELIEF VALVE. MINIMIZE TOTAL LENGTH OF DISCHARGE PIPING AND LOCATE EXPANSION AS CLOSE AS POSSIBLE TO THE RELIEF.
13. ROTOR TYPE SELECTOR VALVE REQUIRED TO MEET INLET PRESSURE DROP REQUIREMENTS.
14. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND 24 PART SUPERSEDES 24590-PTF-M6-FEP-00004 REV 4.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION FOR FEP-WASTE FEED EVAPORATION PROCESS SYSTEM, 24590-PTF-3PS-FEP-T0001 AND SOFTWARE FUNCTIONAL SPECIFICATION FOR PTF EVAPORATOR TRAIN 24590-PTF-3PS-TLF-T0002.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SAFETY SYSTEM REQUIREMENT SPECIFICATIONS 24590-PTF-3PS-PPJ-T0004 (FUTURE), AND -T0018.

REV	DESCRIPTION	ORG	DRD	DWN	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 14					1-3-08

REVISION HISTORY

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

CONTRACT No: DE-AC27-01RV14136

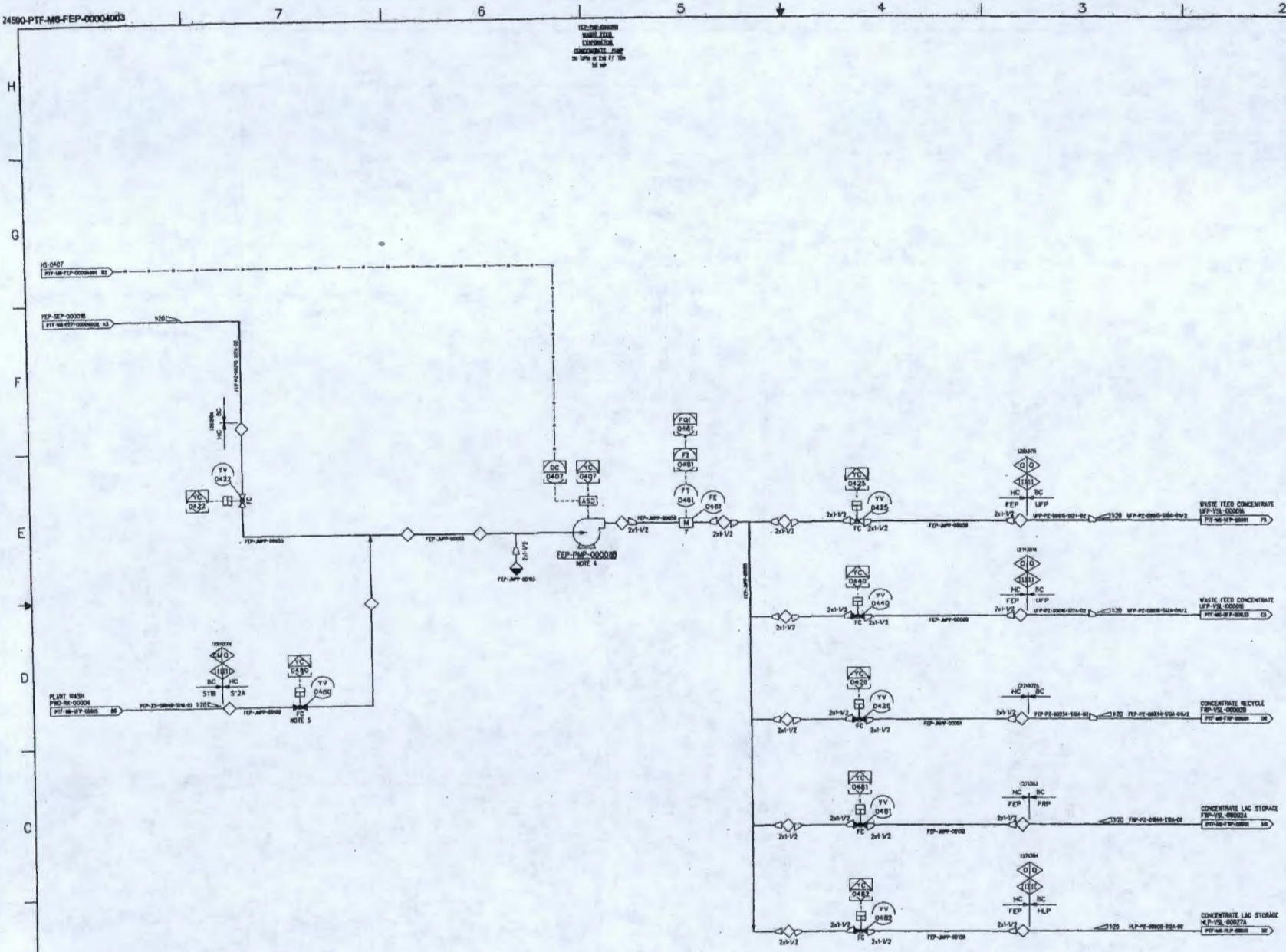
P&ID-PTF
WASTE FEED EVAPORATION PROCESS SYSTEM
REBOILER
FEP-RBLR-00001B

SCALE: NONE

24590-PTF-M6-FEP-00004002

REV: 0

24590-PTF-M6-FEP-00004003



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00006 FOR GENERAL NOTES, SYMBOLS AND LEGEND AND GENERAL SLURRY REQUIREMENTS.
2. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES AND COMPONENTS SHOWN ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
3. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
4. SEE DRAWING 24590-PTF-M6-PSW-00009 FOR PUMP SEAL WATER CONNECTIONS.
5. VALVE TO BE USED TO CONTROL WATER COLUMN SEPARATION DURING FLUSHING.
6. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00004 REV 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-MSN-FEP-00007.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION FOR FEP-WASTE FEED EVAPORATION PROCESS SYSTEM, 24590-PTF-3PS-FEP-T0001 AND SOFTWARE FUNCTIONAL SPECIFICATION FOR PTF EVAPORATOR TRAIN 24590-PTF-3PS-TLP-T0002.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SAFETY SYSTEM REQUIREMENT SPECIFICATIONS 24590-PTF-3PS-PPJ-T0004 (FUTURE), AND -T0016.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 6	CHRIS	JAY	J.M.	RRK	1-22-03

REVISION HISTORY

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

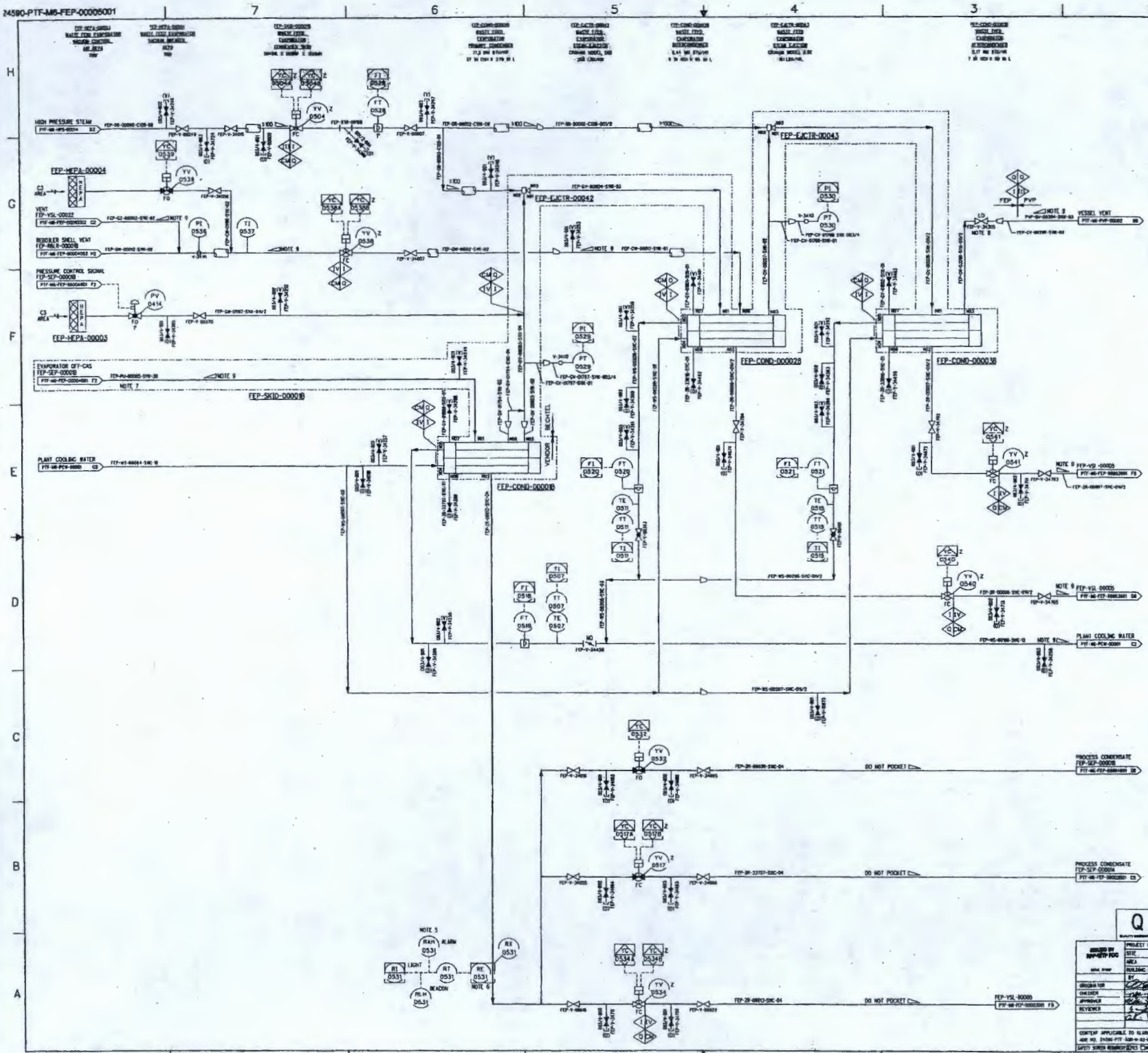
CONTRACT No. DE-AC27-01RV14136

P&ID-PTF
WASTE FEED EVAPORATION PROCESS SYSTEM PUMP
FEP-PMP-00008B

SCALE: NONE

24590-PTF-M6-FEP-00004003

REV 0



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. SEE DRAWING 24590-PTF-M6-FEP-00003B FOR PLANT WASH REPRESENTATION AND NOZZLES UTILIZED.
3. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS SHOWN ON THIS DRAWING ARE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
4. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
5. ALARMS RAM-0531 TO BE LOCATED NEAR CONDENSERS FEP-COND-00001A/B AND SUPPLEMENTED WITH A ROTATING BEACON.
6. INSTALL RADIATION MONITOR ON HORIZONTAL PIPE SEGMENT THAT WILL INSURE FIXED AND CONSTANT VOLUME.
7. LINE FEP-V-00005 SHALL BE PROVIDED BY FEP-SKID-00001B VENDOR SEPARATE FROM SKID.
8. VALVE IS MAINTAINED OPEN FOR SAFETY REASONS TO PROVIDE PRIMARY AIR PURGE PATH FOR FEP SEPARATOR VESSEL AND CONDENSERS, FEP-SEP-00001B, FEP-COND-00001B, FEP-COND-00002B, AND FEP-COND-00003B.
9. SLOPE TO BE MAXIMIZED BASED ON SPACE AVAILABILITY. DO NOT POCKET.
10. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00003 REV 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-M6N-FEP-00001, 24590-PTF-M6PN-FEP-00002 AND -00003.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION FOR FEP-WASTE FEED EVAPORATION PROCESS SYSTEM, 24590-PTF-3PS-FEP-T0001 AND SOFTWARE FUNCTIONAL SPECIFICATION FOR THE EVAPORATOR TRAIN 24590-PTF-3PS-TLP-T0002.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SAFETY SYSTEM REQUIREMENTS SPECIFICATION 24590-PTF-3PS-PPJ-T0016.

[redacted]

DRAWING INDEX

DWG NO.	REV	TITLE
24590-PTF-M6-FEP-00005001	0	WASTE FEED EVAPORATION PROCESS SYSTEM

REVISION HISTORY

REV	DESCRIPTION	DRC	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 10					1-31-08

Q

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

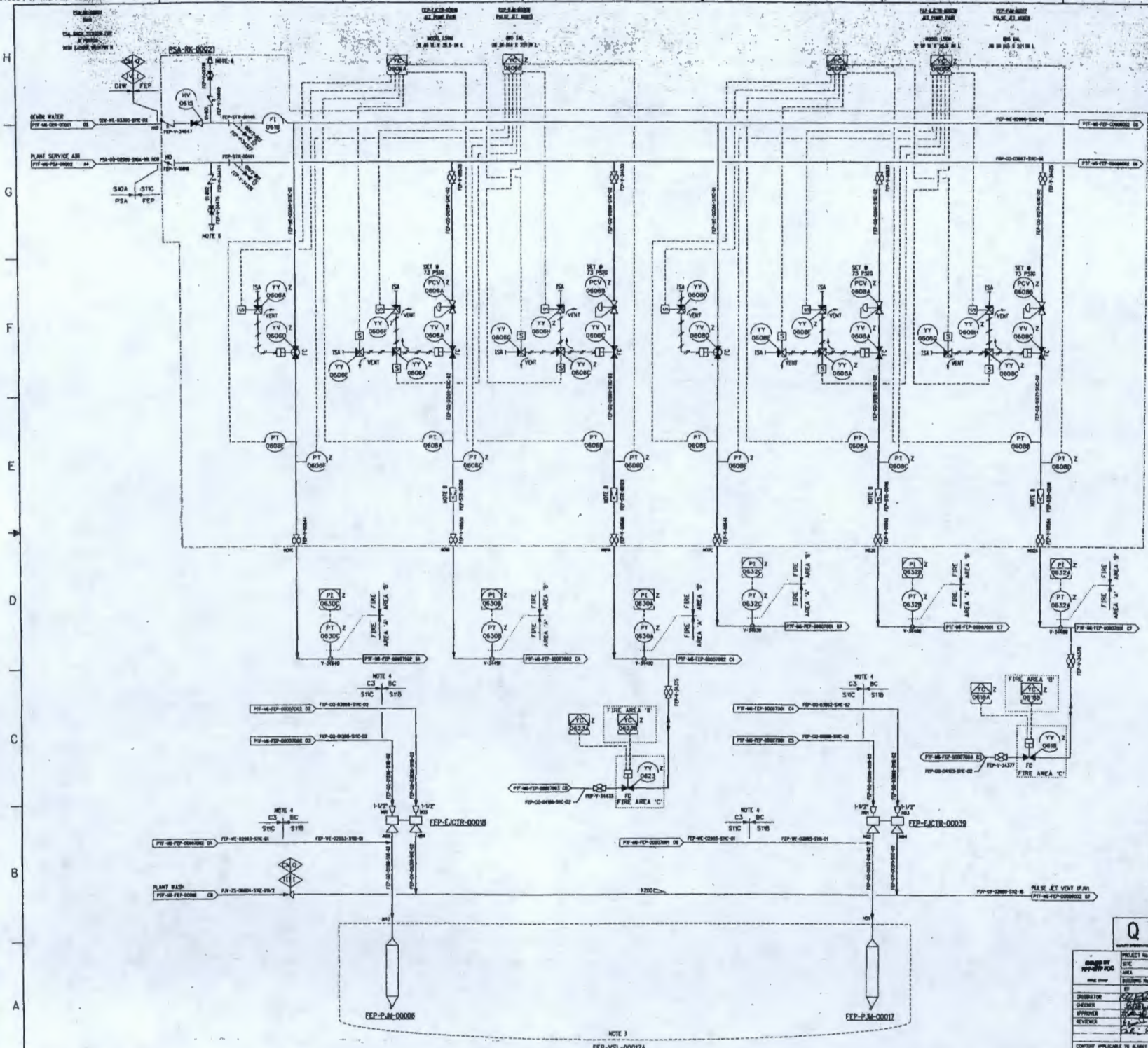
CONTRACT NO. DE-AC27-01RV14136

P&ID - PTF
WASTE FEED EVAPORATION PROCESS SYSTEM CONDENSERS FEP-COND-00001B/2B/3B

SCALE: NONE

24590-PTF-M6-FEP-00005001 REV 0

24590-PTF-M6-FEP-00006001



NOTES:

1. SEE DRAWING 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. SEE ITS-FV-0805 PJM CONTROLLER DETAIL 5 ON LEGEND SHEET 24590-WTP-M6-50-00007.
3. FOR PROCESS INFORMATION REFER TO DRAWING 24590-PTF-M6-FEP-00001001.
4. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (RS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE OR BE JOGGLED, AS DETERMINED BY ENVIRONMENTAL & NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. REAGENT/ PLANT WASH / AIR SERVICES PROVIDED AT A LOCAL UTILITY STATION.
7. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS ON THIS DRAWING IS QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
8. STRAINER IS A CONICAL PILGRIM HAT TYPE STRAINER WITH PERFORATED 1/8 INCH DIAMETER STAGGERED HOLES ON 3/16 INCH CENTERS PERMANENTLY INSTALLED UPSTREAM OF FLANGED VALVE.
9. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00008 REV 3.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION. FOR FEP-WASTE FEED EVAPORATOR PROCESS SYSTEM, 24590-PTF-3PS-FEP-T0001.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SOFTWARE FUNCTIONAL SPECIFICATION 24590-PTF-3PS-PFJ-T0004 (FUTURE).

DRAWING INDEX		
DWG NO.	REV	TITLE
24590-PTF-M6-FEP-00006001	0	WASTE FEED EVAPORATION UTILITY SERVICES
24590-PTF-M6-FEP-00006002	0	WASTE FEED EVAPORATION UTILITY SERVICES
24590-PTF-M6-FEP-00006003	0	WASTE FEED EVAPORATION UTILITY SERVICES
24590-PTF-M6-FEP-00006004	0	WASTE FEED EVAPORATION UTILITY SERVICES

REV.	DESCRIPTION	ORG	CHKD	REVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 9					6-30-09

REVISION HISTORY

Q

ORIGINATOR		11/6/08
CHECKER		11/6/08
APPROVER		6-30-09
REVIEWER		11/6/08
		11/6/08

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

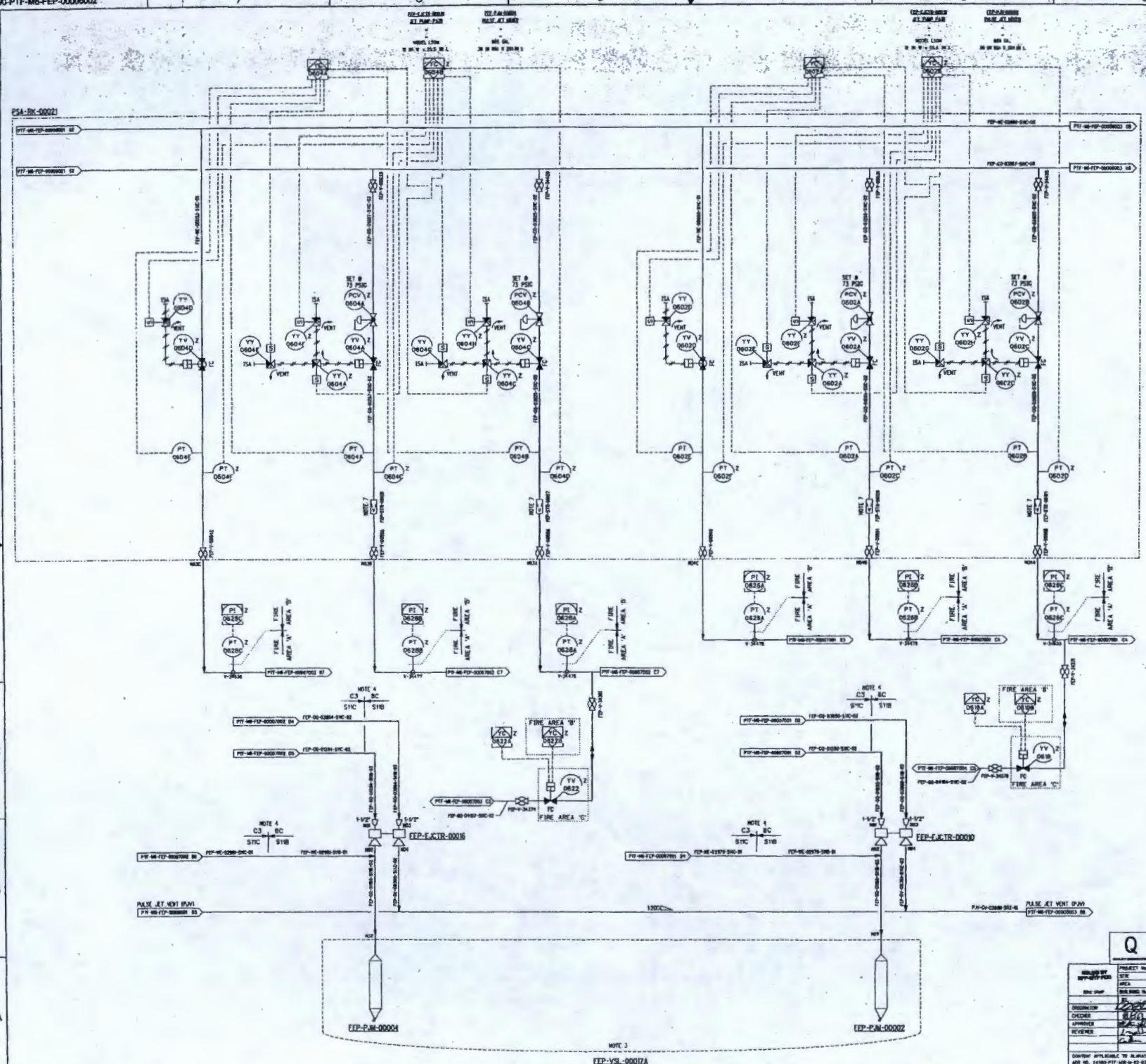
CONTRACT No. DE-AC27-01RV14136

P&ID - PTF
WASTE FEED EVAPORATION UTILITY SERVICES
PSA RACK

SCALE: NONE

24590-PTF-M6-FEP-00006001

REV 0



NOTES:

1. SEE DRAWING 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. SEE ITS FLUIDICS PJM CONTROLLER DETAIL 5 ON LEGEND SHEET 24590-WTP-M6-50-00007.
3. FOR PROCESS INFORMATION REFER TO DRAWING 24590-PTF-M6-FEP-00001001.
4. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (RS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE OR BE JOGGLED, AS DETERMINED BY ENVIRONMENTAL & NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
7. STRAINER IS A CONICAL PILGRIM HAT TYPE STRAINER WITH PERFORATED 1/8 INCH DIAMETER STAGGERED HOLES ON 3/16 INCH CENTERS PERMANENTLY INSTALLED UPSTREAM OF FLANGED VALVE.
8. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00006 REV 3.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSTVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION, FOR FEP-WASTE FEED EVAPORATOR PROCESS SYSTEM, 24590-PTF-3PS-FEP-T0001.
2. FOR PERMISSIVES AND INTERLOCKS TO INPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SOFTWARE FUNCTIONAL SPECIFICATION 24590-PTF-3PS-PPJ-T0004 (FUTURE).

REV	DESCRIPTION	ORG	CHKD	REVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 8					

REVISION HISTORY

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

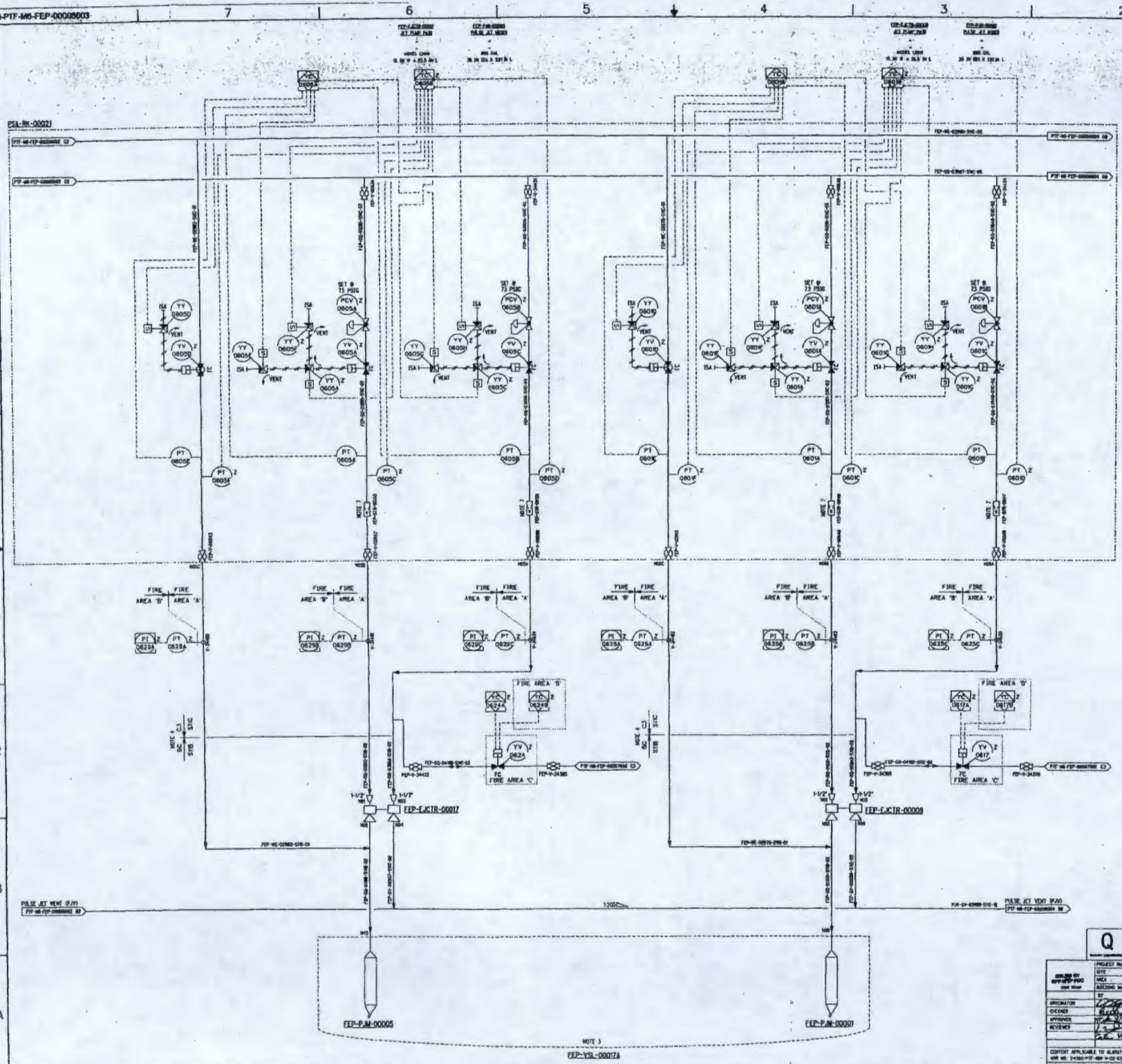
CONTRACT No. DE-AC27-01RV14136

P&ID - PTF
WASTE FEED EVAPORATION UTILITY SERVICES PSA RACK

SCALE: NONE

24590-PTF-M6-FEP-00006002

REV 0



NOTES:

1. SEE DRAWING 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. SEE ITS FLUIDICS PJM CONTROLLER DETAIL 5 ON LEGEND SHEET 24590-WTP-M6-S0-00007.
3. FOR PROCESS INFORMATION REFER TO DRAWING 24590-PTF-M6-FEP-00001001.
4. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND (NACCESSIBLE/REMOTE AREAS (RS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE OR BE JOGGLED, AS DETERMINED BY ENVIRONMENTAL & NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY: SC-I, UNLESS OTHERWISE NOTED.
7. STRAINER IS A CONICAL PILGRIM HAT TYPE STRAINER WITH PERFORATED 1/8 INCH DIAMETER STAGGERED HOLES ON 3/16 INCH CENTERS PERMANENTLY INSTALLED UPSTREAM OF FLANGED VALVE.
8. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00006 REV 3.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION FOR FEP-WASTE FEED EVAPORATOR PROCESS SYSTEM, 24590-PTF-3PS-FEP-T0001.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SOFTWARE FUNCTIONAL SPECIFICATION 24590-PTF-3PS-PPJ-T0004 (FUTURE).

REV	DESCRIPTION	DWG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 8					

REVISION HISTORY

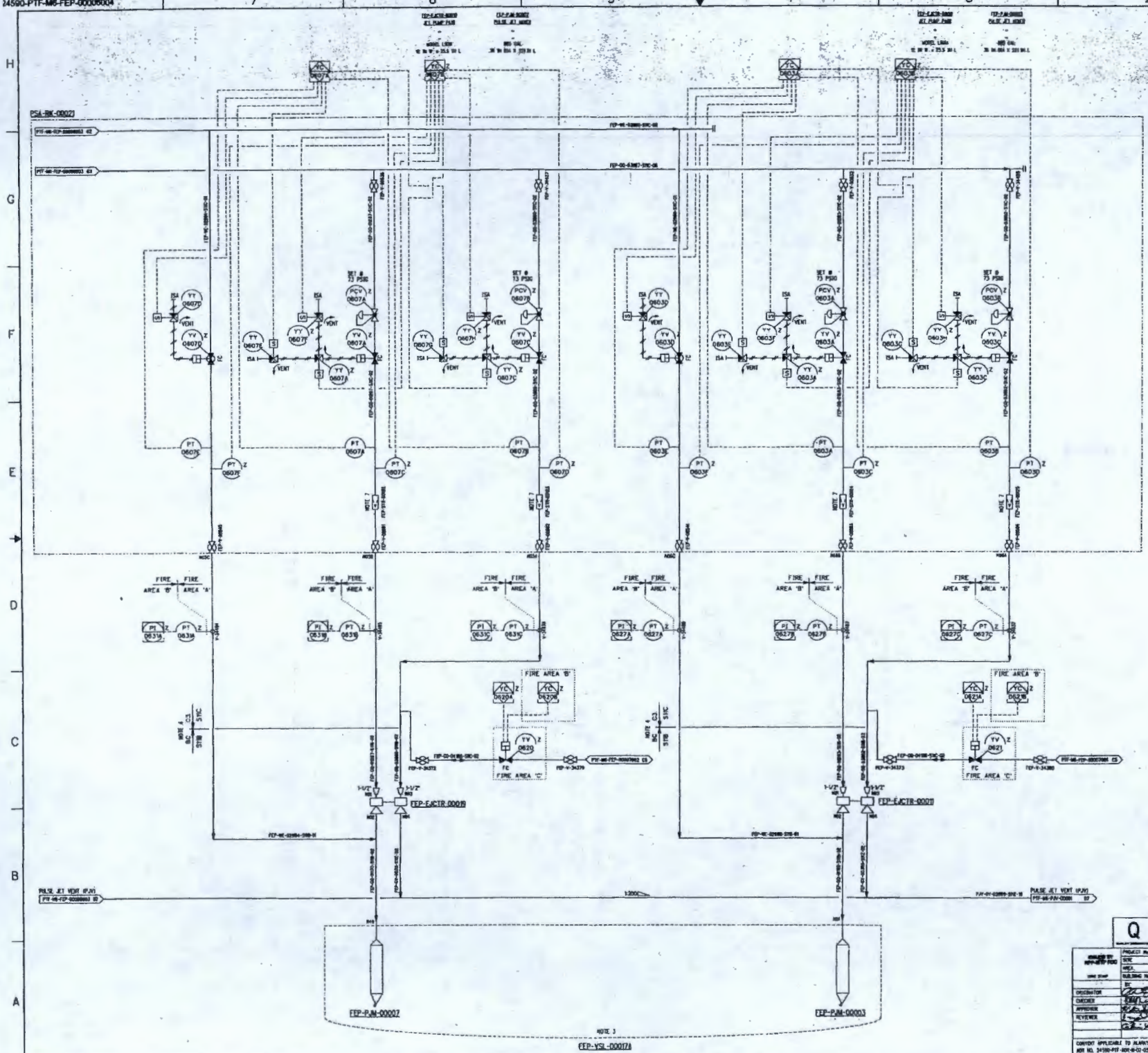
RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No. DE-AC27-01RV14136

P&ID - PTF
WASTE FEED EVAPORATION UTILITY SERVICES PSA RACK

24590-PTF-M6-FEP-00006003 REV 0

SCALE: NONE



NOTES:

1. SEE DRAWING 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. SEE ITS FLUIDICS PJM CONTROLLER DETAIL 3 ON LEGEND SHEET 24590-WTP-M6-50-06007.
3. FOR PROCESS INFORMATION REFER TO DRAWING 24590-PTF-M6-FEP-00001001.
4. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (RS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE OR BE JOGGLED, AS DETERMINED BY ENVIRONMENTAL & NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
7. STRAINER IS A CONICAL PILGRIM HAT TYPE STRAINER WITH PERFORATED 1/8 INCH DIAMETER STAGGERED HOLES ON 3/16 INCH CENTERS PERMANENTLY INSTALLED UPSTREAM OF FLANGED VALVE.
8. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00006 REV 3.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION, FOR FEP-WASTE FEED EVAPORATOR PROCESS SYSTEM, 24590-PTF-3PS-FEP-T0001.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SOFTWARE FUNCTIONAL SPECIFICATION 24590-PTF-3PS-PPJ-T0004 (FUTURE).

Q

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 8					

REVISION HISTORY

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

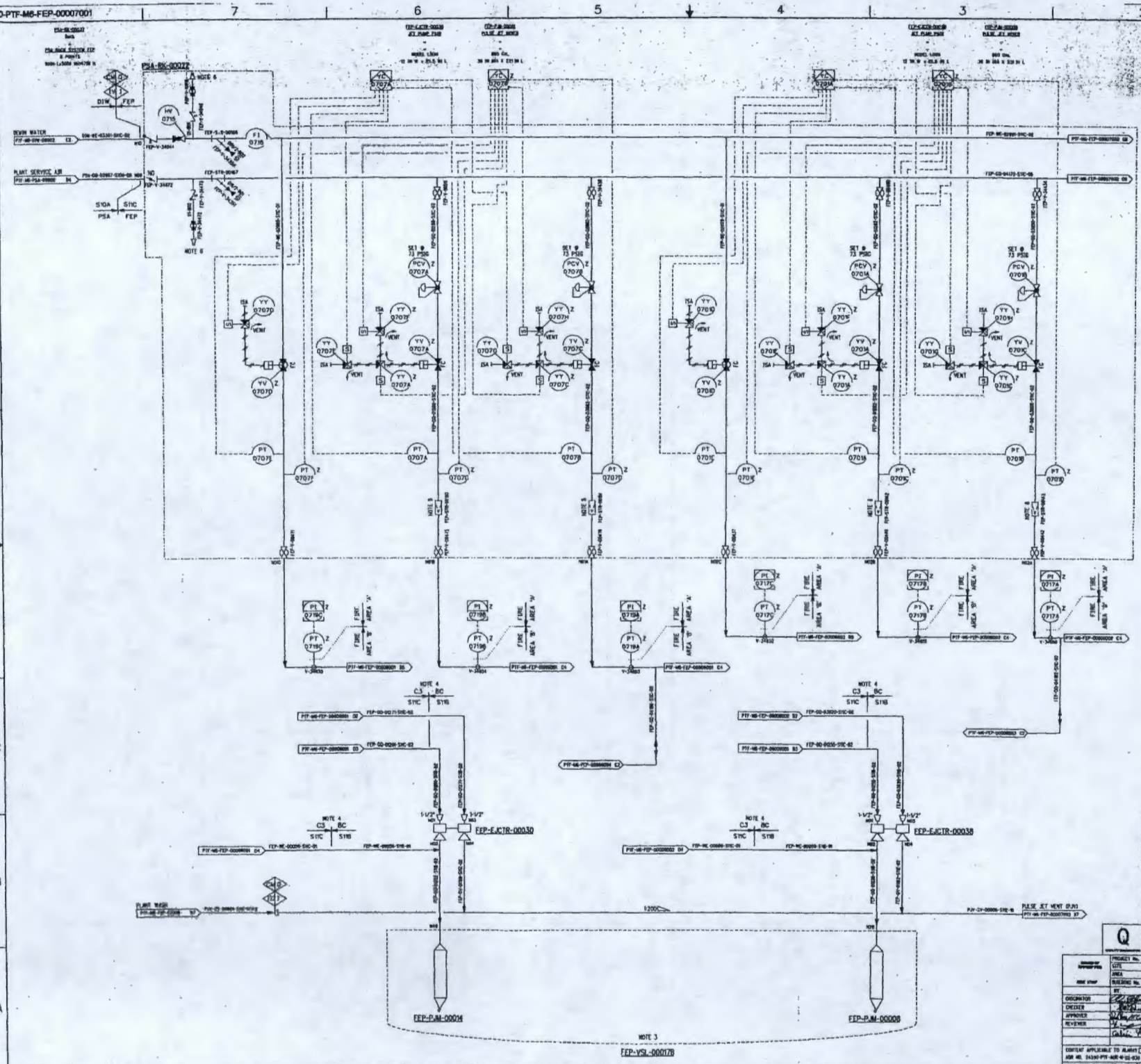
CONTRACT No. DE-AC27-01RV14136

P&ID - PTF
WASTE FEED EVAPORATION UTILITY SERVICES PSA RACK

SCALE: NONE

24590-PTF-M6-FEP-00006004

REV 0



NOTES:

1. SEE DRAWING 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. SEE ITS FLUIDICS PJM CONTROLLER DCTAIL 5 ON LEGEND SHEET 24590-WTP-M6-50-00007.
3. FOR PROCESS INFORMATION REFER TO DRAWING 24590-PTF-M6-FEP-00001002.
4. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (IRS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE OR BE COOLED, AS DETERMINED BY ENVIRONMENTAL & NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. REAGENT / PLANT WASH / AIR SERVICES PROVIDED AT A LOCAL UTILITY STATION.
7. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS ON THIS DRAWING IS QUALITY LEVEL D AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
8. STRAINER IS A CONICAL PILGRIM HAT TYPE STRAINER WITH PERFORATED 1/8 INCH DIAMETER STAGGERED HOLES ON 3/16 INCH CENTERS PERMANENTLY INSTALLED UPSTREAM OF FLANGED VALVE.
9. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00007 REV 3.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS, AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION, FOR FEP-WASTE FEED EVAPORATOR PROCESS SYSTEM, 24590-PTF-SPS-FEP-T0001.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SOFTWARE FUNCTIONAL SPECIFICATION 24590-PTF-SPS-PPJ-T0004 (FUTURE).

DRAWING INDEX

DWG NO	REV	TITLE
24590-PTF-M6-FEP-00007001	0	WASTE FEED EVAPORATION UTILITY SERVICES
24590-PTF-M6-FEP-00007002	0	WASTE FEED EVAPORATION UTILITY SERVICES
24590-PTF-M6-FEP-00007003	0	WASTE FEED EVAPORATION UTILITY SERVICES
24590-PTF-M6-FEP-00007004	0	WASTE FEED EVAPORATION UTILITY SERVICES

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 9	CEV	CEV	CEV	CEV	1-31-07

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

CONTRACT No: DE-AC27-01RV14136

P&ID - PTF
WASTE FEED EVAPORATION UTILITY SERVICES PSA RACK

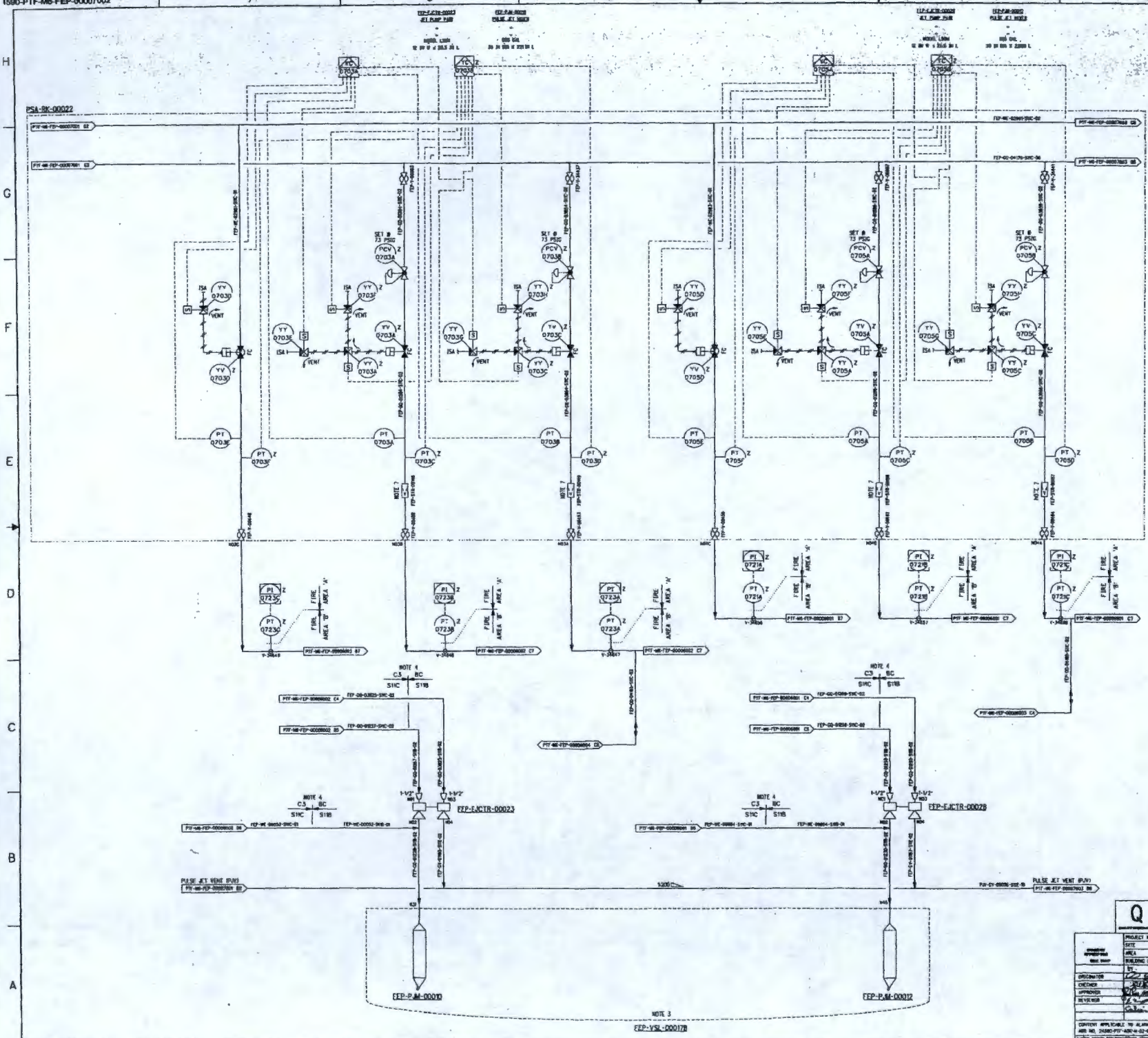
PROJECT No. 24590
SITE HANFORD
AREA 200E
BUILDING No. 10

ORIGINATOR / CHECKER / APPROVER / REVIEWER — DATE 1/31/07

CONTRACT APPLICABLE TO ALARM ☐ YES ☒ NO
ADR NO. 24590-PTF-ADR-M-02-030 REV. 2
SAFETY SCREEN IS ACCEPTED FOR ENGINEERING TYPES IDENTIFIED IN

SCALE NONE

24590-PTF-M6-FEP-00007001 REV 0



NOTES:

1. SEE DRAWING 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. SEE ITS FLUIDICS PJM CONTROLLER DETAIL 5 ON LEGEND SHEET 24590-WTP-M6-50-00007.
3. FOR PROCESS INFORMATION REFER TO PIPING & INSTRUMENTATION DIAGRAM 24590-PTF-M6-FEP-00001002.
4. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (IRS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE OR BE JOGGLED, AS DETERMINED BY ENVIRONMENTAL & NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
7. STRAINER IS A CONICAL PILGRIM HAT TYPE STRAINER WITH PERFORATED 1/8 INCH DIAMETER STAGGERED HOLES ON 3/16 INCH CENTERS PERMANENTLY INSTALLED UPSTREAM OF FLANGED VALVE.
8. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00007 REV 3.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION, FOR FEP-WASTE FEED EVAPORATOR PROCESS SYSTEM. 24590-PTF-SFS-FEP-10001.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SOFTWARE FUNCTIONAL SPECIFICATION 24590-PTF-SFS-PPJ-10004 (FUTURE).

REV	DESCRIPTION	DRG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 8					7-31-08

REVISION HISTORY

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

CONTRACT No: DE-AC27-01RV14136

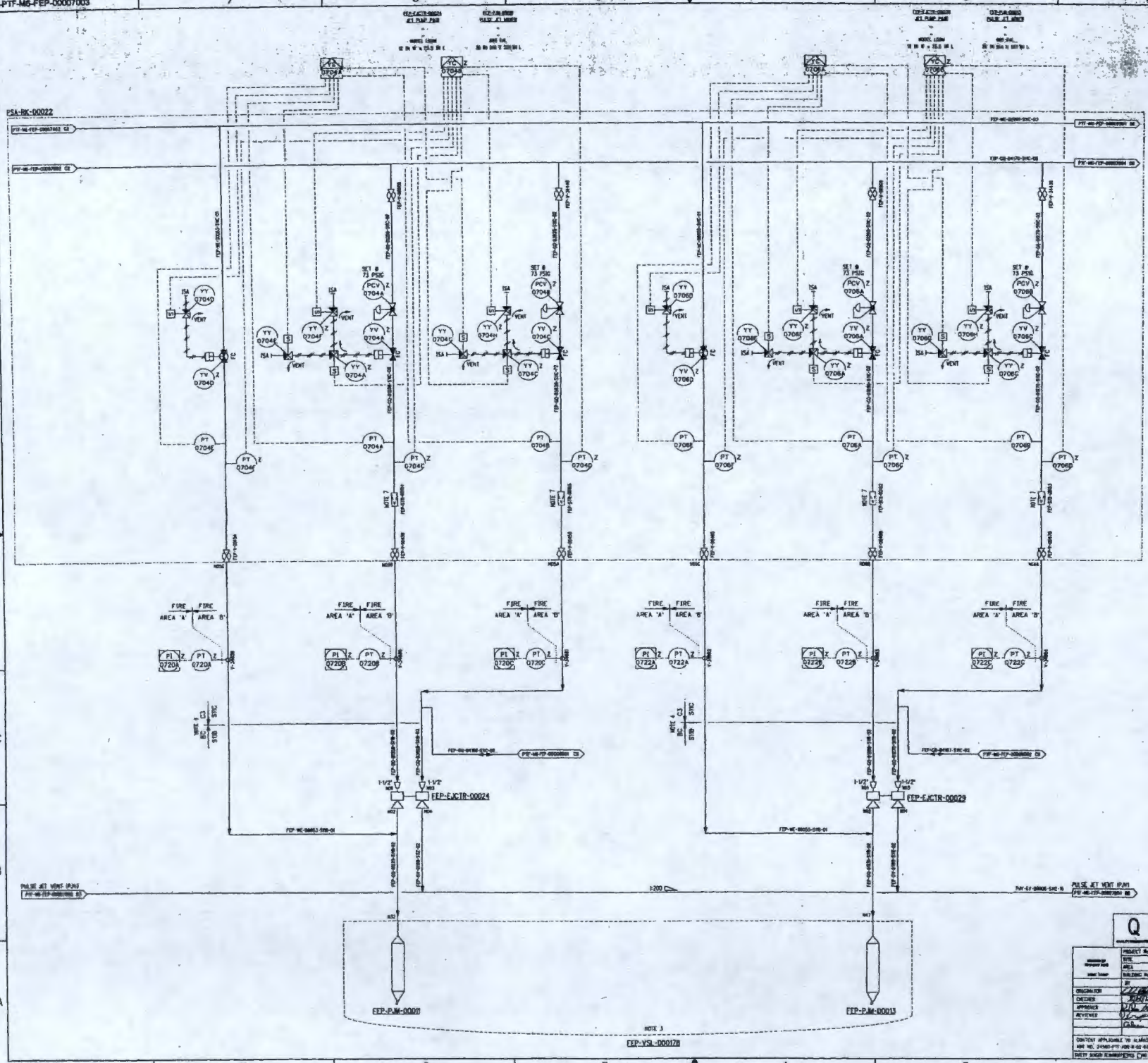
P&ID - PTF
WASTE FEED EVAPORATION UTILITY SERVICES PSA RACK

SCALE: NONE

24590-PTF-M6-FEP-00007002

REV 0

24590-PTF-M6-FEP-00007003



NOTES:

1. SEE DRAWING 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00006 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. SEE ITS FLUIDICS PJM CONTROLLER DETAIL 9 ON LEGEND SHEET 24590-WTP-M6-S0-00007.
3. FOR PROCESS INFORMATION REFER TO PIPING & INSTRUMENTATION DIAGRAM 24590-PTT-M6-FEP-00001002.
4. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (RS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SKSHC OR BE JOGGLED, AS DETERMINED BY ENVIRONMENTAL & NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-1, UNLESS OTHERWISE NOTED.
7. STRAINER IS A CONICAL PILGRIM HAT TYPE STRAINER WITH PERFORATED 1/8 INCH DIAMETER STAGGERED HOLES ON 3/16 INCH CENTERS PERMANENTLY INSTALLED UPSTREAM OF FLANGED VALVE.
8. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00007 REV 3.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION, FOR FEP-WASTE FEED EVAPORATOR PROCESS SYSTEM, 24590-PTF-SPS-FEP-T0001.
2. FOR PERMISSIVES AND INTERLOCKS TO INPORTANT TO SAFETY SYSTEMS (ITS), REFER TO SOFTWARE FUNCTIONAL SPECIFICATION 24590-PTF-SPS-PRJ-T0004 (FUTURE).

REV	DESCRIPTION	ORG	CHKD	REVIEWED	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 8					1-31-08

REVISION HISTORY

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

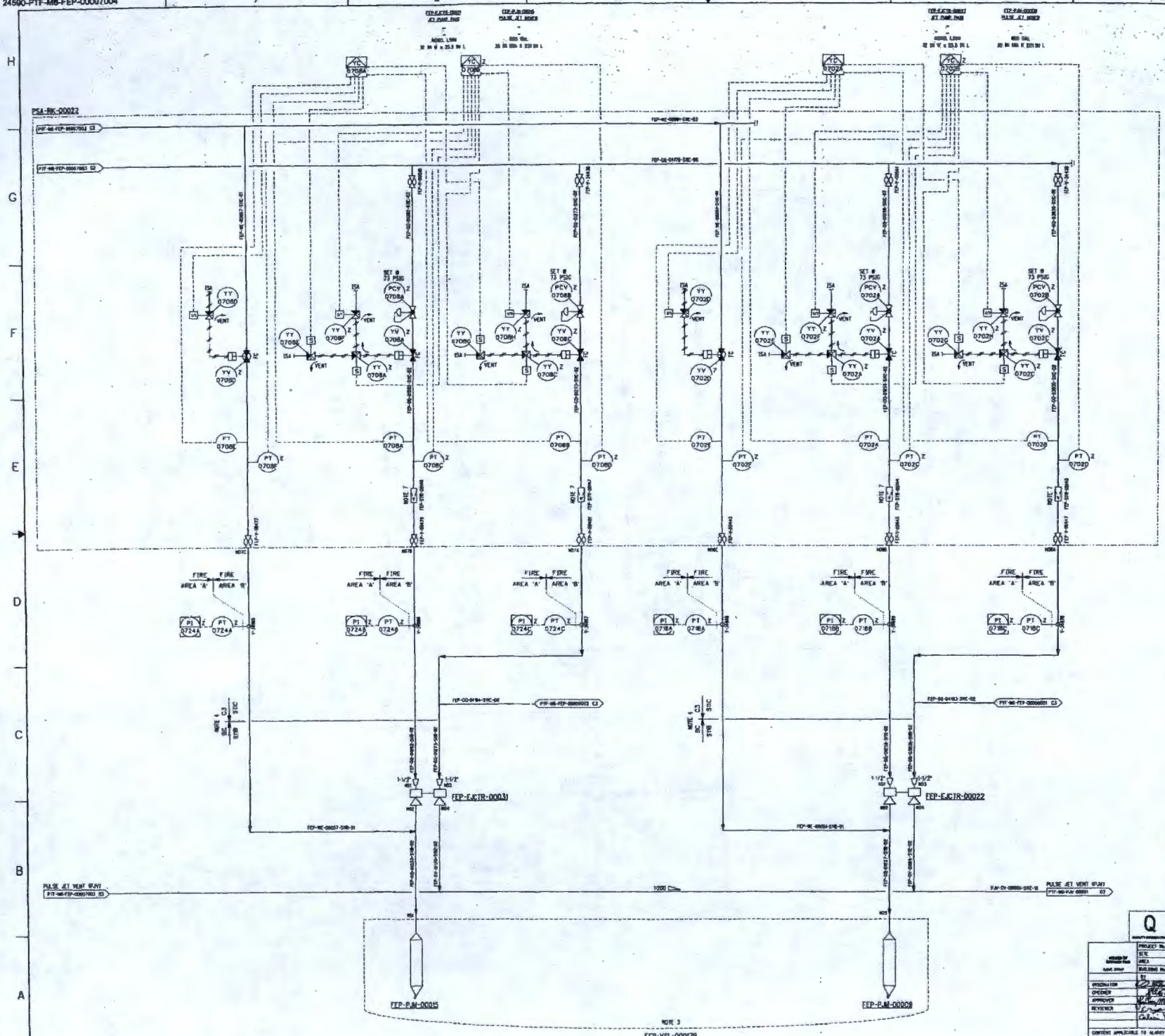
CONTRACT No: DE-AC27-01RV14136

P&ID - PTF
WASTE FEED EVAPORATION
UTILITY SERVICES
PSA RACK

SCALE: NONE

24590-PTF-M6-FEP-00007003

24590-PTF-M6-FEP-00007004



NOTES:

1. SEE DRAWING 24590-WTP-M6-SO-00001 THROUGH 24590-WTP-M6-SO-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. SEE ITS FLUENICS PJM CONTROLLER DETAIL 3 ON LEGEND SHEET 24590-WTP-M6-SO-00007.
3. FOR PROCESS INFORMATION REFER TO PIPING & INSTRUMENTATION DIAGRAM 24590-PTF-M6-FEP-00001002.
4. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (RS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE OR BE JOGGLED, AS DETERMINED BY ENVIRONMENTAL & NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES, AND COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
7. STRAINER IS A CONICAL PILORIM HAT TYPE STRAINER WITH PERFORATED 1/8 INCH DIAMETER STAGGERED HOLES ON 3/16 INCH CENTERS PERMANENTLY INSTALLED UPSTREAM OF FLANGED VALVE.
8. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-FEP-00007 REV 3.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATION INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION, FOR FEP-WASTE FEED EVAPORATOR PROCESS SYSTEM, 24590-PTF-3PS-FEP-T0001.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS) REFER TO SOFTWARE FUNCTIONAL SPECIFICATION 24590-PTF-3PS-PPJ-T0004 (FUTURE).

Q

REV	DESCRIPTION	DRC	CHKD	REVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 8					4-30-09

REVISION HISTORY

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

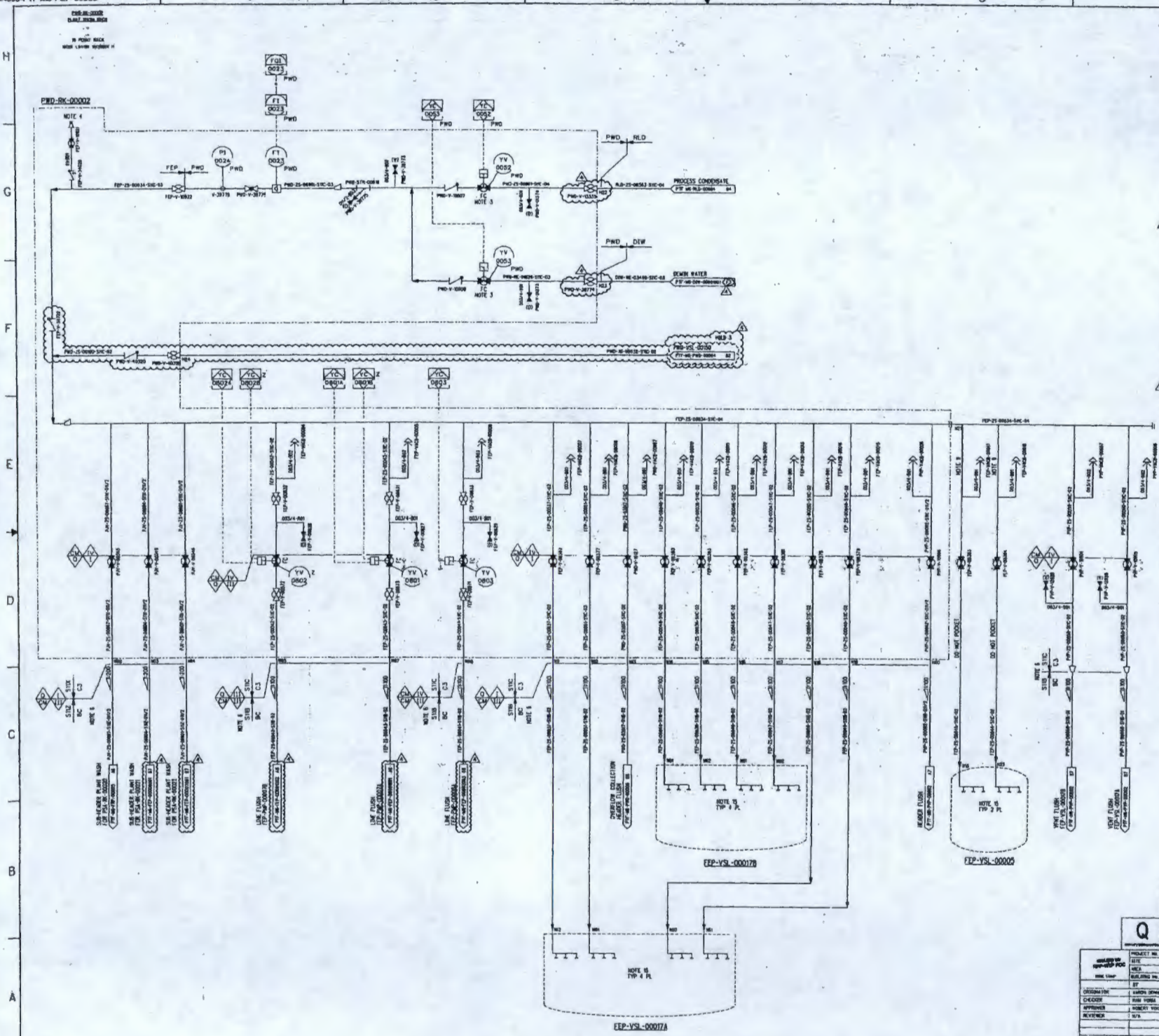
CONTRACT No: DE-AC27-01RV14136

P&ID - PTF
WASTE FEED EVAPORATION
UTILITY SERVICES
PSA RACK

SCALE: NONE

24590-PTF-M6-FEP-00007004

REV 0



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. DELETED
3. VALVES INTERLOCKED TO PREVENT MULTIPLE VALVE OPERATION.
4. REAGENT/PLANT WASH/AIR SERVICES PROVIDED AT UTILITY STATION.
5. DELETED
6. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (RS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE OR BE JOGGLED, AS DETERMINED BY ENVIRONMENTAL AND NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
7. CONTENTS OF THIS DRAWING ARE DANGEROUS WASTE PERMIT AFFECTING.
8. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES AND COMPONENTS SHOWN ON THIS DRAWING IS IDENTIFIED AS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
9. FLUSH CONNECTIONS TO EQUIPMENT LOCATED IN C3 AREAS SHALL NOT PENETRATE C5 AREAS.
10. SHADOW SHIELDING, IF REQUIRED BY ENVIRONMENTAL AND NUCLEAR SAFETY, WILL BE PROVIDED BY BECHTEL.
11. DELETED
12. REVISION 2: INCORPORATED 24590-PTF-M6N-M80T-00008 AND 24590-PTF-M6N-FEP-00015 WITH SPARE NOZZLES, ASSIGNED PIPELINE NUMBERS, REVISED NOTE 8, ADDED ROOT VALVE TO PI-0805, ADDED NOZZLE NUMBERS, DELETED COMPONENT IDENTIFIER FOR SPECIALTY ITEM, RELOCATED 3 PIPELINES, DELETED PIPELINE, ADDED FLOW TOTALIZER, REDUCERS AND VENTS, DELETED NOZZLE NUMBERS N24 & N25, REALIGNED NOZZLES N21, N22 AND N23.
13. DELETED
14. REVISION 3: INCORPORATED 24590-PTF-M6N-M80T-00025. MODIFIED NOTES, SIGNIFICANT REVISION PER PWD WASH REDESIGN. SYSTEM REQUIRES DESIGN REVERIFICATION.
15. PIPE ROUTING LIMITED TO A MAXIMUM OF AN 8 FT STRAIGHT VERTICAL DROP AT THE CONNECTION TO THE VESSEL.
16. BLACK CELL PIPING TO BE SUPPORTED FOR MAXIMUM WATERFALL AND FOR THE EXPECTED DYNAMIC FORCES DURING THE TRANSITION FROM A 3MT PIPE TO A LIQUID-FULL PIPE.
17. REVISION 4: REVISED TO INCORPORATE 24590-PTF-M6N-FEP-00084, ADDED CHEMICAL INJECTION LINE AND CORRECTED OFF SHEET CONNECTIONS. LINE SIZE FOR PVP-25-00082-S1IC, AND -S1IG, TO REMAIN 1½".

HOLD/OPEN ITEMS:

1. DELETED
2. DELETED
3. ON HOLD PENDING ISSUANCE OF PWD P&ID.

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION FOR FEP-WASTE FEED EVAPORATOR PROCESS SYSTEM, 24590-PTF-SFS-FEP-T0001.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITSS), REFER TO SAFETY SYSTEM REQUIREMENTS SPECIFICATION 24590-PTF-SFS-PRJ-T0003 (FUTURE).

REV	DESCRIPTION	DRC	CHRD	RVWD	APVD	DATE
4	REVISED PER NOTE 17					
3	REVISED PER NOTE 14	MR	DMB	RCS	JJ	5/28/08
2	MAJOR REVISION, SEE NOTE 12	RW	J.	JJ	RW	12/1/06
1	ISSUED FOR CONSTRUCTION	RB	RV	RJS	RW	1/26/03

REVISION HISTORY

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

CONTRACT No: DE-AC27-01RV14136

P&ID - PTF
WASTE FEED EVAPORATION
UTILITY SERVICES
PLANT WASH RACK

SCALE: NONE

24590-PTF-M6-FEP-00008

REV 4

Quarter Ending March 31, 2009 24590-PTF-PCN-ENV-08-032

Hanford Facility RCRA Permit Modification Notification Form

Part III, Operating Unit 10

Waste Treatment and Immobilization Plant

Index

Page 2 of 3: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant
Update Piping and Instrumentation Diagrams (P&ID) for the Pretreatment Facility (PTF) Radioactive Liquid Waste Disposal System (RLD) and Ultrafiltration Process System (UFP) in Appendix 8.2 of the Dangerous Waste Permit.

Submitted by Co-Operator:

D. A. Klein 3/26/09
D. A. Klein Date

Reviewed by ORP Program Office:

S. J. Olinger 3/26/09
S. J. Olinger Date

Quarter Ending March 31, 2009 24590-PTF-PCN-ENV-08-032

Hanford Facility RCRA Permit Modification Notification Form

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

Description of Modification:

The purpose of this Class 1 prime modification is to update the Piping and Instrumentation Diagrams (P&ID) for the Pretreatment Facility (PTF) Radioactive Liquid Waste Disposal System (RLD) and Ultrafiltration Process System (UFP) in Appendix 8.2 of the Dangerous Waste Permit. The permit P&IDs incorporated into the DWP are being replaced with source P&IDs as indicated in the Table below. The new drawings (Rev 0) are the result of converting source drawings into multiple sheets in an effort to provide clearer representation of the RLD and UFP systems, including additional details for instrumentation and logic controls.

The following P&IDs are submitted to update the P&IDs currently in Appendix 8.2:

Appendix 8.2			
Replace:	24590-PTF-M6-RLD-P0001, Rev. 0	With:	24590-PTF-M6-RLD-00001, Rev. 2
	24590-PTF-M6-RLD-P0002, Rev. 0		24590-PTF-M6-RLD-00002, Rev. 3
	24590-PTF-M6-RLD-P0003, Rev. 0		24590-PTF-M6-RLD-00003001, Rev. 0
			24590-PTF-M6-RLD-00003002, Rev. 0
			24590-PTF-M6-RLD-00003003, Rev. 0
	24590-PTF-M6-RLD-P0004, Rev. 0		24590-PTF-M6-RLD-00004, Rev. 2
	24590-PTF-M6-RLD-P0006, Rev. 0		24590-PTF-M6-RLD-00006, Rev. 3
	24590-PTF-M6-UFP-P0001, Rev. 0		24590-PTF-M6-UFP-00001001, Rev. 0
			24590-PTF-M6-UFP-00001002, Rev. 0
			24590-PTF-M6-UFP-00001003, Rev. 0
			24590-PTF-M6-UFP-00001004, Rev. 0
			24590-PTF-M6-UFP-00001005, Rev. 0
			24590-PTF-M6-UFP-00001006, Rev. 0
			24590-PTF-M6-UFP-00001007, Rev. 0

This modification requests Ecology approval and incorporation into the permit the changes provided in applicable document change forms (e.g., DCN, SCN, SDDR, FCN, FCR, etc.) and changes associated with the resolution to comments on change documents since the issuance of the last revision of the permitted drawing.

The following types of changes apply to the RLD and UFP P&IDs:

- Drawing converted from a single sheet to multi-sheet drawings
- Modified, deleted, and added notes and references
- Revised piping configuration; added tank vent lines (RLD-TK-00006A/B)
- Modified, added, deleted in-line components and instruments and logic controls
- Modified, identified, and added support/utility system lines, valves, in-line components, instruments and logic controls
- Revised, identified, and added quality level and seismic designations
- Revised, identified, and added slope symbols and/or the slope requirement

Quarter Ending March 31, 2009 24590-PTF-PCN-ENV-08-032

The following is a list of outstanding change documents that have not been incorporated into this modification:

- 24590-PTF-M6N-M80T-00054 (P&ID 24590-PTF-M6-RLD-00003001)
- 24590-PTF-M6PR-RLD-00002 (P&ID 24590-PTF-M6-RLD-00003001, 00003002, 00006)
- 24590-PTF-M6PR-RLD-00003 (P&ID 24590-PTF-M6-RLD-00006)
- 24590-PTF-M6PR-RLD-00004 (P&ID 24590-PTF-M6-RLD-00006)
- 24590-PTF-M6PR-RLD-00005 (P&ID 24590-PTF-M6-RLD-00003001, 00003002)

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

Reason for denial:

Reviewed by Ecology:

E Fredenburg 6/3/2009

E. Fredenburg 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 applicable.

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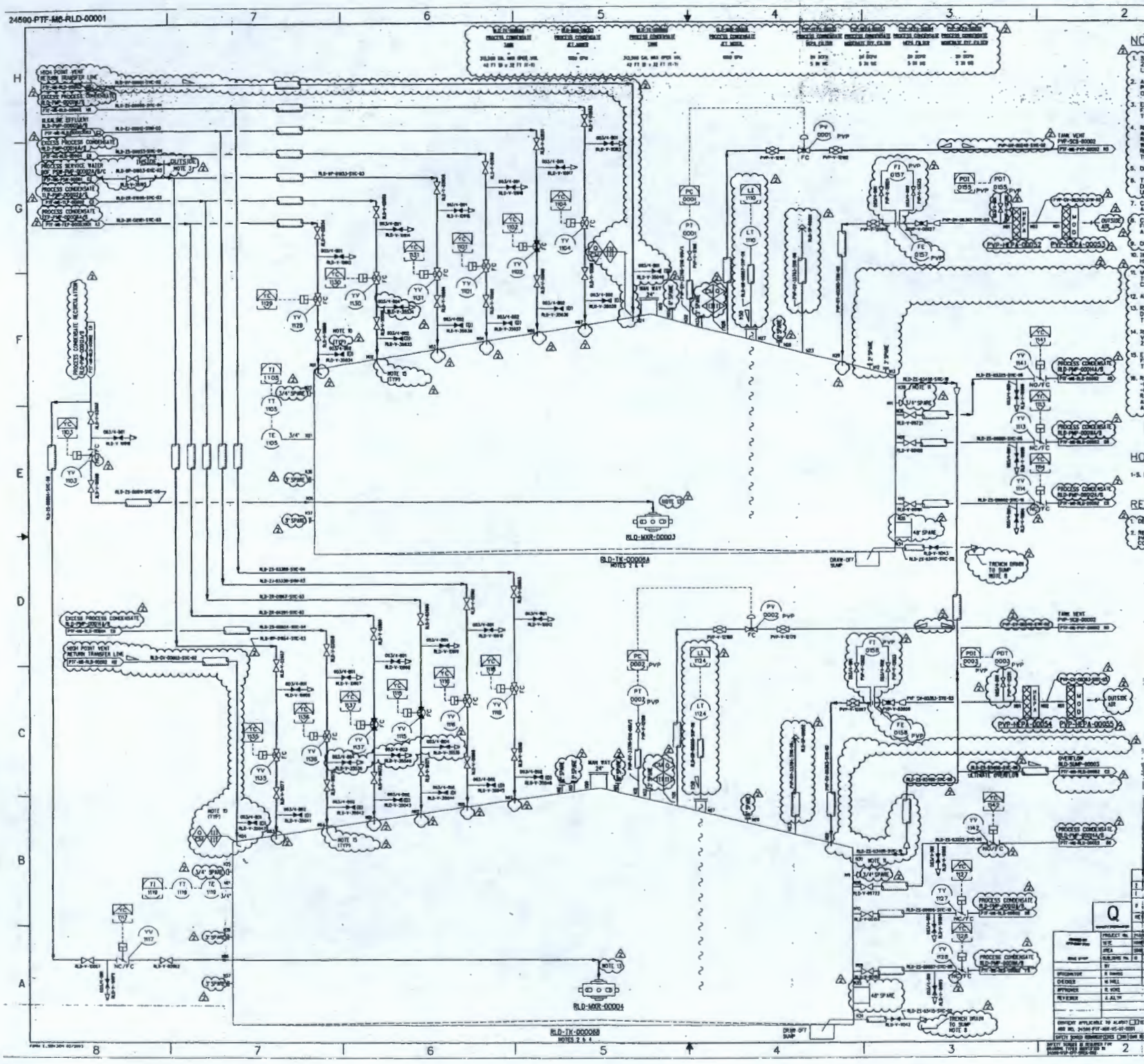
24590-PTF-M6-RLD-00001



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-SO-00001 THROUGH 24590-WTP-M6-SO-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND AND GENERAL SLOPE REQUIREMENTS.
2. ALL INTERNAL SUPPORTS AND WELDS THAT INTERACT WITH THE PRIMARY CONFINEMENT BARRIER (TANK) SHALL MAINTAIN EQUAL QUALITY LEVEL AND SEISMIC CATEGORY AS THE PARENT TANK.
3. ELECTRICAL FREEZE PROTECTION SHALL BE PROVIDED FOR LIQUID FILLED PIPING AND INSTRUMENT SENSING LINES THAT ARE SUBJECT TO FREEZING.
4. RLD-TK-00006A WILL BE DEDICATED TO EVAPORATOR OVERHEADS AND WILL SUPPLY THE PTF WITH PROCESS CONDENSATE FOR REUSE WITHIN THE BUILDING. EXCESS PROCESS CONDENSATE WILL BE TRANSFERRED TO RLD-TK-00006B. RLD-TK-00006B RECEIVES MATERIAL FROM RLD-VSL-00007A/B IN ADDITION TO THE EXCESS CONDENSATE.
5. DELETED
6. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
7. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
8. COVERED TRENCH SHALL BE LOCATED BETWEEN RLD-TK-00006A/B FOR DRAINING THE TANK CONTENTS TO RLD-SUMP-00003. PROVIDE A PLATE COVER FOR THE TRENCH PER 24590-WTP-DD-S13T-00002.
9. DELETED
10. INSTALL THREADED PLUG AFTER PIPELINES HAVE BEEN HYDROTESTED.
11. MAXIMUM OVERFLOW NOZZLE/PIPE ELEVATION SHALL BE LOWER THAN INTERIOR PERIMETER SPRAY RINGS TO PREVENT FLUID FROM CONTAMINATING SPRAY RINGS.
12. ALL LINES SHALL BE FREE DRAINING UNLESS OTHERWISE NOTED.
13. RLD JET MIXER PIPING TO BE SUPPORTED FOR THE EXPECTED DYNAMIC FORCES DURING THE TRANSITION FROM DRY STAGE TO MIXING STAGE.
14. REVISION 9 ISSUED TO REMOVE HOLDS 1, 2, 3, 4, AND 5. MODIFIED VESSEL VENT SYSTEM PER RHEOLOGY CHANGES AND 24590-PTF-M6H-M6OT-00007.
15. EXTEND INLET LINES INTO THE TANK AND DIRECT THEM AWAY FROM THE WALL TO PREVENT LIQUID FROM FLOWING DOWN THE WALLS.
16. REVISION 2: REVISED TO INCORPORATE 24590-PTF-M6H-M6OT-00017, -00025, -00037, -00038, 24590-PTF-M6H-RLD-00015, -00016, -00031, -00036, -00038, 24590-PTF-M6PH-RLD-00001 AND -00002. ADDED RADAR PIPE AT NOZZLE N37. ADDED SLOPE. REVISED TANK VENT AND OVERFLOW LINE SIZE. ADDED QUALITY/SEISMIC FLAGS. ADDED/DELETED/REVISED NOTES AND REFERENCES.

HOLD/OPEN ITEMS:

1-5. DELETED

REFERENCES:

1. DELETED
2. NOTES TO 24590-PTF-M6-RLD-00005 FOR TANK SPRAY WASH INFORMATION. REFER TO 24590-PTF-M1-RLD-00001 FOR PROCESS CONDENSATE TANK ASSEMBLY DETAILS.

REVISION HISTORY						
3	REVISED PER NOTE 16		SC			6/3/03
1	REVISED PER NOTE 14		SC	TH	JJ	8/8/04
0	ISSUED FOR CONSTRUCTION AND INCORPORATED DCN 24590-PTF-M6H-RLD-00006		DWR	DW	JJ	03/25/03
REV	DESCRIPTION	DRD	CHKD	REVIEWED	APVD	DATE

Q

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

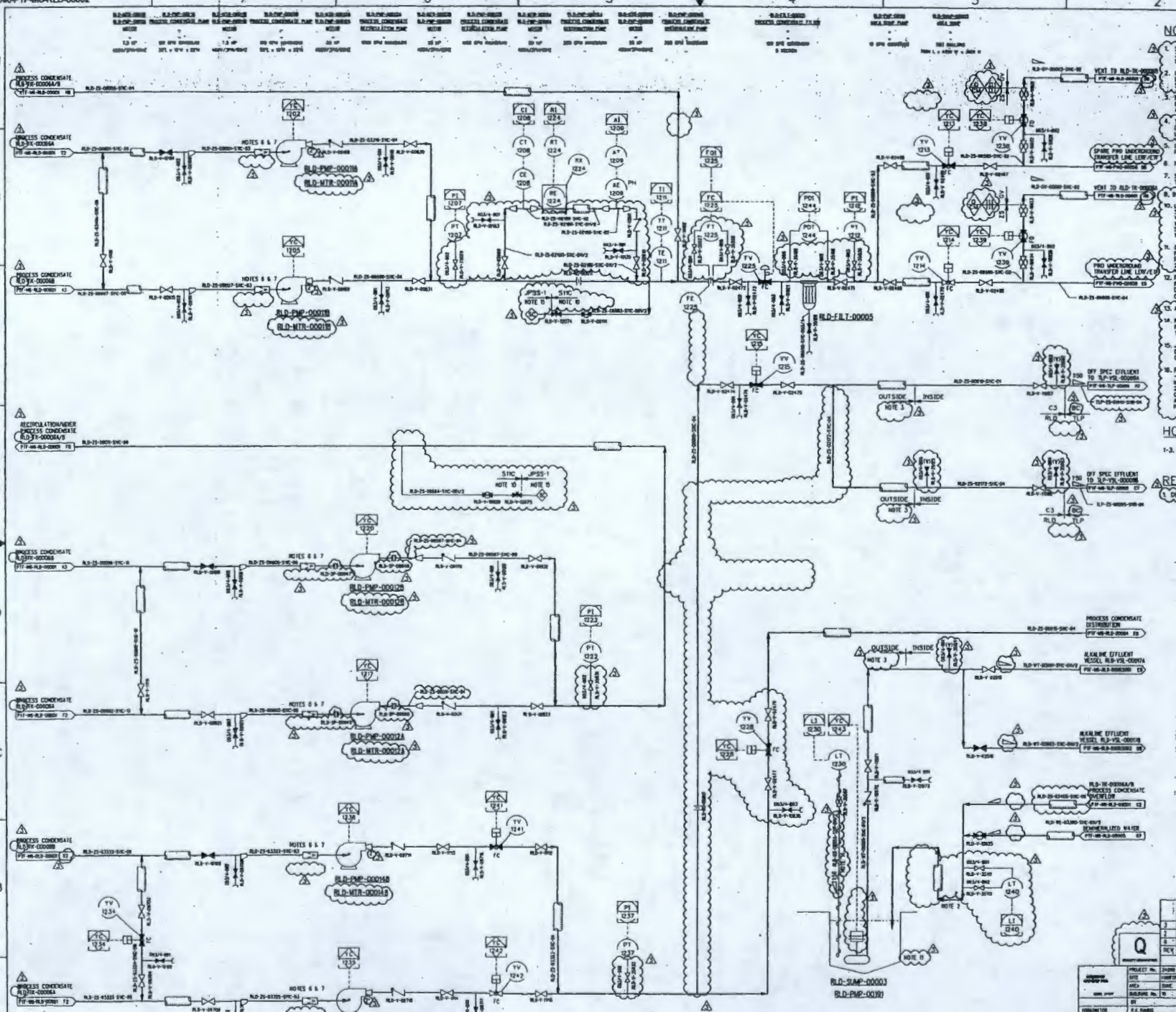
CONTRACT No: DE-AC27-01RV14136

P&ID - PTF
RADIOATIVE LIQUID WASTE DISPOSAL SYSTEM
PROCESS CONDENSATE
RLD-TK-00006A/B

SCALE: NONE

24590-PTF-M6-RLD-00001 REV 2

24590-PTF-M8-RLD-00002



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. OVERFLOW LINE ACHIEVES A HYDRAULIC SEAL BY MEANS OF A LOOP SEAL WHICH SHALL BE HEAT TRACED AND INSULATED. LOOP SEAL WATER LEVEL SHALL BE MAINTAINED.
3. ELECTRICAL FREEZE PROTECTION SHALL BE PROVIDED FOR LIQUID FILLED PIPING AND INSTRUMENT SENSING LINES THAT ARE SUBJECT TO FREEZING.
4. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. PROVIDE A REMOVABLE SPOOL PIECE FOR STARTUP STRAINER.
7. STARTUP STRAINER TO BE PROVIDED BY BECHTEL. STRAINER TYPE SHALL BE "PILGRIM'S HAT" AS PER PIPE SPECIFICATION S1IC.
8. 9. DELETED
10. LOCATE THE SAMPLE CONNECTION IN AN ACCESSIBLE AREA IN A SAFE LOCATION TO FACILITATE SAMPLE COLLECTION. THE BALL VALVE, NEEDLE VALVE, AND SAMPLE CONNECTION POINT SHALL BE WITHIN OPERATOR'S IMMEDIATE REACH WHILE COLLECTING A SAMPLE. PROVIDE A NIPPLE DOWNSTREAM OF THE NEEDLE VALVE WITH A 1/4NPT TERMINUS CLOSED BY A 1/4NPT CAP.
11. COVERED TRENCH SHALL BE LOCATED BETWEEN RLD-TK-00006A/B FOR DRAINING THE TANK CONTENTS TO RLD-SUMP-00003. PROVIDE A PLATE COVER FOR RLD-SUMP-00003 PER 24590-WTP-DD-S131-00002.
12. REVISION 2: REVISED TO INCORPORATE 24590-PTF-M6N-RLD-00013, ROOT VALVE ADDITION, REDUCERS AT PUMP SUCTION AND DISCHARGE, AND INLINE CONDENSATE FILTER PER INTERFACE CONTROL DOCUMENT 24590-WTP-ICD-MG-01-005 REQUIREMENTS.
13. ALL LINES SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
14. RADAR GUIDE TUBE 19 TO BE ROUTED TO TRANSMITTER. A FULL PORT BALL VALVE IS REQUIRED FOR ISOLATION PURPOSE AT TRANSMITTER END OF GUIDE TUBE.
15. JPSS-1 SPECIFICATION AS DEFINED IN INSTRUMENT PIPING MATERIAL CLASS SPECIFICATION 24590-WTP-3PS-JXF0-T0002. SPECIFICATION CHANGE ALSO DEFINES AREA OF CSI RESPONSIBILITY.
16. REVISION 3: REVISED TO INCORPORATE 24590-PTF-M6N-RLD-00022, -00028, PTF-M6N-M001-00029, -00037, AND -00038. FURTHER MODIFIED INFORMATION. INCORPORATED AND FURTHER REVISED 24590-PTF-M6N-RLD-00020 TO DELETE RLD-RO-00012. REROUTED OFF SPEC EFFLUENT TO TLP-VSL-00008A/B. DELETED RLD-RO-00010. ADDED RLD-RO-00017. ADDED QUALITY/SEISMIC FLAGS. REVISED/ADDED NOTES/DELETED NOTES.

HOLD/OPEN ITEMS:

1-3. DELETED

REFERENCES:

1. DELETED

REV	DESCRIPTION	DRG	CHKD	REVIEWED	APVD	DATE
3	REVISED PER NOTE 16	SC	JHD	JHD	PJS	4/1/04
2	SEE NOTE 12	SC	KM	JK	DV	9/8/04
0 - 1	ISSUED FOR CONSTRUCTION	RRR	JH	JK	DV	03/31/03

REVISION HISTORY

Q

ORIGINATOR	R.K. RAMOS	03/19/03
CHECKER	A. MELDING	03/19/03
APPROVER	R. VONE	03/20/03
REVIEWER	J. JULYK	03/20/03

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

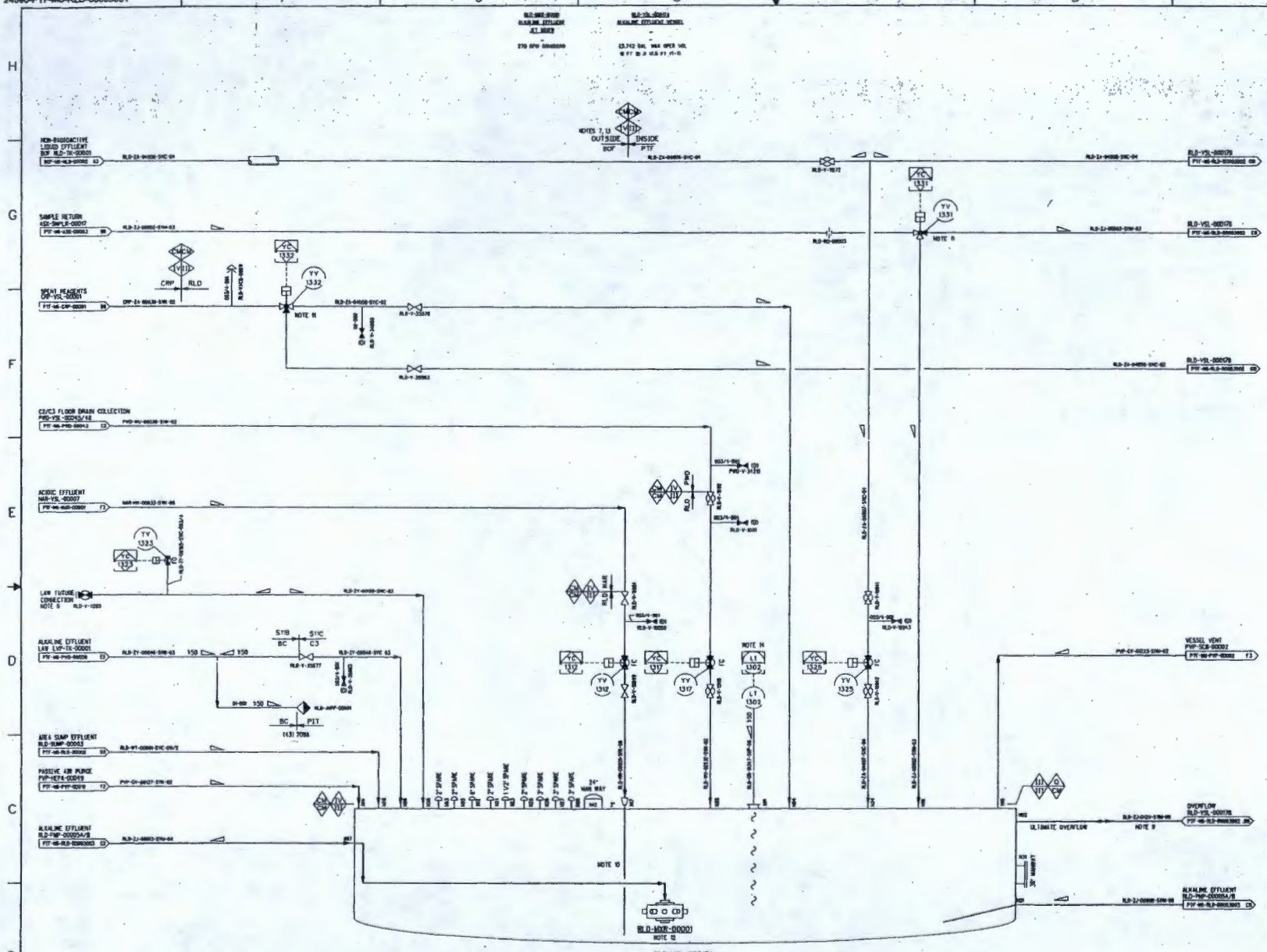
CONTRACT No. DE-AC27-01RV14136

P&ID - PTF
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM PROCESS CONDENSATE
RLD-PMP-00011A/B, 12A/B & 14A/B

SCALE: NONE

24590-PTF-M8-RLD-00002

REV 3



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00006 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III UNLESS OTHERWISE NOTED. ALL INTERNAL SUPPORTS AND WELDS THAT INTERACT WITH THE PRIMARY CONFINEMENT BARRIER (VESSEL) SHALL HAVE THE SAME QUALITY LEVEL AND SEISMIC CATEGORY AS THE PARENT VESSEL.
4. ALL LINES SHALL BE FREE DRAINING UNLESS OTHERWISE NOTED
5. LINES TO/FROM ASX SHALL BE SELF-DRAINING.
6. TRANSFER LINE IS PROVIDED TO ACCOMMODATE CONTAMINATED ALKALINE EFFLUENT FROM FUTURE VESSEL WITHIN FUTURE LAW VITRIFICATION FACILITY.
7. ELECTRICAL FREEZE PROTECTION SHALL BE PROVIDED FOR LIQUID FILLED PIPING AND INSTRUMENT SENSING LINES THAT ARE SUBJECT TO FREEZING.
8. MINIMIZE BRANCH LENGTH TO REDUCE STAGNATION OF PROCESS FLUID.
9. MAXIMUM OVERFLOW NOZZLE/PIPE ELEVATION SHALL BE LOWER THAN INTERIOR PERIMETER SPRAY RINGS TO PREVENT FLUID FROM CONTAMINATING SPRAY RINGS.
10. LINE SHALL BE DIPPED INTO THE PROCESS FLUID TO ACHIEVE HYDRAULIC SEAL.
11. 3-WAY VALVE SHALL FAIL OPEN TO RLD-VSL-00017A AND FAIL CLOSED TO RLD-VSL-00017B.
12. RLD JET MIXER PIPING TO BE SUPPORTED FOR THE EXPECTED DYNAMIC FORCES DURING THE TRANSITION FROM DRY STAGE TO MIXING STAGE.
13. SYSTEM DESIGN & CONSTRUCTION RESPONSIBILITY LIES AT EACH FACILITY'S BATTERY LIMITS 3'-0" OUTSIDE BUILDING WALL.
14. LEVEL INSTRUMENT MOUNTED DIRECTLY ON VESSEL.
15. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-PTF-M6-RLD-00003 REV 3. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-M6M-RLD-00021, -00029, -00030, AND FROM 24590-PTF-M6DT-00025, -00026, -00037, -00038. FURTHER MODIFIED INFORMATION. OTHER CHANGES FROM SUPERSEDED DRAWING INCLUDE THE ADDITION OF VACUUM BREAKER AND TY-1332 ON THE SPENT REAGENT LINE, AND THE REVISION OF SLOPE AND QUALITY LEVEL AND SEISMIC CATEGORY BREAKS.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. REFER TO 24590-PTF-MV-RLD-00001 FOR ALKALINE EFFLUENT VESSEL ASSEMBLY DETAILS
2. REFER TO 24590-PTF-M6-RLD-00006 FOR VESSEL WASH RING

DRAWING INDEX

DWG NO	REV	TITLE
24590-PTF-RLD-00003001	0	RAD LIQ WASTE DISP SYS EFFL COLLECTION RLD-VSL-00017A
24590-PTF-RLD-00003002	0	RAD LIQ WASTE DISP SYS EFFL COLLECTION RLD-VSL-00017B
24590-PTF-RLD-00003003	0	RAD LIQ WASTE DISP SYS EFFL TRANSFER RLD-PMP-00005A/B

REVISION HISTORY

REV	DESCRIPTION	DWG	CHKD	REVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION, SEE NOTE 15	SC	JGT	B-2	JGT	6/6/08

Q

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

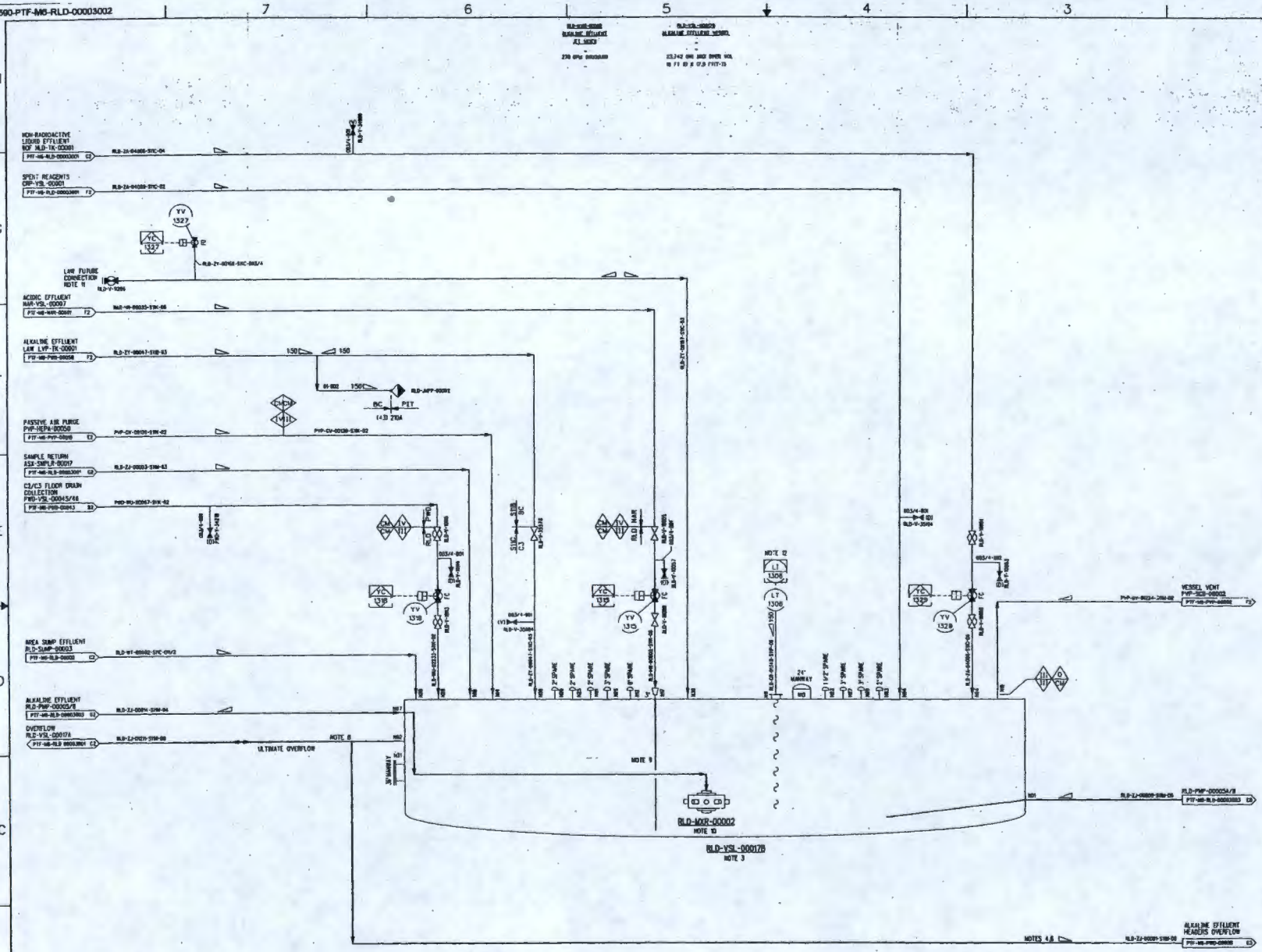
CONTRACT No. DE-AC27-01RV14136

P&ID - PTF
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM EFFLUENT COLLECTION RLD-VSL-00017A

SCALE: NONE

24590-PTF-M6-RLD-00003001

REV 0



NOTES:

1. SEE DRAWINGS 24590-WTP-MB-S0-00001 THROUGH 24590-WTP-MB-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL QM AND SEISMIC CATEGORY SC-III. UNLESS OTHERWISE NOTED. ALL INTERNAL SUPPORTS AND WELDS THAT INTERACT WITH THE PRIMARY CONFINEMENT BARRIER. (VESSEL) SHALL HAVE THE SAME QUALITY LEVEL AND SEISMIC CATEGORY AS THE PARENT VESSEL.
4. ALL LINES SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. LINES TO/FROM ASX SHALL BE SELF DRAINING.
6. THE PIPE SLOPE IS ACHIEVED AS SOON AS PRACTICAL AFTER OVERFLOW CONNECTION BETWEEN RLD-VSL-00017A AND RLD-VSL-00017B.
7. MINIMIZE BRANCH LENGTH TO REDUCE STAGNATION OF PROCESS FLUID.
8. MAXIMUM OVERFLOW NOZZLE/PIPE ELEVATION SHALL BE LOWER THAN INTERIOR PERIMETER SPRAY RINGS TO PREVENT FLUID FROM CONTAMINATING SPRAY RINGS.
9. LINE SHALL BE DIPPED INTO THE PROCESS FLUID TO ACHIEVE HYDRAULIC SEAL.
10. RLD JET MIXER PIPING TO BE SUPPORTED FOR THE EXPECTED DYNAMIC FORCES DURING THE TRANSITION FROM DRY STAGE TO MIXING STAGE.
11. TRANSFER LINE IS PROVIDED TO ACCOMMODATE CONTAMINATED ALKALINE EFFLUENT FROM FUTURE VESSEL WITHIN FUTURE LAW VITRIFICATION FACILITY.
12. LEVEL INSTRUMENT MOUNTED DIRECTLY ON VESSEL.
13. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-PTF-M6-RLD-00003 REV 3. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-MBN-RLD-00021, -00029, -00030, -00034 AND FROM 24590-PTF-M6U1-00025, -00026, -00037, -00038. FURTHER MODIFIED INFORMATION. OTHER CHANGES FROM SUPERSEDED DRAWING INCLUDE THE REVISION OF SLOPE AND QUALITY LEVEL/SEISMIC CATEGORY BREAKS.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. REFER TO 24590-PTF-MV-RLD-00002 FOR ALKALINE EFFLUENT VESSEL ASSEMBLY DETAILS
2. REFER TO 24590-PTF-M6-RLD-00008 FOR VESSEL WASH RING

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION, SEE NOTE 13	SG				6/9/08

REVISION HISTORY

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

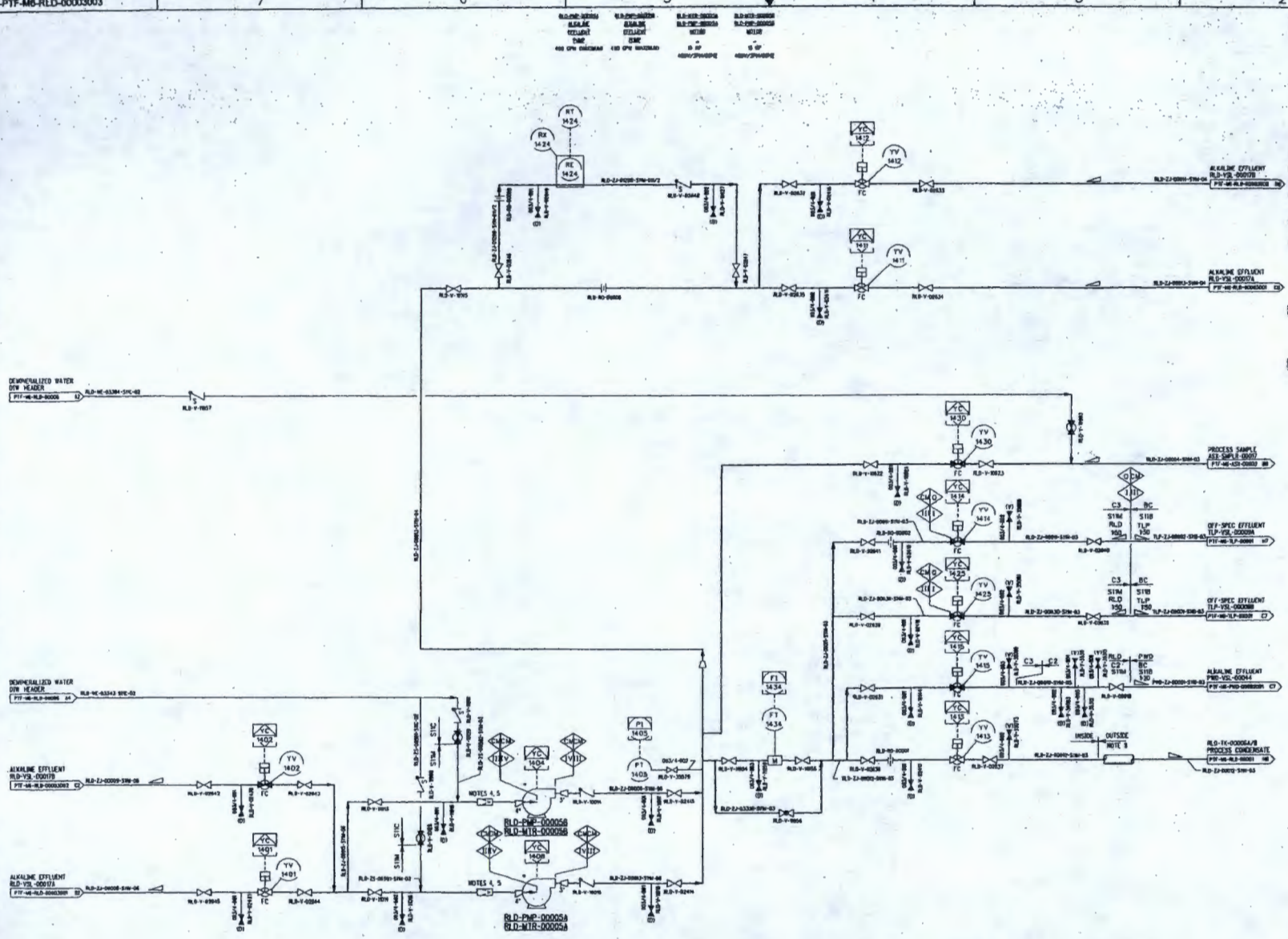
CONTRACT No: DE-AC27-01RV14136

P&ID - PTF
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM
EFFLUENT COLLECTION
RLD-VSL-00017 B

SCALE: NONE

24590-PTF-M6-RLD-00003002

REV 0



NOTES:

1. SEE DRAWINGS 24590-WTP-M5-50-00001 THROUGH 24590-WTP-M5-50-00006 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. STARTUP STRAINER TO BE PROVIDED BY BECHTEL. STRAINER TYPE SHALL BE "PILGRIM'S HAT" AS PER PIPE SPECIFICATION S1M.
5. PROVIDE A REMOVABLE SPOOL PIECE FOR STARTUP STRAINER.
6. ALL LINES SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
7. LINES TO/FROM ASX SHALL BE SELF-DRAINING.
8. ELECTRICAL FREEZE PROTECTION SHALL BE PROVIDED FOR LIQUID FILLED PIPING AND INSTRUMENT SENSING LINES THAT ARE SUBJECT TO FREEZING.
9. MINIMIZE BRANCH LENGTH TO REDUCE STAGNATION OF PROCESS FLUID.
10. THIS DRAWING IS CONVERTED FROM SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-PTF-M6-RLD-00003 REV 3. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-M6N-RLD-00021, -00038, AND FROM 24590-PTF-M6DT-00025, -00026, -00037, -00038. FURTHER MODIFIED INFORMATION. OTHER CHANGES FROM SUPERSEDED DRAWING INCLUDE THE REVISION OF QUALITY LEVEL/SEISMIC CATEGORY BREAKS AND THE REVISION OF THE ADDITION OF RLD-RO-00001/2. DELETED RLD-AE-1423.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

NONE

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 10	SC				6/05/08

REVISION HISTORY

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

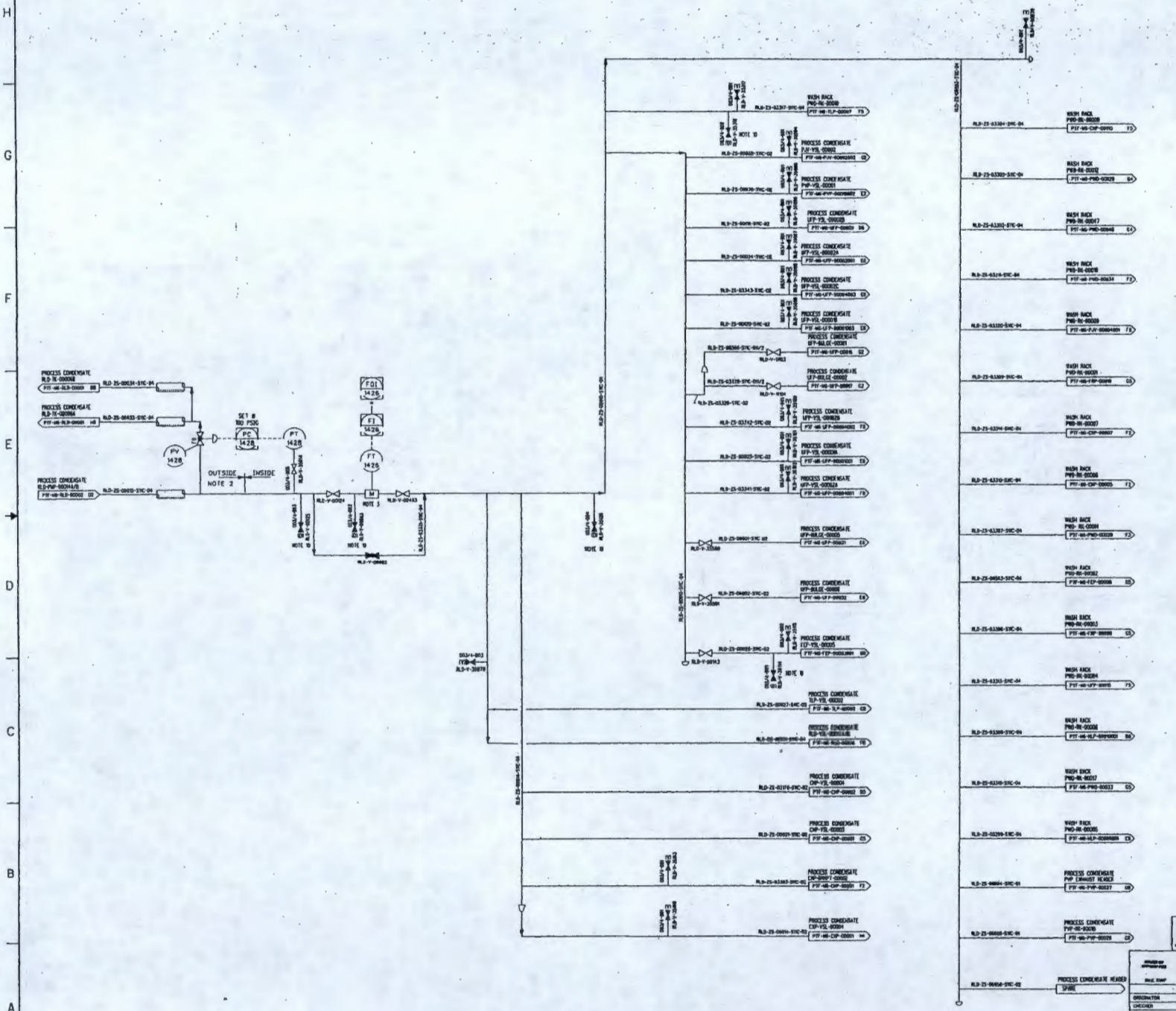
CONTRACT No. DE-AC27-01RV14136

P&ID - PTF
RADIOACTIVE LIQUID WASTE
DISPOSAL SYSTEM
EFFLUENT TRANSFER
RLD-PMP-00005A/B

SCALE: NONE

24590-PTF-M6-RLD-00003003

REV 0



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. ELECTRICAL FREEZE PROTECTION SHALL BE PROVIDED FOR LIQUID FILLED PIPING AND INSTRUMENT SENSING LINES THAT ARE SUBJECT TO FREEZING.
3. MAINTAIN 10 DIAMETERS UPSTREAM AND 5 DIAMETERS DOWNSTREAM STRAIGHT PIPE FOR MAG METER.
4. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL QM AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. 7. DELETED
8. REVISION 1: MAJOR REVISION, INCORPORATED WASH RACK OPTIMIZATION, 24590-PTF-M6N-MB07-00007, 24590-PTF-M6N-RLD-00010, REMOVED HOLD 1, MODIFIED NOTE 3 AND ADDED NOTE 7.
9. ALL LINES SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
10. LOCATE LOW POINT DRAINS AT HEIGHT TO ALLOW PLACEMENT OF 55 GALLON DRUM ON TROLLEY UNDERNEATH.
11. REVISION 2: MAJOR REVISION, NO REVISION CLOUDS REQUIRED. REVISED TO INCORPORATE 24590-PTF-M6N-MB07-00037, -00038, 24590-PTF-M6N-RLD-00010, -00024, -00037, AND -00040. ADDED PROCESS CONDENSATE LINE DISTRIBUTION TO UFP-RULCE-00005/6 AND PVP EXHAUST HEADER/RACK. REVISED/ADDED/DELETED NOTES AND REFERENCES.

HOLD/OPEN ITEMS:

1. DELETED.

REFERENCES:

1. DELETED

REV	DESCRIPTION	DRG	CHKD	RVWD	APVD	DATE
2	REVISED PER NOTE 11	SC	TP	JV	RV	6/3/08
1	REVISED PER NOTE 8	SC	TP	JV	RV	05/25/04
0	ISSUED FOR CONSTRUCTION	SS	MP	JV	RV	05/29/03

REVISION HISTORY

CM

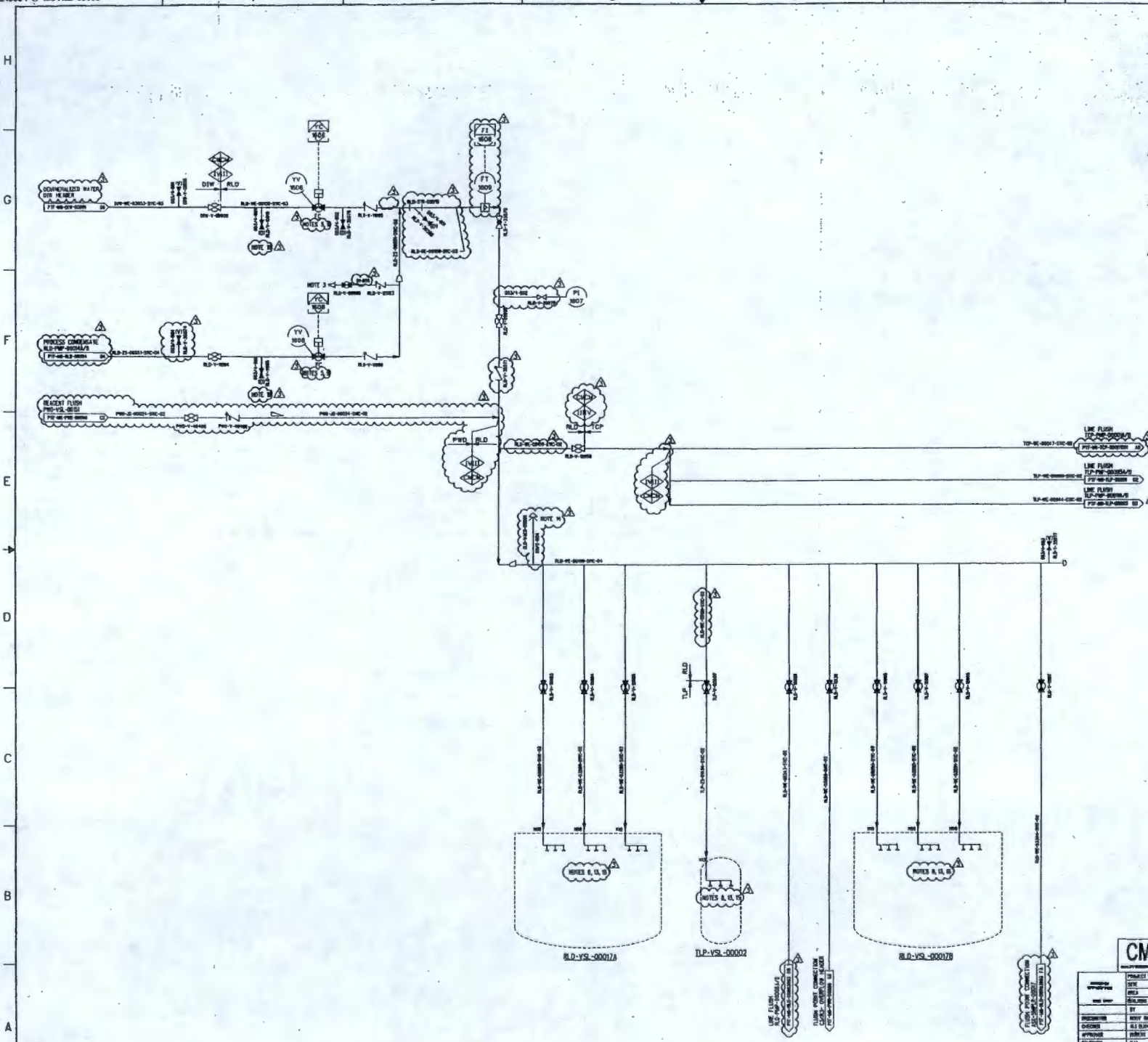
RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No. DE-AC27-01RV14136

P&ID - PTF
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM PROCESS CONDENSATE DISTRIBUTION

ORIGINATOR	S. KANOS	03/05/03
CHECKER	M. HALL	03/05/03
APPROVER	D. VOHS	03/27/03
REVIEWER	J. JAUW	03/25/03

SIZE NONE | 24590-PTF-M6-RLD-00004 | REV 2



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-SO-00001 THROUGH 24590-WTP-M6-SO-00006 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
3. REAGENTS/PLANT WASH/SERVICE AIR PROVIDED AT LOCAL UTILITY STATION.
4. DELETED
5. CONTROL VALVE AND ASSOCIATED BLOCK VALVE SHALL BE LOCATED TOGETHER FOR ACCESSIBILITY.
6. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
7. DELETED
8. MAXIMUM OVERFLOW NOZZLE/PIPE ELEVATION SHALL BE LOWER THAN INTERIOR PERIMETER SPRAY RINGS TO PREVENT FLUID FROM CONTAMINATING SPRAY RINGS.
9. VALVES INTERLOCKED TO PREVENT MULTIPLE VALVE OPERATION.
10. DELETED
11. REVISION 2: REVISED TO INCORPORATE 24590-PTF-MSN-MB0T-00007 AND 24590-PTF-MSN-RLD-00016 REVISED NOZZLE NUMBER, REMOVED QUICK CONNECT 1A6, RELOCATED SERVICE CONNECTION, REPLACED BLIND FLANGE WITH END CAP, UPDATED DFT-SHEET CONNECTOR GRID REFERENCE, REVISED TCP/RLD SYSTEM BREAK.
12. ALL LINES SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
13. PIPE ROUTING LIMITED TO A MAXIMUM OF AN 8 FOOT STRAIGHT VERTICAL DROP AT THE CONNECTION TO THE VESSEL.
14. VACUUM BREAKER IS TO BE CONNECTED TO THE HORIZONTAL RUN OF HEADER PIPE.
15. PIPING TO BE SUPPORTED FOR MAXIMUM WATER FALL AND FOR THE EXPECTED DYNAMIC FORCES DURING THE TRANSITION FROM A DRY PIPE TO A LIQUID FULL PIPE.
16. LOCATE LOW POINT DRAINS AT HEIGHT TO ALLOW PLACEMENT OF 55 GALLON DRUM ON TROLLEY UNDERNEATH.
17. ACCESSIBLE AREAS OF COMPONENTS SHALL HAVE 1 INCH THICK INSULATION FOR PERSONNEL PROTECTION OR HAVE GUARDS, BARRIERS, AND/OR SHIELDS WHERE INSULATION IS NOT FEASIBLE OR APPROPRIATE.
18. REVISION 3: REVISED TO INCORPORATE 24590-PTF-MSN-MB0T-00037 AND -00038, ADDED REAGENT FLUSH LINE PWD-JS-00024-STIC-02 AND VACUUM BREAKER, ADDED FT-1608, DRAIN VENT, AND QUALITY/SEISMIC FLAGS. REVISED/ADDED/DELETED NOTES AND REFERENCES.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. DELETED
2. REFER TO 24590-PTF-M6-RLD-00003001/002 (FUTURE) AND 24590-PTF-M6-TLP-00002 FOR PROCESS INFORMATION. REFER TO 24590-PTF-MV-RLD-00001/2 FOR ALKALINE EFFLUENT VESSEL ASSEMBLY DETAILS. REFER TO 24590-DL-PO4-MEVV-00001 -01-00202 FOR TREATED LAW EVAPORATOR CONDENSATE VESSEL ASSEMBLY DETAILS.

REV	DESCRIPTION	DRG	CHKD	REVWD	APVD	DATE
3	REVISED PER NOTE 18	SC	[illegible]	[illegible]	[illegible]	[illegible]
2	SEE NOTE 11	SC	JEA	AJ	BV	12/8/08
1	ADDED/DELETED COMPONENTS AND REVISED LAYOUT	BB	BB	AJ	BV	02/04/04
0	ISSUED FOR CONSTRUCTION	BB	JE	RVS	BV	12/3/02

REVISION HISTORY

CM

	BY	DATE
ENGINEER	MARK BARNES	12/3/02
CHECKER	ALI SLAMMER	12/3/02
APPROVER	JEREMY VONG	12/3/02
REVIEWER	N/A	

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

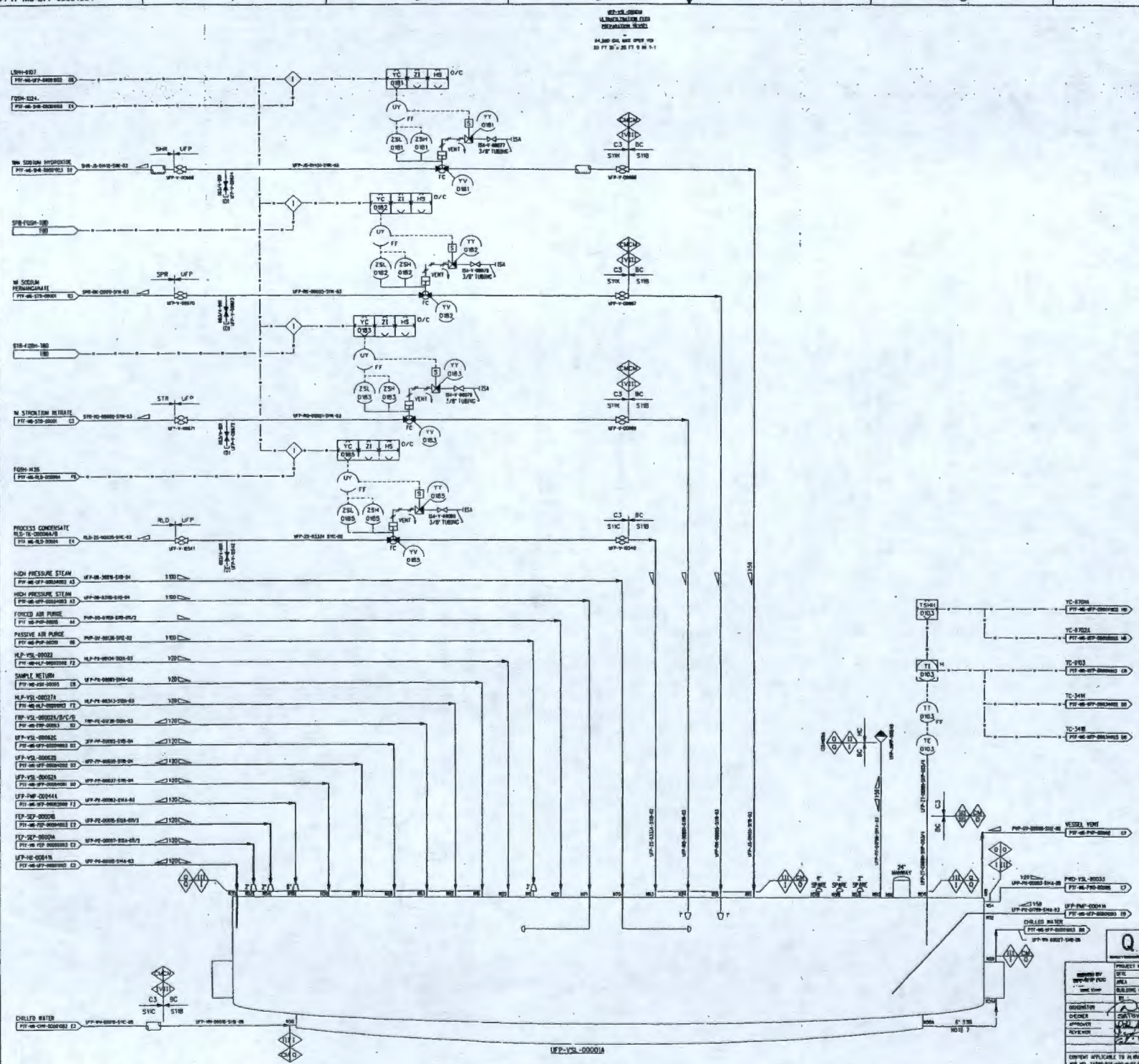
CONTRACT No: DE-AC27-01RV14136

P&ID - PTF
RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM PLANT WASH

SCALE: NONE

24590-PTF-M6-RLD-00006

REV 3



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED. TO PROTECT HOT CELL SC-I COMPONENTS, ALL PIPING, JUMPERS, AND EQUIPMENT LOCATED IN THE HOT CELL TO BE A MINIMUM OF SC-II, WHICH TAKES PRECEDENCE OVER PLACE SHOWN ON THIS DRAWING.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, UNLESS OTHERWISE NOTED.
5. FOR VESSEL WASH REPRESENTATION SEE PLANT WASH DRAWING 24590-PTF-M6-UFP-00015002.
6. FOR REVERSE FLOW DIVERTER/PULSE JET MIXERS REPRESENTATION SEE DRAWINGS: 24590-PTF-M6-UFP-00007001 THRU -00007007 AND 24590-PTF-M6-UFP-00006001 THRU -00006007.
7. VENDOR SUPPLIED PIPING.
8. FOR BUBBLER RACK AND SYSTEM CONNECTION SEE DRAWING 24590-PTF-M6-ISA-00010 AND -00011.
9. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-PTF-M6-UFP-00001 REV 2. THIS IS A MAJOR REVISION, NO REVISION CLOUDS ARE SHOWN. THIS DRAWING MAY INCLUDE INFORMATION FROM 24590-PTF-M6N-MBOT-00017, -00037, -00038, 24590-PTF-M6N-UFP-00037, -00048, -00063, -00064, -00101, AND -00104.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED OPERATIONAL SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE UFP SYSTEM LOGIC DIAGRAMS (FUTURE) AND THE UFP SYSTEM DESCRIPTION (FUTURE REVISION).

DRAWING INDEX	
DWG NO	TITLE
24590-PTF-M6-UFP-00001001	ULTRAFILTRATION PROCESS SYSTEM UFP-VSL-00001A
24590-PTF-M6-UFP-00001002	ULTRAFILTRATION PROCESS SYSTEM BUBBLERS
24590-PTF-M6-UFP-00001003	UFP-PMP-00001A AND UFP-HX-00041A
24590-PTF-M6-UFP-00001004	ULTRAFILTRATION PROCESS SYSTEM UFP-VSL-00001B
24590-PTF-M6-UFP-00001005	ULTRAFILTRATION PROCESS SYSTEM BUBBLERS
24590-PTF-M6-UFP-00001006	UFP-PMP-00001B AND UFP-HX-00041B
24590-PTF-M6-UFP-00001007	UFP FEED PREPARATION HEADER

REV	DESCRIPTION	DRN	CHKD	REVIEW	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 8	DHV	SLJ	[illegible]	[illegible]	12/19/07

REVISION HISTORY

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

CONTRACT NO: DE-AC27-01RV14136

P&ID - PTF
ULTRAFILTRATION PROCESS SYSTEM
FEED PREPARATION VESSEL
UFP-VSL-00001A

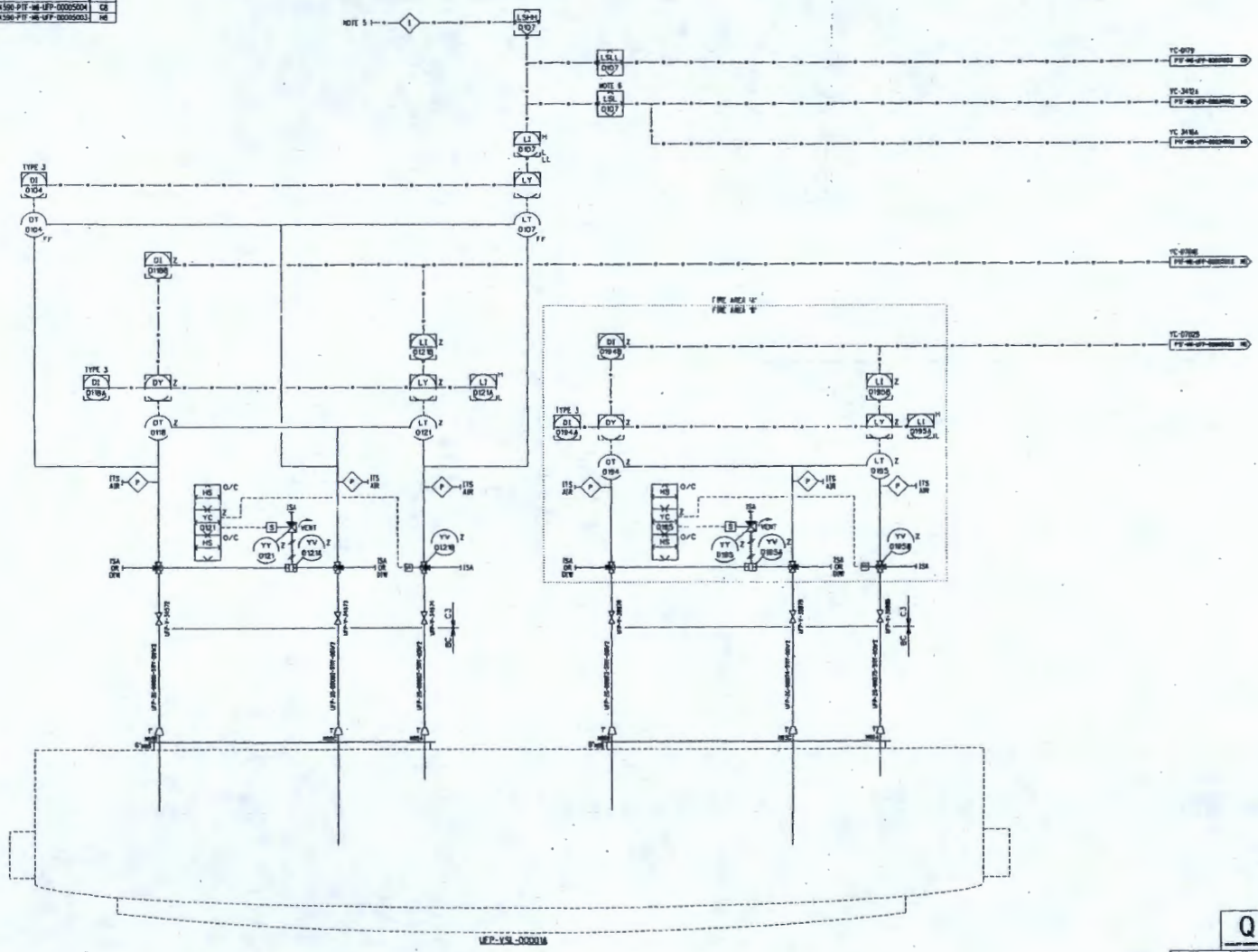
SCALE: NONE

24590-PTF-M6-UFP-00001001

REV 0

TABLE 1

INSTRUMENT TAG	DRAWING NUMBER	GRID
UFP-YC-0101	24590-PTF-M6-UFP-00001001	H8
UFP-YC-0102	24590-PTF-M6-UFP-00001001	G8
UFP-YC-0103	24590-PTF-M6-UFP-00001001	F8
UFP-YC-0105	24590-PTF-M6-UFP-00001001	E8
UFP-YC-3412A	24590-PTF-M6-UFP-00034002	C8
UFP-YC-3416A	24590-PTF-M6-UFP-00034003	C8
HLP-YC-0109A	24590-PTF-M6-HLP-00001003	F3
HLP-YC-0209A	24590-PTF-M6-HLP-00002002	C3
FWP-YC-0343	24590-PTF-M6-FWP-00003	B3
FCP-YC-0415	24590-PTF-M6-FCP-00004003	E4
FCP-YC-0223	24590-PTF-M6-FCP-00002003	E4
UFP-YC-0172A	24590-PTF-M6-UFP-00030001	D6
UFP-YC-0901A	24590-PTF-M6-UFP-00090003	H8
UFP-YC-0508A	24590-PTF-M6-UFP-00005004	C6
UFP-YC-0502A	24590-PTF-M6-UFP-00005003	H6



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-SO-00001 THROUGH 24590-WTP-M6-SO-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, UNLESS OTHERWISE NOTED.
5. ON HIGH HIGH LEVEL DETECTION (UFP-LSHH-0107), VALVES LISTED IN TABLE 1 WILL CLOSE.
6. ON LOW LEVEL DETECTION (UFP-LSL-0107), STEAM VALVES YV-3412 AND YV-3416 WILL CLOSE.
7. SEE DRAWINGS 24590-PTF-M6-ISA-00010, -00011, 24590-PTF-M6-PSA-00048001, AND -00048002 FOR BUBBLER RACK AND SYSTEM CONNECTION.
8. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-PTF-M6-UFP-00001 REV 2. THIS IS A MAJOR REVISION, NO REVISION CLOUDS ARE SHOWN. THIS DRAWING MAY INCLUDE INFORMATION FROM 24590-PTF-M6H-M001-00017, -00037, -00038, 24590-PTF-M6H-UFP-00037, -00046, -00063, -00064, -00101, AND -00104.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED OPERATIONAL SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE UFP SYSTEM LOGIC DIAGRAMS (FUTURE) AND THE UFP SYSTEM DESCRIPTION (FUTURE REVISION).

REV	DESCRIPTION	DRG	CHKD	REVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 8	JW	SJ	CLF	MW	9/10/08

REVISION HISTORY

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

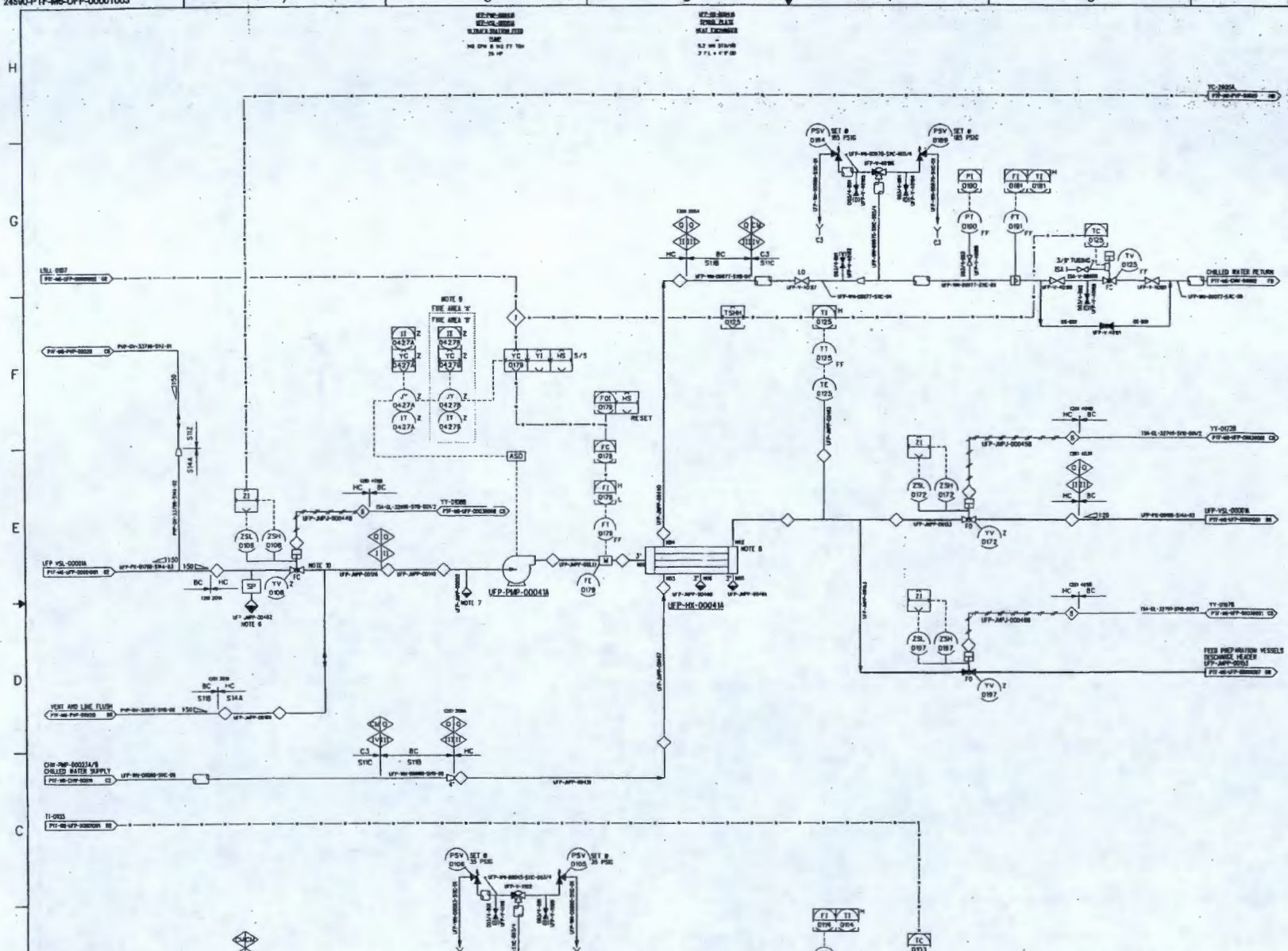
CONTRACT NO. DE-AC27-01RV14136

P&ID - PTF
ULTRAFILTRATION PROCESS SYSTEM BUBBLERS
UFP-VSL-00001A

SCALE: NONE

24590-PTF-M6-UFP-00001002

REV 0



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-SD-00001 THROUGH 24590-WTP-M6-SD-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL 'Q' AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED. TO PROTECT HOT CELL SEISMIC CATEGORY SC-I COMPONENTS, ALL PIPING, JUMPERS, AND EQUIPMENT LOCATED IN THE HOT CELL TO BE A MINIMUM OF SEISMIC CATEGORY SC-II, WHICH TAKES PRECEDENCE OVER FLAGS SHOWN ON THIS DRAWING. ALL ISA BLACK CELL LINES ARE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, UNLESS OTHERWISE NOTED.
5. FOR PUMP SEAL WATER DISTRIBUTION DRAWING SEE 24590-PTF-M6-PCW-00009.
6. SP IS A VALVE THAT WILL SEAL FLUSH AGAINST PIPE.
7. DRAIN INCLUDES PLUG THAT WILL SEAL FLUSH AGAINST JUMPER. PLUG IS PHYSICALLY ATTACHED TO BLANK JUMPER. PLUG SHALL BE SAME MATERIAL AS JUMPER.
8. HEAT EXCHANGER OUTLET NOZZLE SHALL BE LOCATED VERTICALLY FOR HPAV CONTROL.
9. ITS TIMER TO LIMIT PUMP RUN TIME.
10. VALVE YV-0188 MUST BE CLOSED BEFORE HIGH POINT VENT/FLUSH VALVE CONTROL YC-29054 AND/OR YC-29204 (PTF-M6-PVP-00028) OPEN TO PUMP SUCTION.
11. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-PTF-M6-UFP-00001 REV 2. THIS IS A MAJOR REVISION, NO REVISION CLOUDS ARE SHOWN. THIS DRAWING MAY INCLUDE INFORMATION FROM 24590-PTF-M6W-M001T-00037, -00037 -00038, 24590-PTF-M6W-UFP-00037, -00048, -00053, -00061, -00101, AND -00104.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED OPERATIONAL SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE UFP SYSTEM LOGIC DIAGRAMS (FUTURE) AND THE UFP SYSTEM DESCRIPTION (FUTURE REVISION).

REV	DESCRIPTION	ORG	CHKD	SYMBOL	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 6					

REVISION HISTORY

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

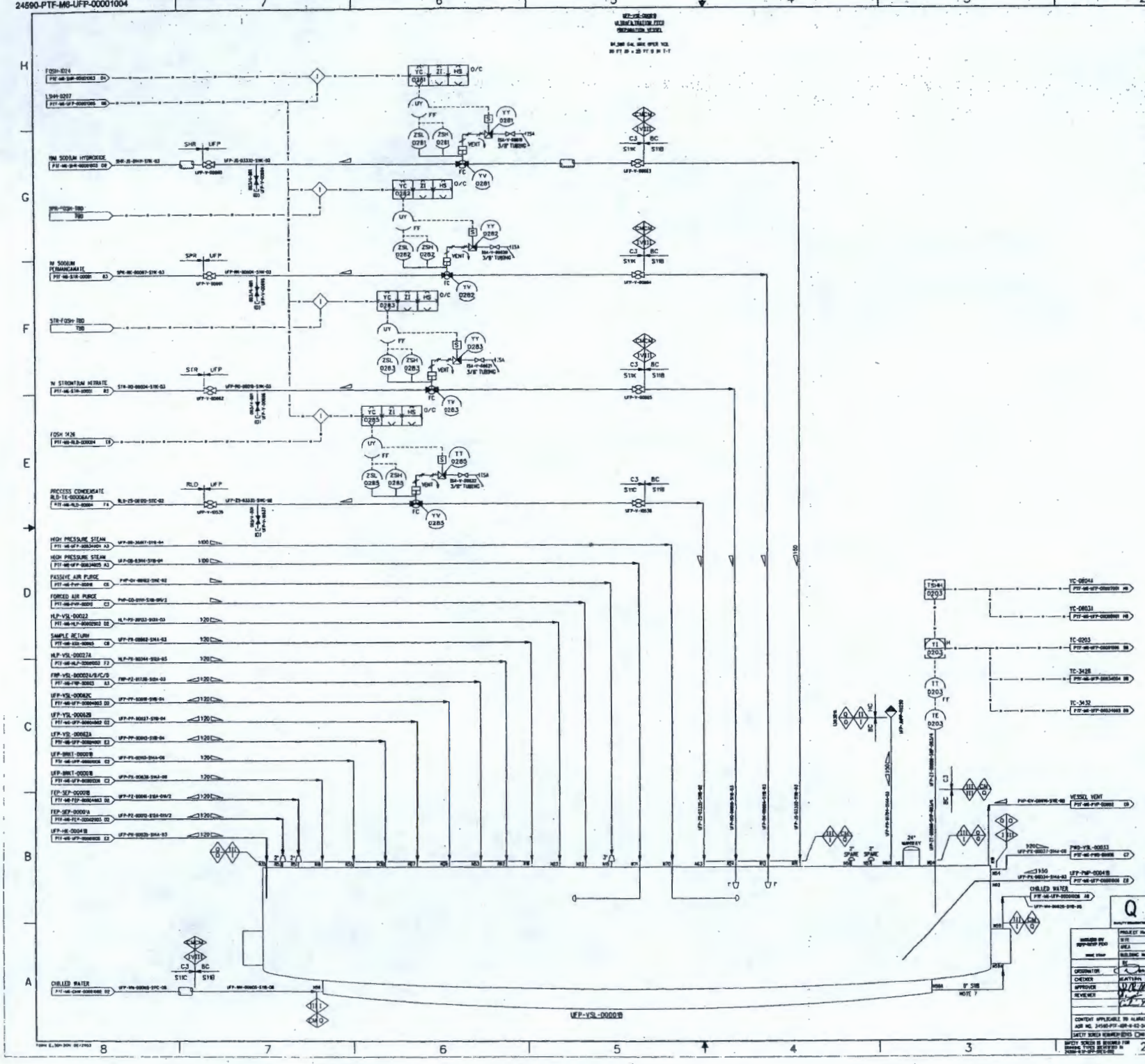
CONTRACT No: DE-AC27-01RV14136

P&ID-PTF
ULTRAFILTRATION PROCESS SYSTEM
UFP-PMP-00041A AND UFP-HX-00041A

SCALE: NONE

24590-PTF-M6-UFP-00001003

REV 0



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-SD-00001 THROUGH 24590-WTP-M6-SD-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED. TO PROTECT HOT CELL SC-I COMPONENTS, ALL PIPING, JUMPERS, AND EQUIPMENT LOCATED IN THE HOT CELL TO BE A MINIMUM OF SC-II, WHICH TAKES PRECEDENCE OVER FLAGS SHOWN ON THIS DRAWING.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, UNLESS OTHERWISE NOTED.
5. FOR VESSEL WASH REPRESENTATION SEE PLANT WASH DRAWING 24590-PTF-M6-PWD-00048.
6. FOR REVERSE FLOW DIVERTER/PULSE JET MIXERS REPRESENTATION SEE DRAWINGS: 24590-PTF-M6-UFP-00007001 THRU -00007007 AND 24590-PTF-M6-UFP-00008001 THRU -00008007.
7. VENDOR SUPPLIED PIPING.
8. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-PTF-M6-UFP-00001 REV 2. THIS IS A MAJOR REVISION, NO REVISION CLOUDS ARE SHOWN. THIS DRAWING MAY INCLUDE INFORMATION FROM 24590-PTF-MER-M80T-00017, -00037, -00038, 24590-PTF-MEN-UFP-00037, -00046, -00083, -00084, -00101, AND -00104.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED OPERATIONAL SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE UFP SYSTEM LOGIC DIAGRAMS (FUTURE) AND THE UFP SYSTEM DESCRIPTION (FUTURE REVISION).

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 8	MV	S.T.	JEW	DW	11/14/08

REVISION HISTORY

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

CONTRACT No: DE-AC27-01RV14136

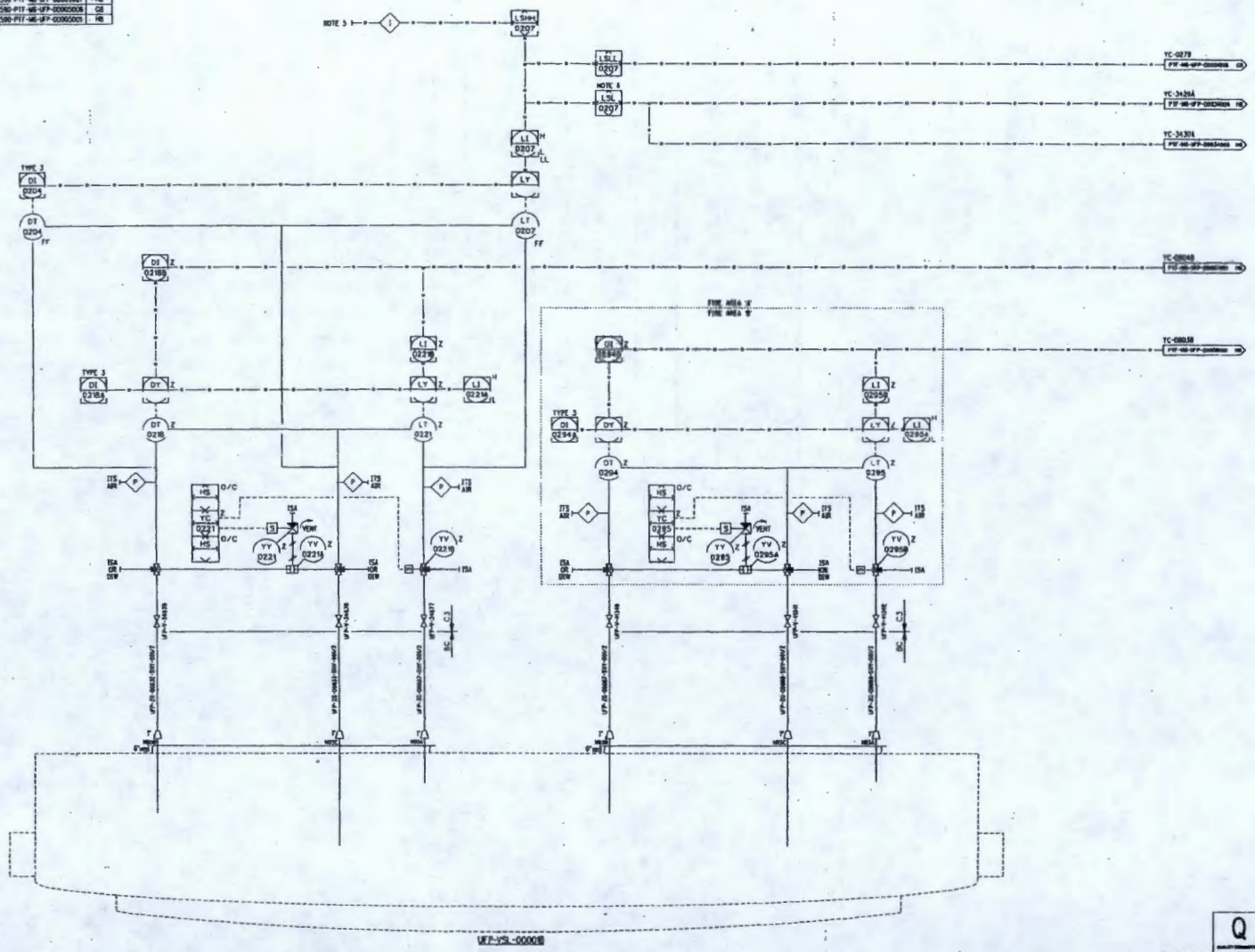
P&ID - PTF
ULTRAFILTRATION PROCESS SYSTEM
FEED PREPARATION VESSEL
UFP-VSL-00001B

SCALE: NONE

24590-PTF-M6-UFP-00001004 REV 0

TABLE 1

INSTRUMENT TAG	DRAWING NUMBER	GRID
UFP-YC-0281	24590-PTF-M6-UFP-00001004	H8
UFP-YC-0282	24590-PTF-M6-UFP-00001004	H8
UFP-YC-0283	24590-PTF-M6-UFP-00001004	H8
UFP-YC-0285	24590-PTF-M6-UFP-00001004	H8
UFP-YC-3426A	24590-PTF-M6-UFP-00034004	G8
UFP-YC-3430A	24590-PTF-M6-UFP-00034005	G8
HLP-YC-0100A	24590-PTF-M6-HLP-00001003	C3
HLP-YC-0370A	24590-PTF-M6-HLP-00003002	E3
FRP-YC-0344	24590-PTF-M6-FRP-00003	B3
FEP-YC-0440	24590-PTF-M6-FEP-00004003	E4
FEP-YC-0240	24590-PTF-M6-FEP-00002003	E4
UFP-YC-0273A	24590-PTF-M6-UFP-00030002	H6
UFP-YC-0902A	24590-PTF-M6-UFP-00009001	H6
UFP-YC-0567A	24590-PTF-M6-UFP-00005006	G6
UFP-YC-0504A	24590-PTF-M6-UFP-00005001	H6



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00006 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL 1 AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, UNLESS OTHERWISE NOTED.
5. ON HIGH HIGH LEVEL DETECTION (UFP-LSHH-0207), VALVES LISTED IN TABLE 1 WILL CLOSE.
6. ON LOW LEVEL DETECTION (UFP-LSL-0207), STEAM VALVES YV-3426 AND YV-3430 WILL CLOSE.
7. SEE DRAWINGS 24590-PTF-M6-ZSA-00010, -00011, 24590-PTF-M6-PSA-00048001, AND -00048002 FOR BUBBLER RACK AND SYSTEM CONNECTION.
8. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-PTF-M6-UFP-00001 REV 2. THIS IS A MAJOR REVISION, NO REVISION CLOUDS ARE SHOWN. THIS DRAWING MAY INCLUDE INFORMATION FROM 24590-PTF-M6N-M001-00002, -00037, -00038, 24590-PTF-M6N-UFP-00037, -00046, -00083, -00084, -00101, AND -00104.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED OPERATIONAL SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE UFP SYSTEM LOGIC DIAGRAMS (FUTURE) AND THE UFP SYSTEM DESCRIPTION (FUTURE REVISION).

REV	DESCRIPTION	DRW	CHKD	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 8	DW	SJT	CHK	RVJ	TRE	9/26/07

REVISION HISTORY

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

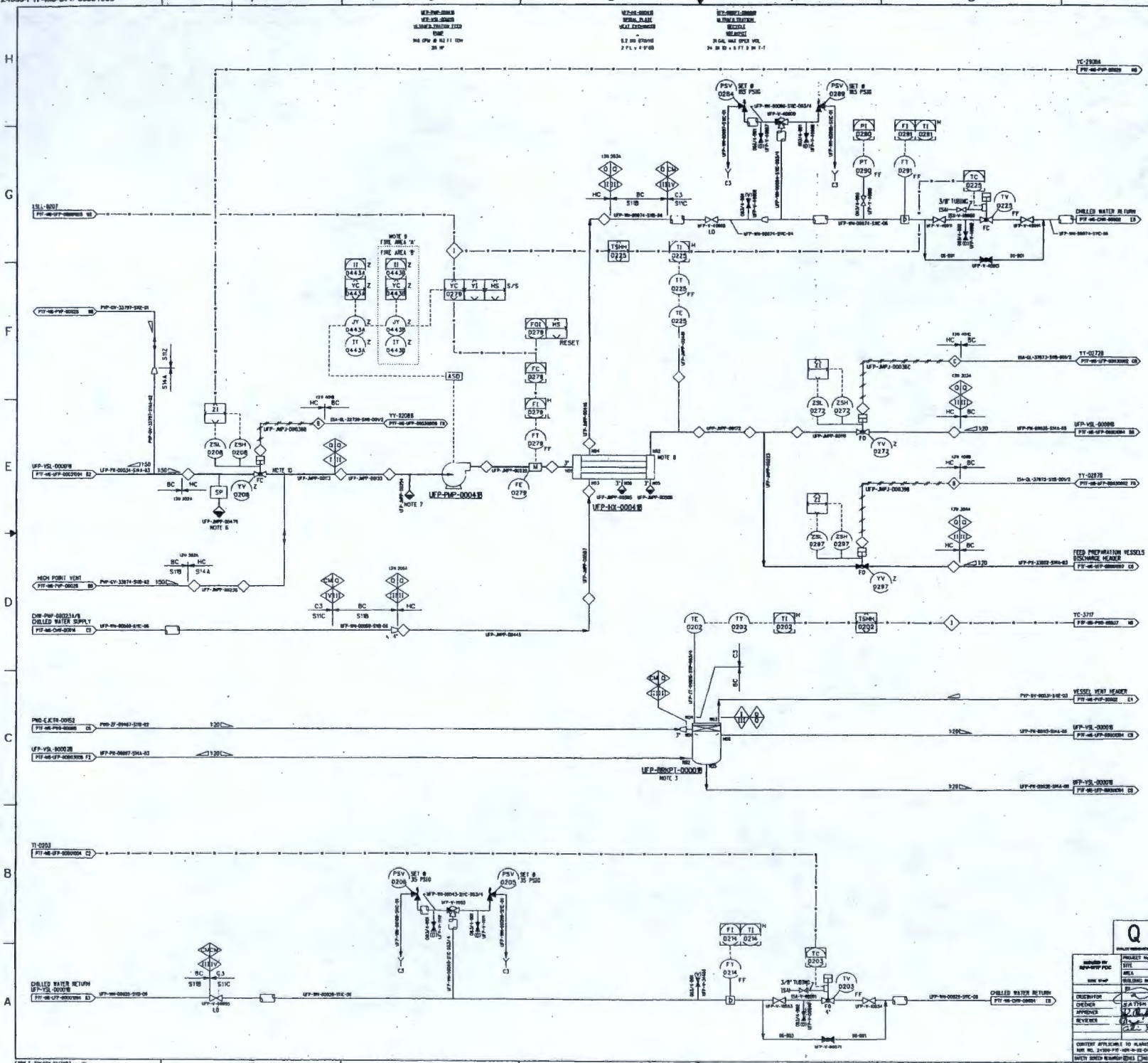
CONTRACT No. DE-AC27-01RV14136

P&ID - PTF ULTRAFILTRATION PROCESS SYSTEM BUBBLERS UFP-VSL-00001B

SCALE: NONE

24590-PTF-M6-UFP-00001005

REV 0



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY, FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III EXCEPT BREAKPOT UFP-BRKPT-00001B WHICH IS SEISMIC CATEGORY SC-II, UNLESS OTHERWISE NOTED. TO PROTECT HOT CELL SEISMIC CATEGORY SC-I COMPONENTS, ALL PIPING, JUMPERS, AND COMPONENT LOCATED IN THE HOT CELL TO BE A MINIMUM OF SEISMIC CATEGORY SC-II, WHICH TAKES PRECEDENCE OVER FLAGS SHOWN ON THIS DRAWING. ALL ISA BLACK CELL LINES ARE QUALITY LEVEL Q AND SEIMIC CATEGORY SC-I.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, UNLESS OTHERWISE NOTED.
5. FOR PUMP SEAL WATER DISTRIBUTION DRAWING SEE 24590-PTF-M6-PCW-00009.
6. SP IS A VALVE THAT WILL SEAL FLUSH AGAINST PIPE.
7. DRAIN INCLUDES PLUG THAT WILL SEAL FLUSH AGAINST JUMPER. PLUG IS PHYSICALLY ATTACHED TO BLANK JUMPER. PLUG SHALL BE SAME MATERIAL AS JUMPER.
8. HEAT EXCHANGER OUTLET NOZZLE SHALL BE LOCATED VERTICALLY FOR HPAV CONTROL.
9. ITS TIMER TO LIMIT PUMP RUN TIME.
10. VALVE YV-0208 MUST BE CLOSED BEFORE HIGH POINT VENT/FLUSH VALVE OPEN CONTROL. YC-2809A AND/OR YC-2814A (PTF-M6-PVP-000291 OPEN TO PUMP SUCTION.
11. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-PTF-M6-UFP-00001 REV. 2. THIS IS A MAJOR REVISION. NO REVISION CLOUDS ARE SHOWN. THIS DRAWING MAY INCLUDE INFORMATION FROM 24590-PTF-M6N-M50T-00017, -00037, -00038, 24590-PTF-M6N-UFP-00037, -00048, -00081, -00084, -00101 AND -00104.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED OPERATIONAL SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE UFP SYSTEM LOGIC DIAGRAMS (FUTURE) AND THE UFP SYSTEM DESCRIPTION (FUTURE REVISION).

REV	DESCRIPTION	DRG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 8	BWW	SJT	CJT	KSF	01/26/06

REVISION HISTORY

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

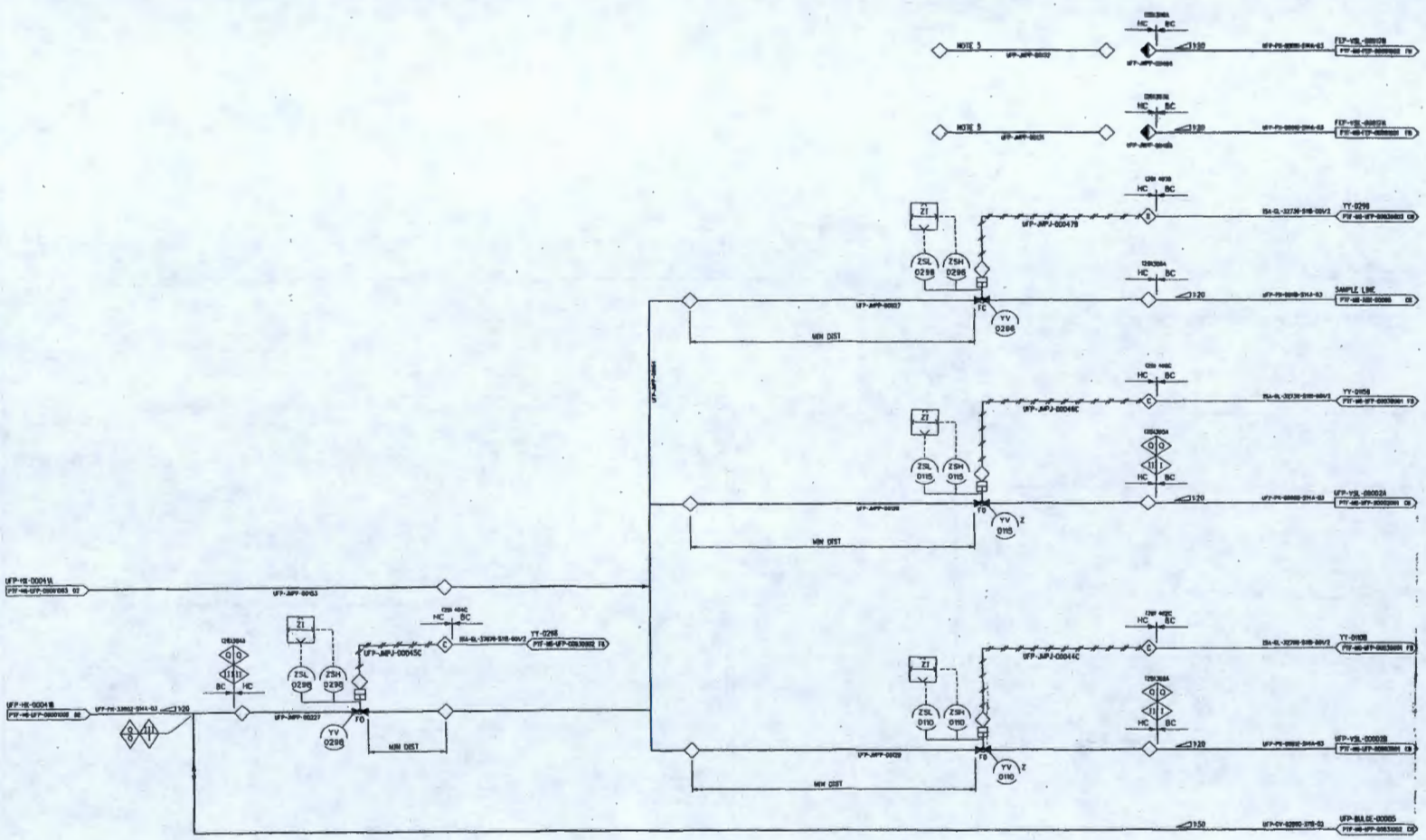
CONTRACT No: DE-AC27-01RV14136

P&ID-PTF ULTRAFILTRATION PROCESS SYSTEM UFP-PMP-00041B AND UFP-HX-00041B

SCALE: NONE

24590-PTF-M6-UFP-00001006

REV: 0



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED TO PROTECT HOT CELL SEISMIC CATEGORY SC-I COMPONENTS. ALL PIPING, JUMPERS, AND EQUIPMENT LOCATED IN THE HOT CELL TO BE A MINIMUM OF SEISMIC CATEGORY SC-II, WHICH TAKES PRECEDENCE OVER FLAGS SHOWN ON THIS DRAWING. ALL ISA BLACK CELL LINES ARE QUALITY LEVEL Q AND SEIMIC CATEGORY SC-I.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING. EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, UNLESS OTHERWISE NOTED.
5. JUMPERS UFP-JMPP-00027, UFP-JMPP-00484 AND UFP-JMPP-00485 ARE NORMALLY INSTALLED. JUMPERS UFP-JMPP-00131 AND UFP-JMPP-00132 ARE TO BE FABRICATED BUT NOT NORMALLY INSTALLED DURING OFF NORMAL OPERATION. JUMPER UFP-JMPP-00027, UFP-JMPP-00484, OR UFP-JMPP-00485 ARE TO BE REMOVED AND REPLACED BY JUMPER UFP-JMPP-00131 OR UFP-JMPP-00132 ON AS-NEEDED BASIS.
6. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-PTF-M6-UFP-00001 REV 2. THIS IS A MAJOR REVISION, NO REVISION CLOUDS ARE SHOWN. THIS DRAWING MAY INCLUDE INFORMATION FROM 24590-PTF-M6N-M6D1-00017, -00037, -00038, 24590-PTF-M6N-UFP-00037, -00048, -00083, -00084, -00101, AND -00104

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED OPERATIONAL SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE UFP SYSTEM LOGIC DIAGRAMS (FUTURE) AND THE UFP SYSTEM DESCRIPTION (FUTURE REVISION).

REV	DESCRIPTION	DRG	CHKD	EVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 6	RAW	SJT	CRW	MAK	9/25/08

REVISION HISTORY

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

CONTRACT NO: DE-AC27-01RV14136

P&ID - PTF
ULTRAFILTRATION PROCESS SYSTEM
FEED PREPARATION HEADER
UFP-VSL-00001A/1B

SCALE: NONE

24590-PTF-M6-UFP-00001007

REV 0

Quarter Ending March 31, 2009 24590-PTF-PCN-ENV-08-033

Hanford Facility RCRA Permit Modification Notification Form

Part III, Operating Unit 10

Waste Treatment and Immobilization Plant

Index

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

Update Piping and Instrumentation Diagrams (P&ID) for the Pretreatment Facility Waste Feed Evaporation Process System (FEP), Pulse Jet Ventilation System (PJV), Pretreatment Vessel Vent Process System (PVV), and Treated LAW Evaporation Process System (TLP) in Appendix 8.2 of the Dangerous Waste Permit.

Submitted by Co-Operator:

D. A. Klein 2/27/09

D. A. Klein Date

Reviewed by ORP Program Office:

S. J. Olinger 3/26/09

S. J. Olinger Date

Quarter Ending March 31, 2009 24590-PTF-PCN-ENV-08-033

Hanford Facility RCRA Permit Modification Notification Form

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

Description of Modification:

The purpose of this Class 1 prime modification is to update the Piping and Instrumentation Diagrams (P&ID) for the Pretreatment Facility (PTF) Waste Feed Evaporation Process System (FEP), Pulse Jet Ventilation System (PJV), Pretreatment Vessel Vent Process System (PVP), and Treated LAW Evaporation Process System (TLP) in Appendix 8.2. of the Dangerous Waste Permit. The permit P&IDs incorporated into the DWP are being replaced with source P&IDs as indicated in the table below. The new drawings (Rev. 0) are the result of converting source drawings into multiple sheets in an effort to provide clearer representation of the PVP system, including additional details for instrumentation and control logic.

The following P&IDs are submitted to update the P&IDs currently in Appendix 8.2.

Appendix 8.2			
Replace:	24590-PTF-M6-FEP-P0008, Rev. 0	With:	24590-PTF-M6-FEP-00008, Rev. 4
	24590-PTF-M6-PJV-P0001, Rev. 0		24590-PTF-M6-PJV-00001, Rev. 3
	24590-PTF-M6-PVP-P0002, Rev. 2		24590-PTF-M6-PVP-00002, Rev. 3
	24590-PTF-M6-PVP-P0018, Rev. 0		24590-PTF-M6-PVP-00018001, Rev. 0
			24590-PTF-M6-PVP-00018002, Rev. 0
	24590-PTF-M6-TLP-P0001, Rev. 0		24590-PTF-M6-TLP-00001, Rev. 3

This modification requests Ecology approval and incorporation into the permit the changes provided in applicable document change forms (e.g., DCN, SCN, SDDR, FCN, FCR, etc.) and changes associated with the resolution to comments on change documents since the issuance of the last revision of the permitted drawing.

The following types of changes apply to the FEP, PJV, PVP and TLP P&IDs:

- Drawing converted from a single sheet to multi-sheet drawings (P&ID 24590-PTF-M6-PVP-00018)
- Modified, deleted, and added notes and references
- Revised piping configuration; added and/or deleted pipeline (24590-PTF-M6-FEP-00008, 24590-PTF-M6-PVP-00002, 24590-PTF-M6-PVP-00018001/2, 24590-PTF-M6-TLP-00001)
- Added high point vent headers (24590-PTF-M6-PVP-00002)
- Modified, added, deleted in-line components and instruments and control logic
- Modified, identified, and added support/utility system lines, valves, in-line components, instruments and control logic
- Revised, identified, and added quality level and seismic designations
- Revised, identified, and added slope symbols and/or the slope requirement

The following is a list of outstanding change documents that have not been incorporated into this modification:

- 24590-PTF-M6N-10-00004 (P&IDs 24590-PTF-M6-FEP-00008, 24590-PTF-M6-PVP-00002)
- 24590-PTF-M6N-FEP-00092 (P&ID 24590-PTF-M6-FEP-00008)
- 24590-PTF-M6N-M80T-00055 (P&ID 24590-PTF-M6-FEP-00008)
- 24590-PTF-M6PR-10-00004 (P&ID 24590-PTF-M6-PJV-00001)
- 24590-PTF-M6N-TLP-00043 (P&ID 24590-PTF-M6-TLP-00001)

Quarter Ending March 31, 2009 24590-PTF-PCN-ENV-08-033

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:

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: ☑ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology: E Fredenburg 4/16/09 Ed Fredenburg 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 applicable.

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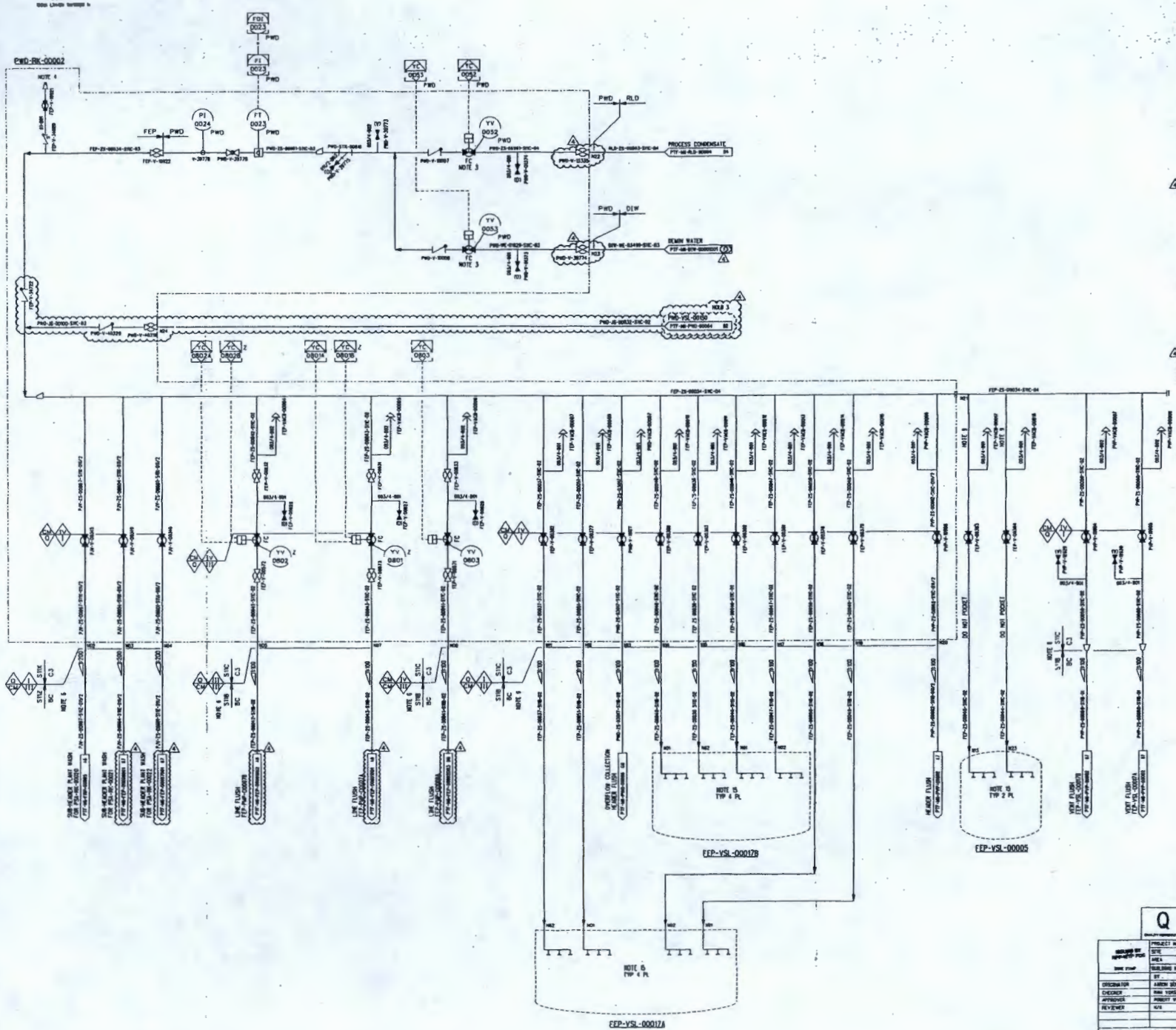


NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. DELETED
3. VALVES INTERLOCKED TO PREVENT MULTIPLE VALVE OPERATION.
4. REAGENT/PLANT WASH/AIR SERVICES PROVIDED AT UTILITY STATION.
5. DELETED
6. PIPE SLEEVE PENETRATIONS BETWEEN OCCUPATIONAL AREAS AND INACCESSIBLE/REMOTE AREAS (RS) SHALL HAVE SHADOW SHIELDING TO MITIGATE DIRECT RADIATION SHINE OR BE JOGGED, AS DETERMINED BY ENVIRONMENTAL AND NUCLEAR SAFETY. ALL PIPE/SLEEVE INTERFACES SHALL BE SEALED USING APPROVED FIRE-RATED PENETRATION SEAL DESIGNS TO MAINTAIN THE INTEGRITY OF THE FIRE WALL BETWEEN AREAS.
7. CONTENTS OF THIS DRAWING ARE DANGEROUS WASTE PERMIT AFFECTING
8. THE PRESSURE BOUNDARY FOR ALL SYSTEMS, STRUCTURES AND COMPONENTS SHOWN ON THIS DRAWING IS IDENTIFIED AS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
9. FLUSH CONNECTIONS TO EQUIPMENT LOCATED IN C3 AREAS SHALL NOT PENETRATE C5 AREAS.
10. SHADOW SHIELDING, IF REQUIRED BY ENVIRONMENTAL AND NUCLEAR SAFETY, WILL BE PROVIDED BY BECHTEL.
11. DELETED
12. REVISION 2: INCORPORATED 24590-PTF MBN-MBOT-00008 AND 24590-PTF-MBN-FEP-00015 WITH SPARE NOZZLES, ASSIGNED PIPELINE NUMBERS, REVISED NOTE 8, ADDED ROOT VALVE TO PI-0805, ADDED NOZZLE NUMBERS, DELETED COMPONENT IDENTIFIER FOR SPECIALTY ITEM, RELOCATED 3 PIPELINES, DELETED PIPELINE, ADDED FLOW TOTALIZER, REDUCERS AND VENTS, DELETED NOZZLE NUMBERS N24 & N25, REALIGNED NOZZLES N21, N22 AND N23.
13. DELETED
14. REVISION 3: INCORPORATED 24590-PTF-MBN-MBOT-00025. MODIFIED NOTES. SIGNIFICANT REVISION PER PWD WASH REDESIGN. SYSTEM REQUIRES DESIGN REVERIFICATION.
15. PIPE ROUTING LIMITED TO A MAXIMUM OF AN 8 FT STRAIGHT VERTICAL DROP AT THE CONNECTION TO THE VESSEL.
16. BLACK CELL: PIPING TO BE SUPPORTED FOR MAXIMUM WATERFALL AND FOR THE EXPECTED DYNAMIC FORCES DURING THE TRANSITION FROM A DRY PIPE TO A LIQUID-FULL PIPE.
17. REVISION 4: REVISED TO INCORPORATE 24590-PTF-MBN-FEP-00084. MODED CHEMICAL INJECTION LINE AND CORRECTED OFF SHEET CONNECTIONS. LINE SIZE FOR PVP-25-00062-S1HC AND -S1HB, TO REMAIN 1 1/2".

HOLD/OPEN ITEMS:

1. DELETED
2. DELETED
3. OM HOLD PENDING ISSUANCE OF PWD P&ID.

REFERENCES:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE SOFTWARE FUNCTIONAL SPECIFICATION FOR FEP-WASTE FEED EVAPORATOR PROCESS SYSTEM, 24590-PTF-3PS-FEP-TD001.
2. FOR PERMISSIVES AND INTERLOCKS TO IMPORTANT TO SAFETY SYSTEMS (ITS) REFER TO SAFETY SYSTEM REQUIREMENTS SPECIFICATION 24590-PTF-3PS-PPJ-TD003 (FUTURE).

REVISION HISTORY

REV	DESCRIPTION	DRG	CHKD	RVWD	APVD	DATE
4	REVISED PER NOTE 17	GRF	BJK	ETJ	RGK	5-9-06
3	REVISED PER NOTE 14	SAR	TMR	RES	JJ	5/26/05
2	MAJOR REVISION, SEE NOTE 12	RM	JL	JJ	BV	2/7/04
1	ISSUED FOR CONSTRUCTION	AB	BV	BVB	BV	1/29/03

Q

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

CONTRACT NO. DE-AC27-01RV14136

P&ID - PTF
WASTE FEED EVAPORATION UTILITY SERVICES PLANT WASH RACK

SHEET NONE

24590-PTF-M6-FEP-00008

REV 4

ORIGINATOR AARON SCHNELL 1/23/03
CHECKER RAM YORSI 1/23/03
APPROVER ROBERT YORK 1/29/03
REVIEWER N/A N/A

CONTENT APPLICABLE TO ALARA? YES NO
ADR NO. 24590-PTF-ADR-M-02-030 REV. 1

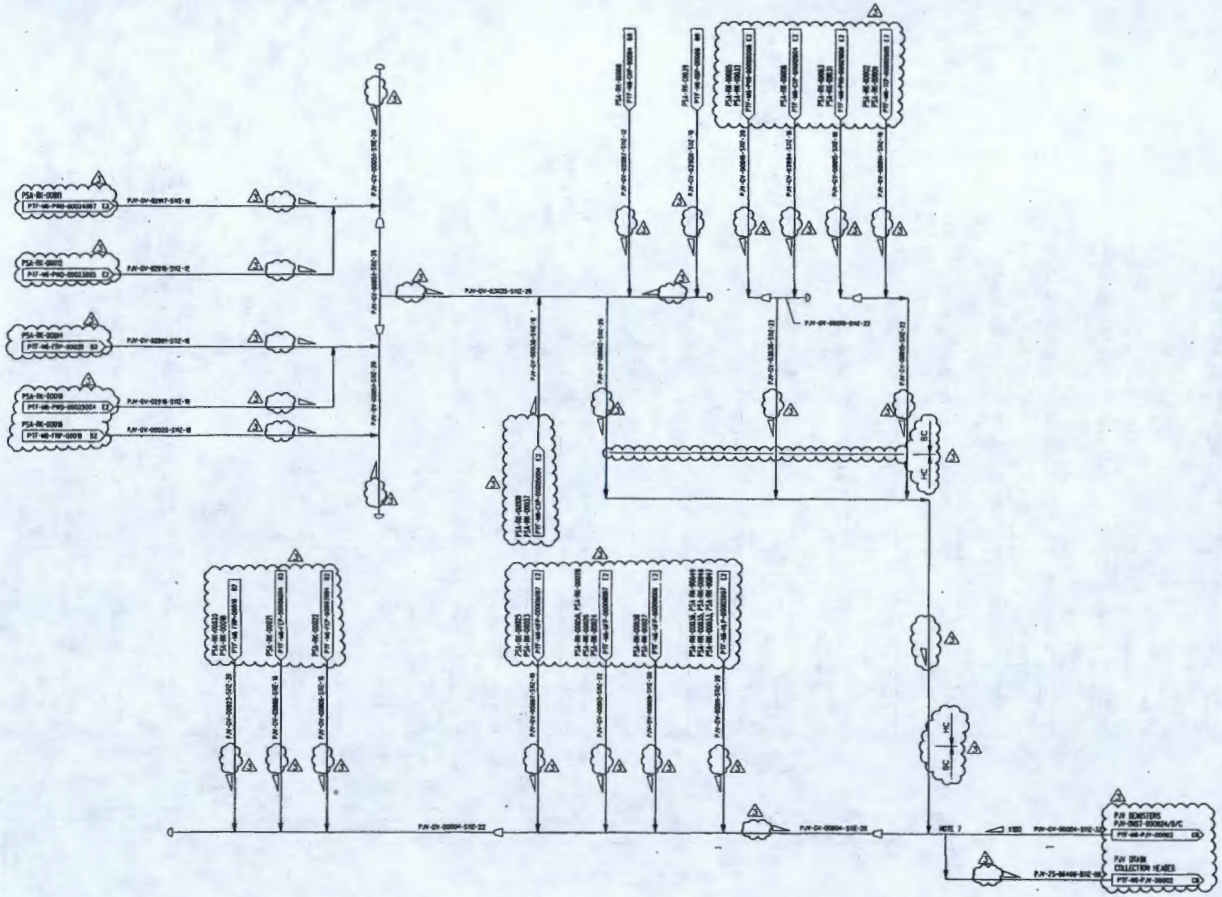
SAFETY SENSITIVE? YES NO
SAFETY SENSITIVE ELEMENTS FOR DRAWING TYPE DESCRIBED IN 24590-PTF-GPP-SECS-000

SAFETY HOLD? YES NO
SAFETY HOLD ELEMENTS FOR DRAWING TYPE DESCRIBED IN 24590-PTF-GPP-SECS-000

COMPUTER GENERATED - MANUAL CHANGES NOT PERMITTED

05/26/2005 10:34:46 AM

24590-PTF-M6-PJV-00001



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. DELETED
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
4. DELETED
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
6. DELETED
7. HORIZONTAL SECTION OF THE HEADER PIPE NEAR THE LOW POINT DRAIN MAY BE FLAT.
8. REVISION 2: REVISED TO INCORPORATE 24590-PTF-M6N-PJV-00016, 24590-PTF-M6N-PJV-00018 AND 24590-PTF-M6N-PJV-00024. DELETED, REVISED AND ADDED NOTES. ADDED SLOPES AND SYMBOLS, LINE NUMBERS, REFERENCED NOTE 7. SYSTEM REQUIRES DESIGN REVERIFICATION.
9. ALL LINES ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, UNLESS OTHERWISE NOTED.
10. REVISION 3: REVISED TO UPDATE OFF SHEET CONNECTORS. ADDED/ REVISED NOTES.

HOLD/OPEN ITEMS:

1-3. DELETED

REFERENCES:

NONE

REV	DESCRIPTION	ORG	CHKD	REVWD	APVD	DATE
3	REVISED PER NOTE 10					
2	REVISED PER NOTE 8					
0	ISSUED FOR CONSTRUCTION					

REVISION HISTORY

Q

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

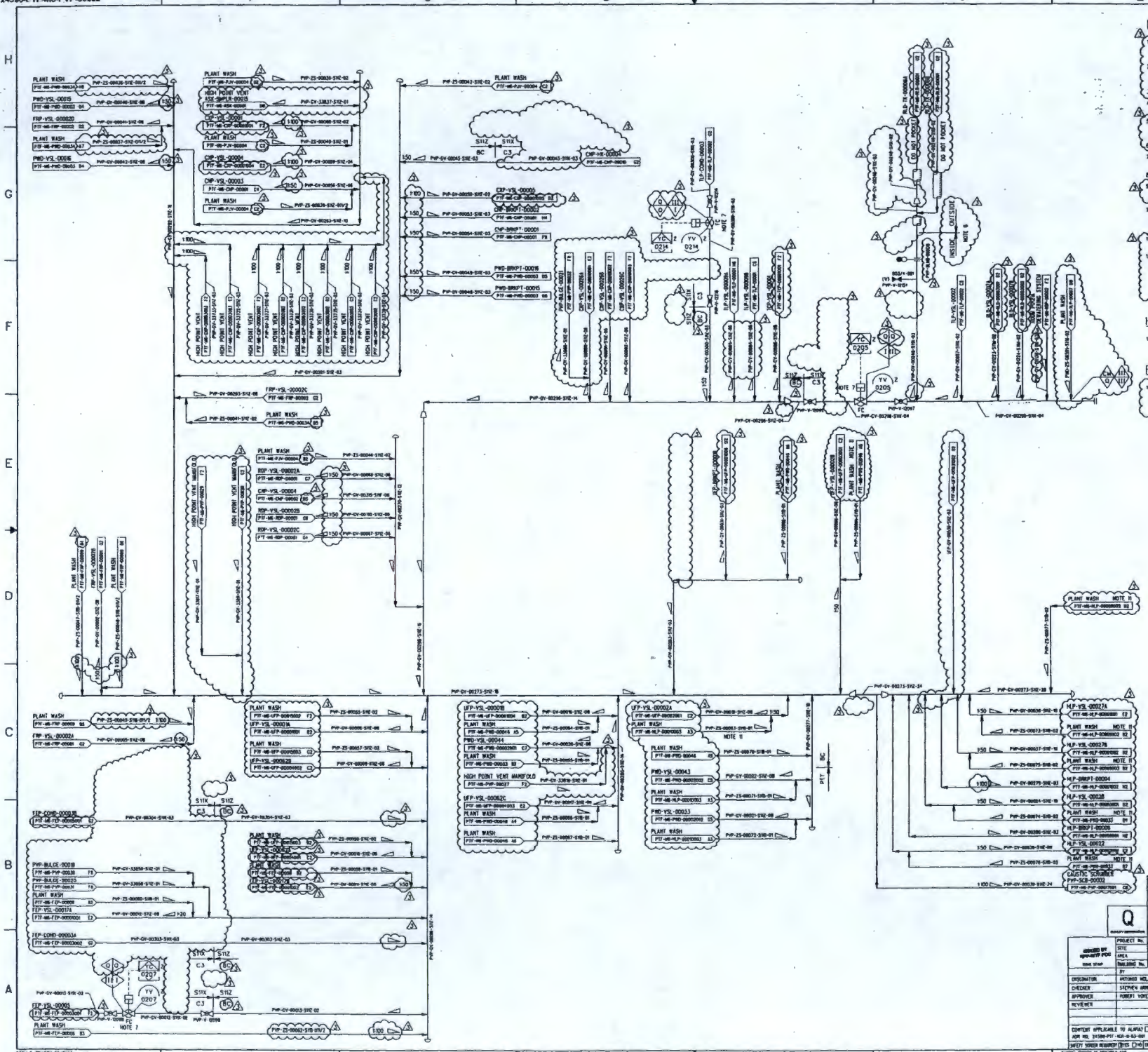
CONTRACT No DE-AC27-01RV14136

P&ID - PTF
PULSE JET VENTILATION SYSTEM AIR RACKS TO DEMISTERS

		DATE
ORIGINATOR	BRIAN MCCLINGHEY	4/28/03
CHECKER	ALEX SCHYVINEVA	4/28/03
APPROVER	DANNY VANE	5/1/03
REVIEWER	JOHN JOLYE	4/28/03

SCALE: NONE

24590-PTF-M6-PJV-00001 REV 3



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND AND GENERAL SLOPE REQUIREMENTS.
2. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I, UNLESS OTHERWISE NOTED.
3. DELETED
4. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
5. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING EXCEPT BLACK CELL LINES WHICH ARE SELF DRAINING, UNLESS OTHERWISE NOTED.
6. HEAT TRACING AND INSULATION TO EXTEND INSIDE THE BUILDING.
7. VALVE SHALL CLOSE ON LOSS OF PRESSURE CONTROL AT THE SCRUBBER.
8. DELETED
9. ALL PLANT WASH CONNECTIONS INSIDE THE BLACK CELL AREAS ARE QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
10. INDIVIDUAL VESSEL VENT LINE SLOPES AND PLANT WASH CONNECTIONS MAY BE IMPLEMENTED TO FLOW WASH TOWARD THE VESSEL OR THE VENT HEADER. WASH CONNECTIONS MUST BE MADE AT THE HIGH POINT.
11. VESSEL VENT PLANT WASH LINES FOR NON-NEWTONIAN VESSELS ARE QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I.
12. REVISION 3: REVISED TO INCORPORATE, 24590-PTF-MEN-M6DT-00027, 24590-PTF-MEN-M6DT-00037, 24590-PTF-MEN-PVP-00029, 24590-PTF-MEN-PVP-00032, 24590-PTF-MEN-PVP-00035, 24590-PTF-MEN-PVP-00041, AND 24590-PTF-MEN-PVP-00057, AND FURTHER REVISED. ADDED HIGH POINT VENT HEADERS, REVISED SEISMIC AND QUALITY FLAGS AND OFF SHEET CONNECTORS. REVISED/ADDED/DELETED NOTES AND REFERENCES.

HOLD/OPEN ITEMS:

1-7. DELETED

REFERENCE:

1. THE REQUIRED BATCH SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE PVP SYSTEM LOGIC DIAGRAMS (FUTURE) AND THE PVP SYSTEM DESCRIPTION (FUTURE REVISION).

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
3	REVISED FOR NOTE 12	FJL	SJ	RY		10/16/04
2	MAJOR REVISION, INCORPORATE 24590-PTF-MEN-PVP-00010, AND PLANT DESIGN LAYOUT	FJL	RH	JJ	RY	08/26/04
0	ISSUED FOR CONSTRUCTION	JM	SA		RY	02/25/02

REVISION HISTORY

Q

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
ENGINEERING No.	10	
	BY	DATE
ORIGINATOR	ANTONIO MOLINA	12/27/02
CHECKER	SHEHEN ARMEN	12/27/02
APPROVER	ROBERT VORE	12/30/02
REVIEWER		

CONTENT APPLICABLE TO ALARA? ☐ YES ☐ NO

ADR NO. 24590-PTF-ADR-U-03-001 REV. 3

SAFETY SCREEN REQUIRED? ☐ YES ☐ NO SAME PATH, IF YES ☐ NO

SAFETY SCREEN IS REQUIRED FOR DRAWING TYPES SHOWN IN 24590-WTP-GPG-ENG-001

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

CONTRACT No: DE-AC27-01RV14136

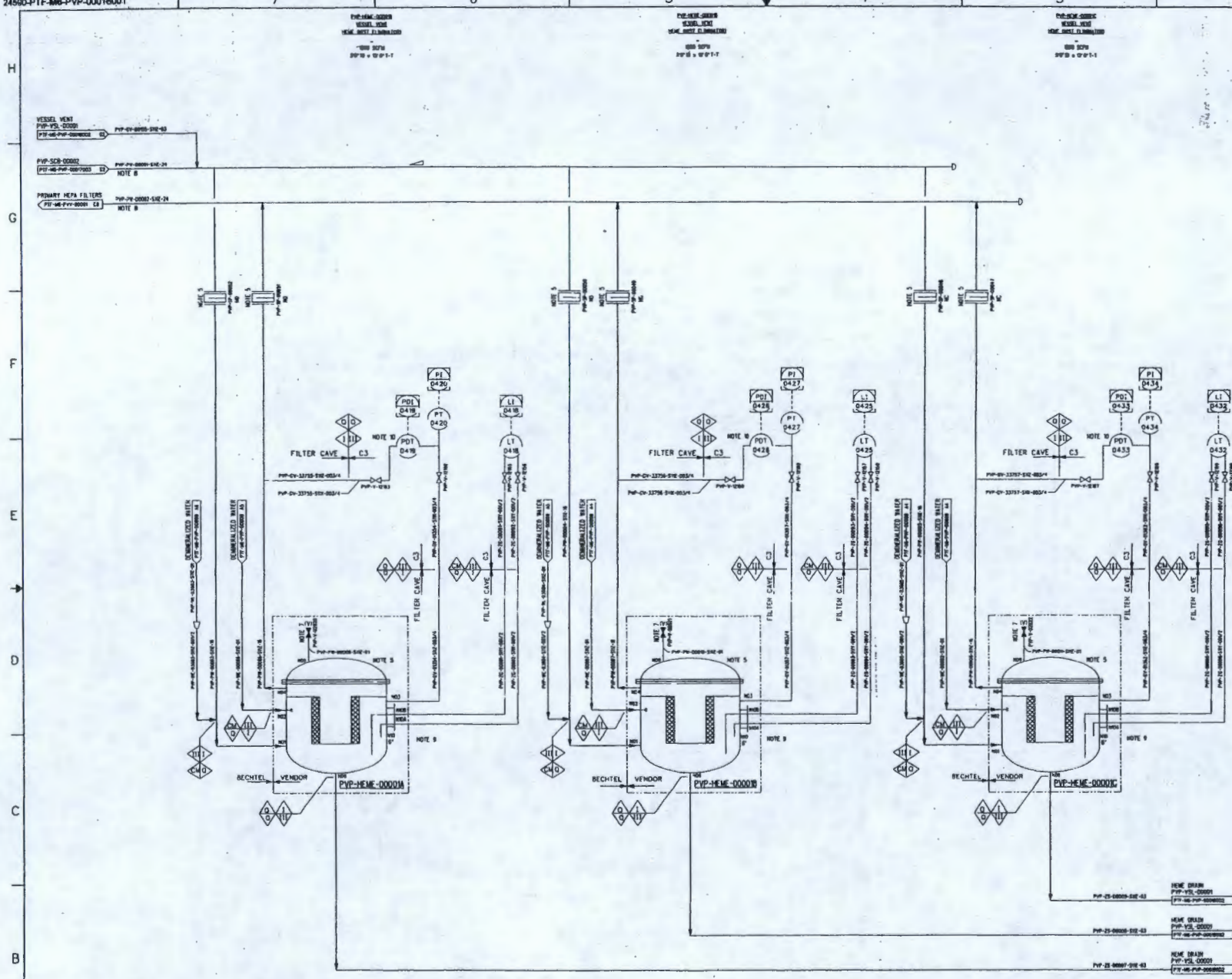
P&ID - PTF
PRETREATMENT VESSEL VENT PROCESS SYSTEM EXHAUST FROM VESSELS

SCALE: NONE

24590-PTF-M6-PVP-00002

REV 3

24590-PTF-M6-PVP-00018001



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DRAWING ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS SHOWN ON THIS DRAWING IS QUALITY LEVEL Q, AND SEISMIC CATEGORY DC-I, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. ALL EQUIPMENT AND COMPONENTS IN THE FILTER CAVE ARE REMOTELY OPERATED/MAINTAINED BY THE OVERHEAD CRANE.
6. HIGH EFFICIENCY MIST ELIMINATORS ARE THREE 50% CAPACITY VESSELS.
7. TOP VENTS ARE 1", 1/4-TURN VALVE BY VENDOR AND REMOTELY OPERATED IN THE FILTER CAVE.
8. HIGH EFFICIENCY MIST ELIMINATOR INLET VENT PIPING ELEVATION IS LOWER THAN OUTLET VENT PIPING.
9. SEE DRAWING 24590-PTF-M6-15A-00008 FOR BUBBLER RACKS AND SYSTEM CONNECTIONS.
10. INSTRUMENT IDENTIFIED AS A BARCT INSTRUMENT.
11. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-PVP-00018, REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-P11-M6N-M001-00036, -00037, 24590-P11F-M6N-PVP-00049, AND FURTHER MODIFIED TO UPDATE COMPARTMENT, QUALITY LEVEL AND SEISMIC BREAKS, CLARIFY SIZING REQUIREMENTS; CORRECTED VESSEL NOZZLE NID DESIGNATORS; REMOVE DESIGN HOLDS IDENTIFY BARCT INSTRUMENTATION AND REFLECT CURRENT DRAFTING PRACTICES.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED OPERATIONAL SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS, AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE PVP SYSTEM LOGIC DIAGRAMS (FUTURE) AND THE PVP SYSTEM DESCRIPTION (FUTURE REVISION).

DRAWING INDEX

DWG NO	TITLE
24590-PTF-M6-PVP-00018001	PRETREATMENT VESSEL VENT PROCESS SYSTEM
24590-PTF-M6-PVP-00018002	PRETREATMENT VESSEL VENT PROCESS SYSTEM

REV	DESCRIPTION	DRG	CHKD	REVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 8					10/8/08

REVISION HISTORY

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 98354

CONTRACT No: DE-AC27-01RV14136

P&ID - PTF
PRETREATMENT VESSEL VENT PROCESS SYSTEM HEMES TO PRIMARY HEPA FILTERS

SCALE: NONE

24590-PTF-M6-PVP-00018001

REV 0

Q

ISSUED BY WTP-WTP PDC

PROJECT No. 24590
SITE HANFORD
AREA 200E
BUILDING No. 11

	BY	DATE
DESIGNATOR		
CHECKER		
APPROVER		
REVIEWER		

CONTAINS APPLICABLE TO ALARA? YES NO

HOB NO. 24590-PTF-MPV-M-02-001 REV 3

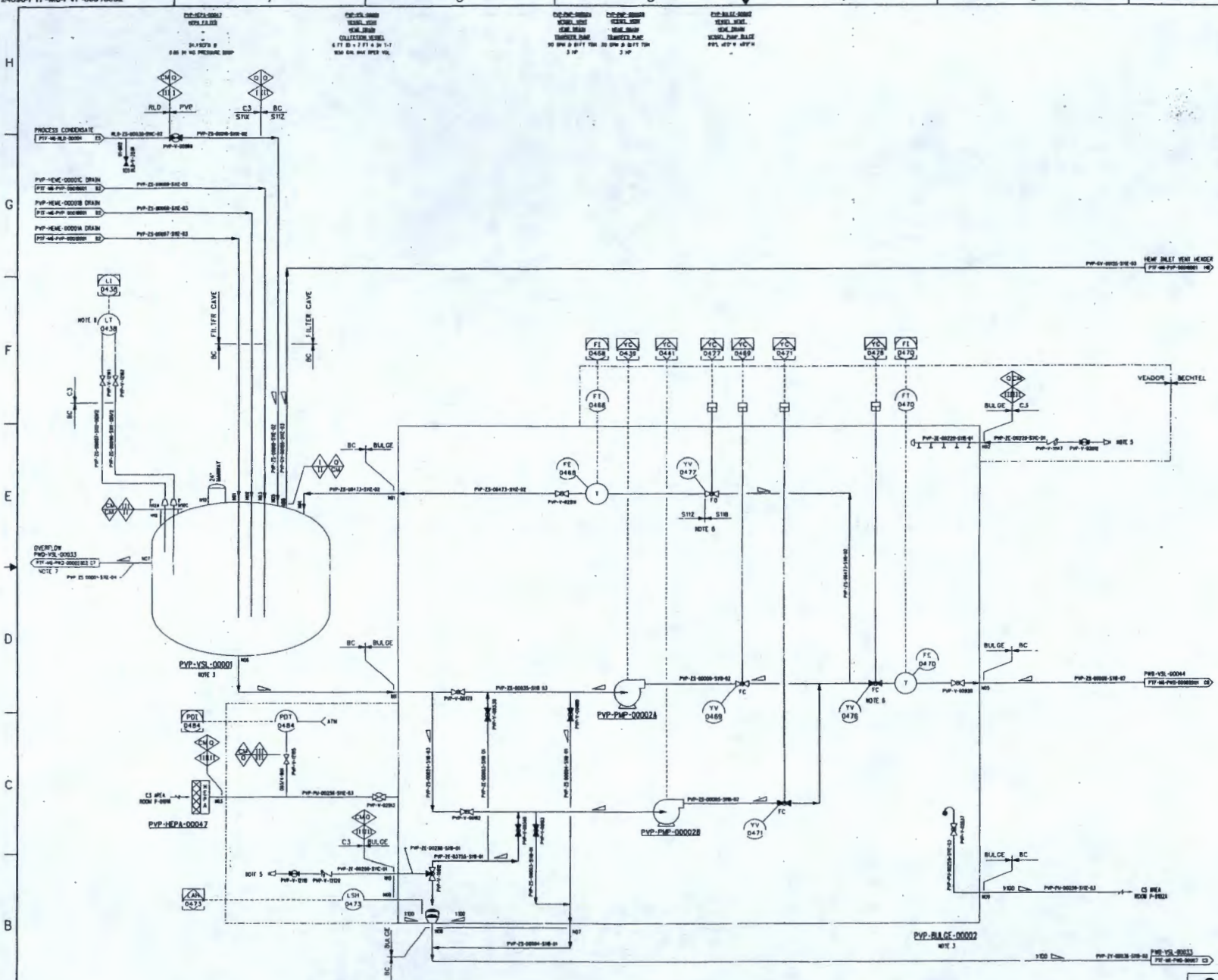
SAFETY SCREEN REQUIRED? YES NO DWG WITH 'F' SIZE? YES NO

SAFETY SCREEN IS REQUIRED FOR DRAWING TYPES IDENTIFIED IN 24590-PTF-MPV-M02-001

CAD FILE - 44434
CONTENTS REVIEWED - UNCHANGED
CHANGES NOT PERMITTED

10/27/2008 07:29:07 AM

FORM C_SDN.DOT 02/2007



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00006 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DRAWING ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS SHOWN ON THIS DRAWING IS QUALITY LEVEL Q, AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED. THE BULGE ENCLOSURE IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-II. PVP-VSL-00001 IS QUALITY LEVEL QN AND SEISMIC CATEGORY SC-II.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, UNLESS OTHERWISE NOTED.
5. REAGENT/PLANT WASH/AIR SERVICES PROVIDED AT UTILITY STATION
6. VALVES CYCLE ON TRANSFER REQUIREMENTS.
7. THE OVERFLOW LINE SHALL BE DIPPED INTO VESSEL PWD-VSL-00033.
8. SEE DRAWING 24590-PTF-M6-15A-00010 FOR BUBBLER RACKS AND SYSTEM CONNECTIONS.
9. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-PTF-M6-PVP-00018, REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-MEN-M8OT-00027, -00028, -00031, -00036, -00037, -00045, 24590-PTF-M6N-PVP-00039, -00042, -00048, -00049, AND FURTHER MODIFIED TO UPDATE COMPARTMENT, QUALITY LEVEL AND SEISMIC BREAKS, CLARIFY SLOPING REQUIREMENTS; REMOVE DESIGN HOLD; AND REFLECT CURRENT DRAFTING PRACTICES.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. THE REQUIRED OPERATIONAL SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS, AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE PVP SYSTEM LOGIC DIAGRAMS (FUTURE) AND THE PVP SYSTEM DESCRIPTION (FUTURE REVISION).

REV	DESCRIPTION	DRC	CHKD	REVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 9					

REVISION HISTORY

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

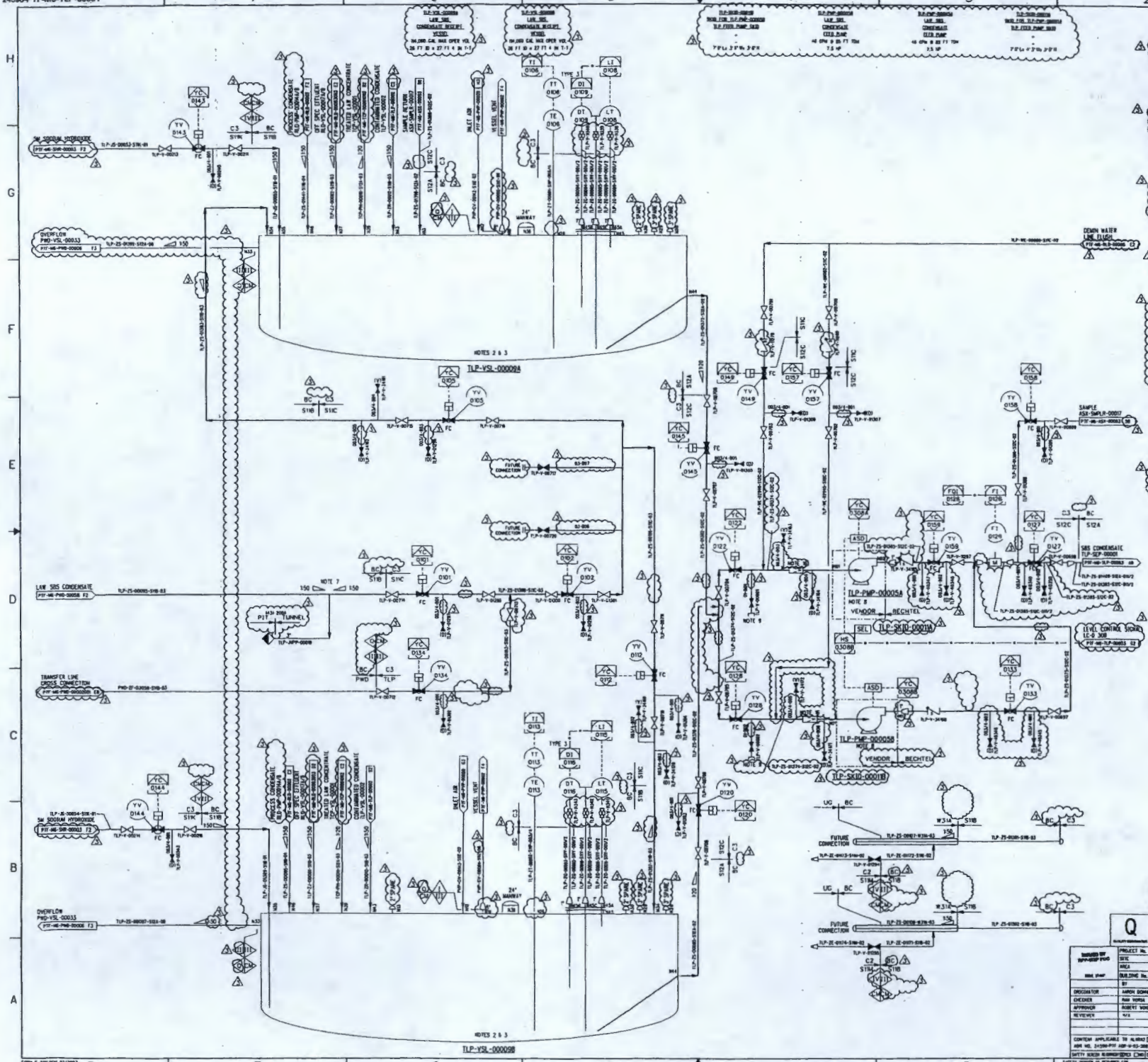
CONTRACT No. DE-AC27-01RV14136

P&ID - PTF
PRETREATMENT VESSEL VENT PROCESS SYSTEM
HEME DRAIN COLLECTION
PVP-VSL-00001 / PVP-BULGE-00002

SCALE: NONE

24590-PTF-M6-PVP-00018002

REV 0



NOTES:

1. SEE 24590-WTP-MB-50-00001 THROUGH 24590-WTP-MB-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. SEE DRAWINGS 24590-PTF-M6-TLP-00005 AND 24590-PTF-M6-TLP-00006 FOR PULSE JET MIXER REPRESENTATION AND NOZZLES UTILIZED.
3. SEE DRAWING 24590-PTF-M6-TLP-00007 FOR PLANT WASH REPRESENTATION AND NOZZLES UTILIZED.
4. DELETED
5. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
6. DELETED
7. WHERE 1:50 SLOPE IS NOT FEASIBLE ON TRANSFER LINE NUMBER TLP-25-00095-S1B-03 A MINIMUM SLOPE OF 1:100 SHALL BE MAINTAINED.
8. SEE DRAWING 24590-PTF-M6-PSW-00006001 FOR PUMP SEAL WATER CONNECTIONS.
9. DO NOT ROUTE OR SEND TO FLOOR DRAINS. DANGEROUS WASTE MUST BE COLLECTED AND PROPERLY MANAGED.
10. DELETED
11. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING
12. SEE DRAWING 24590-PTF-M6-ISA-00010 FOR BUBBLER RACKS AND SYSTEM CONNECTIONS.
13. DELETED
14. REVISION 2: INCORPORATED 24590-PTF-M6N-TLP-00012, -00013, 24590-PTF-M6N-M8OT-00008. ADDITIONAL MINOR REVISIONS INCLUDE ADDITION OF ROOF VALVES AND DELETION OF HARD PIPING DRAIN TO PWD-VSL-00033 (C7 GRID AREA).
15. ALL LINES ON THIS DRAWING SHALL BE FREE DRAWING, EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING, UNLESS OTHERWISE NOTED.
16. REMOVABLE TEMPORARY START-UP STRAINER TO BE REPLACED WITH PIPING SPOOL AFTER START-UP.
17. REVISION 3: REVISED TO INCORPORATE 24590-PTF-M6N-TLP-00017, -00021, -00033, 24590-PTF-M6N-M8OT-00028, -00037, -00038, AND 24590-WTP-FC-F-D6-0216. ADDED PIPING ISOMETRIC/JUMPER SUPPORT FRAME INTERFACE NOZZLE NUMBERS. REVISED/ADDED/DELETED NOTES, INSULATION, OTHER CHANGES, AND MINOR EDITORIAL CHANGES.

HOLD/OPEN ITEMS:

1-7. DELETED

REFERENCES:

1. THE REQUIRED OPERATIONAL SEQUENCES, PERMISSIVES, INTERLOCKS, ALARMS AND OPERATOR INTERFACE POINTS ARE FULLY DESCRIBED IN THE TLP SYSTEM LOGIC DIAGRAMS (FUTURE) AND THE TLP SYSTEM DESCRIPTION (FUTURE REVISION).

REV	DESCRIPTION	ORG	CHKD	REVWD	APVD	DATE
3	REVISED PER NOV 17					
2	REVISED PER NOV 14					
0	ISSUED FOR CONSTRUCTION					

REVISION HISTORY

		DATE
DRIGINATOR	AARON DONNELLY	02/03/2002
CHECKER	RAM VORSA	02/03/2002
APPROVER	ROBERT VONE	02/03/2002
REVIEWER	N/A	

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

CONTRACT No. DE-AC27-01RV14136

P&ID – PTF
TREATED LAW EVAPORATION PROCESS SYSTEM
LAW SBS CONDENSATE RECEIPT
TLP-VSL-00009A & 9B

SIZE: NONE | 24590-PTF-M6-TLP-00001 | REV 3

Quarter Ending December 31, 2008

24590-WTP-PCN-ENV-08-003

Hanford Facility RCRA Permit Modification Notification Form

Part III, Operating Unit 10

Waste Treatment and Immobilization Plant

Index

Page 2 of 2: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant Update *Materials for Ancillary Equipment* in Appendix 7.9 of the Dangerous Waste Permit.

Submitted by Co-Operator:

D. A. Klein — 11/7/08 Date

Reviewed by ORP Program Office:

S. J. Olinger — 2/13/09 Date

Quarter Ending December 31, 2008

24590-WTP-PCN-ENV-08-003

Hanford Facility RCRA Permit Modification Notification Form

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

Description of Modification:

The purpose of this Class 1 prime modification is to update the *Materials for Ancillary Equipment*. The following permitted document is submitted to replace the document currently in Appendix 7.9.

Appendix 7.9			
Replace:	24590-WTP-PER-M-02-002, Rev 1	With:	24590-WTP-PER-M-02-002, Rev 2

This modification requests Ecology approval and incorporation into the permit the revised document. The updated document is the result of ongoing design. The following identifies the significant types of changes on the attached document.

- Updated definition of ancillary equipment
- Updated the descriptions section 3
- Updated section 4 "application of the information"
- Editorial changes throughout 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:

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: ☑ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology:
	E Freudenburg 4/20/09 S. Dahl 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 applicable.

R10961007

ISSUED BY
RPP-WTP PDC

Document title: **Materials for Ancillary Equipment**

Contract number: DE-AC27-01RV14136

Department: Engineering

Author(s): DE Mitchell

Principal author signature:

Document number: 24590-WTP-PER-M-02-002, Rev 2

Checked by: JR Divine

Checker signature:

Date of issue: 10/21/08

Issue status: Approved

Approved by: SW Vail

Approver's position: Supervisor, Materials Engineering Technology

Approver signature:

This bound document contains a total of 8 sheets

River Protection Project
Waste Treatment Plant
2435 Stevens Center Place
Richland, WA 99354
United States of America
Tel: 509 371 2000

Notice

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

History Sheet

Rev	Date	Reason for revision	Revised by
0	8/22/02	Issued for Permitting Use	JR Divine
1	3/19/04	Issued for Permitting Use	JR Divine
2	10/21/08	Total Revision, Issued for Permitting Use	DE Mitchell

Contents

1 Introduction 1
2 Applicable Documents 1
3 Description 1
3.1 Heat Exchangers 2
3.2 Pumps 2
3.3 Piping 2
4 Application of the information 3
5 Summary 4

1 Introduction

The Washington Administrative Code, 173-303-640(3)(a), states that the tank system and ancillary equipment shall be compatible with the waste. This report addresses material selection for corrosion protection of WTP ancillary waste containment equipment. External corrosion protection of pipe in direct contact with the soil or water is not addressed in this report.

According to WAC-173-303-040, Definitions: "Ancillary equipment" means any device including, but not limited to, such devices as piping, fittings, flanges, valves, and pumps, that is used to distribute, meter, or control the flow of dangerous waste from its point of generation to a storage or treatment tank(s), between dangerous waste storage and treatment tanks to a point of disposal on-site, or to a point of shipment for disposal off-site. The definition as used here does not include gaskets, seals, or other non-metallic components.

2 Applicable Documents

The Washington Administrative Code, WAC-173-303-640, Tank Systems

3 Description

The waste containment piping and ancillary equipment material selection is based on the Corrosion Evaluations performed for vessels, tanks, columns, evaporators, ultrafilters, filtration units, lutepots, and breakpots (herein after all are referred to as vessels). Corrosion Evaluations include reviews of:

- General Corrosion,
- Pitting Corrosion,
- End Grain Corrosion,
- Stress Corrosion Cracking,
- Crevice Corrosion,
- Corrosion at Welds,
- Microbiologically Induced Corrosion (MIC),
- Fatigue/Corrosion Fatigue,
- Vapor Phase Corrosion,
- Erosion,
- Galling,
- Fretting/Wear,
- Galvanic Corrosion,
- Cavitation, and
- Creep

3.1 Heat Exchangers

Corrosion Evaluations for process heat exchangers address both the process and cooling sides of the heat exchanger

In tube heat exchangers the shell has a suitable corrosion allowance based on the shell material, the design life of the heat exchanger, and fluid contained by the shell. The corrosion allowance of the tubes might be zero where provisions have been made to replace the heat exchanger and/or tubes, and adding material to the tubes will greatly increase the heat transfer resistance and the size of the heat exchanger.

3.2 Pumps

Corrosion Evaluations are prepared, as required, for the containment boundaries of the pump. For pumps, where more wear can be expected due to increased velocities, a Corrosion Evaluation is prepared for the component to ensure that the materials specified are consistent with the expected chemistry, pH, temperature, and process conditions. Based on the design life of centrifugal pumps, the less easily replaced volute casing has a larger corrosion allowance than the impeller, which may have to be replaced as the efficiency of the pump decreases.

3.3 Piping

Because of the detailed corrosion analysis done on each vessel and the large number of pipes entering or leaving each vessel, a conservative approach has been used. This approach is to construct ancillary equipment downstream of a source vessel of the same material as the vessel and with the same or greater corrosion allowance. If the service seen in the downstream line warrants a different material or corrosion allowance, approval from the Materials Engineering Technology (MET) group is required.

Some exceptions to this philosophy include offgas lines or liquid pipelines exposed to multiple liquids or piping exposed to the same waste stream as the vessel but for shorter periods of times and at the same or lower temperatures as the vessel. Under these conditions, a less resistant material or lower corrosion allowance would be acceptable.

Drain piping that drains to vessels is typically 316L stainless steel. This is based on their limited use and flushing after use.

Exceptions are made for extremely long lines, such as for transfer lines between facilities, that will be flushed and, if needed, flushed with alkaline solutions after each use. Exceptions can also be made if the component is maintainable. In those cases, the alloy selected may be slightly less corrosion resistant but fully qualified for its use and expected life. If the restrictions given for an exemption cannot be met or the specified alloy is not available, then a more corrosion resistant alloy, as specified on the Corrosion Evaluation for the vessel, may be used. Steam ejectors located in some vessels and the downstream lines are subjected to an elevated temperature, they may be fabricated from the more corrosion resistant Hastelloy C-22.

Several high performance materials, erosion and corrosion resistant, are used in the WTP piping systems. These include:

UNS No.	Trade Name	Typical WTP Application
S30403	304L	air, water, reagents, nitric acid, waste, some vent systems
S31603	316L	water, dilute nitric acid, waste, vent systems
N08367/N08926	6% Mo	waste
N06022	Alloy C-22	waste
R50400	Ti-2	canister, cerium nitrate, decontamination

When chemical compatibility is not a question, but erosion is a concern, additional erosion allowances will be specified.

Slurries without glass formers:
Generally the corrosion resistant alloys, i.e. stainless steel, 6% Mo, and C-22, are also resistant to erosion when the slurry velocity is less than 12 feet per second and undissolved solids content is less than or equal to 2wt%. In this case the erosion allowance is 0.004 inch for a 40 yr allowance.

When the undissolved solids content is greater than 2wt% but less than or equal to approximately 27.3 wt% the erosion allowance is 0.016 inch.

When the velocity and/or undissolved solids content is greater or other materials of construction specified, the erosion allowance shall be justified by calculation.

Slurries with glass formers:
When slurry velocity is less than 10 feet per second, a 40 yr erosion allowance of 1/8 inch is added. When velocities are greater than 10 feet per second the erosion allowance, or other materials of construction, shall be justified by calculation.

As noted above, selection criteria are documented in the Corrosion Evaluations.

4 Application of the information

The lowest acceptable piping materials are shown on Material Selection Guide drawings which depict the materials for major process lines. A piping class that is consistent with the material shown on the Material Selection Guide, the process fluid code, and the solids content of the fluid are shown by the piping class for each pipeline on the Piping and Instrument Diagram (P&ID). As part of the check procedure to ensure that the correct material has been chosen, the P&ID is routed through the MET group as required to ensure that the piping class chosen meets the required material and corrosion allowances.

5 Summary

1. Ancillary equipment is fabricated from the same material, or better, as the source vessel unless otherwise specified by the MET group.

2. The corrosion allowances used for the ancillary equipment are the same as that of the source vessel unless the MET group determines that the service seen in the downstream line warrants a different material, corrosion allowance, or other modification.

3. Any exceptions to (1 or 2) are evaluated by the MET group and may result in additional operating restrictions.

4. As part of the check procedure to ensure that the correct material has been chosen, the P&ID is routed through the MET group as required to ensure that the piping class chosen meets the required material and corrosion allowances.

Hanford Facility RCRA Permit Modification Notification Forms

Part III, Operating Unit 15
331-C Storage Unit

Index

Page 2 of 8:	Hanford Facility RCRA Permit, III.15
Page 3 of 8:	Addendum C, Process Information
Page 4 of 8:	Addendum E, Procedures to Prevent Hazards
Page 5 of 8:	Addendum F, Preparedness and Prevention
Page 6 of 8:	Addendum H, Closure Plan
Page 7 of 8:	Addendum I, Inspection Requirements
Page 8 of 8:	Addendum J, Contingency Plan

Submitted by Co-Operator:

Eric G. Damberg — 5 JUN 2009 — Date

Reviewed by DOE Program Office:

Joe R. Franco — D Bryson for — 6/23/09 — Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **331-C Storage Unit**	Permit Part **Part III, Operating Unit 15**

Description of Modification:

Hanford Facility RCRA Permit III.15:

PART III, OPERATING UNIT GROUP 15 CONDITIONS

331-C Storage Unit

Unit Description

The 331-C Storage Unit is a dangerous waste container storage unit located within the south portion of the 300 Area. The unit is used for the collection, consolidation, packaging, storage, and preparation for transport and disposal of dangerous waste. The waste stored at the 331-C Storage Unit consists of listed waste from specific and nonspecific sources, discarded commercial chemical products, characteristic waste, and criteria waste.

The 331-C Storage Unit is divided into a number of separate locations equipped with independent secondary containment to ensure the segregation of incompatible wastes and proper management and removal of any spills or leaks that might occur. A small, laboratory-style fume hood on the south wall in the storage area is used for waste verification, compatibility testing, and small-volume waste work.

List of Addenda Specific to Operating Unit Group 15

Addendum A	Part A Form, dated September 30, 2008
Addendum B	Waste Analysis Plan, dated March 31, 2009
Addendum C~~Chapter 4.0~~	Process Information, dated June 30, 2009~~December 31, 2007~~
Addendum D	Groundwater Monitoring (Reserved)
Addendum E~~Chapter 6.0~~	Procedures to Prevent Hazards, dated June 30, 2009~~December 31, 2007~~
Addendum F	Preparedness and Prevention, dated June 30, 2009
Addendum G	Personnel Training, dated March 31, 2009
Addendum H~~Chapter 11.0~~	Closure Plan, dated June 30, 2009~~January 2007~~
Addendum I	Inspection Requirements, dated June 30, 2009
Addendum J ~~Chapter 7.0~~	Contingency Plan, dated June 30, 2009~~January 2007~~

Definitions

The term **"Cell"** means a discrete area for storing a given type of waste within its own secondary containment, a basic unit of storage, a narrow confining area.

Acronyms

Reserved

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
331-C Storage Unit	**Part III, Operating Unit 15**

Description of Modification:

Addendum C, Process Information:

Remove Chapter 4.0, Process Information dated December 31, 2008 and replace with Addendum C, Process Information dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

Modification Approved/Concur [55] Yes [ ] Denied (state reason below)

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
331-C Storage Unit	**Part III, Operating Unit 15**

Description of Modification:

Addendum E, Procedures to Prevent Hazards:

Remove Chapter 6.0, Procedures to Prevent Hazards, dated December 31, 2007 and replace with Addendum E, Procedures to Prevent Hazards, dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

Modification Approved/Concur [55] Yes [ ] Denied (state reason below)

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
331-C Storage Unit	**Part III, Operating Unit 15**

Description of Modification:

Addendum F, Preparedness and Prevention

Add Addendum F, Preparedness and Prevention dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
331-C Storage Unit	**Part III, Operating Unit 15**

Description of Modification:

Addendum H, Closure Plan

Remove Chapter 11, Closure Plan, dated January 2007, and replace with Addendum H, Closure Plan dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G.P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
331-C Storage Unit	**Part III, Operating Unit 15**

Description of Modification:

Addendum I, Inspection Requirements:

Add Addendum I, Inspection Requirements dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
331-C Storage Unit	**Part III, Operating Unit 15**

Description of Modification:

Addendum J, Contingency Plan:

Remove Chapter 7.0, Contingency Plan, dated December 31, 2007, and replace with Addendum J, Contingency Plan dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification

Part III, Operating Unit 15
331-C Storage Units

Replacement Sections:

- Remove Permit Conditions, dated September 30, 2008 and replace with Permit Conditions dated March 31, 2009
- Remove Chapter 4.0, Process Information dated December 31, 2008 and replace with Addendum C, Process Information dated June 30, 2009
- Remove Chapter 6.0, Procedures to Prevent Hazards, dated December 31, 2007 and replace with Addendum E, Procedures to Prevent Hazards, dated June 30, 2009
- Add Addendum F, Preparedness and Prevention dated June 30, 2009
- Remove Chapter 11, Closure Plan, dated January 2007, and replace with Addendum H, Closure Plan dated June 30, 2009
- Add Addendum I, Inspection Requirements dated June 30, 2009

PART III, OPERATING UNIT GROUP 15 CONDITIONS

331-C Storage Unit

Unit Description

The 331-C Storage Unit is a dangerous waste container storage unit located within the south portion of the 300 Area. The unit is used for the collection, consolidation, packaging, storage, and preparation for transport and disposal of dangerous waste. The waste stored at the 331-C Storage Unit consists of listed waste from specific and nonspecific sources, discarded commercial chemical products, characteristic waste, and criteria waste.

The 331-C Storage Unit is divided into a number of separate locations equipped with independent secondary containment to ensure the segregation of incompatible wastes and proper management and removal of any spills or leaks that might occur. A small, laboratory-style fume hood on the south wall in the storage area is used for waste verification, compatibility testing, and small-volume waste work.

List of Addenda Specific to Operating Unit Group 15

Addendum A	Part A Form, dated September 30, 2008
Addendum B	Waste Analysis Plan, dated March 31, 2009
Addendum C	Process Information, dated June 30, 2009
Addendum D	Groundwater Monitoring (Reserved)
Addendum E	Procedures to Prevent Hazards, dated June 30, 2009
Addendum F	Preparedness and Prevention, dated June 30, 2009
Addendum G	Personnel Training, dated March 31, 2009
Addendum H	Closure Plan, dated June 30, 2009
Addendum I	Inspection Requirements, dated June 30, 2009
Addendum J	Contingency Plan, dated June 30, 2009

Definitions

The term **"Cell"** means a discrete area for storing a given type of waste within its own secondary containment, a basic unit of storage, a narrow confining area.

Acronyms

Reserved

III.15.A COMPLIANCE WITH UNIT-SPECIFIC PERMIT CONDITIONS

III.15.A.1 The Permittees will comply with all conditions in this Chapter and its addenda with respect to dangerous waste management and dangerous waste management units in the 331-C Storage Unit, in addition to requirements in Permit Parts I and II.

III.15.B GENERAL WASTE MANAGEMENT

III.15.B.1 The Permittees are authorized to accept dangerous and/or mixed waste that satisfies the waste acceptance criteria in Addendum B according to the waste acceptance procedures in Addendum B for storage in the 331-C Storage Unit.

III.15.B.2 The Permittees are authorized to store dangerous and/or mixed waste physically located in the 331-C Storage Unit as of the effective date of this Permit, and wastes accepted for storage pursuant to Permit Condition III.15.B.1.

III.15.B.3 The Permittees will maintain the physical structure of the 331-C Storage Unit as documented in Addendum C, Section C.1.4.1. [WAC 173-303-630(7)]

III.15.B.4 The Permittees will conduct waste loading and unloading operations consistent with and no less stringent than the practices described in Addendum F, Section F.2.1. [WAC 173-303-395]

III.15.C WASTE ANALYSIS

III.15.C.1 The Permittees will comply with requirements in Addendum B for waste analysis for all dangerous and/or mixed waste managed at this unit. [WAC 173-303-300(5)]

III.15.C.2 The Permittees will have an accurate and complete waste profile as described in Addendum B, Section B.1.1.1.2.1 for every waste stream accepted by the 331-C Storage Unit. [WAC 173-303-380(1)(a)(b)]

III.15.C.3 The Permittees will place a copy of each waste profile required by Permit Condition III.15.C.2 in the Hanford Facility Operating Record, 331-C Storage Unit File required by Permit Condition II.I.2. [WAC 173-303-380(1)(a)(b)]

III.15.C.4 The Permittees will comply with the requirements in Addendum F, Section F.3.1, and F.3.2, to prevent hazards from ignitable, reactive, or incompatible wastes. [WAC 173-303-395(1)]

III.15.C.5 The Permittees will make a copy of the waste profile required by Permit Condition III.15.C.2 available upon request. [WAC 173-303-380(1)(a) and (b)]

III.15.D RECORDKEEPING AND REPORTING

III.15.D.1 The Permittees will place the following into the Hanford Facility Operating Record, 331-C Storage Unit File required by Permit Condition II.I.2: [WAC 173-303-380]

III.15.D.1.a A description of and quantity of each dangerous and/or mixed waste accepted for storage in the 331-C Storage Unit; [WAC 173-303-380(1)(a)]

III.15.D.1.b Records and results of any sampling or analysis of wastes accepted for storage at the 331-C Storage Unit, and from any other sampling and analysis required by Addendum B; [WAC 173-303-380(1)(c)] [WAC 173-303-300(2)(b)]

III.15.D.1.c Summary reports and details of all incidents that require implementation of Addendum J, Contingency Plan according to the requirements of Permit Condition III.15.G.1; [WAC 173-303-380(1)(d)]

III.15.D.1.d An inspection log, or a summary of such log, of inspections conducted pursuant to Permit Condition III.15.H.1; [WAC 173-303-380(1)(e)]

III.15.D.1.e Records required by WAC 173-303-380(1)(k) and (o), incorporated by reference.

III.15.E SECURITY

III.15.E.1 The Permittees will maintain security at the 331-C Storage Unit according to the requirements in Addendum E, and in accordance with Permit Attachment 3 and required by Permit Condition II.L. [WAC 173-303-310(2)(b)]

III.15.F PREPAREDNESS AND PREVENTION

III.15.F.1 The Permittees will comply with the Preparedness and Prevention requirements in Addendum F. [WAC 173-303-340]

III.15.G CONTINGENCY PLAN

III.15.G.1 The Permittees will comply with Addendum J, in addition to the requirements of Permit Condition II.A when applicable. Enforceable portions of Addendum J are identified in Addendum J, Page J-i. [WAC 173-303-350]

III.15.H INSPECTIONS

III.15.H.1 The Permittee will perform inspections of the 331-C Storage Unit according to Addendum I, Inspection Plan. The inspection shall include:

III.15.H.1.a All monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment that help prevent, detect, or respond to hazards to the public health or the environment; [WAC 173-303-320(2)]

III.15.H.2 The inspection schedule required by Permit Condition III.15.H.1 will provide the frequency of inspection for specific items. The frequency should be based on the rate of possible deterioration of equipment and the probability of an environmental or human health incident. Areas subject to spills must be inspected daily when in use. [WAC 173-303-320(2)(c)

III.15.H.3 The Permittee must remedy any problems revealed by inspections conducted pursuant to Permit Condition III.15.H.1, on a schedule that prevents hazards to the public health and the environment. Where a hazard is imminent or has already occurred, remedial action must be taken immediately. [WAC 173-303-320(3)]

III.15.H.4 The Permittees will place a copy of the inspection requirements and schedule prepared according to Permit Condition III.5.H.1 in the Hanford Facility Operating Record, 331-C Storage Unit File required by Permit Condition II.I.2. [WAC 173-303-320(2)(a)]

III.15.H.5 The Permittee will keep an inspection log or summary of inspections conducted pursuant to Permit Condition III.15.H.1, including at a minimum the following:

III.15.H.5.a Date and time of the inspection;

III.15.H.5.b Printed name and the handwritten signature of the inspector;

III.15.H.5.c Notation of the observations made;

III.15.H.6 An account of spills or discharges in accordance with Permit Condition II.E, and the date and description of any repairs or remedial actions taken

III.15.I TRAINING PLAN

III.15.I.1 The Permittee will include Addendum G training requirements in the written training plan required by Permit Condition II.C. [WAC 173-303-330]

III.15.J OTHER GENERAL REQUIREMENTS

III.15.J.1 The Permittees will conduct waste management activities within 331-C Storage Unit authorized by this Permit according to the requirements in Addendum F, Sections F.3.1, and F.3.2. The Permittees will document compliance with these provisions in the Hanford Facility Operating Record, 331-C Storage Unit File. [WAC 173-303-395(1)(a)-(c)]

III.15.J.2 The Permittees will comply with the requirements of WAC 173-303-395(2), incorporated by reference.

III.15.K CLOSURE

III.15.K.1 The Permittees will close the 331-C Storage Unit in accordance with Addendum H, Closure Plan. [WAC 173-303-610(3)(a)]

III.15.K.2 The Permittees will amend the Closure Plan in accordance with Permit Condition II.J.2 and Addendum H. [WAC 173-303-610(3)(b)]

III.15.K.3 The Permittees will provide Ecology with a Notice of Closure according to Permit Condition II.J.1. [WAC 173-303-610(3)(c)]

III.15.L POST CLOSURE

Reserved

III.15.M CRITICAL SYSTEMS

Reserved

III.15.N RESERVED

III.15.O CONTAINERS

III.15.O.1 Container Storage Unit Standards

III.15.O.1.a The Permittees will maintain the integrity of container storage secondary containment as documented in Addendum C, Section C.1.4, including all chemically resistant coatings and sealants described in Addendum C, Section C.1.4.1.1, as necessary to ensure any spills or releases do not migrate to the underlying concrete or soils.

III.15.O.1.b The Permittees will place documentation of any damage to and subsequent repairs of chemically resistant coatings in 331-C Storage Unit secondary containment in the Hanford Facility Operating Record, 331-C Storage Unit File required by Permit Condition II.I.2. [WAC 173-303-630(7)]

III.15.O.1.c Within thirty (30) days of the effective date of this Permit, the Permittee will place documentation in the Hanford Facility Operating Record, 331-C Storage Unit File identifying the specific chemical resistant coatings and sealants used for construction and maintenance of the 331-C Storage Unit cells. This documentation will demonstrate that these materials are impervious to the wastes managed in each of the 331-C Storage Unit cells to contain spills until the collected spill material is detected and removed. [WAC 173-303-630(7)(a)(i)]

III.15.O.2 Container Management Standards

III.15.O.2.a The Permittees are authorized to manage wastes in the 331-C Storage Unit according to the requirements of Addendum C, Sections C.1.1, C.1.2, C.1.4, and Addendum B, Section B.1.1.1.2.2, and Table B.1.

III.15.O.2.a.i Wastes may be stored in the outside storage area identified as "10" in Addendum C, Figure C.5, only if they do not require secondary containment per WAC 173-303-630(7)(c) and meet all other requirements cited in Condition III.15.O.2.a. [WAC 173-303-630(2), (4), (5), (8), and (9)]

III.15.O.2.b The Permittees will label containers according to the requirements of Addendum C, Section C.1.3. The Permittees will also ensure that:

III.15.O.2.b.i Appropriate labels are affixed to containers into which wastes are transferred;

III.15.O.2.b.ii Container labels are not obscured or are otherwise unreadable;

III.15.O.2.b.iii Containers are oriented so that labels are readily visible;

III.15.O.2.b.iv Container labels are removed or completely obscured when the container to which they are attached is rendered empty. [WAC 173-303-630(3)]

III.15.O.2.c The Permittees comply with the requirements of WAC 173-303-630(4), incorporated by reference.

III.15.O.2.d The Permittees will ensure the physical arrangement and spacing of drums that are stored in the 331-C Storage Unit are stored in rows no more than two drums wide and with a separation of at least thirty (30) inches between rows of drums to ensure that all drums are readily accessible for movement and inspection. [WAC 173-303-630(5)(c), WAC 173-303-340(3)]

III.15.O.2.e The Permittees will remove any accumulated liquids from container storage areas in the 331-C Storage unit, including individual secondary containment systems (spill pallets, portable booms, or other commercially available drum containment systems) that may be used to ensure containers are not in contact with free liquids and to prevent overflow of the container storage area secondary containment. [WAC 173-303-630(7)]

III.15.O.2.f The Permittees are authorized to consolidate containerized wastes, and to treat wastes in containers via consolidation of wastes, decanting of free liquids and addition of absorbents. Absorbents must satisfy the requirements of WAC 173-303-140(4)(b)(iv), incorporated by reference, for wastes to be land disposed in Washington. The Permittees may not use addition of absorbents for purposes of changing the treatability group of a waste with respect to the land disposal restriction standards of 40 CFR 268, incorporated by reference by WAC 173-303-140. [WAC 173-303-140]

III.15.O.2.g The Permittees will comply with the requirements for air emissions from containers as described in Addendum C, Section C.8.3. [WAC 173-303-692]

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Addendum C — Process Information

C. PROCESS INFORMATION C.1

C.1 CONTAINERS C.1
C.1.1 Description of Containers C.1
C.1.2 Container Management Practices C.1
C.1.3 Container Labeling C.2
C.1.4 Containment Requirements for Storing Containers C.3
C.1.5 Demonstration that Containment Is Not Required C.6
C.1.6 Prevention of Reaction of Ignitable, Reactive, and Incompatible Waste in Containers C.7

C.2 TANK SYSTEMS C.7

C.3 WASTE PILES C.7

C.4 SURFACE IMPOUNDMENTS C.7

C.5 INCINERATORS C.7

C.6 LANDFILLS C.7

C.7 LAND TREATMENT C.8

C.8 AIR EMISSIONS CONTROL C.8
C.8.1 Process Vents C.8
C.8.2 Equipment Leaks C.8
C.8.3 Tanks and Containers C.8

Figures

Figure C.1. Acids and Oxidizers Cell C.9
Figure C.2. Poisons and Class 9 Cell C.10
Figure C.3. Alkaline, Washington State Criteria Waste, Organic Peroxides, and Non-Regulated Waste Cell C.11
Figure C.4. Flammable, Organic, and Compressed Aerosols Cell C.12
Figure C.5. Bay Storage Area C.13

Tables

Table C.1. Storage Devices Used at the 331-C Storage Unit C.14
Table C.2. Building Occupancy Limits* C.15

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C. PROCESS INFORMATION

C.1 CONTAINERS

The following sections describe the types of containers stored at the 331-C Storage Unit.

C.1.1 Description of Containers

Containers of hazardous waste entering the 331-C Storage Unit are inspected before being accepted for storage. Generating units are responsible for placing the materials in adequate containers. Waste not in its original container must be placed in containers that are compatible with the materials to be stored.

Containers in poor condition or inadequate for storage are not accepted at the unit. If transport is by unit personnel, such containers are not accepted for transport. Refer to Addendum B, Section B.2.1 for inspection before transport performed by unit personnel. "Container in poor condition or inadequate for storage" means a container that is not intact or undamaged and not securely sealed to prevent leakage during storage, transport and ultimate offsite disposal. Examples of acceptable packaging include laboratory reagent bottles, DOT containers, spray cans, sealed ampoules with septums, paint cans, leaking containers that have been over packed, etc. Unit operations personnel have the authority to determine whether a container is in poor condition or inadequate for storage, using the criteria of WAC 173-303-190 and professional judgment whether the packaging may leak during handling, storage, and/or disposal.

All flammable liquid waste is stored in compatible DOT-specified shipping containers and/or in Underwriter's Laboratory (UL)-listed and Factory Mutual (FM)-approved flammable storage cabinets. Solid chemicals are stored on shelving in specifically designated areas based on the DOT hazard classification.

All containers used for offsite transport of dangerous waste at the unit shall comply with all applicable criteria found in WAC 173-303-190.

C.1.2 Container Management Practices

Management practices for containers of dangerous waste are in place at the 331-C Storage Unit to verify the safe receipt, handling, storage, preparation for transport, and transportation of waste. These practices are summarized below.

Inspection of Containers. A system of daily, weekly, and yearly inspections is in place to verify container integrity, check for proper storage location, prevent capacity overrun, etc. These inspection activities are detailed in Addendum I, Section I.1.

Container Handling. All unit staff is instructed in proper container handling safeguards as part of their training. Containers are always kept closed except when adding or removing waste, in accordance with WAC 173-303-630(5)(a).

Containers are not opened, handled, or stored in a manner that would cause the container to leak or rupture. Small containers (five gallons or less capacity) are stored on shelving or in flammable liquid storage lockers (if appropriate) according to permit requirements. Containers over five gallons capacity are stored on the floor of the appropriate storage cell, in cabinets, or stored in the appropriate containment area on the bay floor. Unnecessary handling not required for redistribution or preparation for transport and disposal by either lab packing or bulking is minimized. For manual movement, hand trucks specifically designed for drum handling are used. When using the forklift, a drum hoist is used or the drums are carried on pallets. Drums are never carried on the forks or "speared" by slipping the forks under the chime. When waste handling operations are conducted, at least two persons are present in the unit.

Compressed gas cylinders will have valve caps appropriately secured, if so equipped, and will be secured in an upright position at all times except when adding or removing cylinders from the compressed cylinder storage area.

Aisle Spacing. A minimum thirty-inch separation is maintained between rows of drums in order to allow for movement of equipment and ease of inspection. Rows of drums are not more than two drums wide.

Lab Packing. One of the major functions of the 331-C Storage Unit is the preparation of lab packs for offsite recycling, treatment and/or disposal of small quantity lab waste generated by DOE-RL/PNNL activities.

Lab packs are prepared in compliance with WAC 173-303-161, 49 CFR 173.12, other applicable regulations, and requirements of the planned receiving facility (recycler, treatment facility, or disposal facility). Requirements affecting preparation of lab packs might include types of absorbent materials to be used (e.g., no vermiculite).

Lab packs are prepared in the bay area or in the storage cell containing the hazard class(es) to be placed in the lab pack.

Partial and completed lab packs are closed, labeled, and the contents list documented. Lab packs are stored in the cell from which the containers inside were drawn, or in the bay area if appropriate.

Unit personnel wear appropriate protective clothing while handling containers being placed in lab packs. At a minimum, this includes lab coats or long sleeved shirt, long pants, safety glasses or other protective eyewear, and chemical resistant gloves. More stringent requirements, including use of respiratory protection, may be imposed if appropriate.

Bulking. In order to promote greater recycling or treatment of waste and reduce land disposal, some liquid wastes are "bulked" into larger containers, typically 30- or 55-gallon closed head drums. Bulking is the commingling of small containers of compatible waste into one container. Appropriate respiratory protection will be used when the bulking of flammable liquids or toxics are performed. Bulking of nonvolatile, low hazard waste such as saline solutions or ethylene glycol may be done within the containment areas of the appropriate storage cell or bay area.

Compatibility of waste to be bulked is determined using the information from generating unit designation information, process knowledge, laboratory analyses, and/or by compatibility determinations. During the waste acceptance process, each waste is assigned to one or more hazard classes, according to the Department of Transportation waste compatibility requirements in 49 CFR 174.81. Wastes are segregated according to the compatibility requirements documented in Table B.1 in Addendum B.

Glass containers emptied (as defined by WAC 173-303-160(2)) as a result of bulking activities are usually crushed onsite by an electric glass crusher, which mounts on a 55-gallon drum or managed as solid waste in accordance with WAC 173-303-160(3). If an emptied glass container held acutely hazardous waste, as defined by WAC 173-303-040(2), the container is rinsed at least three times with an appropriate cleaner or solvent before being destroyed. The rinsates are managed as dangerous waste.

Once bulking is complete, the bulk container is closed, labeled, and the contents list documented. Containers of bulked waste are stored in the cell from which the containers inside were drawn, or in Cell 7 if appropriate. If incompatible wastes are stored in Cell 7, they are kept in individual secondary containment systems if in bulk drum form.

Unit personnel wear appropriate protective clothing while bulking containerized liquid waste. At a minimum, this includes coveralls, or long sleeved shirt, long pants, disposable splash-resistant apron, eye protection, and chemical resistant gloves. More stringent requirements, including use of respiratory protection, may be imposed if appropriate.

C.1.3 Container Labeling

As required by WAC 173-303-395 and WAC 173-303-630, all containers of dangerous waste are marked and/or labeled to describe the contents of the container and the major hazards of the waste. Containers are also marked with a unique identifying number assigned by the unit's computerized waste tracking system.

C.1.4 Containment Requirements for Storing Containers

The 331-C Storage Unit stores certain wastes exempt from secondary containment per WAC 173-303-630(7)(c) in the "Outdoor Storage" area (designated as "10" in Figure C.5.), which does not have secondary containment. The other waste storage areas in the 331-C Storage Unit do not meet the conditions for reduced requirements for storing only containers without free liquid; therefore, those areas are subject to the full requirements for containment and therefore will follow requirements in WAC 173-303-630(7)(a) and (b). The secondary containment for these areas is described in this section.

C.1.4.1 Secondary Containment System Design

Several design features have been engineered into the construction of the 331-C Storage Unit as added safeguards for containment of dangerous waste spills or leaks. The following subsections comment briefly on each of the design features.

C.1.4.1.1 System Design

The facility is covered by a roof that is maintained to prevent intrusion of rainwater into areas where hazardous waste is stored.

The base of the facility consists of a 6-inch reinforced, poured concrete slab. All exposed surfaces were finished with a smooth troweled surface and painted with a chemical resistant epoxy based coating. All edges and corners were sealed with a bead of sealant.

The concrete floors in each bay storage cell are sealed and bermed using angle iron and have containment trenches at the entrances to these cells. These trenches are isolated from each other to prevent interaction, reactions, or offsite migration of spilled materials. This provides protection even during simultaneous spills.

The condition of the floor coating is inspected weekly per Addendum I, and repairs are made to ensure any spills or releases do not migrate to the underlying concrete or soils. Minor nicks and small chips resulting from normal operations will be repaired on a periodic basis.

The floors in Cell 7 are sealed and bermed using angle iron and have containment trenches at every exit to the area to prevent offsite migration of spilled material. Drums stored in this area are also stored on pallets to prevent contact with spilled material in the event of a release.

C.1.4.1.2 Structural Integrity of Base

The concrete was mixed in accordance with ASTM C94/C94M, and is capable of bearing the loads associated with normal container storage and movement.

C.1.4.1.3 Containment System Capacity

Secondary containment is provided for all dangerous waste stored at the 331-C Storage Unit. Storage limits for all chemicals are listed in Table C.2 (1988 Uniform Building Code). In addition, all floors in the bay area are coated with an epoxy-based coating as described in Section C.1.4.1.1. Inspection of the containment system to maintain integrity is described in Addendum I. Individual secondary containment systems are configured as follows:

Acids and Oxidizers Cell. The acids and oxidizers cell (Cell 1) is located at the northwest corner of the 331-C Storage Unit bay area. The concrete floor in this storage cell is sealed and bermed using angle iron and has a containment trench at the entrance. This trench is isolated from the other trenches in order to prevent interaction, reactions, or offsite migration of spilled materials. This provides protection even during simultaneous spills. Six cabinets, open shelving, and a large-container storage area are provided within the cell to allow storage of various sizes of containers. The containment volume of the sump entering the cell is 98 gallons. A diagram of the cell is provided in Figure C.1.

Poisons and Class 9 Cell. The poisons and Class 9 cell (Cell 2) is located just south of the acids and oxidizers cell along the west wall of the bay area. The concrete floor in this storage cell is sealed and bermed using angle iron and has a containment trench at the entrance. This trench is isolated from the other trenches in order to prevent interaction, reactions, or offsite migration of spilled materials. This provides protection even during simultaneous spills. The northeast corner of the cell is used for PCB storage for disposal complying with 40 CFR 761.65(b). The containment volume of the sump entering the cell is 98 gallons. A diagram of this cell is provided in Figure C.2.

Alkaline, Washington State Criteria Waste, Organic Peroxides, and Non-Regulated Waste Cell. The alkaline, Washington State Criteria waste, and non-regulated waste cell (Cell 3) is located south of the poisons and Class 9 cell on the west wall of the bay area. The concrete floor in this storage cell is sealed and bermed using angle iron and has a containment trench at the entrance. This trench is isolated from the other trenches in order to prevent interaction, reactions, or offsite migration of spilled materials. This provides protection even during simultaneous spills. Four storage cabinets, three sets of open shelving, and one explosion proof refrigerator, are positioned in the cell to allow storage of various sizes of containers. The containment volume of the sump entering the cell is 98 gallons. A diagram of this cell is provided in Figure C.3.

Flammable, Organic and Compressed Aerosols Cell. The flammable cell (Cell 4) is located south of the alkaline, Washington State Criteria waste, and non-regulated waste cell. The concrete floor in this storage cell is sealed and bermed using angle iron and has a containment trench at the entrance. This trench is isolated from the other trenches in order to prevent interaction, reactions, or offsite migration of spilled materials. This provides protection even during simultaneous spills. The containment volume of the sump entering the cell is 98 gallons. A diagram of this cell is provided in Figure C.4.

Ignitable organic waste materials are stored in Cell 4, which also exhibits the characteristics of corrosivity and/or toxicity as well as reactivity. Eight Factory Mutual-approved flammable liquid storage cabinets are used for storage of various classes of flammable liquids as defined by the Uniform Fire Code. The capacities of the various cabinets are shown in Table C.1. The following cabinets also are used for storage in this cell: one for combustibles, one for aerosols, two for flammable solids, and one for overflow from one of the other cabinets.

Ignitable waste storage capacity of the 331-C Storage Unit, including the organics cell (this section), ignitable drum storage area (Section F), and bay storage area (Section H), is limited by the following UBC restrictions for Class B occupancy:

- Class 1A flammable liquids: 120 gallons
- Class 1B flammable liquids: 240 gallons
- Class 1C flammable liquids: 360 gallons
- Maximum Class 1A, 1B, and 1C at any one time: 480 gallons
- Class 2 combustible liquids: 480 gallons
- Class 3A combustible liquids: 1320 gallons
- Combustible fibers, loose: 100 cubic feet
- Combustible fibers, baled: 1000 cubic feet
- Flammable gases in any one cylinder: 3000 cubic feet
- Liquefied flammable gases: 60 gallons

The flammable liquid storage module adds extra storage capacity; see below.

Flammable Liquid Storage Module. The flammable liquid storage module is a self-contained storage module (Cell 8) that allows additional storage space and capacity for flammable waste. The flammable liquid storage module is located along the south wall and is connected to the building's fire suppression system. The flammable liquid storage module has a 2-hour fire rated containment system, so according to the Uniform Fire Code, an unlimited capacity is allowed. However, the flammable waste storage capacity of the flammable liquid storage module is limited by the 240-gallon capacity of the module's secondary containment system. No more than 240 gallons of any combination of flammable liquid classes will be

stored in the module. This flammable waste storage capacity is in addition to the flammable storage limits for the bay area described in the previous section. A diagram showing the module location in the bay area is included in Figure C.5.

Ignitable Waste Drum Storage Area. The bay area (Cell 8) has six flammable drum storage cabinets used to store drum quantities of ignitable waste before offsite shipment. The bay area is bordered on all sides by angle iron (3½ in. x 6 in.) bolted to the floor and sealed to provide secondary containment. To enhance further containment and to allow greater storage capacity, the drums stored in this area are stored in flammable liquid drum storage cabinets.

Maximum storage in these cabinets is approximately four 55-gallon drums and twelve five-gallon drums. A diagram showing the location of the flammable storage cabinets is included in Figure C.5. Additional ignitable waste storage is provided for in Cell 4, the organics cell, and in the flammable liquids storage module. All of this ignitable waste storage is provided utilizing flammable liquid storage cabinets for added safety.

Universal and Recycling Waste Storage Area. A section of the bay (Cell 6) has been dedicated to storage of drum quantities of universal and recycling waste before shipment. The area is approximately 20 ft. x 5 ft. in size dependent on the amounts in storage. All material in this area is stored in DOT approved containers and is stored on pallets to prevent contact with spilled waste in the event of an incident. A diagram of this area is included in Figure C.5.

Bay Storage Area. The bay storage area is itself a secondary containment area for loading, unloading, and the storage of dangerous waste. All floors in the bay area are bordered on all sides by angle iron (3½ in. x 6 in.) bolted to the floor and sealed with an epoxy based coating to provide secondary containment. Sump locations are indicated in Figure C.5. All floors in the bay area have sumps that have no drains and are covered with grating to prevent safety hazards. The capacity of the two sumps at the entrances to the building is 168 gallons per trench, and the sumps to the individual storage cells have a capacity of 98 gallons per sump. The secondary containment capacity for the bay area is hence 728 gallons.

Due to space limitations in the individual cells, and for ease of mechanical handling, the bay floor is typically used for storage of chemicals in drums. Palletized drums may be stacked not more than two drums high. Smaller containers (e.g. 5-gallon pails) can also be stacked on top of drums in this area without being on pallets if it can be safely done (e.g. capable of sitting on a drum without tipping).

The bay floor is also used to store lab packs and bulked waste containers before offsite shipment to permitted treatment, disposal, or recycling facilities. Generally, only corrosives, oxidizers, toxic organic solvent mixtures (typically halogenated solvents), antifreeze mixtures, contaminated water which is toxic dangerous waste, nonliquid waste, Class 9, or state-only dangerous waste materials are stored in the bay storage area.

If incompatible wastes are stored in the bay area, they are kept in individual secondary containment systems (spill pallets, portable booms or other commercially available drum containment systems) if in bulk drum form. If the waste is in lab pack form, it will meet WAC 173-303-161, *Over packed containers (lab packs)*, requirements before being stored in the bay area. The DOT approved outer container serves as the secondary containment system for segregation in case of simultaneous accidental spillage.

The bay storage is governed by the building occupancy limits of Table C.2, which includes the inventory of the individual storage cells previously described. In order to provide additional separation from spilled liquids and for ease of handling, all drums stored on the bay floor are stored on pallets. A diagram of the bay area is provided in Figure C.5.

Explosives Storage Area. Due to Uniform Building Code restrictions, waste classified as explosive by DOT regulations are stored in a 3 ft. x 3 ft. x 3 ft. explosives magazine, with an 8 cubic foot interior, in the southeast portion of the bay area. The magazine is constructed of steel and certified to have been fabricated per Institute of Makers of Explosives (IME) SLP22, type 2-day box requirements. No more than one pound of explosives is stored in the magazine at one time. The location of the magazine is indicated in Figure C.5.

Staging, Loading, and Unloading Area. Wastes may be managed in the Staging, Loading, and Unloading Area only for purposes of staging, loading and unloading of waste containers. Wastes may be stored for a maximum of 72 hours in this area. This 72-hour limitation does not apply to storage of universal waste or non-dangerous wastes.

C.1.4.1.4 Control of Run-On

The 331-C Storage Unit was designed to eliminate the likelihood of on-site, or for that matter, off-site migration via run-on and run-off. The building and the covered area adjacent to the building have been constructed upon a foundation and the surrounding soil sloped away so that precipitation cannot cause either run-on or run-off problems.

C.1.4.2 Removal of Liquids from Containment System

Upon discovery of liquid accumulation in the containment resulting from a spill or other release, the Building Emergency Director (BED) must be contacted in accordance with the contingency plan (Addendum J). The BED may determine that the contingency plan should be implemented. If the incident is minor, and the BED approves, removal of the liquids will commence immediately following a safety evaluation. Appropriate protective clothing and respiratory protection will be worn during removal activities; a PNNL industrial hygienist may be contacted to determine appropriate personnel protection requirements and any other safety requirements that may be required, such as chemical testing or air monitoring. In addition, ventilation of the spill-impacted area may be performed if determined to be safe and if appropriate monitoring of the air discharge(s) is performed.

Spills are normally contained either within the storage cabinet, within the cell, or within a secondary containment trench or berm as described in Section C.1.4.1.1. In any case, spilled material will be recovered to the extent possible by pumping recovered liquids with a pump made of non-reactive materials (either steel or PVC) to intact containers selected in accordance with the container criteria in WAC 173-303-190. Non-recoverable liquids will be absorbed with an appropriate absorbent (after appropriate chemical reaction to neutralize reactivity in the case of reactive waste, or neutralization in the case of corrosive materials); refer to Addendum F, Table F.2 for a list of available materials for this purpose. The absorbent material will then be recovered and placed in a container selected in accordance with Section C.1.1, using non-sparking shovels in the case of ignitable waste. The floor, cabinets, and any other impacted containers may be cleaned with dry rags, soap and water, or a compatible solvent if necessary to remove external contamination. Contaminated rags and other cleanup material will be disposed of in an appropriate manner.

C.1.5 Demonstration that Containment Is Not Required

Demonstration that containment is not required because containers do not contain free liquids, wastes that exhibit ignitability or reactivity, or wastes designated F020-F023, F026, or F027. This section is not applicable to the 331-C Storage Unit because the storage area is used to store containers both with and without free liquids. The 331-C Storage Unit does not meet the conditions for reduced requirements for storing only containers without free liquid; therefore, the facility is subject to the full requirements for containment.

C.1.6 Prevention of Reaction of Ignitable, Reactive, and Incompatible Waste in Containers

The following sections provide information on the management of ignitable, reactive, and incompatible waste in containers. Additional information on this subject can be found in Addendum F, Section F.3.

C.1.6.1 Management of Certain Reactive Wastes in Containers

Wastes described in WAC 173-303-070(7)(vi), (vii), and/or (viii) (explosive type wastes) will be stored in the explosives magazine described in Section C.1.4.1.3 above. This magazine meets the Uniform Fire Code requirements for storage of such materials.

C.1.6.2 Management of Ignitable or Reactive Waste in Containers

Ignitable and reactive wastes are stored in compliance with Uniform Fire Code Division II regulations for Container and Portable Tank Storage Inside Buildings (International Conference of Building Officials 1988). Containers of ignitable and reactive waste are stored in individual flammable storage cabinets within the storage cells.

C.1.6.3 Design of Areas to Manage Incompatible Wastes

Addendum F, Section F.3.2 describes guidelines used at the 331-C Storage Unit to determine the compatibility of dangerous waste so that incompatible wastes are not stored together. Chemical waste stored in the 331-C Storage Unit are separated by compatibility, chemical makeup, and hazard class as documented in 49 CFR 174.81 and Table B.1 of Addendum B and stored in areas having appropriate secondary containment, as described in Section C.1.4.1.3.

As shown in Figures C.1 through C.5, each storage area has individual storage configurations; secondary containment structures are provided to verify that incompatible materials will not commingle if spilled. Further segregation is provided by chemical storage cabinets located throughout the facility in various areas as shown in Figures C.1 through C.5. Cabinet types are noted in those figures and capacities are described in Table C.1. Incompatible wastes are never placed in the same container, or in unwashed containers that previously held incompatible waste.

Compliance with WAC 173-303-395(1)(b) is assured utilizing the DOT hazard categorization system given in Addendum B, Section B.1.1.1.2.2 and Table B.1. Using this system and following the guidelines for handling ignitable or reactive waste and mixing of incompatible waste, as described in Addendum F, Section F.2.2, fulfills the requirements of WAC 173-303-395(1)(c).

C.2 TANK SYSTEMS

This section is not applicable to the 331-C Storage Unit because waste is not managed in tanks.

C.3 WASTE PILES

This section is not applicable to the 331-C Storage Unit because waste is not managed in waste piles.

C.4 SURFACE IMPOUNDMENTS

This section is not applicable to the 331-C Storage Unit because waste is not placed in surface impoundments.

C.5 INCINERATORS

This section is not applicable to the 331-C Storage Unit because waste is not incinerated.

C.6 LANDFILLS

This section is not applicable to the 331-C Storage Unit because waste is not placed in landfills.

C.7 LAND TREATMENT

This section is not applicable to the 331-C Storage Unit because waste is not treated in land treatment units.

C.8 AIR EMISSIONS CONTROL

C.8.1 Process Vents

This section is not applicable to the 331-C Storage Unit, as no equipment subject to WAC 173-303-690 (Subpart AA requirements) is located or utilized at the unit.

C.8.2 Equipment Leaks

This section is not applicable to the 331-C Storage Unit, as no equipment subject to WAC 173-303-691 (Subpart BB requirements) is located or utilized at the unit. Note that pumps or other equipment may contact hazardous waste with an organic concentration of at least ten percent by weight for less than 300 hours per calendar year. If so, the equipment will be identified as required by WAC 173-303-691(1)(f).

C.8.3 Tanks and Containers

C.8.3.1 Applicability of Subpart CC Standards

The requirements of WAC 173-303-692 (Subpart CC standards) apply to dangerous waste stored at the 331-C Storage Unit unless one or more of the exceptions given at WAC 173-303-692(1)(b) apply.

C.8.3.2 Tank Systems and Container Areas – Demonstrating Compliance

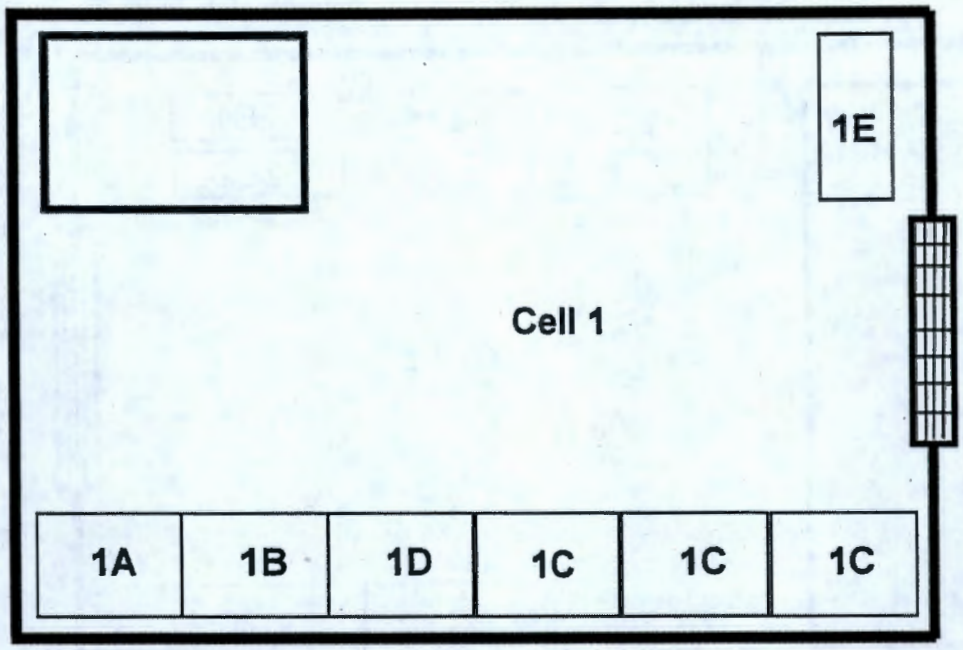
Compliance with the Subpart CC standards is maintained at the 331-C Storage Unit by utilizing DOT-specification containers for storage, when the container has a design capacity greater than 0.1 m^3 (26.4 gallons). Containers greater than 0.46 m^3 (121 gallons) are not typically utilized at 331-C, and if they are, they would be used only for materials with low vapor pressures. Hence, Level 1 container standards are the only standards that must be met.

To meet the Level 1 standards, the following standards are observed:

- Opening hazardous waste containers only occurs when adding or removing waste, or for necessary inspection or sampling, after which the container is promptly re-closed.
- Inspection of the closure of hazardous waste containers is checked prior to loading for shipment to 331-C as part of the waste acceptance process (Addendum B, Section B.2.1).
- Any waste container greater than 0.1 m^3 capacity stored longer than one year is re-inspected at least once every 12 months to check the container for deterioration or damage. Any deterioration or damage is documented and promptly repaired in accordance with 40 CFR 264.1086(c)(4)(iii).

Determination that containers with capacity greater than 0.46 m^3 (121 gallons) are not in "light material service" is provided through the acceptance criteria in the 331-C waste analysis plan (Addendum B, Section B.1.1.1.2).

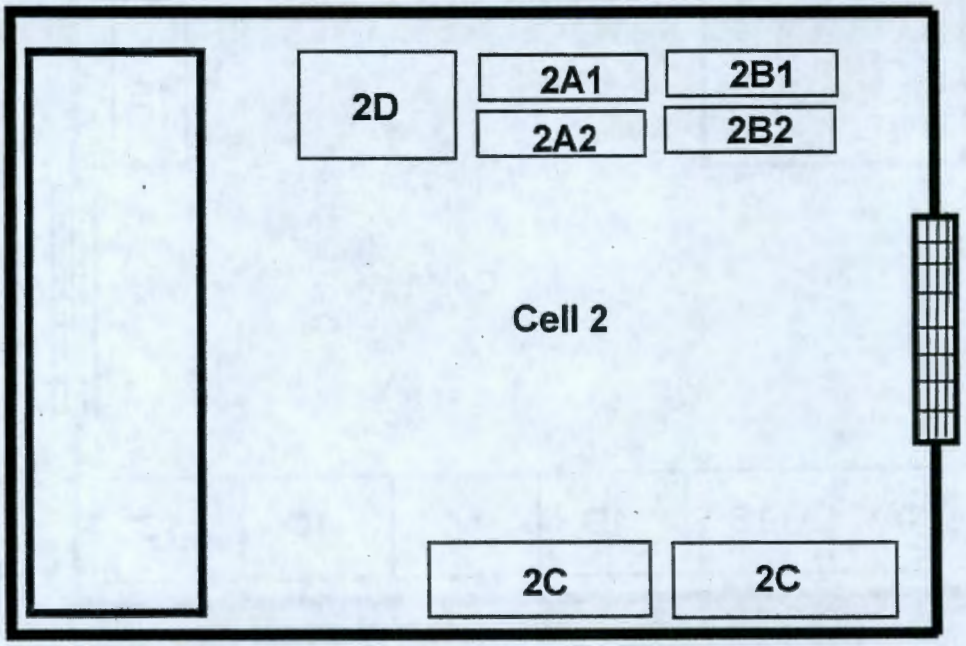
Figure C.1. Acids and Oxidizers Cell



Legend

1A	Liquid Oxidizers (Medium Cabinet)
1B	Solid Oxidizers (Small Cabinet)
1C	Inorganic Acids (Medium Cabinet)
1D	Organic Acids (corrosive) (Small Cabinet)
1E	Mercury/Corrosive Solids (Small Shelf)
▮	Epoxy coated angle iron
▦	Collection Sump
▢	Drum and Carboy Storage Area

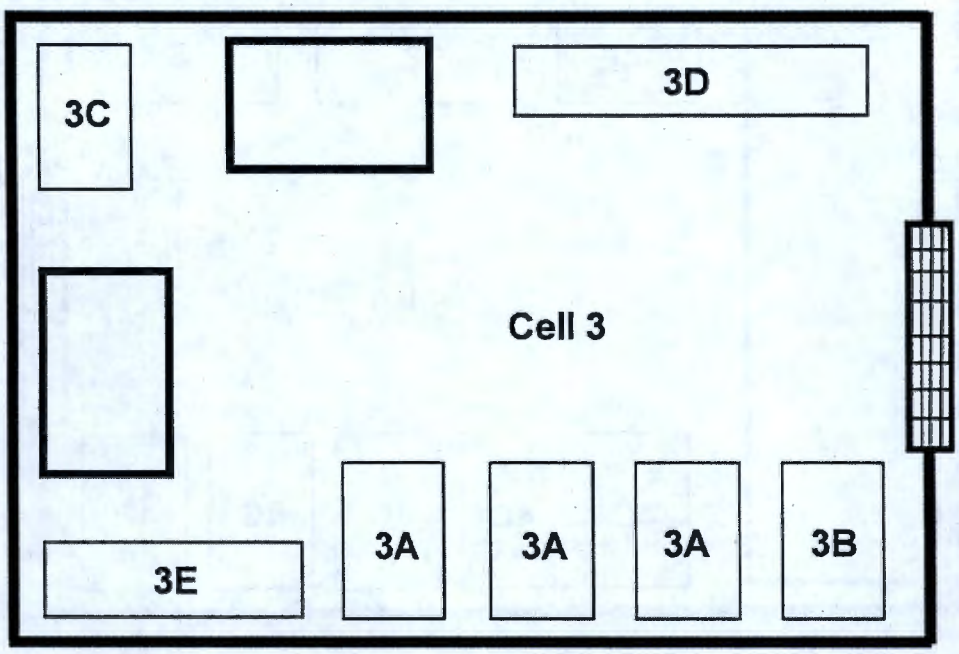
Figure C.2. Poisons and Class 9 Cell



Legend

2A1	Poisons, Acidic (P.G.II and P.G.III) (Small Cabinet)
2A2	Poisons, Neutral/Basic (P.G.II and P.G.III) (Small Cabinet)
2B1	Poisons, Neutral/Basic (P.G.I) (Small Cabinet)
2B2	Poisons, Acidic (P.G.I) (Small Cabinet)
2C	Class 9 (nonreactive) (Large and Small Shelf)
2D	Class 9 (reactives) (Large Cabinet)
▮	Epoxy coated angle iron
▦	Collection Sump
▯	Drum and Carboy Storage Area

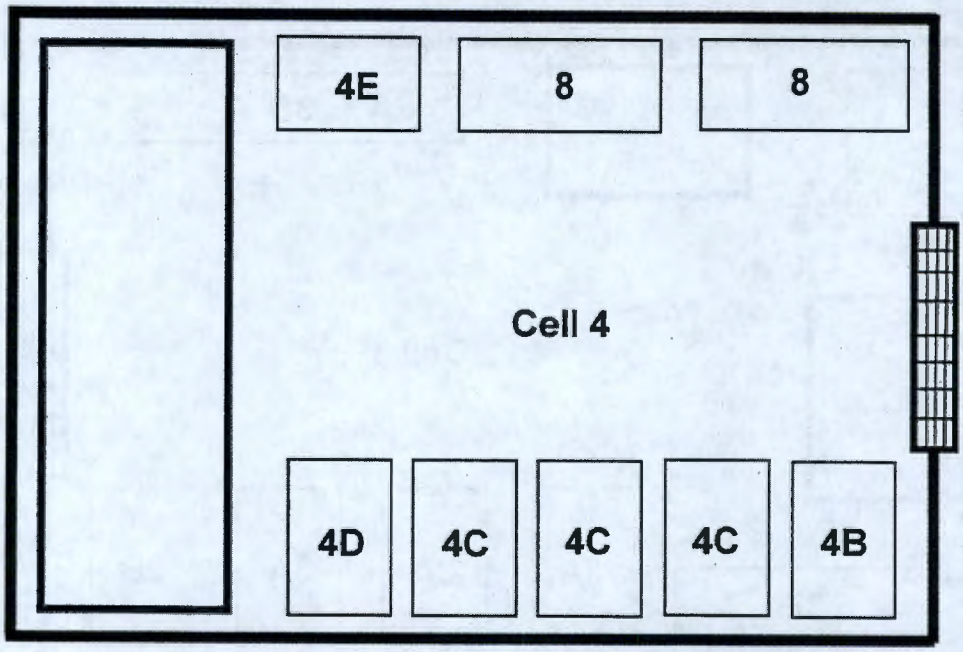
Figure C.3. Alkaline, Washington State Criteria Waste, Organic Peroxides, and Non-Regulated Waste Cell



Legend

3A	Alkaline (liquids and solids) (Medium Cabinet)
3B	Alkaline/Oxidizers (Medium Cabinet)
3C	Organic Peroxides and temperature sensitive (refrigerator)
3D	Washington State Criteria Waste (Large Shelve)
3E	Non-Regulated Liquids/Solids (Small Shelf)
▌	Epoxy coated angle iron
▦	Collection Sump
▯	Drum and Carboy Storage Area

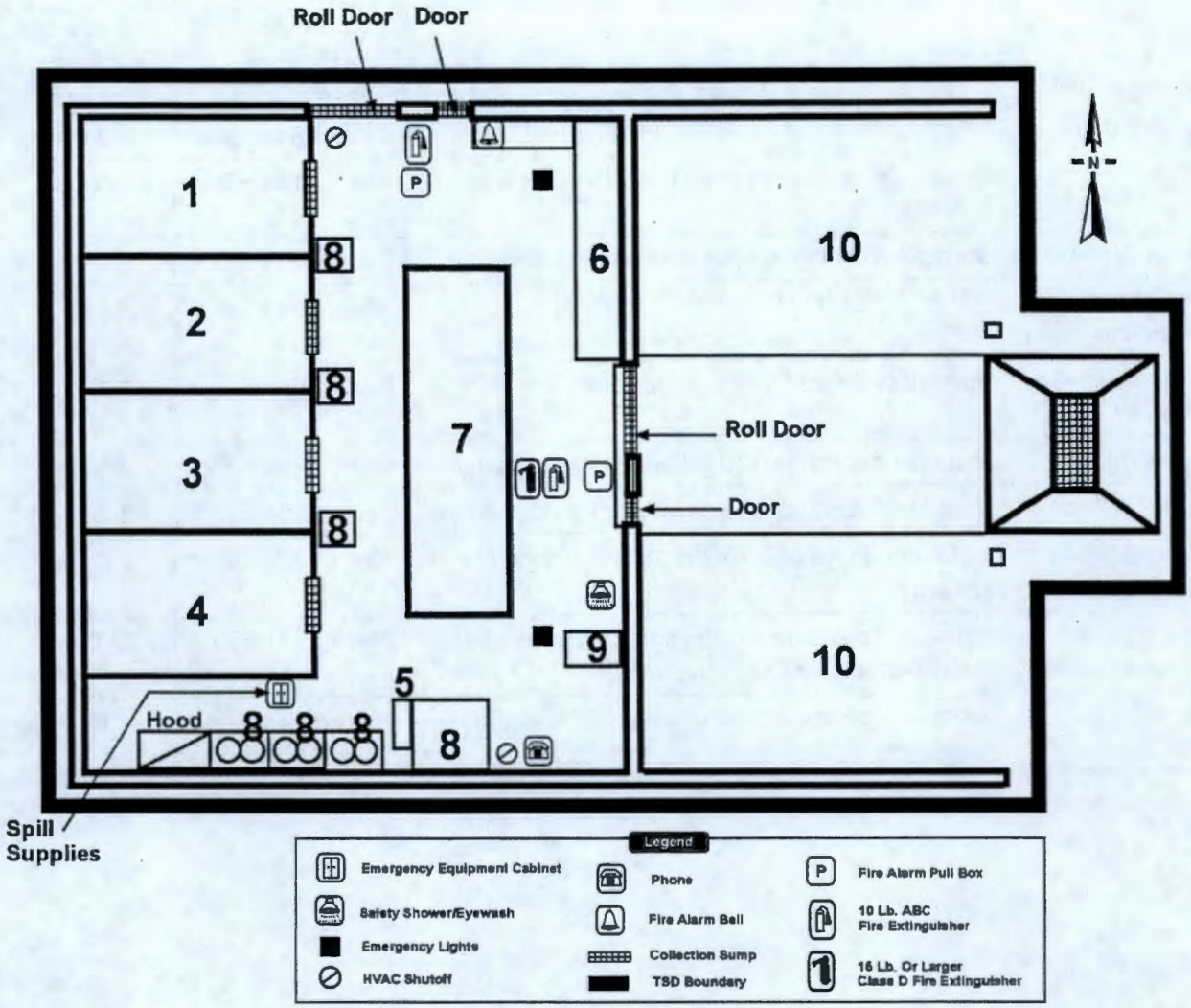
Figure C.4. Flammable, Organic, and Compressed Aerosols Cell



Legend

4B	Aerosols (Large Cabinet)
4C	Flammable Liquids (Large Cabinet)
4D	Flammable Solids (Dangerous When Wet) (Large Cabinet)
4E	Flammable Solids (with water Spontaneously Combustible) (Large Cabinet)
4F	Floating Cabinet (Large Cabinet)
8	Flammable Liquids (Large Cabinets)
▮	Epoxy coated angle iron
▦	Collection Sump
□	Drum and Carboy Storage Area

Figure C.5. Bay Storage Area



Legend

1. Acids, Oxidizers
2. Poisons, Class 9
3. Alkaline, WSDW, Organic Peroxides
4. Organics Flammable and Compressed Aerosols
5. Compressed gases
6. Universal/Recycling Storage Area
7. Class 9, WSDW, Non-flammable and compatible waste
8. Flammable Storage
9. Explosive Magazine
10. Outdoor Storage
11. Staging, Loading, and Unloading Area

Table C.1. Storage Devices Used at the 331-C Storage Unit

Storage Device	Typical Use	Approximate External Dimensions (in.)	Approximate Capacity (Gal or ft^3.)
Small Cabinet	Storage of containers (5 gallons or less capacity)	43w x 18d x 65h	50 max
Medium Cabinet	Storage of containers (18.93 liter [5 gallons] or less capacity	31w x 31d x 65h	60 max
Large Cabinet	Storage of containers (5 gallons or less capacity)	34w x 34d x 65h	80 max
Small Drum Cabinet	Storage of drums (5 to 55 gallons capacity)	34w x 34d x 65h	65 max
Large Drum Cabinet	Storage of drums (5 to 55 gallons capacity)	59w x 34d x 65h	130 max
Small Shelving	Storage of containers (5 gallons or less capacity)	47w x 18d x 62h	65 max
Large Shelving	Storage of containers (5 gallons or less capacity)	72w x 18d x 62h	100 max
Flammable Storage Module	18.93 liter [5 gallons] to 208.18 liter [55 gallons] capacity	78w x 73d x 100h	240 max
Refrigerator/ Freezer	Storage of containers of organic peroxides and other temperature sensitive waste	34w x 29d x 67h	25 Cu.Ft.
Explosives Magazine	Storage of containers containing DOT classified explosives	36w x 36d x 36h	8 Cu.Ft.

1 **Table C.2. Building Occupancy Limits***

TABLE NO.9-A—EXEMPT AMOUNTS OF HAZARDOUS MATERIALS, LIQUIDS AND CHEMICALS REPRESENTING A PSYICAL HAZARD BASIC QUANTITIES PER CONTROL AREA[1]

When two units are given values within parentheses are in cubic feet (Cu.Ft.) or pounds (Lbs.)

CONDITION		STORAGE[2]			USE[2]–CLOSED SYSTEMS			USE[2]–OPEN SYSTEMS		
MATERIAL	CLASS	Solid Lbs. (Cu.Ft.)	Liquid Gallons (Lbs.)	Gas (Cu.Ft.)	Solid Lbs. (Cu.Ft.)	Liquid Gallons (Lbs.)	Gas (Cu.Ft.)	Solid Lbs. (Cu.Ft.)	Liquid Gallons (Lbs.)	Gas (Cu.Ft.)
1.1 Combustible liquid[3]	II	–	120[4,5]	–	–	120[4]	–	–	30[4]	–
	III-A	–	330[4,5]	–	–	330[4]	–	–	80[4]	–
	III-B	–	13,200[5,6]	–	–	13,200[6]	–	–	3,300[6]	–
1.2 Combustible dust lbs./1000 Cu.Ft.		1[7]	–	–	1[7]	–	–	1[7]	–	–
1.3 Combustible fiber			–	–		–	–		–	–
(loose)		(100)			(100)			(20)		
(baled)		(1,000)			(1,000)			(200)		
1.4 Cryogenic, flammable or oxidizing			45	–	–	45	–	–	10	–
2.1 Explosives		1[5,8,9]	(1)[5,8,9]	–	¼[8]	(¼)[8]	–	¼[8]	(¼)[8]	–
3.1 Flammable solid		125[4,5]	–	–	25[4]	–	–	25[4]	–	–
3.2 Flammable gas										–
(gaseous)		–	–	750[4,5]	–	–	750[4,5]	–	–	–
(liquefied)		–	15[4,5]	–	–	15[4,5]	–	–	–	
3.1 Flammable liquid[3]		–	30[4,5]	–	–	30[4]	–	–	10[4]	–
		–	60[4,5]	–	–	60[4]	–	–	15[4]	–
		–	90[4,5]	–	–	90[4]	–	–	20[4]	–
Combination I-A, I-B, I-C		–	120[4,5,10]	–	–	120[4,10]	–	–	30[4,10]	–
4.1 Organic peroxide, unclassified detonable		1[5,8]	(1)[5,8]	–	¼[8]	(¼)[8]		¼[8]	(¼)[8]	–
4.2 Organic peroxide	I	5[4,5]	(5)[4,5]	–	(1)[4]	(1)[4]	–	1[4]	1[4]	–
	II	50[4,5]	(50)[4,5]	–	50[4]	(50)[4]	–	10[4]	(10)[4]	–
	III	125[4,5]	(125)[4,5]	–	125[4]	(125)[4]	–	25[4]	(25)[4]	–
	IV	500	(500)	–	500[4]	(500)	–	100	(100)	–
	V	N.L.	N.L.	–	N.L.	N.L.	–	N.L.	N.L.	–
4.3 Oxidizer	4	1[5,8]	(1)[5,8]	–	¼[8]	(¼)[8]	–	¼[8]	(¼)[8]	–
	3	10[4,5]	(10)[4,5]	–	2[4]	(2)[4]	–	2[4]	(2)[4]	–
	2	250[4,5]	(250)[4,5]	–	250[4]	(250)[4]	–	50[4]	(50)[4]	–
	1	1,000[4,5]	(1,000)[4,5]	–	1,000[4]	(1,000)[4]	–	200[4]	(200)[4]	–
4.1 Oxidizer—Gas										
(gaseous)		–	–	1,500[4,5]	–	–	1,500[4,5]	–	–	–
(liquefied)		–	15[4,5]	–	–	15[4,5]	–	–	–	–
5.1 Pyrophoric		4[5,8]	(4)[5,8]	50[5,8]	1[8]	(1)[8]	10[5,8]	0	0	0
6.1 Unstable (reactive)	4	1[5,8]	(1)[5,8]	10[5,8]	¼[8]	(¼)[8]	2[5,8]	¼[8]	(¼)[8]	0
	3	5[4,5]	(5)[4,5]	50[4,5]	1[4]	(1)[4]	10[4,5]	1[4]	(1)[4]	0
	2	50[4,5]	(50)[4,5]	250[4,5]	50[4]	(50)[4]	250[4,5]	10[4]	(10)[4]	0
	1	125[4,5]	(125)[4,5]	750[4,5]	125[4]	(125)[4]	750[4,5]	25[4]	(25)[4]	0
7.1 Water (reactive)	3	5[4,5]	(5)[4,5]	–	5[4]	(5)[4]	–	1[4]	(1)[4]	–
	2	50[4,5]	(50)[4,5]	–	50[4]	(50)[4]	–	10[4]	(10)[4]	–
	1	125[5,6]	(125)[5,6]	–	125[6]	(125)[5,6]	–	25[6]	(25)[6]	–

TABLE NO.9-B—EXEMPT AMOUNTS OF HAZARDOUS MATERIALS, LIQUIDS AND CHEMICALS REPRESENTING A HEALTH HAZARD MAXIMUM QUALTITIES PER CONTROL AREA[1 2]

When two units are given, values within parentheses are in pounds (Lbs)

	STORAGE[3]			USE[3]–CLOSED SYSTEMS			USE[3]–OPEN SYSTEMS		
MATERIAL	Solid Lbs. (Cu.Ft.)[5 6]	Liquid Gallons[5 6] (Lbs.)	Gas (Cu.Ft.)[5]	Solid (Lbs.)[5]	Liquid Gallons[5] (Lbs.)	Gas (Cu.Ft.)	Solid (Lbs.)[5]	Liquid Gallons[5] (Lbs.)	Gas (Cu.Ft.)
• Corrosives	5,000	500	650[6]	5,000	500	650[5]	1,000	100	–
• Highly Toxics[1]	1	(1)	20[7]	1	(1)	20[7]	(¼)	(¼)	–
• Irritants	5,000	500	650[6]	5,000	500	650[5]	1,000	100	
• Sensitizers	5,000	500	650[6]	5,000	500	650[5]	1,000	100	
• Other Health Hazards	5,000	500	650[6]	5,000	500	650[5]	1,000	100	

N.L. = Not Limited

[1] Control area is a space bounded by not less than a one-hour fire-resistive occupancy separation within which the exempted amounts of hazardous materials may be stored dispensed, handled, or used. The number of control areas within a building used for retail and wholesale stores shall not exceed two. The number of control areas in buildings with other uses shall not exceed four.

[2] The aggregate quantity in use and storage shall not exceed the quantity listed for storage.

[3] The quantities of alcoholic beverages in retail sales uses are unlimited provided the liquids are packaged in individual containers not exceeding four liters.

The quantities of medicines, foodstuffs, and cosmetics containing not more than 50 percent of volume of water-miscible liquids and with the remainder of the solutions not being flammable in retail sales or storage occupancies are unlimited when packaged in individual containers not exceeding four liters.

[4] Quantities may be increased 100 percent in sprinklered buildings. When Footnote 5 also applies, the increase for both footnotes may be applied.

[5] Quantities may be increased 100 percent when stored in approved storage cabinets or safety cans as specified in the fire code. When Footnote 4 also applies, the increase for both may be applied.

[6] The quantities permitted in a sprinklered building are not limited.

[7] A dust explosion potential is considered to exist if 1 pound or more of combustible dust per 1,000 cubic feet of volume is normally in suspension or on horizontal surfaces inside buildings or equipment and which could be put into suspension by an accident, sudden force, or small explosion.

[8] Permitted in sprinklered buildings only. None is allowed in un-sprinklered buildings.

[9] One pound of black sporting powder and 20 pounds of smokeless powder are permitted in sprinklered or un-sprinklered buildings.

[10] Containing not more than the exempt amounts of Class I-A, Class I-B, and Class I-C flammable liquids.

*Source: Uniform Building Code, 1988. Only the quantities listed for "Storage" are applicable to storage limits at 331-C Storage Unit; wastes are not "used" at 331-C. Other allowances in this table (e.g. quantity increase for storage in sprinklered buildings) apply where applicable.

E. PROCEDURES TO PREVENT HAZARDS E.1

E.1 SECURITY E.1
E.1.1 Security Procedures and Equipment E.1
E.1.2 Waiver E.1

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E. PROCEDURES TO PREVENT HAZARDS

The 331-C Storage Unit is operated to minimize exposure of the general public and operating personnel to dangerous and mixed waste.

E.1 SECURITY

Security for 331-C Storage Unit is provided by a combination of the overall security system for the 300 Area and a specific security system for the waste storage unit. The former controls access to the 300 Area proper while the latter controls access to 331-C Storage Unit.

The 331-C Storage Unit is located in the southern portion of the 300 Area. The security program for the 300 Area is described in Permit Attachment 33.

The security program for the 331-C Storage Unit, in addition to 300 Area security, is designed to limit building access to those personnel within the 300 Area authorized to enter the unit. Access to the 331-C Storage Unit can be gained through two walk-in doors and two large roll up doors that facilitate loading and unloading activities. All doors to the 331-C Storage Unit are kept locked at all times except when in use. All requests for keys are reviewed and approved by the unit operating supervisor and the building manager.

Keys to the unit are issued only to unit personnel, security personnel, and emergency response personnel. The unit-operating supervisor approves any additions to this list and the building. Specific aspects of the security programs for the 331-C Storage Unit is described in more detail below.

E.1.1 Security Procedures and Equipment

The following sections describe the 24-hour surveillance system, barrier, and warning signs used to provide security and control access to the 331-C Storage Unit.

E.1.1.1 Barrier and Means to Control Entry

Entrances to the 331-C building are kept locked except when the building is in use to prevent unauthorized access. All waste management activities are conducted within the unit and the east fenced yard. Therefore, the unit itself provides a barrier surrounding the active waste management operations.

Entry to the unit is controlled using locked entrances. The 331-C Storage Unit is kept locked at all times except when in use. Physical control of keys and records of key distributions are maintained by PNNL Security. Distribution of keys to the 331-C Storage Unit is subject to approval by the building manager and the unit-operating supervisor. Personnel in possession of keys have been instructed to admit only persons having official business. The 331-C Storage Unit staff must escort all untrained visitors (personnel without 24/40-hour hazardous waste operations training) in the waste storage areas.

E.1.1.2 Warning Signs

The 331-C Storage Unit is posted with *DANGER - UNAUTHORIZED PERSONNEL KEEP OUT* and *331-C CHEMICAL WASTE STORAGE BUILDING* signs near each entrance on all sides of the unit. The signs are clearly visible from the required distance of 25 feet.

E.1.2 Waiver

Waivers of the security procedures and equipment requirements for the 331-C Storage Unit are not required and will not be requested.

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Addendum F — Preparedness and Prevention

F. PREPARDENESS AND PREVENTION F.1

F.1 PREPAREDNESS AND PREVENTION REQUIREMENTS F.1
F.1.1 Equipment Requirements F.1
F.1.2 Aisle Space Requirements F.2

F.2 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT F.2
F.2.1 Unloading Operations F.2
F.2.2 Run-Off F.2
F.2.3 Water Supplies F.3
F.2.4 Equipment Failure and Power Outages F.3
F.2.5 Personnel Protection Equipment F.3

F.3 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND/OR INCOMPATIBLE WASTE F.4
F.3.1 Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste F.4
F.3.2 General Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste F.4

Tables

Table F.1. Emergency Signals and Responses F.1
Table F.2. Material and Equipment for Spill Containment and Cleanup F.3

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F. PREPARDENESS AND PREVENTION

F.1 PREPAREDNESS AND PREVENTION REQUIREMENTS

The following documents the preparedness and prevention measures taken at the 331-C Storage Unit.

F.1.1 Equipment Requirements

The following sections describe the internal and external communications and emergency equipment in use at the 331-C Storage Unit.

F.1.1.1 Internal Communications

Communication systems are used to provide immediate emergency instruction to personnel in the 331-C Storage Unit. Internal communications address general emergencies that may occur in the 300 Area as well as specific emergencies that may occur in the 331-C Storage Unit.

Because of the nature of activities that occur in the 300 Area, the potential exists for emergencies outside of 331-C Storage Unit (e.g., release of mixed waste materials) that could impact operations and staff in the 331-C Storage Unit. For this reason, the general emergency signals for the 300 Area are applicable to the 331-C Storage Unit. These signals are summarized in Table F.1. Fire alarm signals are located in each building throughout the 300 Area. Because fissile materials are not handled in the 331-C Storage Unit, there is no criticality alarm for the unit.

Internal communications to provide emergency instruction in the event of an emergency in the 331-C Storage Unit consist of a fire alarm and a telephone. The fire alarm is used to provide notification for immediate evacuation of the 331-C Storage Unit. Fire alarm pull boxes are located at all exits of the unit such that operating personnel have immediate access to one in all portions of the 331-C Storage Unit. One fire alarm bell is located within the 331-C Storage Unit and is audible at all locations within the building. The location of the fire alarm bell is shown in Addendum A.

The telephone can also be used to request emergency services. The location of the telephone is shown in Addendum A.

Table F.1. Emergency Signals and Responses

Signal	Meaning	Response
Gong	Fire	Evacuate building. Move upwind. Keep clear of emergency vehicles.
Siren—steady 3-5 minute blast	Area Evacuation	Proceed promptly to north parking area. Stand by to follow instructions from emergency director.
Wavering Siren	Take Cover	Close all exterior doors, turn off all intake ventilation, and notify the Environmental Management Services Department (EMSD) of your whereabouts. Requests call back for status and monitor portable radios.
Howler (Aa-oo-gah)	Criticality	Follow "take cover" instructions above. (No criticality will take place in the 331-C Storage Unit since fissile materials are not accepted for storage.)
ALL EMERGENCY SIGNALS CAN BE HEARD BY PHONING 373-2345		

F.1.1.2 External Communications

Both a fire alarm system and a telephone are in place in the 331-C Storage Unit. Both systems can be used to summon emergency assistance. The fire alarm system summons direct response from the Hanford Fire Department's 300 Area Station. The telephone can be used to access the PNNL Single-Point Contact directly by dialing 375-2400 or by dialing the emergency number, 911. Locations of fire alarm pull boxes and the telephone are shown in Addendum A.

F.1.1.3 Emergency Equipment

Emergency equipment available for trained 331-C Storage Unit personnel includes portable fire extinguishers, a fire suppression system, spill response equipment, and decontamination equipment.

Several portable 10-lb ABC fire extinguishers and one 15-lb (or larger) Class D fire extinguisher for combustible metals are available at various locations throughout the 331-C Storage Unit. The locations of these are shown in Addendum A.

The facility is also equipped with an automatic fire suppression system consisting of galvanized steel, schedule 40 per ASTM A120 pipe, and 150-lb malleable iron per ANSI B16.3 fittings. All components are UL-listed or FM-approved and installation of the fire sprinkler system has been conducted in accordance with NFPA 13 for ordinary hazards. Spill cleanup supplies and equipment maintained are summarized in Table F.2. An emergency eye wash/shower is available for emergency personnel decontamination. The location of the emergency eye wash/shower is shown in Addendum A. If needed, the Hanford Fire Department can provide additional emergency equipment.

F.1.1.4 Water for Fire Control

The large diameter line that services the 331-C Storage Unit for fire protection supplies adequate water volume and pressure. Fire hydrants are located in the immediate proximity to serve the 331-C Storage Unit. In addition, the Hanford Fire Department's 300 Area Station is located within 1 mile of the 331-C Storage Unit.

F.1.2 Aisle Space Requirements

Containers stored in the 331-C Storage Unit are placed to provide aisle space clearance in accordance with WAC 173-303-340(3), -630(5)(c), and applicable standards of the Uniform Building Code. The proper maintenance of aisle space is inspected weekly and noted on the weekly inspection checklist (Addendum I, Figure I.1).

F.2 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT

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

F.2.1 Unloading Operations

Procedures have been developed at the 331-C Storage Unit to prevent hazards and minimize the potential for breakage, punctures, or the accidental opening of containers during waste loading and unloading. All waste is loaded or unloaded inside the 331-C Storage Unit or in the containment area on the east side of the building. Either of the bay rollup doors is opened, and small transporting vehicles (usually a pickup truck) are driven inside. By unloading all waste inside the fully contained facility, spills during unloading operations will be contained. All waste is inspected prior to shipment to the 331-C Storage Unit to verify that they are in appropriate containers and that the containers are in good condition. Inspection of containers prior to acceptance at the 331-C Storage Unit minimizes the potential for spills during unloading operations. The potential for spills during waste handling is minimized using appropriate container handling equipment. Forklifts may also be used to load or unload heavy waste items. Small waste items can be unloaded by hand. Each small waste item is removed from the secondary containment unit in which it was transported (e.g., plastic storage tub) and placed in the appropriate storage location.

Wastes that are shipped off-site for final treatment and disposal are usually transported in large tractor-trailer vehicles. These vehicles are staged in a secondary containment area on the east side of the building during loading operations. This containment system was designed and constructed as an added safeguard for containment of dangerous waste spills or leaks that may occur during any loading operations. The containment system consists of a smooth troweled concrete loading dock that is sloped to a containment sump large enough to prevent offsite migration of spilled material.

F.2.2 Run-Off

The 331-C Storage Unit was designed to eliminate the likelihood of off-site migration via run-off. Because the Unit is completely enclosed (i.e., complete roof), run-off of precipitation is not a factor. In addition, the floor is bermed using angle iron and the loading/unloading area, and each storage cell is similarly bermed. The main bay area and each storage cell are fully contained by at least a 6-in. high

angle iron berm and a collection trench to the area. Each door from the waste handling areas to the storage cells and to the outside area has a collection trench to intercept any potential run-off. The containment system for the 331-C Storage Facility is described in more detail in Addendum C.

F.2.3 Water Supplies

The 331-C Storage Unit is designed and operated to safely contain waste and prevent any contamination of water supplies. The containment system described in Addendum C, Section C.1.1.3 prevents infiltration of waste that could contaminate groundwater and prevents run-off of waste that could contaminate surface water. The nearest water supply is the 300 Area water intake, which is located on the Columbia River approximately 1 mile from the 331-C Storage Unit.

Table F.2. Material and Equipment for Spill Containment and Cleanup

Materials/Equipment			Notes
Diatomaceous Earth	30-gallon drum	To absorb small spills of oils, solvents, and aqueous materials. Not used for acids or caustics unless first neutralized.	Stored in bay area or in covered storage area of 331-C Storage Unit
Vermiculite	55-gallon drum	To absorb small spills of oils, solvents, and aqueous materials. Not used for acids or caustics unless first neutralized.	Stored in bay area or covered area of 331-C Storage Unit
Absorbent Pillows or Booms	3 cartons, each containing booms or 12 pillows	To be used for diking or damming and absorption of spilled materials	Each boom or pillow can absorb slightly more than 1 L of liquid
Acid- and base-specific and solvent absorbents or neutralizers	50-lb box of each in 331-C Storage Unit	Neutralization of known chemical spills.	J. T. Baker™ brand or equivalent
Citric Acid	30-gallon drum	Neutralization of alkaline spills	Stored in high bay of 331-C Storage Unit
Sodium Bicarbonate	30-gallon drum	Neutralization of acid spills.	Stored in high bay of 331-C Storage Unit

F.2.4 Equipment Failure and Power Outages

The 331-C Storage Unit does not have any systems that would cause release of dangerous waste during a power failure or equipment failure. Interruption of power to any of the systems utilizing electrical power merely causes the equipment to stop operating. The unit has an emergency lighting system that operates automatically during power failure incidents.

For actions to be taken in the event of power failure to unit systems or equipment, refer to Addendum J.

F.2.5 Personnel Protection Equipment

Protective clothing and equipment are provided to employees during normal and emergency operations. During routine operations, the maximum number of employees working in the 331-C Storage Unit is less than ten. For dry chemical handling activities, such as labpacking, the minimum protection requirement is eye protection (safety glasses with side shields or chemical goggles), long pants, long sleeved shirt or lab coat, and chemical resistant gloves (nitrile or other construction as appropriate). Protection levels for other operations, such as bulking and emergency situations, are determined in consultation with a PNNL industrial hygienist, and staffing levels are revised according to the availability of proper protective equipment as shown below. Protective clothing and equipment available in the 331-C Storage Unit include:

- 6 sets of chemically resistant suits, aprons, boots, and gloves
- 20 pairs of protective eyeglasses

- 5 pairs of chemical goggles
- 4 face shields

This protective equipment is stored on shelves or in cabinets and is well stocked at all times. The location of the storage cabinets is shown in Addendum A. This equipment is periodically replaced as it is used. The above inventory reflects the quantities of each type of PPE that is typically present at the 331-C Storage Unit. Minimum quantities required to be present are given in the weekly inspection checklist.

F.3 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND/OR INCOMPATIBLE WASTE

The following sections describe prevention of reaction of ignitable, reactive, and incompatible waste.

F.3.1 Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste

The 331-C Storage Unit may be used to store a variety of ignitable waste. Precautions to prevent ignition of ignitable waste involve the separation of waste from sources of ignition and the use of procedures that minimize the potential for accidental ignition. There are no routine sources of ignition or open flame in the 331-C Storage Unit. Work with ignition or heat sources, if required, is limited and controlled by PNNL management and is performed in compliance with internal PNNL health and safety requirements for elimination of ignition sources. These requirements:

Prohibit use of open flame equipment when working with flammable liquids (except when performing flash point tests for waste verification purposes)

- Prohibit smoking around flammable liquids (no smoking is allowed at the 331-C Storage Unit)
- Require electrical equipment used in flammable or explosive atmospheres to comply with the National Electrical Code, NFPA 70
- Require the use of equipment with automatic, adjustable temperature controls and high-temperature limit switches to prevent overheating
- Prohibit placement of flammable liquids on hot surfaces
- Require all static electricity sources to be grounded in areas where ignitable vapors may be present
- Require bonding of conductive containers when transferring flammable liquids.

All maintenance or modifications that require work with ignition sources must receive prior approval by a PNNL Safety Engineer. Smoking is not allowed in the 331-C Storage Unit at any time, and the interior and exterior of the facility are clearly posted with "No Smoking" signs. Waste storage areas are not heated by any radiant heat source. All tools used to open ignitable waste containers are constructed of nonsparking materials.

A fire safety engineer familiar with the Uniform Fire Code inspects ignitable waste storage areas annually. This inspection is documented in the Hanford Facility Operating Record, 331-C Storage Unit file. There are also storage restrictions at the 331-C Storage Unit for combustible waste as part of fire safety requirements. The storage restrictions defined in the Uniform Building Code for Class B Occupancy apply to the 331-C Storage Unit (International Conference of Building Officials 1988). The weekly inspection for the 331-C Storage Unit includes checking to see if the inventory of combustibles is below these limits. These inspections are documented in the Hanford Facility Operating Record, 331-C Storage Unit file.

F.3.2 General Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste

As described in Section F.3.1, ignitable wastes are managed in a manner that protects the waste from sources of ignition or open flame. Ignitable waste containers are maintained in good condition and

inspected weekly to minimize the potential for releases that could result in fire. Containers of ignitable waste are protected from high temperature to prevent the potential for pressurization and buildup of ignitable vapors. Containers of ignitable waste are stored in flammable material storage cabinets in the bay area and within the appropriate waste storage cells, as described in Addendum C.

Because of the wide variety of waste that may be accepted at the 331-C Storage Unit, the potential exists for storage of incompatible waste. The mixing of incompatible waste is prevented through waste segregation and storage procedures. Chemical waste stored in the 331-C Storage Unit are separated by compatibility and hazard class and stored in separate storage cells awaiting packaging, if needed. Separate storage shelves and cabinets are used within the storage cells, as described in Addendum C, Section C.1.4.1.3, to provide further waste segregation. The following general guidance is used to segregate and separate chemicals:

- Store acids in acid storage cabinets
- Separate acids from bases and alkaline metals such as potassium or sodium
- Separate oxidizing acids from organic acids and flammable or combustible materials
- Store bases away from acids and store solutions of inorganic hydroxides in polyethylene containers
- Store oxidizers away from flammable or combustible materials and reducing agents such as zinc, alkaline metals, and formic acid
- Store peroxide-forming chemicals in airtight containers in a dark, cool, and dry place (inside of cabinets)
- Store flammable materials in approved containers or cabinets
- Separate flammable materials from oxidizing acids and oxidizers and keep them away from sources of ignition
- Clearly mark cabinets to identify the hazards associated with their contents
- The potential for waste ignition or reaction at 331-C Storage Unit is also minimized through storage restrictions on hazardous material quantities. The storage restrictions defined in the Uniform Building Code for Class B Occupancy apply to 331-C Storage Unit (International Conference of Building Officials 1988). The weekly inspection of 331-C Storage Unit includes checking to see if waste inventories are below these limits. These inspections are documented in the Hanford Facility Operating Record, 331-C Storage Unit file.

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Addendum H — Closure Plan

H. CLOSURE PLAN H.1

H.1 CLOSURE PLAN/FINANCIAL ASSURANCE FOR CLOSURE H.1
H.1.1 Closure Performance Standard H.1
H.1.2 Closure Activities H.1
H.1.3 Maximum Waste Inventory H.5
H.1.4 Closure of Waste Piles, Surface Impoundments, Incinerators, Land Treatment Facilities, and Miscellaneous Units H.5
H.1.5 Closure of Landfill Units H.5
H.1.6 Schedule for Closure H.5
H.1.7 Extension for Closure Time H.5
H.1.8 Closure Cost Estimate H.5
H.1.9 Financial Assurance Mechanism for Closure H.6

H.2 NOTICE IN DEED H.6

H.3 POSTCLOSURE PLAN H.6

H.4 LIABILITY REQUIREMENTS H.6

Tables

Table H.1. Summary of Closure Activities H.6
Table H.2. Detailed Schedule of Closure H.6

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H. CLOSURE PLAN

This addendum, in accordance with the requirements of WAC 173-303-806(4)(a)(xiii), is a plan to ensure safe closure of the 331-C Storage Unit. In accordance with WAC 173-303-610, copies of this closure plan and all revisions will be maintained at 331-C Storage Unit until certification of closure completeness has been submitted and accepted by Ecology. A post-closure plan is not required because 331-C Storage Unit is not a land-based unit and all dangerous waste and dangerous waste residues will be removed at the time of closure.

H.1 CLOSURE PLAN/FINANCIAL ASSURANCE FOR CLOSURE

This plan presents the activities required for final closure of the 331-C Storage Unit at its maximum extent of operation. This closure plan is expected to be updated at closure to reflect integration with the River Corridor cleanup project. Partial closure will not be conducted. Closure activities are presented in sufficient detail such that the closure process is understandable and a closure schedule can be developed.

H.1.1 Closure Performance Standard

The following sections identify performance standards for clean closure of the 331-C Storage Unit.

H.1.1.1 Performance Standards for Soil/Environmental Media

Closure of the 331-C Storage Unit will be conducted in a manner that meets the clean closure performance standards of WAC 173-303-610(2)(a). The performance standards will be met by removing all dangerous waste inventories and by removing or decontaminating all structures and soil to clean closure removal or decontamination standards.

Due to the scope of operations of the 331-C Storage Unit and the preventive measures utilized during operations, releases from the unit that result in soil contamination are not expected. Should such releases result in soil contamination during the operating life of the 331-C Storage Unit, remediation of the contaminants of concern to the numeric cleanup levels prescribed by WAC 173-303-610(2)(b)(i) will be addressed in conjunction with operable unit remediation requirements under the 300-FF-2 Record of Decision and associated CERCLA documentation.

H.1.1.2 Structure Removal or Decontamination Standards

The clean closure removal and decontamination standards for structures, equipment, bases, liners, etc. have been established in accordance with WAC 173-303-610(2)(b)(ii).

The clean closure standard for structures is a visually verifiable standard established in accordance with WAC 173-303-610(2)(b)(ii). The standard is the absence of obvious stains or residues that would indicate potential dangerous waste contamination. Surfaces must be free of indications of potential dangerous waste, except for residual waste stains consisting of light shadows, slight streaks, or minor discoloration. The standard will be achieved through decontamination of all indoor and outdoor storage and loading area floor and pad surfaces. The standard will be verified by visual inspections performed and documented as described in Section H.1.2.3.2. Only storage and loading area floor surfaces and some miscellaneous components that will remain after closure are expected to have the potential to have been contaminated by storage operations and these areas will be required to meet this standard.

H.1.2 Closure Activities

This plan identifies the steps necessary to perform final closure of the unit in order to meet the closure performance standards. Closure activities to achieve and verify clean closure of structures and soil (i.e., storage and loading area pads, floors, trenches, and sumps) are as follows.

Remove all dangerous waste inventory

Remove potentially contaminated storage building equipment and components for reuse

Decontaminate storage building components and storage building and loading area floors, trenches, and sumps

Visually inspect the decontaminated surfaces for achievement of the clean closure standard

Sample any contaminated soil and compare results to clean closure standards for soil (not currently expected to be necessary)

Certify that closure activities were completed in accordance with the approved closure plan.

H.1.2.1 Maximum Extent of Operations

The 331-C Storage Unit is used to store a variety of different research-related waste and is expected to be fully operational until closure (i.e. no partial closures of storage areas are expected). The maximum inventory of waste in storage at any time will be constrained by three factors:

The total amount of dangerous waste in storage at 331-C Storage Unit at any time will not exceed the design capacity of 20,000 gallons (it is typically 2,000 to 5,000 gallons during normal operations)

The total amount of any particular dangerous waste in storage during any given year will not exceed the amounts given in Addendum A.

The total amount of dangerous waste by hazard class in storage at any one time will not exceed Uniform Building Code Class B Hazardous Material Quantity Restrictions (Addendum C, Table C.1).

Evidence of spills or leaks will be obtained through (a) review of spill reports and operating log books; (b) visual inspection of unit structures accessible to the environment (e.g., floors) and through inspection of all visible barriers designed to prevent migration to the environment, and (c) sampling, as necessary to characterize waste/debris that is found while performing visual inspection. If this inspection program indicates that contamination is present, the potential for migration of contamination to the environment will be evaluated. If potential migration appears likely, samples will be taken. In addition, if the inspections identify any potential contaminant migration routes (e.g., cracks in sumps), samples will be collected to determine whether migration has occurred. Waste site specific information discovered during facility closure will be updated in WIDS.

H.1.2.2 Removing Dangerous Wastes

Closure activities will be initiated by removal of the dangerous waste inventory present at 331-C Storage Unit at the time of closure. Inventory removal procedures will be identical to the waste handling, packaging, and manifesting activities associated with normal operation of the unit. All dangerous waste present will be placed into proper containers according to waste handling procedures described in Addendum C. To the extent possible, chemicals will be labpacked or bulked into larger containers. If wastes are bulked, containers will be emptied in compliance with WAC 173-303-160 so that they are not dangerous waste. Labpack containers will be packaged in compliance with the requirements of WAC 173-303-161. All containers of dangerous waste will be manifested, and custody transferred to a dangerous waste transporter having a proper dangerous waste identification number. Waste will be transported to a permitted dangerous waste facility for treatment or disposal.

H.1.2.3 Decontaminating Structures, Equipment and Soil

The following sections describe decontamination and inspection activities for structures and miscellaneous building components that will remain after closure.

H.1.2.3.1 Waste Handling Equipment

No equipment will remain after closure that would require decontamination to meet clean closure levels. All portable waste handling equipment used for handling containers (e.g., barrel tongs, forklift truck, shelving, cabinets) will be decontaminated in the same manner as described in Section H.1.2.3.3 below, removed and redeployed to other Hanford or PNNL operations.

H.1.2.3.2 Examination of Structure Surfaces

After waste inventory removal, but prior to beginning decontamination procedures, the unit surfaces will be inspected to identify any cracks or other openings through which dangerous waste or decontamination fluids might migrate. The inspections will determine which of the materials that will remain after closure already meet the clean closure standard of a "clean debris surface" and which materials require decontamination to meet the standard. A *clean debris surface means the surface, that when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste, except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discoloration, and soils and waste in cracks, crevices and pits shall be limited to no more than 5% of each square inch of surface area.* (40 CFR 268.45)

Any cracks or openings in unit surfaces will be documented in the Hanford Facility Operating Record, 331-C Storage Unit file and investigated to determine if releases of dangerous waste or dangerous waste constituents have occurred. If the potential exists for releases to have occurred, sampling will be required, in which case this closure plan will be amended to provide for the sampling and analysis process (Section H.1.2.4). If no potential for releases is found, the cracks or openings will be repaired to prevent release of decontamination fluids and decontamination will proceed as described below.

H.1.2.3.3 Decontamination of Structures

Storage cell floors, sumps, trenches, and outdoor loading areas requiring decontamination will be cleaned using one or more of the removal technologies described in 40 CFR 268.45, as necessary to meet the "clean debris surface" criteria. Cleaning will be conducted so as to minimize the quantity of rinsates generated. Rinsates (if any) will be collected in trenches or sumps, pumped from the sumps into appropriate containers, and the pump triple rinsed. Rinsate collection locations will be cleaned and inspected last. Decontamination will be documented on a decontamination and inspection checklist. All decontamination waste will be designated in accordance with WAC 173-303 and, if hazardous, managed in compliance with WAC 173-303-610(5). Decontamination waste requiring management as dangerous waste will be managed in a 90-day accumulation area established for the purpose and/or transported to a permitted TSD unit for storage pending disposal.

Inspection of materials for a "clean debris surface" will be documented on a checklist that will identify the area inspected, whether decontamination/treatment methods were implemented and the standard used to perform the inspection. If contamination above the clean surface debris criteria is found, the affected areas will be cleaned. Any contaminated material generated by this activity will be managed as described above.

Following completion of decontamination, another visual inspection will be performed to verify that decontamination is complete. The cleaned surfaces will be visually inspected for achievement of the clean closure standard described in Section H.1.1.2 of no obvious stains or residues indicating potential dangerous waste contamination. The visual inspection will be documented on the checklist used to document the decontamination. When the visual standard is met, the structure will be considered clean. Copies of the completed visual inspection checklist(s) will be placed in the Hanford Facility Operating Record, 331-C Storage Unit file.

H.1.2.3.4 Decontamination and Inspection of Miscellaneous Building Components

Grating over trenches of the indoor areas and the outdoor loading pads will be cleaned by high-pressure/low-volume steam or water spray, or will be cleaned by hand using rags, brushes, water, and an appropriate cleaner, if necessary. Rinsate and decontamination materials will be collected, designated, and managed accordingly. Decontamination will be documented on a decontamination and inspection checklist. The grating will be inspected for achievement of the clean closure standard and the inspection documented on the checklist used to document the decontamination.

H.1.2.4 Sampling and Analysis to Identify Extent of Decontamination/Removal and to Verify Achievement of Closure Standard

No sampling and analysis of environmental samples (soil or other materials) is expected to be required due to the preventive measures in place during the operating life of the 331-C Storage Unit. If environmental media are contaminated during operation of the 331-C Storage Unit, this plan will be revised to identify methods for sampling and analysis of such media. Decontamination of hazardous debris will be conducted in accordance with the procedures given in Section H.1.2.3. The results of this examination will be documented on a decontamination and inspection checklist. Any necessary sampling and analysis will be conducted in accordance with a sampling and analysis plan to be developed according to Ecology's Clean Closure Guidance (Publication 94-111, current version).

H.1.2.5 Other Activities

Within 60 days of completion of the final closure activities described in this plan, a certification of closure will be submitted to Ecology. This certification will indicate that the 331-C Storage Unit has been closed as described in this plan and that the closure performance standard given in Section H.1 has been met. The certification will be submitted by registered mail and will be signed by the Permittees and an independent Professional Engineer registered in the State of Washington as described below.

The Permittees will certify with the following document or a document similar to it:

> *I, (name), an authorized representative of the U.S. Department of Energy-Richland Operations Office located at the Federal Building, 825 Jadwin Avenue, Richland, Washington, hereby state and certify that the 331-C Storage Unit at the 300 Area, to the best of my knowledge and belief, has been closed in accordance with the attached approved closure plan, and that the closure was completed on (date).*
>
> (Signature and date)

The Permittees will engage an independent Professional Engineer registered in the State of Washington to inspect closure activities, to verify that closure activities are being conducted according to this plan, and to certify that closure has been performed in accordance with this plan.

The engineer will inspect the 331-C Storage Unit at least weekly while closure activities are being performed. During these inspections the engineer will observe closure activities to determine whether they are being performed according to this plan. Inspections will include, but not be limited to:

Inspection of dangerous waste containment structures and systems to determine whether releases of waste to the environment have occurred

Verification that the dangerous waste inventory has been removed within 90 days of receipt of the last waste shipment

Inspection of manifests and Hanford Facility Operating Record, 331-C Storage Unit file to verify that these waste were disposed of in compliance with WAC 173-303

Inspection of decontamination operations to verify that they are being performed using the procedures described in this plan

Inspections of the Hanford Facility Operating Record, 331-C Storage Unit file to verify that samples of liquid decontamination waste were collected and analyzed using the procedures described in this plan

Inspection of the Hanford Facility Operating Record, 331-C Storage Unit file to verify that decontamination waste were properly managed in accordance with the requirements of WAC 173-303-610(5).

Inspections by the engineer will be documented in a bound notebook. Notations will include the date and time of the inspection, the areas inspected, the activities inspected, applicable closure plan requirements inspected, status of observed activities with respect to plan requirements, corrective actions required

status of past corrective actions, and name and signature of inspector. This inspection notebook will be made available to Ecology upon request.

Upon completion of closure according to the plan, the Permittees will require the engineer to sign the following document or a document similar to it:

> *I, (name), a registered Professional Engineer, hereby certify, to the best of my knowledge and belief, that I have made visual inspection(s) of the 331-C Storage Unit at the 300 Area and that closure of the aforementioned unit has been performed in accordance with the attached approved closure plan.*

(Signature, date, state Professional Engineer license number, business address, and phone number.)

No other activities are expected to be necessary for clean closure.

H.1.3 Maximum Waste Inventory

The maximum waste inventory for the 331-C Storage Unit will not exceed 20,000 gallons, as described in Addendum A. The inventory will consist of the waste types described in Addendum A.

H.1.4 Closure of Waste Piles, Surface Impoundments, Incinerators, Land Treatment Facilities, and Miscellaneous Units

This section is not applicable to the 331-C Storage Unit because wastes are not managed in these types of units.

H.1.5 Closure of Landfill Units

This section is not applicable to the 331-C Storage Unit because it does not contain any landfill units and will not be closed as a dangerous waste landfill unit.

H.1.6 Schedule for Closure

When closure begins, the inventory of dangerous waste will be removed within 90 days from receipt of the final volume of waste. All closure activities will be completed within 180 days of receipt of the final volume of waste. Ecology will be notified by DOE-RL at least 45 days before the final closure activities are begun. Closure activities are summarized in Table 11.1. A detailed schedule of closure activities is provided in Table 11.2.

H.1.7 Extension for Closure Time

The inventory of dangerous waste will be removed from the 331-C Storage Unit within 90 days of receipt of the last volume of waste. The closure activities described in this plan will be completed within 180 days of receipt of the final volume of waste. No extension to the time frame for initiation and completion of closure is currently expected to be necessary. Extensions to the time frames for closure would only be necessary if unexpected conditions were encountered during closure of the unit. If it becomes apparent that all waste cannot be removed within 90 days, Ecology will be so notified at least 30 days prior to expiration of the 90-day period. This notification will demonstrate why more than 90 days is required for removal of the waste and will demonstrate that steps have been taken to prevent threats to human health and the environment and that the unit is in compliance with applicable permit standards. If it becomes apparent that closure cannot be completed within 180 days after approval of this plan, Ecology will be so notified at least 30 days prior to expiration of the 180-day period. This notification will demonstrate why more than 180 days is required for closure and will demonstrate that steps have been taken to prevent threats to human health and the environment and that the unit is in compliance with applicable permit standards.

H.1.8 Closure Cost Estimate

The Hanford Facility is not required to comply with the financial assurance requirements in WAC 173-303-620 based upon Permit Condition II.J.

H.1.9 Financial Assurance Mechanism for Closure

The Hanford Facility is not required to comply with the financial assurance requirements in WAC 173-303-620.

H.2 NOTICE IN DEED

This section is not applicable because the 331-C Storage Unit is not expected to be closed as a dangerous waste disposal unit.

H.3 POSTCLOSURE PLAN

This section and subsequent subsections are not applicable because the 331-C Storage Unit is expected to be clean closed, not as a land-based unit.

H.4 LIABILITY REQUIREMENTS

The Hanford Facility is not required to comply with the financial assurance requirements in WAC 173-303-620.

Table H.1. Summary of Closure Activities

Closure Activity Description	Expected Duration
Receipt of final volume of dangerous waste	N/A
Notify EPA and Ecology that closure will begin	30 days
Remove waste inventory – package all dangerous waste, manifest, and transfer to permitted facility for further storage, treatment and/or disposal	45 days
Decontaminate structural surfaces and equipment.	55 days
Analyze decontamination waste to determine proper methods of treatment/disposal	25 days
Dispose of decontamination waste based on results of waste analysis	20 days

Table H.2. Detailed Schedule of Closure

Action	Schedule
Pre-Closure Activities	
Date of receipt of last volume of waste	Day 0
Notify EPA and Ecology	Day 30
Closure Activities	
Removal of Waste Inventory	Day 75
Removal of equipment and components	Day 95
Decontamination of Unit	Day 130
Management of Decontamination Waste	
Waste Analysis	Day 155
Waste Disposal	Day 175
Other Activities	
Certification of Closure to Ecology	Day 215

Addendum I — Inspection Requirements

I. INSPECTION REQUIREMENTS I.1
I.1 INSPECTION PLAN I.1
I.1.1 General Inspection Requirements I.1
I.1.2 Inspection Log I.2
I.1.3 Schedule for Remedial Action for Problems Revealed I.2
I.1.4 Specific Process Inspection Requirements I.2

Figures

Figure I.1. Example of Weekly Inspection Checklist Form I.4

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I. INSPECTION REQUIREMENTS

I.1 INSPECTION PLAN

The purpose and intent of implementing inspection procedures at the 331-C Storage Unit are to prevent malfunctions, deterioration, operator errors, and/or discharges that may cause or lead to the release of regulated waste to the environment or threats to human health. A system of daily, weekly, quarterly, once every 4 months, and annual inspections involving various PNNL departments and levels of management are implemented at the 331-C Storage Unit.

I.1.1 General Inspection Requirements

The content and frequency of inspections performed at the 331-C Storage Unit are described in this section. Also described is maintenance of inspection records.

I.1.1.1 Types of Problems

Daily, weekly, quarterly, once every 4 months, and annual inspections are performed at the 331-C Storage Unit. The types of problems addressed by each of these inspections are described below.

Daily Inspections. The 331-C Storage Unit is inspected daily whenever waste packaging, transfer, shipping, or movement operations are being carried out. Daily inspections monitor container condition and integrity, the building waste containment system, and other building areas where wastes are handled. Specific inspection points include:

- Inspection of stored containers for leaks or damage
- Mislabeled or opened containers
- Improper storage (e.g., incompatible waste storage)
- Disorderliness or uncleanliness of a storage unit
- Check for accumulation of waste in containment systems.

Results of these daily inspections are recorded in the daily operating logbook that is part of the permanent Hanford Facility Operating Record, 331-C Storage Unit file.

Weekly Inspections. Waste management organization personnel conduct weekly inspections of both safety and operating equipment in the 331-C Storage Unit. Safety and emergency equipment are inspected for functionality and adequacy of supply. Staff conducts the weekly inspection each week using the inspection Logbook and the most current version of the Weekly Inspection Checklist Form that is on file at 331-C Storage Unit. An example of a Weekly Inspection Checklist is shown in Figure I.1. The Inspection Checklist and Inspection Logbook become a permanent part of the Hanford Facility Operating Record, 331-C Storage Unit file.

Specific problems to be looked for with each of the items inspected are identified on the Inspection Checklist Form. The use of this form enhances inspection effectiveness by providing a consistent and detailed listing of areas of potential problems and those safeguards in place to prevent them. There is space provided on the form for the inventory summary, comments, and required remedial actions (if any), as well as the date such actions are accomplished. The inspector is required to sign and date the inspection checklist after performing the inspection. A copy of the completed inspection form with any assigned action items is distributed to the responsible operating personnel. All corrective actions required must be completed within 1 week of the inspection that found them deficient, unless there is documented reason for further delay. When corrective action has been completed, the responsible personnel date and initial the form.

Quarterly, Once Every Four Months, and Annual Inspections. Safety inspections are performed to verify that the fire protection system, eye wash/shower unit, and walk-in hood ventilation systems are in working order. On an annual basis, the Fire Department performs a full inspection of the sprinkler system and pull boxes. A complete flow test is performed from the furthest valve to verify flow through the entire system. Fire extinguishers are also checked for proper pressure and function. The Hanford Fire

Department keeps records of these fire inspections. Documentation of any required corrective actions is kept in the Hanford Facility Operating Record, 331-C Storage Unit file.

PNNL facilities support staff perform additional documented inspections of the emergency eye wash/shower unit and the hood airflow. The emergency eyewash/safety shower and airflow of the hood are inspected quarterly. The emergency eyewash/safety shower is checked for proper operation, and the hood ventilation face velocity must meet minimum requirements. Records of these safety equipment inspections and their results, as well as documentation of any required corrective actions, are maintained by the preventive maintenance staff in PNNL's Facilities Management Department and Technical Services Department.

I.1.1.2 Frequency of Inspections

Inspections are conducted on a daily, weekly, quarterly, and annual basis, as described in Section I.1.1.1.

The frequency of inspections is based on specific regulatory requirements and on the rate of possible deterioration of equipment and probability of environmental or human health incidents.

Areas where dangerous wastes are actively handled, including the bay area, storage cells, and flammable liquid module, are considered to be areas subject to spills. These areas are given daily inspections when in use, as required by WAC 173-303-320(2)(c).

The containment system (i.e., floors and sumps) is inspected daily when in use for accumulation of spilled material. The containment system itself is inspected weekly for structural integrity (i.e., no cracks, gaps, leaks, etc. that could result in environmental release of waste in the event of a spill). This frequency is based on the need to perform timely corrective actions in the event that problems are noted.

Aisle space between containers is inspected weekly. This frequency is based on the consideration of the rate of container transfers and movement within the 331-C Storage Unit. Weekly inspections will allow container spacing problems to be identified and corrected before they become major problems.

Emergency and safety equipment and personal protective equipment are inspected weekly. This frequency is based on consideration of the expected rate of use of this equipment. Use of emergency equipment should not occur more than once during any one-week period. Weekly inspections will verify that this equipment is always functional and available in adequate supply.

I.1.2 Inspection Log

An example of the weekly inspection form is provided as Figure I.1. Completed inspection information (daily, weekly inspections) is maintained in the Hanford Facility Operating Record, 331-C Storage Unit file.

I.1.3 Schedule for Remedial Action for Problems Revealed

The 331-C Storage Unit staff conducting the inspection are responsible to take action to correct problems discovered during any inspection, in consultation with management if necessary (e.g. to acquire external resources necessary to address the problem). Any inspection finding indicating an imminent hazard will be immediately addressed. Other findings are expected to be remedied by the time of the next scheduled inspection (e.g. within one week for weekly inspection findings) unless a reason for further delay is documented.

I.1.4 Specific Process Inspection Requirements

The following sections detail the inspections to be performed at the 331-C Storage Unit.

I.1.4.1 Container Inspection

When in use, dangerous waste storage areas, as well as containers stored at 331-C Storage Unit, are inspected daily for leakage, evidence of damage or deterioration, proper and legible labeling, and proper lid and bung closure. When work is being performed, the containment system is also checked on a daily

basis for accumulation of any waste that may have been spilled into them. Structural integrity of the containment systems is checked on a weekly basis.

Daily and weekly inspections are performed and documented in accordance with Section I.1.1.1. Specific inspection items are enumerated in Section I.1.1.1 in association with the inspection description and frequency. Response to problems and documentation of corrective actions are as described in Section I.1.1.1.

I.1.4.2 Tank Inspection

This section does not apply to the 331-C Storage Unit because waste is not stored or treated in tanks.

I.1.4.3 Storage of Ignitable and Reactive Wastes

Inspection of areas where ignitable or reactive wastes are stored is conducted and documented at least annually in accordance with the annual inspection described in Section I.1.1.1.

I.1.4.4 Air Emissions Control and Detection – Inspections, Monitoring and Corrective Actions

I.1.4.4.1 Process Vents

This requirement does not apply to the 331-C Storage Unit because no process equipment subject to Subpart AA requirements is used there.

I.1.4.4.2 Equipment Leaks

This requirement does not apply to the 331-C Storage Unit because no process equipment subject to Subpart BB requirements is used there.

I.1.4.4.3 Tanks and Containers

The process for inspecting and monitoring containers subject to Subpart CC requirements is given in Addendum C, Section C.8.3.2.

I.1.4.5 Waste Pile Inspection

This section does not apply to the 331-C Storage Unit because waste is not placed in waste piles.

I.1.4.6 Surface Impoundment Inspection

This section does not apply to the 331-C Storage Unit because waste is not placed in surface impoundments.

I.1.4.7 Incinerator Inspection

This section does not apply to the 331-C Storage Unit because waste is not incinerated.

I.1.4.8 Landfill Inspection

This section does not apply to the 331-C Storage Unit because waste is not placed in landfills.

I.1.4.9 Land Treatment Facility Inspection

This section does not apply to the 331-C Storage Unit because waste is not treated in land treatment units.

Figure I.1. Example of Weekly Inspection Checklist Form

331C Chemical Waste Storage Unit

Inspector Name (print): _____ Inspector Signature: _____ Time/Date: _____

Waste Containment Locations (Y=Yes, N=No)

Earliest PCB Accumulation Date in Cell 2:_____

PCB Tracking log checked for CD return date (take corrective actions if O.O.S. date is over nine months with no CD returned) _____

Cell:	1 Oxidizer Acids	2 Poison, PCB, Class 9	3 Alkaline, WSDW, Organic Peroxides	4 Organics, Flammable and Compressed Aerosols	5 Compressed gases	6 Universal/ Recycling Storage Area	7 Class 9, WSDW, Non-flammable and Compatible Waste	8 Flammable Storage	9 Explosive Magazine	10 Outdoor Non-regulated Drum Storage
Container integrity good?										
Containers properly sealed?										
Containers properly labeled?										
Containers properly segregated?										
Floor free of major cracks/gaps?										
Sumps empty and dry?										

Minimum aisle space present? (30" aisles) _____

Inventory below 20,000-gallon design capacity? _____ Estimated volume = total liters ÷ 3.7854 _____gallons.

Inventory below UBC Class B limits? _____

Daily inspections logged? _____

Air Operating Permit requirements being met (check verification logbook)? _____

Part A Permit requirements are being met? _____

Explosive Storage—Assure controls and containment systems are working as designed and that releases are not escaping the unit? _____

Is there a clear path adequate for truck/trailer access to and from the waste loading area? _____

Verify tumbleweed/debris buildup around 331-C Facility is not in excess. _____

Figure I.1. Example of Weekly Inspection Checklist Form (cont.)

Weekly Inspection Form
331-C Storage Unit Chemical Waste Storage

Emergency Equipment and Supplies (Y=Yes, N=No)		UBC Class B within storage capacities? (Y=Yes, N=No)		
Eyewash safety shower: clear access?	____	Class 1A flammable liquids	120 gallons	____
Fire extinguishers inspected and have clear access?	____	Class 1B flammable liquids	240 gallons	____
Facility phone (376-0703) operational?	____	Class 1C flammable liquids	360 gallons	____
Synthetic, rubber, leather gloves stocked?	____	Maximum 1A,1B,1C combined	480 gallons	____
Are spill supplies stocked?	____	Maximum 1A,1B,1C combined	240 gallons	____
30 gallons of dioatomaceous earth?	____	stored in cell 8 flammable module		
55 gallons of vermiculite?	____	Class 2 combustible liquids	480 gallons	____
3 cartons of absorbent pillows?	____	Class 3A combustible liquids	1320 gallons	____
Acid, base and solvent neutralizers	____	Single flammable gas cylinder	3000 cubic ft	____
		Liquefied flammable gases	60 gallons	____
		Explosives	<2 lb	____
		Organic peroxides, unclassified, detonatable	<2 lb	____
		Pyrophorics	<8 lb	____
		Unstable (reactive) Class 4	<2 lb	____

Personal Protective Equipment (Y=Yes, N=No)	
4 face shields?	____
6 sets of chemically resistant suits, aprons, boots, and gloves	____
20 pairs of protective eyeglasses?	____
5 pairs of chemical goggles?	____
Inventory as noted and in working order?	____

Corrective Action and/or Clean-up Performed

Action	Initial	Date Corrected

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Hanford Facility RCRA Permit Modification Notification Forms

Part III, Operating Unit 16
400 Area Waste Management Unit

Permit Modification Index

Page 2 of 10: Hanford Facility Permit, III.16
Page 3 of 10: Addendum B, Waste Analysis Plan
Page 4 of 10: Addendum C, Process Information
Page 5 of 10: Addendum E, Procedures to Prevent Hazards
Page 6 of 10: Addendum F, Preparedness and Prevention
Page 7 of 10: Addendum G, Personnel Training
Page 8 of 10: Addendum H, Closure Plan
Page 9 of 10: Addendum I, Inspection Requirements
Page 10 of 10: Addendum J, Contingency Plan

Submitted by Co-Operator:

Steven T. Dahlgren — 5/29/09 Date

Reviewed by DOE Program Office:

DAT 6/5/09

Matthew S. McCormick — 6/8/09 Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management Area	**Part III, Operating Unit 16**

Description of Modification:

Hanford Facility Permit, III.16:

Part III, OPERATING UNIT GROUP 16 PERMIT CONDITIONS

400 Area Waste Management Unit

Unit Description:

The 400 Area Waste Management Unit (WMU) is in the Property Protected Area (PPA) at the Fast Flux Test Facility (FFTF), in Hanford's 400 Area. The 400 Area WMU consists of two container storage units:

- Fuel Storage Facility (FSF, Building 403). The FSF is a large steel-frame, metal-sided, high bay building. Its dimensions are 34 x 27 x 12 meters (112 x 90 x 40 feet). The container storage unit is on the ground-level floor. In it are two large steel boxes that store sodium-contaminated core component pots (CCPs). The Permittees do not plan to store more mixed waste than is currently stored in the facility; however, the FSF is physically capable of storing additional mixed waste. They will store any additional wastes at the 400 Area WMU in the Interim Storage Area.
- Interim Storage Area, 4718 (ISA). The ISA consists of 156 x 247 meters (513 x 247 feet) totally fenced area. This area is for aboveground dry cask storage of spent fuel. A concrete pad in the ISA, which measures 27 x 37 meters (90 x 120 feet), was used for dry cask storage, but will not necessarily be used for mixed waste management. The rest of the ISA surface is gravel. The ISA is generally flat. However, it is graded to drain in accordance with the general drainage plan for the FFTF PPA. Inside the ISA, there is also one building along the west fence line, and open on the side. This building, Building 432A, is authorized for mixed waste management.

The scale map in Addendum A shows the location of each storage unit. The only mixed waste stored in these two container storage units is debris (e.g., piping, equipment, and components) contaminated with elemental sodium and sodium hydroxide (D002). This waste stream is designated as (D001, D003, and WSC2). The 400 Area WMU will not store, treat, or dispose of bulk metallic sodium or bulk sodium hydroxide.

List of Addenda Specific to Operating Unit Group 16

Addendum A	Part A Form, dated October 1, 2008
Addendum B	Waste Analysis Plan, dated ~~August 27, 2008~~June 30, 2009
Addendum C	~~Reserved~~ Process Information, dated June 30, 2009
Addendum D	Groundwater Monitoring – Reserved
Addendum E	Procedures to Prevent Hazards, dated June 30, 2009
Addendum F	Preparedness and Prevention, dated June 30, 2009
Addendum ~~F~~G	Personnel Training, dated ~~March 31, 2009~~June 30, 2009
Addendum ~~G~~H	Closure Plan, dated ~~August 27, 2007~~June 30, 2009
Addendum ~~H~~I	Inspection Requirements, dated ~~March 31, 2009~~June 30, 2009
Addendum ~~E~~J	Contingency Plan, dated ~~March 31, 2009~~June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management Area	**Part III, Operating Unit 16**

Description of Modification:

Addendum B, Waste Analysis Plan:

Remove Addendum B, Waste Analysis Plan, dated August 27, 2007, and replace with Addendum B, Waste Analysis Plan, dated June 30, 2009

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

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

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

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Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management Area	**Part III, Operating Unit 16**

Description of Modification:

Addendum C, Process Information:

Add Addendum C, Process Information dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management Area	**Part III, Operating Unit 16**

Description of Modification:

Addendum E, Security Requirements:

Add Addendum E, Procedures to Prevent Hazards dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management Area	**Part III, Operating Unit 16**

Description of Modification:

Addendum F, Preparedness and Prevention:

Add Addendum F, Preparedness and Prevention dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P Davis — G. P Davis

5/28/09 — Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management Area	**Part III, Operating Unit 16**

Description of Modification:

Addendum G, Personnel Training:

Remove Addendum F, Personnel Training dated March 31, 2009, and replace with Addendum G, Personnel Training dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management Area	**Part III, Operating Unit 16**

Description of Modification:

Addendum H, Closure Plan:

Remove Addendum G, Closure Plan dated August 27, 2007, and replace with Addendum H, Closure Plan dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G. P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management Area	**Part III, Operating Unit 16**

Description of Modification:

Addendum I, Inspection Requirements:

Remove Addendum H, Inspection Requirements dated March 31, 2009, and replace with Addendum I, Inspection Requirements dated June 30, 2009

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

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

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

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

Reason for denial:

Reviewed by Ecology:

G.P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management Area	**Part III, Operating Unit 16**

Description of Modification:

Addendum J, Contingency Plan:

Remove Addendum E, Contingency Plan dated March 31, 2009, and replace with Addendum J, Contingency Plan dated June 30, 2009

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

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

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

A.1 General Permit Provisions, Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

G P. Davis 5/28/09

G. P Davis Date

Hanford Facility RCRA Permit Modification
Part III, Operating Unit 16
400 Area Waste Management Area

Remove and replace the following sections for Part III, Operating Unit 16:

- Remove Operating Unit 16, Unit Specific Conditions dated June 30, 2009, and replace with Unit Specific Conditions dated March 31, 2009
- Remove Addendum B, Waste Analysis Plan dated August 27, 2007, and replace with Addendum B, Waste Analysis Plan dated June 30, 2009
- Add Addendum C, Process Information dated June 30, 2009
- Add Addendum E, Procedures to Prevent Hazards dated June 30, 2009
- Add Addendum F, Preparedness and Prevention dated June 30, 2009
- Remove Addendum F, Personnel Training dated March 31, 2009, and replace with Addendum G, Personnel Training dated June 30, 2009
- Remove Addendum G, Closure Plan dated August 27, 2007, and replace with Addendum H, Closure Plan dated June 30, 2009
- Remove Addendum H, Inspection Requirements dated March 31, 2009, and replace with Addendum I, Inspection Requirements dated June 30, 2009

PART III, OPERATING UNIT GROUP 16 PERMIT CONDITIONS

400 Area Waste Management Unit

UNIT DESCRIPTION:

The 400 Area Waste Management Unit (WMU) is in the Property Protected Area (PPA) at the Fast Flux Test Facility (FFTF), in Hanford's 400 Area. The 400 Area WMU consists of two container storage units:

- Fuel Storage Facility (FSF, Building 403). The FSF is a large steel-frame, metal-sided, high bay building. Its dimensions are 34 x 27 x 12 meters (112 x 90 x 40 feet). The container storage unit is on the ground-level floor. In it are two large steel boxes that store sodium-contaminated core component pots (CCPs). The Permittees do not plan to store more mixed waste than is currently stored in the facility; however, the FSF is physically capable of storing additional mixed waste. They will store any additional wastes at the 400 Area WMU in the Interim Storage Area.
- Interim Storage Area, 4718 (ISA). The ISA consists of 156 x 247 meters (513 x 247 feet) totally fenced area. This area is for aboveground dry cask storage of spent fuel. A concrete pad in the ISA, which measures 27 x 37 meters (90 x 120 feet), was used for dry cask storage, but will not necessarily be used for mixed waste management. The rest of the ISA surface is gravel. The ISA is generally flat. However, it is graded to drain in accordance with the general drainage plan for the FFTF PPA. Inside the ISA, there is also one building along the west fence line, and open on the side. This building, Building 432A, is authorized for mixed waste management.

The scale map in Addendum A shows the location of each storage unit. The only mixed waste stored in these two container storage units is debris (e.g., piping, equipment, and components) contaminated with elemental sodium and sodium hydroxide (D002). This waste stream is designated as (D001, D003, and WSC2). The 400 Area WMU will not store, treat, or dispose of bulk metallic sodium or bulk sodium hydroxide.

LIST OF ADDENDA SPECIFIC TO OPERATING UNIT GROUP 16

Addendum A	Part A Form, dated October 1, 2008
Addendum B	Waste Analysis Plan, dated June 30, 2009
Addendum C	Process Information, dated June 30, 2009
Addendum D	Groundwater Monitoring – Reserved
Addendum E	Security Requirements, dated June 30, 2009
Addendum F	Preparedness and Prevention, dated June 30, 2009
Addendum G	Personnel Training, dated June 30, 2009
Addendum H	Closure Plan, dated June 30, 2009
Addendum I	Inspection Requirements, dated June 30, 2009
Addendum J	Contingency Plan, dated June 30, 2009

DEFINITIONS

The term **"CCP" or Core Component Pot** means one of 109 cylindrical containers, each containing 3.75 gallons of un-reacted sodium totaling 405 gallons, currently stored as mixed waste in the FFTF Fuel Storage Facility. The CCPs were previously filled with sodium and used in the FFTF Interim Decay Storage Vessel to store spent FFTF Driver Fuel Assemblies under inert gas.

ACRONYMS

FFTF	Fast Flux Test Facility
CCP	Core Component Pot
PPA	Property Protected Area
ISA	Interim Storage Area
FSF	Fuel Storage Facility
WMU	Waste Management Unit

III.16.A COMPLIANCE WITH UNIT-SPECIFIC PERMIT CONDITIONS

III.16.A.1 The Permittees will comply with all conditions in this Chapter and its addenda with respect to dangerous waste management and dangerous waste management units in the 400 Area WMU, in addition to conditions in Permit Parts I and II.

III.16.B GENERAL WASTE MANAGEMENT

III.16.B.1 The Permittees are authorized to accept, according to the waste acceptance procedure documented in Addendum B, Section B.2, mixed debris generated from demolition and decommissioning of the Fast Flux Test Facility reactor system containing or contaminated with residual elemental sodium and sodium hydroxide. The Permittee will store these wastes in the ISA.

III.16.B.2 The Permittees are authorized to store core component pots generated prior to the effective date of this permit in two large metal boxes in the 400 Area WMU, FSF.

III.16.B.3 The Permittees are authorized store mixed waste in the ISA up to a maximum capacity of 19,000 gallons.

III.16.B.4 The Permittees will maintain the physical structure of dangerous waste management units in the 400 Area WMU as documented in the Unit Description above and Addendum C, Figures C.1 and C.2.

III.16.B.5 The Permittees will maintain appropriate administrative controls and work practices to ensure that only wastes specified in Permit Condition III.16.B.1, are received by the ISA for storage, and that no co-mingling or cross-contamination of the waste stream specified in Permit Condition III.16.B.1 with any other waste stream may occur.

III.16.C WASTE ANALYSIS

III.16.C.1 The Permittees will have an accurate and complete waste profile for the waste stream identified in Permit Condition III.16.B.1. This waste profile will be signed and dated upon approval by the 400 Area WMU authorized representative. [WAC 173-303-380(1)(a)]

III.16.C.2 The Permittees will make a copy of the waste profile required by Permit Condition III.16.C.1 available upon request. [WAC 173-303-815(2)(b)(ii)]

III.16.D RECORDKEEPING AND REPORTING

III.16.D.1 The Permittees will place the following into the Hanford Facility Operating Record, 400 Area WMU File required by Permit Condition II.I.2. [WAC 173-303-380]

III.16.D.2 Records required by WAC 173-303-380(1)(o), incorporated by reference;

III.16.E SECURITY

III.16.E.1 The Permittees will post warning signs at all entrances to the FSF and the ISA specified in Addendum E, Section E.1.1. [WAC 173-303-310(2)(a)]

III.16.F PREPAREDNESS AND PREVENTION

III.16.F.1 The Permittees will comply with the Addendum F, Preparedness and Prevention requirements specific to the 400 Area WMU. [WAC 173-303-340]

III.16.G CONTINGENCY PLAN

III.16.G.1 The Permittees will comply with Addendum J, Contingency Plan in addition to the requirements of Permit Condition II.A when applicable. [WAC 173-303-350]

III.16.H INSPECTIONS

III.16.H.1 The Permittees will perform inspections of the 400 Area WMU according to Addendum I, Inspection Plan for inspecting all monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment that help prevent, detect, or respond to hazards to the public health or the environment pursuant to the requirements of WAC 173-303-320 [WAC 173-303-320(2)]

III.16.I TRAINING PLAN

III.16.I.1 The Permittees will include Addendum G unit-specific training requirements in the written training plan required by Permit Condition II.C. [WAC 173-303-330]

III.16.J OTHER GENERAL REQUIREMENTS

III.16.J.1 The Permittees will comply with the requirements of WAC 173-303-395(1)(a)-(c), incorporated by reference, for prevention of reaction of ignitable, reactive, or incompatible wastes.

III.16.J.2 Land Disposal Restriction Requirements

III.16.J.2.a The Permittees will ensure a schedule of compliance and any applicable associated work requirements are included in the land disposal restrictions report required by the HFFACO Milestone M-26, incorporated by reference by Permit Condition II.O for treatment and/or acquisition of treatment capacity for wastes which are or are expected to be stored in the 400 Area WMU container storage units.

III.16.K CLOSURE

III.16.K.1 The Permittees will close the 400 Area WMU Container Storage Units in accordance with Addendum H, Closure Plan. [WAC 173-303-610(4)]

III.16.L POST CLOSURE

Reserved

III.16.M CRITICAL SYSTEMS

Reserved

III.16.N RESERVED

III.16.O CONTAINERS

III.16.O.1 Container Management Standards

III.16.O.1.a The Permittees will ensure that all containers remain in good condition. If a container holding mixed waste is not in good condition (e.g., severe rusting or corrosion, or apparent structural defects), or if it begins to leak, the Permittee must transfer the waste from the container to a container that is in good condition or place the leaking container in an appropriate over-pack container. [WAC 173-303-630(2)]

III.16.O.1.b The Permittees shall ensure that all containers are constructed of carbon steel or stainless steel, or other materials compatible with metallic sodium and sodium hydroxide. [WAC 173-303-630(4)]

III.16.O.1.c The Permittees must remove spilled or leaked waste within secondary containment pursuant to WAC 173-303-630(7)(a)(ii), incorporated by reference.

III.16.O.1.d Requirements for the Fuel Storage Facility

III.16.O.1.e The Permittee will maintain an inert gas (argon or nitrogen) cover within each large metal box to prevent contact of the metallic sodium with the water vapor in the air and the formation of free liquids.

III.16.O.1.f The Permittees will place large boxes stored in the FSF in drip pans to ensure a base free of cracks or gaps, and ensure that the large boxes are elevated or otherwise protected from contact with accumulated liquids.

III.16.O.1.g Requirements for the Interim Storage Area

III.16.O.1.h The Permittee may store wastes in the ISA in standard metal containers (e.g., 208-liter drums), large metal boxes fabricated to accommodate the size and shape of a particular component or debris, or unique components removed from FFTF that when closed in accordance with WAC 173-303-630(5)(a) serve as a primary container.

III.16.O.1.i The Permittees will manage unique components stored in the ISA on the gravel surface with sufficient open space between components and between components and the fence line to accommodate inspections and movement of equipment.

III.16.O.1.j The Permittees will not place wastes in the open-sided structure (Building 432A) within the ISA identified in the Unit Description above.

B. WASTE ANALYSIS PLAN B.1

B.1 UNIT DESCRIPTION B.1
B.1.1 Description of Unit Processes and Activities B.1

B.2 CONFIRMATION PROCESS B.1
B.2.1 Pre-Transfer Review B.2
B.2.2 Verification of Waste B.2
B.2.3 Waste Acceptance B.2
B.2.4 Conformance Issue Resolution B.2

B.3 SELECTING WASTE ANALYSIS PARAMETERS B.2

B.4 SELECTING SAMPLING PROCESSES B.3

B.5 SELECTING A LABORATORY, LABORATORY TESTING, AND ANALYTICAL METHODS B.3

B.6 SELECTING WASTE RE-EVALUATION FREQUENCIES B.3

B.7 SPECIAL PROCEDURAL REQUIREMENTS B.3

B.8 RECORDKEEPING B.3

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B. WASTE ANALYSIS PLAN

The purpose of this Waste Analysis Plan (WAP) is to document waste analysis activities associated with the 400 Area WMU to comply with WAC 173-303-300(1), (2), (4), and (5). WAC 173-303-300(3) and (6) are not applicable, as the 400 Area WMU will not receive waste from any offsite facilities. Mixed waste managed in the 400 Area WMU is limited to waste generated in the 400 Area. Descriptions required by WAC 173-303-300(5) are contained in the following sections.

B.1 UNIT DESCRIPTION

The 400 Area WMU is a non-land based unit located in the 400 Area of the Hanford Facility and contains two container storage dangerous waste management units. The 400 Area WMU is operated in accordance with the provision of WAC 173-303-630. The mission of the 400 Area WMU is to store mixed waste until it is treated. Treatment is not currently provided for mixed waste stored at the 400 Area WMU.

B.1.1 Description of Unit Processes and Activities

The 400 Area WMU includes the FSF (Building 403) and the ISA. The unit boundary is represented by the perimeter of each of these noncontiguous storage locations, as shown on the topographic map related to the Addendum A, Part A Form on file with Ecology.

Addendum A, Part A Form identifies waste quantities and the process design capacity for the 400 Area WMU. Sodium contamination is associated with the sodium used as coolant in the FFTF reactor. The 400 Area WMU will continue to receive sodium-contaminated waste and debris as it is generated from FFTF. In addition, sodium-contaminated waste, generated in association with former FFTF operations and currently in storage at other Hanford Facility locations, could be transferred to the 400 Area WMU for consolidation with other 400 Area-generated waste. Transfers of mixed waste to the 400 Area WMU will be conducted under Permit Condition II.Q.

B.1.2 Identification and Classification of Waste

Waste types not specifically identified in Addendum A, Part A Form are prohibited from storage in the 400 Area WMU. The waste can only exhibit the characteristics of ignitability, reactivity, and/or corrosivity.

Waste is designated using manufacturers' product information, Material Safety Data Sheets (MSDSs), laboratory analysis provided by the generator, and/or reference material such as Registry of Toxic Effects of Chemical Substances (published by the National Institutes for Occupational Safety and Health). Addendum A, Part A Form identifies dangerous waste numbers for waste types stored at the 400 Area WMU. These dangerous waste numbers and corresponding references are as follows:

Dangerous Waste Number (Characteristic)	Reference
D001 (ignitable)	WAC 173-303-090(5)
D002 (corrosive liquid)	WAC 173-303-090(6)
D003 (reactive)	WAC 173-303-090(7)
WSC2 (corrosive solid)	WAC 173-303-090(6)/104

B.2 CONFIRMATION PROCESS

The confirmation process is the process by which the 400 Area WMU staff will confirm their knowledge about a waste before it is placed into storage to ensure the waste is managed properly. The confirmation process includes completing appropriate pre-transfer reviews and verification steps as described in this section.

B.2.1 Pre-Transfer Review

Pre-transfer review takes place before waste can be placed in the 400 Area WMU. The review focuses on whether the analysis information (e.g., waste profile documentation) is sufficient to determine that the waste can be safely stored and that the waste was generated at the 400 Area. The pre-transfer review will be documented on a waste profile and maintained in the Hanford Facility Operating Record, 400 Area WMU File. The analysis must include data obtained by testing the waste and/or 'knowledge' of the waste (i.e., sufficient information about a waste to substitute reliably for direct testing of the waste). 'Knowledge' consists of existing published or documented analysis data on the waste or data from waste generated in similar processes, including but not limited to the following:

- MSDSs on chemical products
- Analytical data on the waste or a waste from a similar process
- Interview information
- Logbooks
- Procurement records
- Qualified analytical data
- Procedures and/or methods
- Process flow charts
- Inventory sheets
- Vendor information

B.2.2 Verification of Waste

Verification is an assessment performed at waste receipt to substantiate that the waste stream received at the 400 Area WMU is the same as represented by the analysis information and/or supporting documentation. Verification includes a container a receipt inspection. Documentation to be reviewed as part of verification activities may include the container inventory documentation, a container listing report, and the waste profile documentation. For all TSD locations within the 400 Area WMU, each container or group of containers is inspected before acceptance by waste operations personnel for damage, proper closure, marking, and proper accompanying documentation.

B.2.3 Waste Acceptance

Acceptance of waste into the 400 Area WMU occurs only after the confirmation process (pre-transfer review and verification) is complete. Conformance issues identified during the confirmation process are documented and managed in accordance with Section B.2.4. Conformance issues that must be corrected before waste acceptance include:

- Waste that does not match approved waste profile documentation
- Designation discrepancy
- Packaging discrepancy

B.2.4 Conformance Issue Resolution

A conformance issue is any discrepancy identified during the confirmation process with waste profile documentation, a waste package, or a waste shipment. Discrepancies can be identified during pre-transfer review of a waste stream or during the verification process. If a possible conformance issue is identified, the following actions are taken by the 400 Area WMU staff to resolve the issue:

- Compile all information concerning the possible conformance issue(s).
- Gather additional knowledge that may assist in the resolution of the concern(s).
- Determine and implement the appropriate course of action to resolve the issue.

B.3 SELECTING WASTE ANALYSIS PARAMETERS

Sodium is the material of interest to support safe storage of the waste (including contaminated piping, appurtenances, and debris) at the 400 Area WMU. Sodium is a single element waste (i.e., no other chemical contamination) as it was contained in closed-loop cooling systems throughout FFTF reactor

operation. In addition, the ignitable and reactive properties of sodium metal are well known and documented (MSDSs and FFTF operating history), and the sodium waste to be stored in the 400 Area WMU is consistent with these properties. Analytical data exist for the sodium contained in the FFTF cooling system, therefore, no further sampling and analyses of the sodium waste are planned.

Based on known chemical properties of sodium metal, small amounts of concentrated sodium hydroxide and trace amounts of hydrogen may be generated if the sodium comes in contact with water vapor in the air during storage. Due to the potential formation of sodium hydroxide having a pH greater than 12.5, the sodium metal is designated as a corrosive (WSC2). In the event that liquid is identified in sodium waste secondary containment, the liquid will be managed under the generator provisions of WAC 173-303-200 and is beyond the scope of this WAP.

B.4 SELECTING SAMPLING PROCESSES

Additional analytical data are not required to store safely the sodium-contaminated waste at the 400 Area WMU. Therefore, no additional waste sampling is planned.

B.5 SELECTING A LABORATORY, LABORATORY TESTING, AND ANALYTICAL METHODS

Additional analytical data are not required to store safely the sodium-contaminated waste at the 400 Area WMU. Therefore, there is no need to select a laboratory, laboratory testing methods, or analytical methods.

B.6 SELECTING WASTE RE-EVALUATION FREQUENCIES

Additional analytical data are not required to store safely the sodium-contaminated waste at the 400 Area WMU. Therefore, there is no need to select a waste re-evaluation frequency.

B.7 SPECIAL PROCEDURAL REQUIREMENTS

Provisions of WAC 173-303-300(5)(f) are not applicable. Additional analytical data are not required to store safely the sodium-contaminated waste at the 400 Area WMU. Therefore, no special procedural requirements for sampling and analysis apply.

The 400 Area WMU will not conduct any land disposal restrictions (LDR) treatment of waste in storage. Therefore, the LDR requirements applicable to the 400 Area WMU are limited to the record keeping requirements in WAC 173-303-380(1)(o) and LDR reporting requirements under the Hanford Federal Facility Agreement and Consent Order. Mixed waste stored in the 400 Area WMU will be treated in accordance with Permit Condition II.S.

B.8 RECORDKEEPING

Confirmation process records, will be maintained in accordance with Permit Condition II.I.1. These records will be maintained in the Hanford Facility Operating Record, 400 Area WMU File from the time the waste is received until a period of ten years following certification of closure.

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Addendum C — Process Information

C. PROCESS INFORMATION C.1

C.1 CONTAINERS C.1
C.1.1 Description of Containers C.1
C.1.1.1 Description of Containers in the FSF (Building 403) C.1
C.1.1.2 Description of Containers in the ISA C.2
C.1.2 Container Management Practices C.2
C.1.2.1 Container Management Practices for the FSF C.2
C.1.2.2 Container Management Practices for the ISA C.3
C.1.2.3 Container Labeling C.4
C.1.3 Secondary Containment Requirements for Storing Containers C.4
C.1.3.1 Secondary Containment System Design and Operation C.4
C.1.3.2 Secondary Containment System Capacity C.4
C.1.3.3 Control of Run-On C.4
C.1.4 Removal of Liquids from Secondary Containment System C.5

C.2 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND INCOMPATIBLE WASTE IN CONTAINERS C.5
C.2.1 Management of Reactive Waste in Containers C.5
C.2.2 Management of Ignitable and Reactive Waste in Containers C.5
C.2.3 Design of Areas to Manage Incompatible Wastes C.5

C.3 AIR EMISSIONS CONTROL C.5

Figures

Figure C.1. Fuel Storage Facility C.6
Figure C.2. Container Management Area C.7

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C. PROCESS INFORMATION

This Addendum discusses the processes used to store sodium-contaminated waste at the 400 Area WMU. It includes a description of the containers used to store mixed waste at the two waste storage areas, the container management practices, the use of secondary containment systems, and special procedures related to ignitable, reactive, and incompatible wastes.

C.1 CONTAINERS

The following sections provide a description of 400 Area WMU waste containers, their management, their secondary containment, and removal of liquids from secondary containment systems.

C.1.1 Description of Containers

All mixed waste stored at the 400 Area WMU is packaged in containers. The specific size and type of container is dictated by the size, shape, or form of the waste. Containers generally consist of:

- Standard metal containers [e.g., 208-liter (55-gallon) drums]
- Large metal boxes [e.g., 1.2 meters by 1.2 meters by 2.4 meters (4 feet by 4 feet by 8 feet), 2.7 meters by 2.7 meters by 3.7 meters (9 feet by 9 feet by 12 feet)] fabricated to accommodate the size and shape of a particular component or piece of debris
- Unique components removed from FFTF that, when closed in accordance with WAC 173-303-630(5)(a), can serve as a primary container (e.g., large pumps, valves, tube bundles, cold traps).

Specific debris or components removed from FFTF may require the design and fabrication of additional boxes and, in some cases, containers smaller than 208-liter (55-gallon) may be appropriate for the waste type. The remainder of this Addendum describes storage of sodium-contaminated waste in standard metal containers [e.g., 208-liter (55-gallon) drums], large metal boxes, and unique components. Metallic containers (either carbon steel or stainless steel) are compatible with sodium for storage.

Sodium-contaminated waste stored at the 400 Area WMU is designated reactive per WAC 173-303-090(7). In addition to D003, this waste also is assigned dangerous waste numbers D001 and WSC2.

The 400 Area WMU consists of two container storage dangerous waste management units: the FSF (Building 403) and the ISA. The ISA is an outdoor storage area with a concrete pad and a gravel-surface pad. Refer to the map in Addendum A, Part A Form, for locations of these storage sites within the FFTF PPA. A maximum of 75,686 liters (20,000 gallons) of the sodium contaminant could potentially be stored in the 400 Area WMU.

C.1.1.1 Description of Containers in the FSF (Building 403)

The Core Component Pots (CPPs), cylindrical containers previously used to hold assemblies and other components are stored in FSF (Building 403) in large metal boxes. Each box measures 1.78 meters by 2.29 meters by 3.56 meters (5.84 feet by 7.51 feet by 11.68 feet). The box serves as the primary container for the residual sodium inside the CCPs. Each CCP has been emptied of sodium to the extent practicable, but a maximum of 14 liters (3.7 gallons) of radiologically contaminated sodium remains in each CCP.

The volume of actual sodium in each box is estimated to be less than 757 liters (200 gallons). Each box lid is closed with an elastomer gasket and bolted flange closures. An inert gas (argon or nitrogen) cover is maintained on storage of each box to prevent contact of the metallic sodium with the water vapor in the air. Shielding is provided for worker protection and to meet as low as reasonably achievable (ALARA) requirements.

C.1.1.2 Description of Containers in the ISA

The ISA is an outdoor storage area, which includes a concrete pad and an additional area of open level ground. The two types of containers anticipated to be stored in the ISA are the unique components and standard metal containers described in Sections C.1.1.2.1 and C.1.1.2.3 respectively.

C.1.1.2.1 Storage of Standard Metal Containers in the ISA

The standard metal containers stored in the ISA are contained in container storage modules, specifically configured for the storage of reactive, ignitable, and corrosive waste. Each module is totally enclosed to protect the containers from the weather. The modules are placed directly onto the gravel pad and anchored by conventional methods (e.g., screw anchor or conventional dead man).

C.1.1.2.2 Storage of Large Metal Boxes in the ISA

Large metal boxes can be stored in the ISA. Waste placed in the large metal boxes will not be amenable for storage in standard metal containers, but does not require development of a unique package. Large metal boxes are commercially available and will be placed within secondary containment in the ISA.

C.1.1.2.3 Storage of Unique Components in the ISA

Unique components can be stored in the ISA. Unique components are anticipated to be removed as intact units, except for severed inlet and outlet piping. The inlets and outlets are closed as part of the removal process to prevent any residual sodium inside the component from reacting with water vapor in the air to form sodium hydroxide. Each component, once closed, serves as the primary container for the sodium waste residue on the interior surfaces of the component.

C.1.2 Container Management Practices

During the container receipt inspection, any discrepancies that have been noted are resolved in accordance with Addendum B, Waste Analysis Plan. Appropriate labels are applied to the containers before acceptance at any of the three waste storage locations in the 400 Area WMU to meet the requirements of WAC 173-303-630(3) and WAC 173-303-395(6). The container packaging and container handling are designed to maintain containment of the waste, maintain damage-free and contamination-free containers, limit storage intrusion, and limit human exposure to mixed waste.

The subsections below describe the container management practices for the FSF and the ISA.

C.1.2.1 Container Management Practices for the FSF

The FSF is a steel-framed, metal-sided, one-story building that is erected on a reinforced concrete substructure. It has electrical service, lighting, and ventilation, but no water services. The reinforced concrete floor has a load rating of approximately 0.49 kilograms per square centimeter (1,000 pounds per square foot). The loaded weight of each storage container is approximately 8,256 kilograms (18,200 pounds), which provides a floor load factor of safety of approximately four (Figure C.1).

The drip pan is placed on the floor and the large metal box is placed onto the drip pan. A forklift/rigging packet is provided as an integral part of the base of each metal box. Lifting slings are also available on each box and the overhead bridge crane can be used to lift and position the box.

Sodium is stored at room temperature under an inert gas blanket to protect sodium from reaction with air.

Shielding is provided for worker protection and to meet ALARA requirements. Containers are inspected for deterioration and leakage once each week using a mirror to view all outer surfaces of the waste boxes. The aisle space requirements of WAC 173-303-630(5)(c) do not apply because there are only two containers. The waste is stored in a manner equivalent to WAC 173-303-630(5)(c) and the International Fire Code as interpreted by the Hanford Fire Department.

C.1.2.2 Container Management Practices for the ISA

The three types of containers identified in Section C.1.1 can be stored at the ISA. This dangerous waste management unit will be in compliance prior to use (Figure C.2). Management practices for these three container types are described in Sections C.1.2.2.1, C.1.2.2.2, and C.1.2.2.3.

C.1.2.2.1 Management of Standard Metal Containers in the ISA

The waste is stored in standard metal containers [e.g., 208-liter (55-gallon) drums], as described in Section C.1.1.2.1. Standard metal containers are placed into the container storage modules by means of a forklift or by manual placement depending on weight of the container and storage configuration.

Container storage modules in the ISA will be placed in a manner equivalent to the International Fire Code as interpreted by the Hanford Fire Department.

Standard metal containers placed into a container module can be stored four to a pallet, and multiple pallets will constitute a row of containers. Since only one row of pallets can be placed within the container storage modules, there are no aisles between rows, and therefore, the 30-inch aisle spacing requirement of WAC 173-303-630(5)(c) does not apply. Spacing between the pallets and the walls of the container storage module will be maintained to facilitate inspection and emergency response. Standard metal containers can be stacked two high within the container storage modules.

Standard metal containers managed in container storage modules are positioned so labels are visible for inspection. Receipt inspections of the containers are preformed at the time the containers are loaded into the module according to Addendum B, Waste Analysis Plan. Standard metal containers in storage are visually inspected at least weekly in accordance with WAC 173-303-630(6) (refer to Addendum I, Inspection Requirements).

Container receipt inspections of standard metal containers are performed at the storage location within the ISA. The standard metal containers are visually inspected at least weekly while in storage (refer to Addendum I, Inspection Requirements).

C.1.2.2.2 Management of Large Metal Boxes in the ISA

The waste is stored in large metal boxes as described in Section C.1.1.2.2. Large metal boxes in the ISA will be placed in a manner equivalent to the International Fire Code as interpreted by the Hanford Fire Department. Prior to placement of a large metal box in the ISA, a drip pan described in Section C.1.3.2 will be placed at the storage location. The large metal box serves as the primary container. The drip pan used for secondary containment of the large metal box is placed on the ground; the large metal box is placed in the drip pan, and elevated from the base of the drip pan. Each large metal box is handled and positioned in a manner to prevent rupture and container leakage.

Container receipt inspections of large metal boxes are performed at the storage location within the ISA. The large metal boxes are visually inspected at least weekly while in storage (refer to Addendum I, Inspection Requirements).

C.1.2.2.3 Management of Unique Components in the ISA

Waste is stored as unique components as described in Section C.1.1.2.3. Unique components in the ISA will be placed in a manner equivalent to the International Fire Code as interpreted by the Hanford Fire Department.

Prior to placement of a unique component in the ISA, a drip pan described in Section C.1.3.2 will be placed at the storage location. The unique component serves as the primary container.

The drip pan used for secondary containment of the unique component is placed on the ground. The unique components are placed in the drip pans and elevated from the base of the drip pans. Each unique component is handled and positioned in a manner to prevent rupture and container leakage.

Container receipt inspections of unique components are performed at the storage location within the ISA. The unique components are visually inspected at least weekly while in storage (refer to Addendum I, Inspection Requirements).

C.1.2.3 Container Labeling

Containers are labeled and marked to meet the requirements of WAC 173-303-630(3) and WAC 173-303-395(6).

C.1.3 Secondary Containment Requirements for Storing Containers

The following sections describe secondary containment systems for the 400 Area WMU.

C.1.3.1 Secondary Containment System Design and Operation

The design of secondary containment systems varies depending on the particular dangerous waste management unit and the container type. Design, placement, and operation of each type of secondary containment system are discussed in Sections C.1.3.1.1 and C.1.3.1.2.

C.1.3.1.1 Secondary Containment System Design and Operations for the FSF

Secondary containment requirements in WAC 173-303-630(7) are met for the large metal boxes by placing the waste containers in drip pans. A forklift/rigging packet is provided as an integral part of the base of each metal box and results in elevation of the base of the box approximately 10.2 cm (four inches) above the drip pan keeping the base of the container from contacting any waste that could accumulate in the drip pan. The depth of the drip pan is approximately 8.9 centimeters (3.5 inches).

C.1.3.1.2 Secondary Containment System Design and Operations for the ISA

For each type of container stored within the ISA, secondary containment is provided compliant with WAC 173-303-630(7). The design can include provisions for indoor or outdoor storage. Indoor storage is provided for small metal containers managed in container storage modules. The container storage modules will be procured to be compliant with WAC 173-303-630(7). Outdoor storage is provided for large metal containers and unique components. A forklift/rigging packet is provided as an integral part of each secondary containment drip pan for outdoor storage. Outdoor containers are elevated in the drip pan keeping the base of the container from contacting any waste or liquids that could accumulate in the drip pan. Capacity will be designed on a case-by-case basis in accordance with Section C.1.3.2.

C.1.3.2 Secondary Containment System Capacity

Each secondary containment system is designed to provide a base underlying the boxes, containers, or components that is free of cracks or gaps and is sufficiently impervious (WAC 173-303-630(7)(a)(i)). For outdoor storage, the capacity of the containment (e.g., drip pan) will also meet the 25-year 24-hour storm value of 3.35 centimeters (1.32 inches) (WAC 173-303-630(7)(a)). In rare cases, when a container can contain free liquids, the drip pan will also be designed to meet the requirements of WAC 173-303-630(7)(a)(iii). Since sodium melts at 98 degrees C, an event causing liquid sodium to be released into the secondary containment is extremely unlikely. Since run-on is prevented as described in Section C.1.3.3, additional capacity is not required for run-on.

C.1.3.3 Control of Run-On

There is not a credible pathway, which run-on can come into contact with the sodium-contaminated waste or enter the secondary containment for the waste containers. The contour of the ground and the 400 Area storm water drainage systems around the FSF and the ISA prevents run-on. Waste containers stored at the ISA are stored either on covered drip pans or in weather-tight storage modules. Run-on is prevented in either case.

Refer to Section C.1.4 for a discussion of response to accumulation of water from a known source (e.g., rainwater or snowmelt) in secondary containment.

C.1.4 Removal of Liquids from Secondary Containment System

In the unlikely event of liquid intrusion into the secondary containment system, the following is performed:

- Liquid in the secondary containment system is visually inspected for signs of other materials (e.g., dust, etc.).
- Containers affected are inspected for signs of damage. Damaged containers are repackaged and identified in the 400 Area WMU operating logbook.
- Previous inspection checklists are reviewed to identify any waste releases in the waste storage areas for which remedial actions have not been completed.
- Liquid removed from secondary containment is removed and characterized under the generator provisions of WAC 173-303-200 and is outside the scope of TSD unit operations.
- The 400 Area WMU supervisor signs the operating logbook indicating that the previous steps have been completed and that the secondary containment and/or storage structure(s) are clean.

Records of spills and releases of mixed waste are maintained as part of the 400 Area WMU operating record. For related records maintained elsewhere, both a description and the location of such records are entered into the operating record. These records include, but are not limited to, electronic and/or paper records. These records will be retained in accordance with Permit Condition I.E.10.c. These records will eventually be utilized during closure activities at the 400 Area WMU, as noted in Addendum H, Closure Plan. Additional actions taken in response to a spill or discharge are detailed in the Addendum J, Contingency Plan.

C.2 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND INCOMPATIBLE WASTE IN CONTAINERS

Ignitable and reactive waste stored in containers is packaged and managed in the manner described in Sections C.1.1 and C.1.2. The waste stored in the 400 Area WMU is not incompatible with storage container materials of construction or other waste in the storage unit based on the waste codes and generating source documented in Addendum A, Part A Form.

C.2.1 Management of Reactive Waste in Containers

The reactive designation for waste identified in the Addendum A, Part A Form, is not based on WAC 173-303-090(7)(a)(vi), (vii) or (viii), which address explosives and materials that can be detonated.

C.2.2 Management of Ignitable and Reactive Waste in Containers

Waste storage limits and spacing requirements are equivalent to those specified in the International Fire Code as interpreted by the Hanford Fire Department.

A qualified staff member will inspect the areas storing mixed waste annually as specified in WAC 173-303-395(1)(d). This inspection will be performed in the presence of a professional person who is familiar with the International Fire Code, including the local, state, or federal fire marshal.

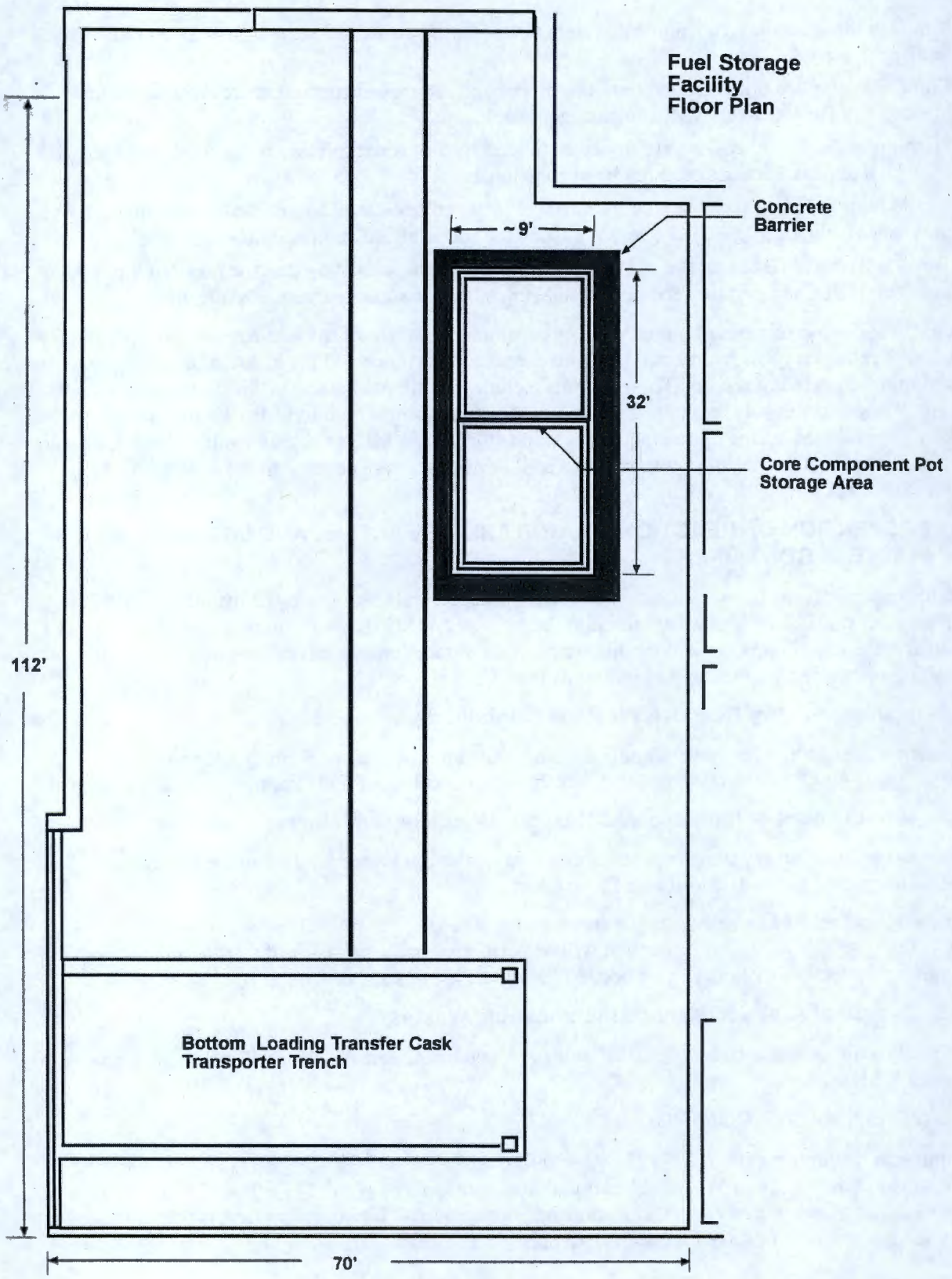
C.2.3 Design of Areas to Manage Incompatible Wastes

Only waste with the waste codes identified in the Addendum A, Part A Form, will be stored in the 400 Area WMU.

C.3 AIR EMISSIONS CONTROL

Air emission requirements of WAC 173-303-690 through WAC 173-303-691 do not apply to mixed waste stored at the 400 Area WMU. The air emission standards of WAC 173-303-692 (Subpart CC) apply to tank, surface impoundment, and container storage units. However, containers that are used solely for management of mixed waste are exempt.

Figure C.1. Fuel Storage Facility



Not to scale.

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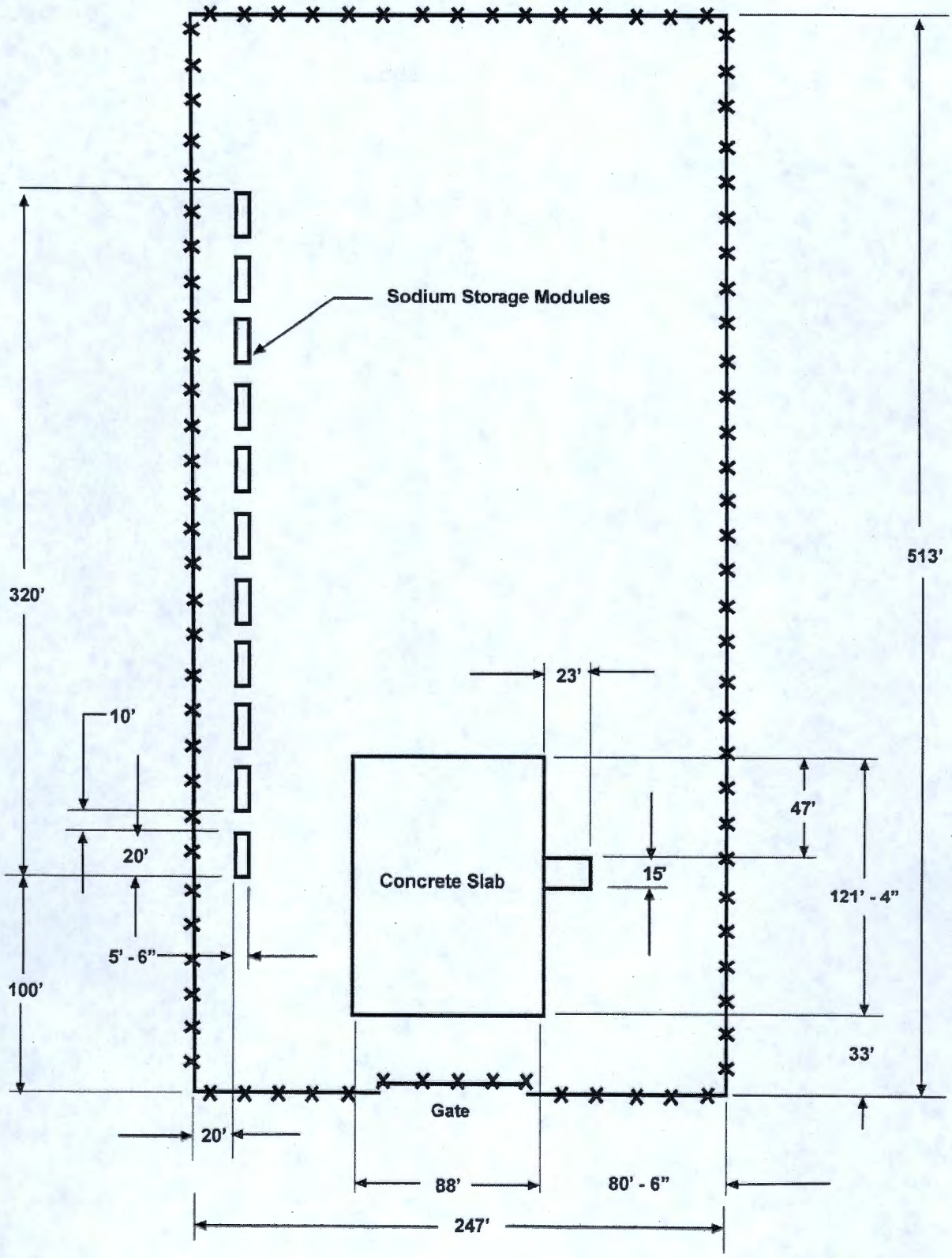
R1 4-13-07

Figure C.2. Container Management Area



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E. PROCEDURES TO PREVENT HAZARDS E.1

E.1 SECURITY REQUIREMENTS E.1
E.1.1 Security Procedures and Equipment E.1
E.1.2 Waiver E.1

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E. PROCEDURES TO PREVENT HAZARDS

The 400 Area WMU is designed and operated to minimize exposure of the general public and operating personnel to waste. Shielding, control of toxic or dangerous material, safety and security procedures, and structures are used to keep exposure within ALARA requirements. In addition, the 400 Area WMU is designed to withstand accidents without undue risk to the health and safety of the general public and operating personnel.

E.1 SECURITY REQUIREMENTS

Refer to Permit Attachment 33, Section 6.1, Security.

E.1.1 Security Procedures and Equipment

The 400 Area WMU is located within the 400 Area property protection area (PPA) of the Hanford Facility and access is controlled by physical barriers, which complies with WAC 173-303-310(2)(c). Signs stating *Danger-Unauthorized Personnel Keep Out*, or equivalent language, legible at 7.6 meters (25 feet) or more, are posted near the entrance of each mixed waste storage area.

E.1.2 Waiver

Waiver of the security procedures and equipment requirements for the 400 Area WMU is not requested.

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F PREPARDENESS AND PREVENTION F.1

F.1 PREPAREDNESS AND PREVENTION REQUIREMENTS F.1
F.1.1 Equipment Requirements F.1
F.1.2 Aisle Space Requirement F.2

F.2 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT F.2
F.2.1 Unloading Operations F.2
F.2.2 Run Off F.2
F.2.3 Water Supplies F.2
F.2.4 Equipment and Power Failure F.2
F.2.5 Personnel Protection Equipment F.2

F.3 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND/OR INCOMPATIBLE WASTE F.2
F.3.1 Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste F.2
F.3.2 Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste F.3

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F PREPARDENESS AND PREVENTION

This Addendum discusses preparedness and prevention requirements; preventive procedures, structures, and equipment; and prevention of reaction of ignitable and reactive waste stored at 400 Area WMU.

The 400 Area WMU is designed and operated to minimize exposure of the general public and operating personnel to waste. Shielding, control of toxic or dangerous material, safety and security procedures, and structures are used to keep exposure within ALARA requirements. In addition, the 400 Area WMU is designed to withstand accidents without undue risk to the health and safety of the general public and operating personnel.

F.1 PREPAREDNESS AND PREVENTION REQUIREMENTS

The following sections document the preparedness and prevention measures taken at the 400 Area WMU.

F.1.1 Equipment Requirements

The following sections describe the internal and external communications systems and the emergency equipment required that could be activated by the 400 Area WMU Building Emergency Director. Hanford Facility-wide equipment is identified in Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02).

F.1.1.1 Internal Communications

Groups or individuals working in any of the 400 Area WMU mixed waste storage areas communicate by two-way radio or cell phone. The S&M Operations Manager is the point of contact and all operations personnel with radios may function as a backup. The public address (PA) system is also available. The Hanford Patrol Operations Center (POC) is available by dialing 911. Cell phones should use 373-3800 to call the POC.

The ISA has no installed communication or alarm systems. The PA system can be heard throughout the 400 Area property protection area (PPA). A pressure alarm in the feed line for the inert gas to the CCP storage boxes in the FSF is wired to an alarm panel in Building 481A to alert the stationary operating engineer t in the event of low pressure.

F.1.1.2 External Communications

The 400 Area WMU is equipped with devices for summoning emergency assistance from the Hanford Fire Department, the Hazardous Materials Response Team, and/or Hanford Patrol as necessary. External communication to summon emergency assistance is made via a telephone communication system, fire alarm pull boxes, a two-way radio base station, and two-way portable radios as described in Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02). The locations of the primary staging area are identified in Addendum J, Contingency Plan.

F.1.1.3 Emergency Equipment

The 400 Area WMU relies primarily on the Hanford Fire Department to respond to fires and other emergencies as described in Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02). The Hanford Fire Department is capable of providing rapid response to fires within the 400 Area WMU.

A detailed list of emergency response equipment is included in Addendum J, Contingency Plan. Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02) also contains the Hanford Facility wide equipment list. Fire extinguishers (Class D) are in the areas of the stored ignitable and/or reactive waste. Personnel are trained in the use of emergency equipment (Addendum G, Personnel Training).

F.1.1.4 Water for Fire Control

The only mixed waste stored in the 400 Area WMU consists of containerized reactive sodium metal as a residual contaminant on piping and components. Therefore, water will not be used to extinguish a fire associated with this waste stream. Existing water fire suppressions systems have been physically disconnected in any case where sprinkled water could potentially contact the stored metallic sodium waste in the 400 Area WMU.

F.1.2 Aisle Space Requirement

A discussion on the applicability of aisle space is found in Addendum C, Process Information.

F.2 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT

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

F.2.1 Unloading Operations

Unloading requirements in WAC 173-303-395(4) do not apply to the 400 Area WMU because liquid dangerous waste will not be accepted into the TSD unit on a manifest shipment.

F.2.2 Run Off

The 400 Area storm water drainage system and appropriate grading prevent run-off.

F.2.3 Water Supplies

The discussion of water supplies in the context of the 400 Area WMU is not applicable, because water is not connected. Therefore, no potential for cross connection or back flow that could contaminate a water source exists.

F.2.4 Equipment and Power Failure

Loss of electrical power does not constitute an emergency situation regarding storage of mixed waste at the 400 Area WMU. The FFTF facility is deactivated and in a long-term surveillance and maintenance mode. Therefore, the 400 Area WMU only has minimal electrical power is available. Indoor waste areas will not be occupied during power outages without adequate alternate substitutes for those systems except for personnel providing a fire watch or other emergency response activity.

As described in Section F.1.1.2, emergency communication equipment is available to summon emergency assistance in the event of a power loss.

F.2.5 Personnel Protection Equipment

Refer to Addendum J, Contingency Plan, for information regarding required personnel protection equipment available for use at 400 Area WMU.

F.3 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND/OR INCOMPATIBLE WASTE

The following section describes prevention of reaction of ignitable, reactive, and/or incompatible waste.

F.3.1 Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste

All waste stored in the 400 Area WMU is stored in closed containers.

Activities involving heat generation (welding, cutting, open flames, hot surfaces, frictional heat, sparks, or radiant heat) are not allowed within the 400 Area WMU, without specific authorization by the S & M Operations Manager.

'NO SMOKING' signs are conspicuously placed wherever there is a hazard from ignitable or reactive waste.

The containerized waste (metallic sodium) is also water reactive. Precautions have been taken to ensure that water does not contact the waste. These precautions included removal of water fire suppression systems in the immediate area of waste containers, sealing the containers, and ensuring that outdoor container storage provides protection from precipitation and run-on.

WAC 173-303-630 requires managing ignitable and reactive waste containers in a manner equivalent to the International Fire Code. The Hanford Fire Department will determine whether the storage of ignitable and reactive waste meets the International Fire Code or equivalent.

F.3.2 Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste

Metallic sodium, in a solid form due to its high melting point (98°C), is the only waste stored at the 400 Area WMU. This waste is adhered to or contained in the interior of debris that has been generated from FFTF. This waste, which is a mixed waste, exhibits the characteristics of ignitability and reactivity due to the metallic sodium. It is also designated as a corrosive waste, as it may generate sodium hydroxide if it comes into contact with water vapor in the air.

There is no potential for mixing the metallic sodium waste with another waste that could result in an incompatible reaction, as the sodium waste is the only waste stored in the 400 Area WMU. The containers selected for storage of the waste are made of either carbon steel or stainless steel and are well suited to store the waste, even if small amounts of highly alkaline sodium hydroxide are generated inside the container. Either new containers are used or existing containers are thoroughly cleaned and dried before waste is placed in them.

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400 Area Waste Management Unit Training Matrix

	Training Category*				
Permit Attachment 5, Training Category	General Hanford Facility Training	Contingency Plan Training	Emergency Coordinator Training	Operations Training	
400 Area WMU DWTP implementing plan	Orientation Program	Emergency Response (Contingency Plan)	Emergency Coordinator Training	General Waste Management	Container Management
Job title/position					
Environmental Compliance Officer	X	X		X	
Building Emergency Director	X		X		
Non-Resident Waste Service Provider	X			X	
Non-Resident Sampler	X			X	

*Refer to the 400 Area WMU Dangerous Waste Training Plan (DWTP) for a complete description.

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H CLOSURE PLAN H.1
H.1 CLOSURE PERFORMANCE STANDARD H.1
H.2 CLOSURE ACTIVITIES H.1
H.2.1 Remove Waste Inventory H.2
H.2.2 Perform Document Review and Interview Personnel to Determine Spill History H.2
H.2.3 Verify Performance Standard Achievement H.3
H.2.4 Decontaminate or Remove Equipment H.3
H.2.5 Decontaminate Structures H.3
H.2.6 Remediate Soils H.3
H.3 MAXIMUM EXTENT OF OPERATION AND MAXIMUM WASTE INVENTORY H.3
H.4 SCHEDULE FOR CLOSURE H.3
H.5 CERTIFICATION OF CLOSURE H.4

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H CLOSURE PLAN

The closure plan for the 400 Area WMU addresses closure of the two container storage units referred to as the Fuel Storage Facility (FSF) and the Interim Storage Area (ISA). This closure plan is based on closure by removal or decontamination, or "clean closure", and the general and unit-specific closure criteria in WAC 173-303-610(2) and WAC 173-303-630(10). All mixed waste will be removed from the FSF and ISA at the time of closure.

The following sections document the required closure performance standards and necessary closure activities to close the two container storage units at the 400 Area WMU.

H.1 CLOSURE PERFORMANCE STANDARD

The closure performance standard for the FSF and the ISA, based on "clean closure", are established for structures, equipment, bases, and liners under WAC 173-303-610(2)(b)(ii). Ecology may establish closure standards under this authority on a case-by-case basis. FSF and ISA will be considered clean when surfaces of structures, equipment, bases, liners, etc., meet the clean debris surface standard in 40 CFR 268.45, Table 1, Footnote 3. This standard requires that potentially contaminated surfaces when viewed without magnification shall be free of all visible contaminated soil and dangerous waste. Except the 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 such staining and waste, and soil in cracks, crevices, and pits shall be limited to no more than 5 percent of each square inch of surface area.

The clean closure standard will be achieved by documenting the absence of, or removing the mixed waste inventory. This includes all mixed waste and dangerous waste constituents from the 400 Area WMU. The operating practices used for waste management at the FSF and the ISA will identify and cleanup any spills or releases that may occur during operation of the units, and document in the Hanford Facility Operating Record, 400 Area WMU File the occurrence of a response to any spill or release. Cleanup of spills and releases from waste management operations will be consistent with the closure performance standard established in this plan, so that no additional cleanup or verification will be necessary at the time of closure. [WAC 173-303-610(2) and WAC 173-303-630(10)].

Contamination of soil, groundwater, surface water, or air related to operations at the FSF and ISA is not anticipated to be a concern at the time of closure. Therefore, the closure standards identified in WAC 173-303-610 (2)(b)(i) for soils, ground water, surface water, and air are not discussed at this time. However, in the unlikely event that soil contamination is found, this Closure Plan will be amended with an approved Permit modification and in accordance with WAC 173-303-610(3)(b) to incorporate soil closure performance standards.

H.2 CLOSURE ACTIVITIES

The 400 Area WMU is operated as a clean, well-maintained dangerous waste management unit. Detailed records are and will continue to be maintained of the materials and waste stored at the FSF and ISA, pursuant to Permit Condition III.16.B.2.c. Spills and other unusual occurrences are responded to and documented pursuant to Section H.1. Clean closure of the 400 Area WMU container storage units will demonstrate that the storage areas are not contaminated with mixed waste or dangerous waste constituents. Contamination from the FSF and ISA operations is not expected to be present at the time of closure, since the permit condition governing dangerous waste management activities require that any spills or releases be promptly identified and cleaned up to a performance standard equivalent to the clean closure performance standard established in this closure plan. Therefore, no decontamination is expected to be necessary at the time of closure, no sampling is planned in support of clean closure, and no other closure activities are anticipated.

If evaluation of documentation such as spill records, field observations, and personnel interviews indicate the likelihood of waste contamination that was not previously cleaned up, or that the results of past spill cleanup cannot be verified, this Closure Plan will be amended with an approved Permit modification and

in accordance with Permit Condition II.J.3. Any unanticipated decontamination activities, sampling and analysis activities, or other activities required for clean closure will be accomplished in accordance with the amended Closure Plan. The Closure Plan will contain the necessary provisions at the time of closure.

At a minimum, closure activities will accomplish the following.

- Remove stored waste inventory and transfer to a permitted on-site dangerous waste management unit, or to an off-site facility meeting the definition of a "designated facility" in WAC 173-303-040, incorporated by reference, as appropriate.
- Perform document review and interview personnel to determine spill history and ensure spills were completely cleaned up consistent with closure performance standards for the FSF and ISA
- Verify that performance standard has been achieved
- Obtain certification described in Section H.5 upon performance standard verification
- Prepare a Permit modification in accordance with Permit Condition II.J.3 to amend the Closure Plan and include the additional work requirements necessary to achieve clean closure upon an initial finding that the performance standard(s) was not achieved.

Detailed information for the closure activities are provided as follows.

H.2.1 Remove Waste Inventory

All containers of waste will be removed from each container storage dangerous waste management unit. If the containers are removed from the FSF to the ISA to close the FSF in advance of the ISA, a waste transfer to consolidate wastes in the ISA will be accomplished without the need for specialized equipment. Waste transfers will be in compliance with WAC 173-303-380(1)(b).

If the containers require transportation from the FSF or the ISA to another on-site dangerous waste management unit or off-site TSD Facility, special transportation containment will be designed and fabricated for the waste stored in the FSF. For waste stored in the ISA, specialized transportation containment and/or packaging will be determined on a case-by-case basis. In addition, the receiving on-site dangerous waste management unit or off-site TSD Facility may require time to modify documents in order to receive the containers of waste.

No waste treatment capacity is currently available for the inventory of wastes expected to be managed at the FSF or the ISA. No waste is expected to be generated during closure activities following removal of the waste inventory. This closure plan will be amended in accordance with Permit Condition II.J.3 in the event that waste will be generated.

If the ISA never managed any waste at the time of closure, the inspection/survey below will document that condition.

H.2.2 Perform Document Review and Interview Personnel to Determine Spill History

Because the 400 Area WMU is and will continue to be a well operated dangerous waste management unit, the Hanford Facility Operating Record, 400 Area WMU File will contain documentation of how any spills were properly cleaned up. Proper clean up of spills will be determined by demonstrating any residuals from the spills have been removed. The Hanford Facility Operating Record, 400 Area WMU File will show how the spill was cleaned up. A visual performance standard will allow for clean closure of structures, equipment, bases, liners, etc. The spill clean up records in the Hanford Facility Operating Record, 400 Area WMU File will become a basis to support clean closure of the ISA gravel areas without the need for sampling. If review of the Hanford Facility Operating Record, 400 Area WMU File reveals a problem, the Closure Plan will be amended to include the necessary steps to satisfy the closure performance standard.

H.2.3 Verify Performance Standard Achievement

After all waste has been removed from a container storage dangerous waste management unit(s) and the document review has been completed, a visual inspection/survey will be performed on any structures, equipment, bases, liners, etc, to verify that the surface meets the clean debris surface in 40 CFR 268.45 Table 1, Footnote 3, incorporated by reference. The inspection/survey will evaluate all surfaces, with special emphasis on information derived from evaluation of the operation records, logbooks, and personnel interviews.

If no spills occurred in the gravel area of the ISA, the visual inspection/survey will document that "no spills occurred". If there was a spill in the gravel area, and a document review shows that the spill was properly and completely cleaned up, a visual inspection/survey will document the review finding(s). If information indicates from evaluation of the operation records, logbooks, and personnel interviews that contamination is possible from TSD unit activities, this Closure Plan will be amended with an approved Permit modification in accordance with Permit Condition II.J.3, to incorporate the steps and requirements to achieve clean closure.

Once the inspection/survey is complete and results verify clean closure achievement, the certification described in Section H.5 will be obtained.

H.2.4 Decontaminate or Remove Equipment

No decontamination or equipment removal is expected to be required to achieve clean closure. In the event a problem occurs where decontamination or equipment removal is necessary, a Permit modification will be prepared to amend the closure plan in accordance with Permit Condition II.J.3.

H.2.5 Decontaminate Structures

No structures will require decontamination to achieve clean closure. In the event a problem occurs where structures will require decontamination, a Permit modification will be prepared to amend the closure plan in accordance with Permit Condition II.J.3.

H.2.6 Remediate Soils

Soil remediation activities are not expected to be necessary as the FSF and ISA are anticipated to be well maintained. Any spills occurring during the operating life of the FSF and ISA are expected to have been properly and completely cleaned up to standards consistent with the closure performance standards. In the event that sampling is necessary for the surrounding gravel areas of the ISA, the Closure Plan will be amended through a Permit modification in accordance with Permit Condition II.J.3.

H.3 MAXIMUM EXTENT OF OPERATION AND MAXIMUM WASTE INVENTORY

As authorized by Permit Condition III.16.B.1, the FSF and ISA provide storage capacity for waste generated from decommissioning of the Fast Flux Test Facility (FFTF) before final treatment and/or disposal. The estimated maximum waste inventory is consistent with the combined storage capacity of the FSF and the ISA, or 20,000 gallons.

H.4 SCHEDULE FOR CLOSURE

In accordance with WAC 173-303-610(3)(c), notification to Ecology is required at least 45 days prior to the start of closure of the FSF or the ISA.

The closure schedule is based on the time required to perform applicable closure activities described in Section H.2. Closure of the FSF and the ISA will be completed 180 days after the start of closure activities at each unit, respectively. When a closure date is established for a container storage dangerous waste management unit(s), the schedule will be evaluated, including any additional closure activities required for clean closure. If Closure Plan modifications are necessary to achieve clean closure, a revised schedule will be proposed as part of the Permit modification package prepared in accordance with Permit Condition II.J.2.

H.5 CERTIFICATION OF CLOSURE

Within 60 days of completion of closure activities required by this closure plan, the Permittees will submit to the Department by registered mail, a certification that the dangerous waste management unit(s) has been closed in accordance with the specifications in this Plan that are in effect at the time of completion of closure activities. This certification of closure will address only requirements of this closure plan covered by the completed closure activities (i.e., either the FSF or the ISA, or both). The Permittees and an independent registered professional engineer will sign this certification. The independent registered professional engineer certification is to confirm that the activities took place and that the unit was closed in accordance with the approved Closure Plan. Documentation supporting the independent registered professional engineer's certification must be furnished to Ecology upon request.

Addendum I Inspection Requirements

I. INSPECTION REQUIREMENTS I.1
I.1 GENERAL INSPECTION REQUIREMENTS I.1
I.1.1 Types of Inspections I.1
I.1.2 Frequency of Inspections I.1
I.2 SCHEDULE FOR REMEDIAL ACTION FOR PROBLEMS REVEALED I.2

Tables

Table I.1. Inspection Schedule I.2

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I. INSPECTION REQUIREMENTS

This section describes the method and schedule for inspection of the 400 Area WMU. The purpose of the inspections are to prevent malfunctions and deterioration, operating errors, discharges, identify leaking containers, improperly stored containers, and degradation of containment and safety equipment and/or systems (e.g., inert gas pressure in feed line). These inspections help to ensure that situations do not exist that might cause or lead to the release of waste to the environment or that might pose a threat to human health. Abnormal conditions identified by inspections are corrected in accordance with WAC 173-303-320(3).

I.1 GENERAL INSPECTION REQUIREMENTS

The content and frequency of inspections are described in this section. Inspections, implemented through operating requirements, are documented on inspection checklists and log sheets. Inspection records are maintained in accordance with Permit Condition II.I.1, and contain the following information:

- Date and time of inspection,
- Printed name and the handwritten signature of the inspector,
- Notation of the observations made, and
- Date and nature of any repairs or remedial actions taken

The inspection checklists consist of a listing of items that are to be assessed during each inspection. For each item listed, a yes/no response is made. A 'yes' response means that the item complies with the conditions stated on the checklist. Any problems identified during the inspection, as indicated by a 'no' response on the checklist, are reported to the S & M Operations Manager.

I.1.1 Types of Inspections

Semi-annually a qualified person performs an inspection of the active 400 Area WMU storage areas and containers for any signs of malfunctions, deterioration, discharges, and other anomalies. Specific items and/or problems to be noted during semi-annual inspections include the following:

- Condition of concrete floor, curbing, and walls in the FSF
- Appropriate safety and packaging equipment
- Container structural integrity
- Containers closed
- Inert gas pressure in feed line to CCP boxes in the FSF
- Significant corrosion of containers
- Evidence of spills or leaks
- Container labels and markings in place, legible, and un-obscured
- Moisture in modules including condensation in the ISA storage modules

As needed to support work within the 400 Area WMU, personnel will conduct inspections and tests of safety equipment. These inspections and tests include portable fire extinguishers, first aid equipment, and spill kits. For addition information, refer to Table I.1, Inspection Schedule.

I.1.2 Frequency of Inspections

Qualified personnel perform the 400 Area WMU inspections. The following inspection frequencies exist (refer to Table I.1):

- Semi-Annually container inspections
- Semi-Annually inspections
- Daily inspections of those portions of the 400 Area WMU that are in the process of receiving waste or transferring waste out to document any deficiencies noted and to immediately bring deficiencies to the attention of the S & M Operations Manager.
- Annual ignitable/reactive waste storage area inspections

I.2 SCHEDULE FOR REMEDIAL ACTION FOR PROBLEMS REVEALED

Consistent with WAC 173-303-320(3), if inspections identify leaks, spills, and/or precipitation, in the secondary containment; the resultant material will be removed on a schedule that prevents hazards to human health and the environment. If corrosion or other obvious structural deficiency is observed on containers, corrective actions shall be pursued in a timeframe established by the S & M Operations Manager.

On receipt and before containers are accepted for storage in the 400 Area WMU, personnel inspect each container to confirm appropriate documentation, labeling, and soundness of containers. Depending on the severity of any container anomalies, corrective actions could range from continued monitoring to correcting on discovery or longer if procurement of needed materials and personnel are required. Other conditions that are not a threat to human health and the environment will be dispositioned in a timeframe established by the S & M Operations Manager.

Table I.1. Inspection Schedule

Requirement Description	Inspection Frequency	Types of Problems
Inspections of those portions of the 400 Area WMU that are in process of receiving or transferring waste out	Daily	Document any deficiencies noted and immediately bring the deficiencies to the attention of the S & MOperations Manager
Container storage areas (FSF)	Semi-Annually	Condition of concrete floor, container structural integrity, containers closed, inert gas pressure in feed line to large boxes, significant corrosion of containers, evidence of leaks, spills, accumulated liquids, and open and improperly sealed containers, container labels and markings in place, legible, and unobstructed
Container storage, large boxes, and unique components (ISA)	Semi-Annually	Condition of containers/large boxes/unique components structural integrity, containers closed, significant corrosion of containers, evidence of leaks, spills, accumulated liquids, and open and improperly sealed containers, container labels and markings in place, legible, and unobstructed, and moisture and condensate in the storage modules
Portable fire extinguishers, first aid kits, and spill response kits	As needed to support work within the 400 Area WMU	Check for equipment not present and test, as appropriate
Ignitable or reactive waste	Annual	Storage in compliance with WAC 173-303-395(l)(d)