1215425

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

12-EMD-0082

JUL 6 2012

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JUL 16 2012
EDMC

Mr. E. R. Skinnarland
Nuclear Waste Program
State of Washington
Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

Dear Mr. Skinnarland:

CLASS 1 MODIFICATIONS TO THE HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY ACT PERMIT, QUARTER ENDING JUNE 30, 2012

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, 2012. Enclosure 1 includes the Class 1 modification information that has been cleared for public release. Enclosure 2 includes the Class 1 modification information that contains Official Use Only information and is not for public distribution.

These modifications update information in Part III of Permit Revision 8C. The modifications pertain to the 400 Area Waste Management Unit, the Liquid Effluent Treatment Facility, and 200 Area Effluent Treatment Facility, the Integrated Disposal Facility, the PUREX Storage Tunnels, and the Waste Treatment and Immobilization Plant. 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,

Matt McCormick
Manager

EMD:ACM

Enclosures

cc w/encls: See Page 2

Document transmitted contains OUO information.

When separated from Enclosure 2, handle this document as non-sensitive information.

- A9910074

H01 S35
H08 T34

cc w/encls:
P. G. Harrington, ORP (CD ROM)
Ecology NWP Library (Hardcopy)
Environmental Portal, LMSI, A3-95 (CD ROM)
Administrative Record, TSD: H-0-1, H-0-8, S-3-5, T-3-4, H6-08 (Hard Copy & CD ROM)
HF Operating Record (J. K. Perry, MSA, H7-28) (CD ROM)

cc w/o encls:
F. W. Bond, Ecology
D. M. Busche, BNI
A. S. Carlson, Ecology
B. L. Curn, URS
S. L. Dahl, Ecology
L. L. Fritz, MSA
J. A. Hedges, Ecology
D. L. McDonald, Ecology
A. L. Prignano, Ecology
J. R. Seaver, CHPRC

ENCLOSURE 1

CLASS 1 MODIFICATIONS FOR QUARTER ENDING JUNE 30, 2012

Mr. E. R. Skinnarland, Ecology
Consisting of 401 pages, including this cover sheet

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Hanford Facility RCRA Permit Modification Notification Forms

Part III, Operating Unit 16

400 Area Waste Management Unit

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Page 14 of 14 Addendum G, 400 Area Waste Management Unit Training Matrix

Submitted by Co-Operator: _____ 6/20/12 Date

Reviewed by RL Program Office: 6.21.12 _____ 6.21.12 Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management	**Part III, Operating Unit 16**

Description of Modification:
Hanford Facility RCRA 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 ~~December 31, 2011~~June 30, 2012
Addendum B	Waste Analysis Plan, dated ~~December 31, 2011~~June 30, 2012
Addendum C	Process Information, dated ~~December 31, 2011~~June 30, 2012
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 ~~March 31, 2012~~June 30, 2012
Addendum H	Closure Plan, dated June 30, 2009
Addendum I	Inspection Requirements, dated September 30, 2009
Addendum J	Contingency Plan, dated December 31, 2011

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

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

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

Reviewed by Ecology: 6/19/12

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management	**Part III, Operating Unit 16**

Description of Modification:
Hanford Facility RCRA 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 not 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 elemental sodium, and sodium potassium (D001, D003, and WSC2), sodium hydroxide (D002), and potassium hydroxide (D002) and debris (e.g., piping, equipment, and components) contaminated with elemental sodium, sodium potassium, ~~and~~ sodium hydroxide ~~(D002)~~, and potassium hydroxide. ~~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 December 31, 2011
Addendum B	Waste Analysis Plan, dated December 31, 2011
Addendum C	Process Information, dated December 31, 2011
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 March 31, 2012
Addendum H	Closure Plan, dated June 30, 2009
Addendum I	Inspection Requirements, dated September 30, 2009

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: F.4.b
Enter wording of WAC 173-303-830, Appendix I Modification citation:
Storage of different wastes that do not require different management standards. Waste configuration and volume are addressed in Addenda A and C (see Modification Form 11 of 13)

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

Reviewed by Ecology:
T. H. Bond
A. L. Prignano 5/9/12
Date

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

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management	**Part III, Operating Unit 16**

Description of Modification:
Addendum A, Section XI:

The Fast Flux Test Facility (FFTF) was a 400-megawatt (thermal) liquid-metal cooled (sodium) research and test reactor located in the 400 Area of the Hanford Facility. The FFTF developed and tested advanced fuels and material for the Liquid Metal Fast Breeder Reactor program. The FFTF was constructed in the late 1970's and first went critical on February 9, 1980. FFTF operated successfully from 1982 to 1992. The Department of Energy (DOE) issued a shutdown order in December 1993, and since that time, the DOE has been de-fueling the reactor and deactivating systems, as they were no longer needed. Mixed waste stored in the 400 Area Waste Management unit can include elemental sodium (Na), sodium potassium (NaK) (D001, D003, WSC2) and sodium hydroxide and potassium hydroxide (D002); as well as debris (for example piping, equipment, and components) contaminated with Na or NaK, ~~elemental sodium and~~ sodium hydoxide, or potassium hydroxide. The mixed waste stored in the 400 Area Waste Management unit is limited to wastes generated from the 400 Area. Mixed waste will be stored in containers (for example drums and boxes) until treatment capabilities are available.

Greater-than 90-day Storage Areas:

Fuel Storage Facility (Building 403)

The Fuel Storage Facility (FSF) is a one-level reinforced concrete substructure covered by a steel frame metal-sided high bay building. Building dimensions are 34 x 27 x 12 meters (112 x 90 x 40) high. The principal equipment in the FSF is a belowground cell containing a carbon steel storage vessel approximately 6.4 meters (21 feet) in diameter and 7.3 meters (24 feet) deep for storing up to 466 FFTF spent fuel assemblies in liquid sodium. Adjacent buildings and below-grade cells contain the natural draft heat exchanger used to cool the FSF pool. With the exception of two areas, which are radiation areas (cells 907 and 906); all accessible areas are Radioactive Material Areas. The process design capacity for the FSF is 1,000 gallons.

Interim Storage Area

The 400 Area Interim Storage Area (ISA) consists of 156 x 75 meters (513 x 247 feet) totally fenced area with perimeter lighting that has been designated for above ground dry cask storage of spent fuel. A concrete pad, which measures 27 x 37 meters (90 x 120 Feet), was used for cask storage. The process design capacity for the ISA is 19,000 gallons.

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: F.4.b
Enter wording of WAC 173-303-830, Appendix I Modification citation: Based on waste configuration and volume, specified on Modification form 11 of 13, it was determined that storage of NaK in these facilities does not require different management standards.

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

Reviewed by Ecology:
F.W. Bond
A. L. Prignano 5/9/12
Date

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management	**Part III, Operating Unit 16**

Description of Modification:
Addendum B, Section B.1.1:

B.1.1 Description of Unit Processes and Activities

The 400 Area WMU includes the FSF (Building 403) and the ISA. The ~~unit~~locations and boundaries of these two container storage units is documented in Figures C.1 and C.2 of Addendum C, and the topographic map in Addendum A~~y 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 (Na) and sodium potassium (NaK) contamination is associated with the Na and NaK~~sodium~~ used as coolant in the FFTF reactor. The 400 Area WMU will continue to receive ~~sodium~~Na and NaK-contaminated waste and debris ~~as it is generated~~ from decommissioning of the 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.

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: F.4.b
Enter wording of WAC 173-303-830, Appendix I Modification citation: Based on waste configuration and volume, specified on Modification form 11 of 13, it was determined that storage of NaK in these facilities does not require different management standards.

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

Reviewed by Ecology:
Fabio Bong
A. L. Prignano 5/9/12
Date

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **400 Area Waste Management**	Permit Part **Part III, Operating Unit 16**

Description of Modification:
Addendum B, Section B.2.2:

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.

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

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

Modification Approved: ☑ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology: F. W. Boyd A. L. Prignano — Date 5/9/12

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **400 Area Waste Management**	Permit Part **Part III, Operating Unit 16**

Description of Modification:
Addendum B, Section B.3:

B.3 SELECTING WASTE ANALYSIS PARAMETERS

Na and NaK~~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~~Na and NaK consists of un-reacted elements (either Na or a mixture of Na and K, respectively) ~~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 and potassium metal are well known and documented (MSDSs and FFTF operating history), and the Na and NaK~~sodium~~ waste to be stored in the 400 Area WMU storage units is consistent with these properties. Analytical data exist for the ~~sodium~~ Na and NaK 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 and a mixture of sodium and potassium metal, small amounts of concentrated sodium hydroxide and potassium 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 or potassium hydroxide having a pH greater than 12.5, debris contaminated with Na or NaK ~~the sodium~~ metal is designated as a corrosive (D002 and WSC2, corrosive liquid and solid, respectively). In the event that liquid is identified in Na or NaK ~~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.

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: F.4.b
Enter wording of WAC 173-303-830, Appendix I Modification citation: Based on waste configuration and volume, specified on Modification form 11 of 13, it was determined that storage of NaK in these facilities does not require different management standards.

Modification Approved: [✓] Yes [ ] No (state reason for denial) Reason for denial:	Reviewed by Ecology: F.W. Bond A. L. Prignano — Date 5/9/12

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management	**Part III, Operating Unit 16**

Description of Modification:
Addendum B, Section B.4:

B.4 SELECTING SAMPLING PROCESSES

Additional analytical data are not required to store safely the Na or NaK ~~sodium~~-contaminated waste at the 400 Area WMU. Therefore, no additional waste sampling is planned.

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: F.4.b
Enter wording of WAC 173-303-830, Appendix I Modification citation: Based on waste configuration and volume, specified on Modification form 11 of 13, it was determined that storage of NaK in these facilities does not require different management standards.

Modification Approved: ☑ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology: F. W. Bond A. L. Prignano — 5/9/12 Date

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **400 Area Waste Management**	Permit Part **Part III, Operating Unit 16**

Description of Modification:
Addendum B, Section B.6:

B.6 SELECTING WASTE RE-EVALUATION FREQUENCIES

Additional analytical data are not required to store safely the Na or NaK~~sodium~~-contaminated waste at the 400 Area WMU. Therefore, there is no need to select a waste re-evaluation frequency.

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: F.4.b
Enter wording of WAC 173-303-830, Appendix I Modification citation: Based on waste configuration and volume, specified on Modification form 11 of 13, it was determined that storage of NaK in these facilities does not require different management standards.

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

Reviewed by Ecology:
F. W. Bond
A. L. Prignano 5/9/12 Date

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management	**Part III, Operating Unit 16**

Description of Modification:
Addendum C, Section C:

C. PROCESS INFORMATION

This Addendum discusses the processes used to store (Na) and sodium potassium (NaK)~~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.

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: F.4.b
Enter wording of WAC 173-303-830, Appendix I Modification citation: Based on waste configuration and volume, specified on Modification form 11 of 13, it was determined that storage of NaK in these facilities does not require different management standards.

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

Reviewed by Ecology:
T. W. Bond
A. L. Prignano 5/9/12
Date

[1] Class 1 modifications requiring prior Agency approval.

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Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management	**Part III, Operating Unit 16**

Description of Modification:
Addendum C, Section C.1.1:

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 Na and NaK~~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 Na and NaK~~sodium~~ for storage.

Na and NaK~~Sodium~~-contaminated waste stored at the 400 Area WMU is designated ignitable (D001) and reactive (D003) per WAC 173-303-090(7). In addition to D003, this waste may also exhibit the characteristics of corrosivity from generation of small quantities of sodium hydroxide or potassium hydroxide due to the reaction of waste residuals with atmospheric moisture. Therefore, waste managed in the FSF and the ISA are also designated as D002 (corrosive liquids) and WSC2 (corrosive solid)~~is assigned dangerous waste numbers D001 and WSC2~~.

The quantity of the NaK stored in the ISA is estimated to be 0.8 liters (28 fluid ounces). The NaK is contained within debris stored in the ISA containers.

The sodium in the CCPs stored in the FSF have approximately 0.02 volume percent potassium due to the mixing of NaK into the Na. This small quantity would represent an impurity or trace amount and would not affect the chemical properties of the Na in the CCPs.

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, and Figures C.1 and C.2 in this Addendum for locations of these storage sites within the FFTF PPA. A combined maximum of 75,686 liters (20,000 gallons, 1,000 gallons in the FSF and 19,000 gallons in the ISA) of the Na or NaK~~sodium~~ contaminant could potentially be stored in the two 400 Area WMU container storage units.

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

Enter relevant WAC 173-303-830, Appendix I Modification citation number: F.4.b
Enter wording of WAC 173-303-830, Appendix I Modification citation: Based on waste configuration and volume, specified on Modification form 11 of 13, it was determined that storage of NaK in these facilities does not require different management standards.

Modification Approved: ☑ Yes ☐ No (state reason for denial) Reason for denial:	Reviewed by Ecology: F.W. Bond A.L. Prignano — 5/9/12 Date

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management	**Part III, Operating Unit 16**

Description of Modification:
Addendum C, Section C.1.1.2.3:

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 Na or NaK~~sodium~~ inside the component from reacting with water vapor in the air to form sodium hydroxide and potassium hydroxide, respectively. Each component, once closed, serves as the primary container for the sodium waste residue on the interior surfaces of the component.

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: F.4.b
Enter wording of WAC 173-303-830, Appendix I Modification citation: Based on waste configuration and volume, specified on Modification form 11 of 13, it was determined that storage of NaK in these facilities does not require different management standards.

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

Reviewed by Ecology:
Toby Bond
A. L. Trignano
5/9/12
Date

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management	**Part III, Operating Unit 16**

Description of Modification:
Addendum C, 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. Although, NaK is typically liquid at ambient conditions, most if not all NaK will have been drained from contaminated debris and components. Spills or leaks of liquid NaK into secondary containment will be negligible and unlikely to pose any human health or environment threats. Since run-on is prevented as described in Section C.1.3.3, additional capacity is not required for run-on.

WAC 173-303-830 Modification Class [1]	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: F.4.b
Enter wording of WAC 173-303-830, Appendix I Modification citation: Based on waste configuration and volume, specified on Modification form 11 of 13, it was determined that storage of NaK in these facilities does not require different management standards.

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

Reviewed by Ecology:
A. L. Prignano 5/9/12 Date

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
400 Area Waste Management	**Part III, Operating Unit 16**

Description of Modification:
Addendum G, 400 Area Waste Management Unit Training Matrix:

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					
Nuclear Chemical Operator	X	X			X
D&D Worker	X	X			
Operations Supervisor	X	X			
Field Work Supervisor	X	X			
Environmental Compliance Officer	X	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.

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

Enter relevant WAC 173-303-830, Appendix I Modification citation number: B.5.b
Enter wording of WAC 173-303-830, Appendix I Modification citation: Other changes. Changes in responsibilities due to the recent inspection plan changes, additions of personnel that can serve as emergency responders, and changes in titles of personnel that do not affect the type, or decrease the amount of training given to employees.

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

Reviewed by Ecology:
A. L. Prignano — Date 6/18/12

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

Remove and Replace the Following Sections:

Remove Part III Permit Conditions, dated December 31, 2011, and replace with Permit Conditions dated June 30, 2012.

Remove Addendum A, dated December 31, 2011, and replace with Addendum A, dated June 30, 2012.

Remove Addendum B, dated December 31, 2011, and replace with Addendum B, dated June 30, 2012.

Remove Addendum C, dated December 31, 2011, and replace with Addendum C dated June 30, 2012.

Remove Addendum G, dated March 31, 2012, and replace with Addendum G dated June 30, 2012.

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 not 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 elemental sodium, and sodium potassium (D001, D003, and WSC2), sodium hydroxide (D002), and potassium hydroxide (D002) and debris (e.g., piping, equipment, and components) contaminated with elemental sodium, sodium potassium, sodium hydroxide, and potassium hydroxide. 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 June 30, 2012
Addendum B	Waste Analysis Plan, dated June 30, 2012
Addendum C	Process Information, dated June 30, 2012
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, 2012
Addendum H	Closure Plan, dated June 30, 2009
Addendum I	Inspection Requirements, dated September 30, 2009
Addendum J	Contingency Plan, dated December 31, 2011

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.

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Dangerous Waste Permit Application Part A Form

Date Received	Reviewed by:	Date: 0 9 2 2 2 0 0 8
Month Day Year	Approved by: D.P. Vareo	Date: 0 9 2 2 2 0 0 8
0 9 1 9 2 0 0 8		

I. This form is submitted to: (place an "X" in the appropriate box)

☒	Request modification to a final status permit (commonly called a "Part B" permit)
☐	Request a change under interim status
☐	Apply for a final status permit. This includes the application for the initial final status permit for a site or for a permit renewal (i.e., a new permit to replace an expiring permit).
☐	Establish interim status because of the wastes newly regulated on: (Date)
	List waste codes:

II. EPA/State ID Number

W A 7 8 9 0 0 0 8 9 6 7

III. Name of Facility

US Department of Energy – Hanford Facility

IV. Facility Location (Physical address not P.O. Box or Route Number)

A. Street

825 Jadwin

City or Town	State	ZIP Code
Richland	WA	99352

County Code (if known)	County Name
0 0 5	Benton

B. Land Type	C. Geographic Location Latitude (degrees, mins, secs)	Longitude (degrees, mins, secs)	D. Facility Existence Date Month Day Year
F	Refer to TOPO Map (Section XV.)		0 3 0 2 1 9 4 3

V. Facility Mailing Address

Street or P.O. Box

P.O. Box 550

City or Town	State	ZIP Code
Richland	WA	99352

VI. Facility contact (Person to be contacted regarding waste activities at facility)	
Name (last)	**(first)**
Brockman	David
Job Title	**Phone Number (area code and number)**
Manager	(509) 376-7395
Contact Address	
Street or P.O. Box	
P.O. Box 550	

City or Town	State	ZIP Code
Richland	WA	99352

VII. Facility Operator Information	
A. Name	**Phone Number**
Department of Energy Owner/ Operator CH2M HILL Plateau Remediation Company Co-Operator for 400 Area Waste Management Unit*	(509) 376-7395 (509) 376-0556*
Street or P.O. Box	
P.O. Box 550 P.O. Box 1600 *	

City or Town	State	ZIP Code
Richland	WA	99352

B. Operator Type	F
C. Does the name in VII.A reflect a proposed change in operator?	☐ Yes ☒ No Co-Operator* change
If yes, provide the scheduled date for the change:	Month 10 Day 01 Year 2008
D. Is the name listed in VII.A. also the owner? If yes, skip to Section VIII.C.	☐ Yes ☒ No

VIII. Facility Owner Information	
A. Name	**Phone Number (area code and number)**
David A. Brockman, Operator/ Facility-Property Owner	(509) 376-7395
Street or P.O. Box	
P.O. Box 550	

City or Town	State	ZIP Code
Richland	WA	99352

B. Owner Type	F
C. Does the name in VIII.A reflect a proposed change in owner?	☐ Yes ☒ No
If yes, provide the scheduled date for the change:	Month Day Year

IX. NAICS Codes (5/6 digit codes)													
A. First							**B. Second**						
5	6	2	2	1		Waste Treatment & Disposal	9	2	4	1	1	0	Administration of Air & Water Resource & Solid Waste Management Programs
C. Third							**D. Fourth**						
5	4	1	7	1		Research & Development in the Physical, Engineering, & Life Sciences							

X. Other Environmental Permits (see instructions)

A. Permit Type	B. Permit Number	C. Description
E	AIR 06-107	WAC 246-247, Radiation Protection – Air Emissions
E	AIR 10-412	WAC 246-247, Radiation Protection – Air Emissions
E	UST 451	WAC 173-216, State Waste Discharge Permit Program

XI. Nature of Business (provide a brief description that includes both dangerous waste and non-dangerous waste areas and activities)

The Fast Flux Test Facility (FFTF) was a 400-megawatt (thermal) liquid-metal cooled (sodium) research and test reactor located in the 400 Area of the Hanford Facility. The FFTF developed and tested advanced fuels and material for the Liquid Metal Fast Breeder Reactor program. The FFTF was constructed in the late 1970's and first went critical on February 9, 1980. FFTF operated successfully from 1982 to 1992. The Department of Energy (DOE) issued a shutdown order in December 1993, and since that time, the DOE has been de-fueling the reactor and deactivating systems, as they were no longer needed. Mixed waste stored in the 400 Area Waste Management unit can include elemental sodium (Na), sodium potassium (NaK) (D001, D003, WSC2) and sodium hydroxide and potassium hydroxide (D002); as well as debris (for example piping, equipment, and components) contaminated with Na or NaK, sodium hydoxide, or potassium hydroxide. The mixed waste stored in the 400 Area Waste Management unit is limited to wastes generated from the 400 Area. Mixed waste will be stored in containers (for example drums and boxes) until treatment capabilities are available.

Greater-than 90-day Storage Areas:

Fuel Storage Facility (Building 403)

The Fuel Storage Facility (FSF) is a one-level reinforced concrete substructure covered by a steel frame metal-sided high bay building. Building dimensions are 34 x 27 x 12 meters (112 x 90 x 40) high. The principal equipment in the FSF is a belowground cell containing a carbon steel storage vessel approximately 6.4 meters (21 feet) in diameter and 7.3 meters (24 feet) deep for storing up to 466 FFTF spent fuel assemblies in liquid sodium. Adjacent buildings and below-grade cells contain the natural draft heat exchanger used to cool the FSF pool. With the exception of two areas, which are radiation areas (cells 907 and 906); all accessible areas are Radioactive Material Areas. The process design capacity for the FSF is 1,000 gallons.

Interim Storage Area

The 400 Area Interim Storage Area (ISA) consists of 156 x 75 meters (513 x 247 feet) totally fenced area with perimeter lighting that has been designated for above ground dry cask storage of spent fuel. A concrete pad, which measures 27 x 37 meters (90 x 120 Feet), was used for cask storage. The process design capacity for the ISA is 19,000 gallons.

EXAMPLE FOR COMPLETING ITEMS XII and XIII (shown in lines numbered X-1, X-2, and X-3 below): A facility has two storage tanks that hold 1200 gallons and 400 gallons respectively. There is also treatment in tanks at 20 gallons/hr. Finally, a one-quarter acre area that is two meters deep will undergo *in situ vitrification.*

Section XII. Process Codes and Design Capacities								Section XIII. Other Process Codes								
Line Number		A. Process Codes (enter code)			B. Process Design Capacity		C. Process Total Number of Units	Line Number		A. Process Codes (enter code)			B Process Design Capacity		C. Process Total Number of Units	D. Process Description
					1. Amount	2. Unit of Measure (enter code)							1. Amount	2. Unit of Measure (enter code)		
X	1	S	0	2	1,600	G	002	X	1	T	0	4	700	C	001	In situ vitrification
X	2	T	0	3	20	E	001									
X	3	T	0	4	700	C	001									
	1	S	0	1	20,000	G	003		1							
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2	5							2	5							

XIV. Description of Dangerous Wastes

Example for completing this section: A facility will receive three non-listed wastes, then store and treat them on-site. Two wastes are corrosive only, with the facility receiving and storing the wastes in containers. There will be about 200 pounds per year of each of these two wastes, which will be neutralized in a tank. The other waste is corrosive and ignitable and will be neutralized then blended into hazardous waste fuel. There will be about 100 pounds per year of that waste, which will be received in bulk and put into tanks.

Line Number	A. Dangerous Waste No.				B. Estimated Annual Quantity of Waste	C. Unit of Measure	D. Processes									
							(1) Process Codes									(2) Process Description [If a code is not entered in D (1)]
X 1	D	0	0	2	400	P	S	0	1	T	0	1				
X 2	D	0	0	1	100	P	S	0	2	T	0	1				
X 3	D	0	0	2												Included with above
1	D	0	0	1	30	T	S	0	1							Includes debris
2	D	0	0	2		T	S	0	1							Includes debris
3	D	0	0	3		T	S	0	1							Includes debris
4	W	S	C	2		T	S	0	1							Includes debris
5																
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XV. Map

Attach to this application a topographic map of the area extending to at least one (1) mile beyond property boundaries. The map must show the outline of the facility; the location of each of its existing and proposed intake and discharge structures; each of its dangerous waste treatment, storage, recycling, or disposal units; and each well where fluids are injected underground. Include all springs, rivers, and other surface water bodies in this map area, plus drinking water wells listed in public records or otherwise known to the applicant within ¼ mile of the facility property boundary. The instructions provide additional information on meeting these requirements.

Topographic map is located in the Ecology Library

XVI. Facility Drawing

All existing facilities must include a scale drawing of the facility (refer to Instructions for more detail).

XVII. Photographs

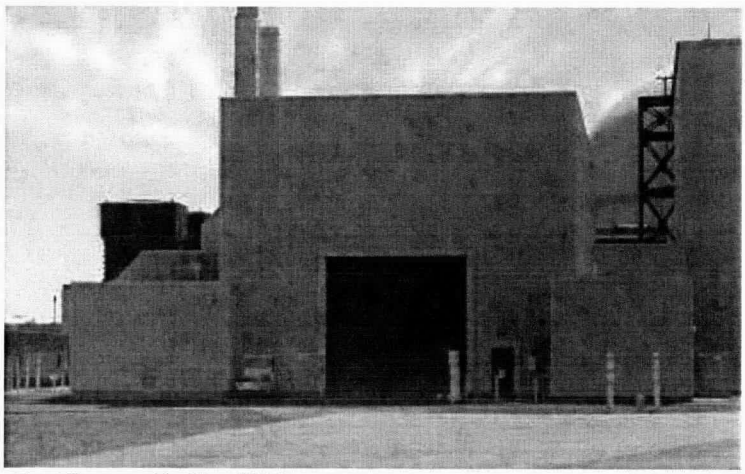
All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment, recycling, and disposal areas; and sites of future storage, treatment, recycling, or disposal areas (refer to Instructions for more detail).

XVIII. Certifications

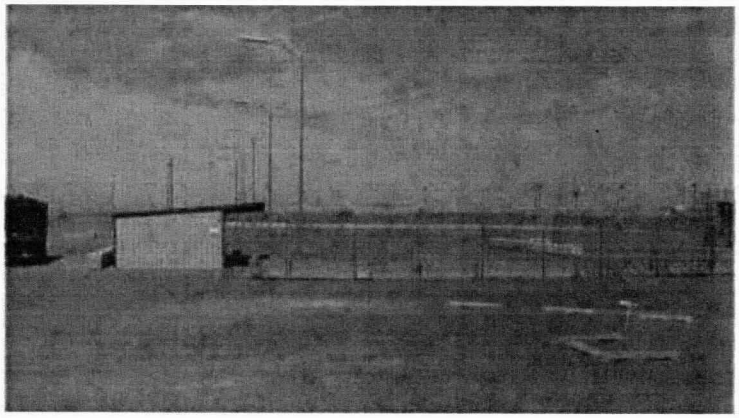
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage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

Operator Name and Official Title (type or print) David A. Brockman, Manager U.S. Department of Energy Richland Operations Office	**Signature**	**Date Signed** 9/19/08
Co-Operator* Name and Official Title (type or print) John G. Lehew, III President and Chief Executive Officer CH2M HILL Plateau Remediation Company	**Signature**	**Date Signed** 9/2/08
Co-Operator – Address and Telephone Number* P.O. Box 1600 Richland, WA 99352 (509) 376-0556		
Facility-Property Owner Name and Official Title (type or print) David A. Brockman, Manager U.S. Department of Energy Richland Operations Office	**Signature**	**Date Signed** 9/19/08

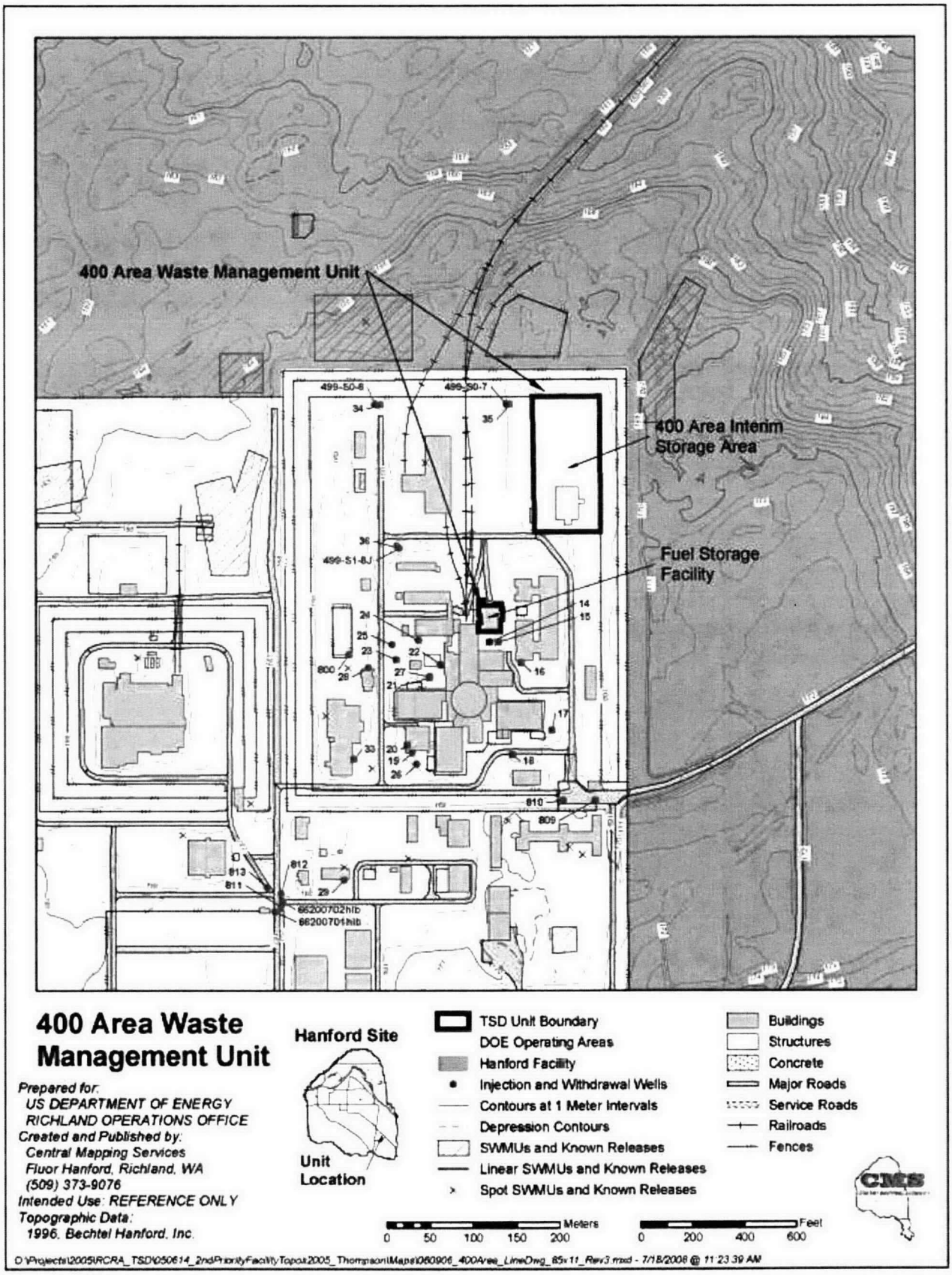
Comments



Fuel Storage Facility (FSF) 8-2006
Building 403



Interim Storage Area (ISA) 8-2006
Building 4718


400 Area Waste Management Unit
400 Area Interim Storage Area
Fuel Storage Facility
499-S0-8
499-S0-7
499-S1-8J
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23
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27
21
800
28
14
15
16
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810
809
812
813
811
29
66200702hlb
66200701hlb
400 Area Waste Management Unit
Prepared for:
US DEPARTMENT OF ENERGY
RICHLAND OPERATIONS OFFICE
Created and Published by:
Central Mapping Services
Fluor Hanford, Richland, WA
(509) 373-9076
Intended Use: REFERENCE ONLY
Topographic Data:
1996, Bechtel Hanford, Inc.
Hanford Site
Unit Location
TSD Unit Boundary
DOE Operating Areas
Hanford Facility
Injection and Withdrawal Wells
Contours at 1 Meter Intervals
Depression Contours
SWMUs and Known Releases
Linear SWMUs and Known Releases
Spot SWMUs and Known Releases
Buildings
Structures
Concrete
Major Roads
Service Roads
Railroads
Fences
Meters
0 50 100 150 200
Feet
0 200 400 600
CMS
D:\Projects\2005\RCRA_TSD\050614_2ndPriorityFacilityTopo\2005_ThompsonMaps\060906_400Area_LineDwg_8Sx11_Rev3.mxd - 7/18/2008 @ 11:23:39 AM

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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.3

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 requirements in the Hanford Dangerous Waste permit established pursuant to 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 locations and boundaries of these two container storage units is documented in Figures C.1 and C.2 of Addendum C, and the topographic map in Addendum A.

Addendum A, Part A Form identifies waste quantities and the process design capacity for the 400 Area WMU. Sodium (Na) and sodium potassium (NaK) contamination is associated with the Na and NaK used as coolant in the FFTF reactor. The 400 Area WMU will continue to receive Na and NaK-contaminated waste and debris from decommissioning of the 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 this Waste Analysis Plan are prohibited from storage in the 400 Area WMU dangerous waste management units. 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 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

Na and NaK is the material of interest to support safe storage of the waste (including contaminated piping, appurtenances, and debris) at the 400 Area WMU. Na and NaK consists of un-reacted elements (either Na or a mixture of Na and K, respectively) (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 and potassium metal are well known and documented (MSDSs and FFTF operating history), and the Na and NaK waste to be stored in the 400 Area WMU storage units is consistent with these properties. Analytical data exist for the Na and NaK 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 and a mixture of sodium and potassium metal, small amounts of concentrated sodium hydroxide and potassium 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 or potassium hydroxide having a pH greater than 12.5, debris contaminated with Na or NaK metal is designated as a corrosive (D002 and WSC2, corrosive liquid and solid, respectively). In the event that liquid is identified in Na or NaK 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 Na or NaK-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 Na or NaK-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

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C. PROCESS INFORMATION

This Addendum discusses the processes used to store (Na) and sodium potassium (NaK)-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 Na and NaK-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 Na and NaK for storage.

Na and NaK-contaminated waste stored at the 400 Area WMU is designated ignitable (D001) and reactive (D003) per WAC 173-303-090(7). In addition to D003, this waste may also exhibit the characteristics of corrosivity from generation of small quantities of sodium hydroxide or potassium hydroxide due to the reaction of waste residuals with atmospheric moisture. Therefore, waste managed in the FSF and the ISA are also designated as D002 (corrosive liquids) and WSC2 (corrosive solid).

The quantity of the NaK stored in the ISA is estimated to be 0.8 liters (28 fluid ounces). The NaK is contained within debris stored in the ISA containers.

The sodium in the CCPs stored in the FSF have approximately 0.02 volume percent potassium due to the mixing of NaK into the Na. This small quantity would represent an impurity or trace amount and would not affect the chemical properties of the Na in the CCPs.

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, and Figures C.1 and C.2 in this Addendum for locations of these storage sites within the FFTF PPA. A combined maximum of 75,686 liters (20,000 gallons, 1,000 gallons in the FSF and 19,000 gallons in the ISA) of the Na or NaK contaminant could potentially be stored in the two 400 Area WMU container storage units.

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 two 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 three types of containers anticipated to be stored in the ISA are the standard metal containers, large metal boxes, and unique components described in Sections C.1.1.2.1 through 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 Na or NaK inside the component from reacting with water vapor in the air to form sodium hydroxide and potassium hydroxide, respectively. 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 two 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 no electrical service, lighting, ventilation, and 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 in accordance with Addendum I, Inspections Requirements for deterioration and leakage using a mirror to view the outer surfaces (sides and top) 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 in accordance with 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 are 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 in storage are visually inspected in accordance with 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. Although, NaK is typically liquid at ambient conditions, most if not all NaK will have been drained from contaminated debris and components. Spills or leaks of liquid NaK into secondary containment will be negligible and unlikely to pose any human health or environment threats. 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, through 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

Wastes managed at the FSF and the ISA are designated as reactive solely with respect to the requirements of WAC 173-303-090(7)(a)(ii) and (iii). Management of these wastes as documented in this Addendum provide appropriate protection from contact with water and the risk of generation of potentially explosive hydrogen gas. 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. Therefore, no specific management requirements are necessary with respect to the potential for explosion or detonation.

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 demonstrating compliance with the requirements of WAC 173-303-395(1).

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.

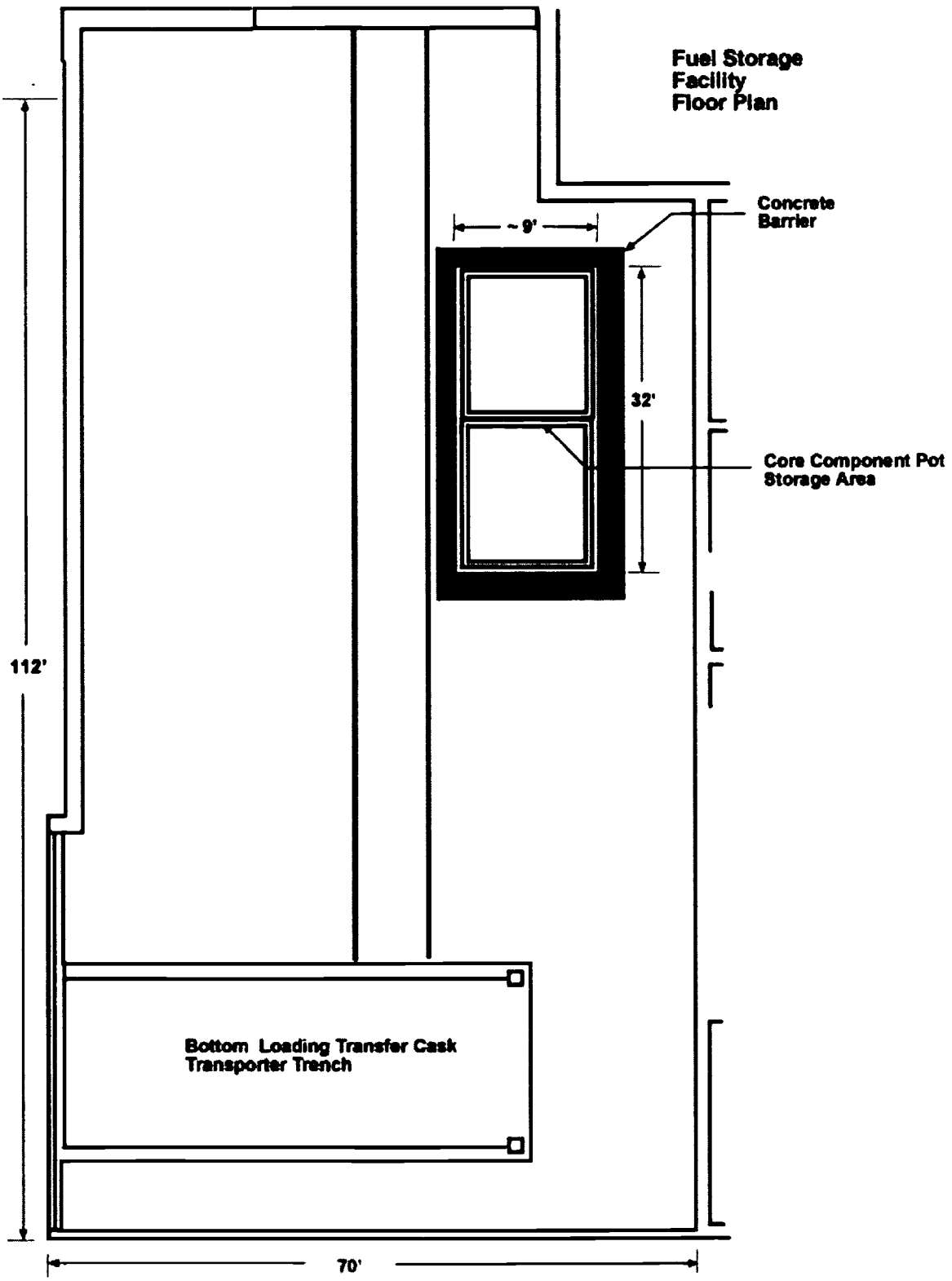
C.2.3 Design of Areas to Manage Incompatible Wastes

Only waste as documented in Addendum B Waste Analysis Plan 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, since containers that are used solely for management of mixed waste are exempt, all containers in the FSF and the ISA are exempt from the requirements of WAC 173-303-692.

Figure C.1. Fuel Storage Facility



Not to scale.

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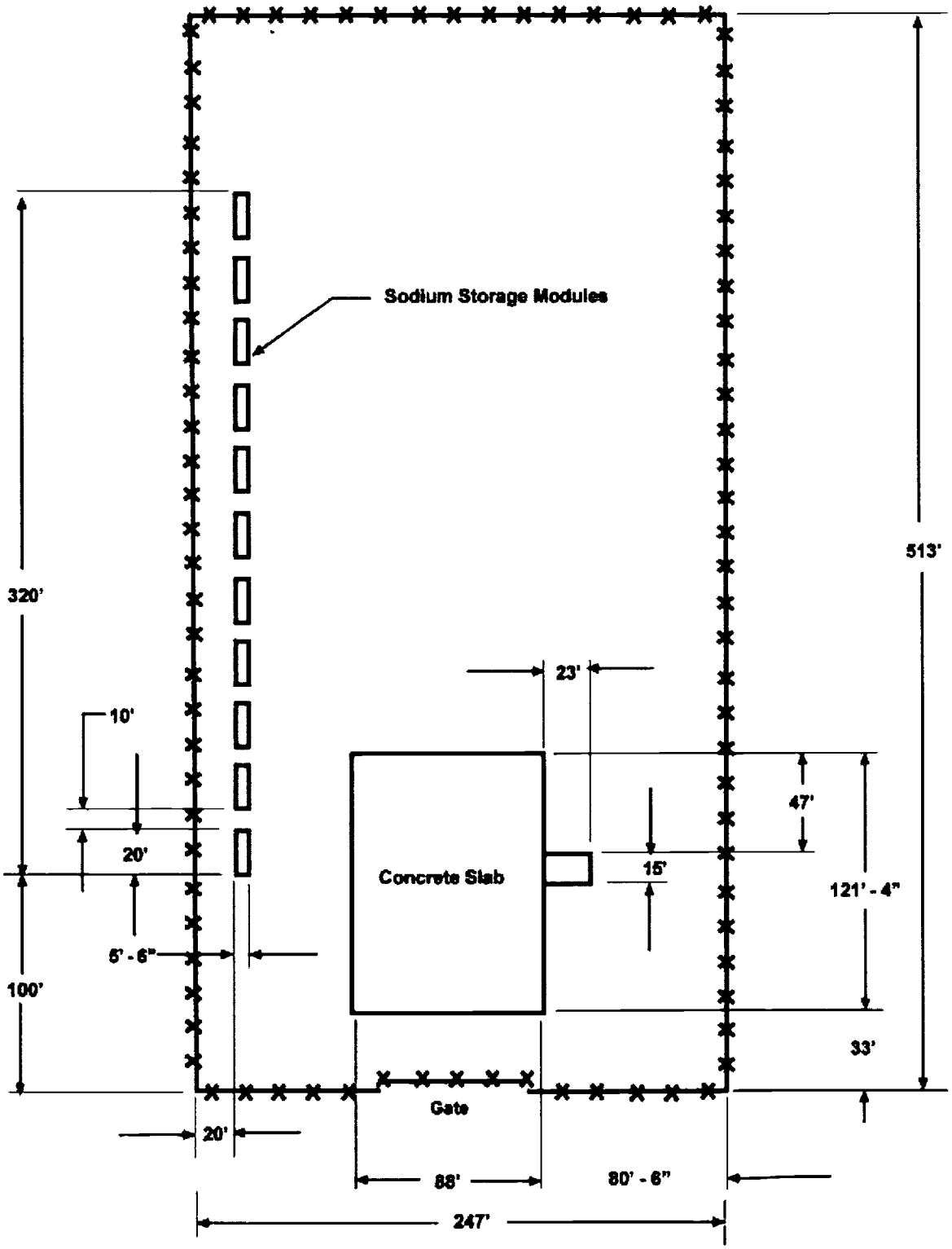
Figure C.2. Container Management Area



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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					
Nuclear Chemical Operator	X	X			X
D&D Worker	X	X			
Operations Supervisor	X	X			
Field Work Supervisor	X	X			
Environmental Compliance Officer	X			X	X
Building Emergency Director	X		X		
Waste Service Provider	X			X	
Sampler	X			X	

*Refer to the 400 Area WMU Dangerous Waste Training Plan (DWTP) for a complete description.

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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

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Page 6 of 6 Addendum G, 200 Area Liquid Waste Processing Facilities Training Matrix

Submitted by Co-Operator: _____ 6/20/12 Date

Reviewed by RL Program Office: _____ 6.21.12 Date

Hanford Facility RCRA Permit Modification Notification Form

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

Description of Modification:
Hanford Facility RCRA Permit III.3:

PART III, OPERATING UNIT GROUP 3 PERMIT CONDITIONS
Liquid Effluent Retention Facility & 200 Area Effluent Treatment Facility

Unit Description:

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

The LERF consists of three lined surface impoundments, or basins. Aqueous waste from LERF is pumped to the 200 Area ETF for treatment in a series of process units, or systems, that remove or destroy essentially all of the dangerous waste constituents. The treated effluent is discharged to a State-Approved Land Disposal Site (SALDS) north of the 200 West Area, under the authority of a Washington State Waste Discharge Permit (Ecology 2000) and 200 Area ETF Delisting (40 CFR 261, Appendix IX, Table 2). Construction of the LERF began in 1990. Waste management operations began at LERF in April 1994. Construction of the 200 Area ETF began in 1992. Waste management operations began at 200 Area ETF in November of 1995.

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

List of Addenda Specific to Operating Unit Group 3

Addendum A	Part A Form, dated June 30, 2012~~June 30, 2011~~
Addendum B	Waste Analysis Plan, dated March 31, 2012
Addendum C	Process Information, dated December 31, 2011
Chapter 5.0	Groundwater Monitoring (PNNL-11620 & WHC-SD-EN-AP-024), dated June 30, 2008
Addendum E	Security Requirements, dated, June 30, 2011
Addendum F	Preparedness and Prevention, dated June 30, 2012~~June 30, 2011~~
Addendum G	Personnel Training, dated June 30, 2011
Addendum H	Closure Plan, dated June 30, 2011
Addendum I	Inspection Requirements, dated June 30, 2011
Addendum J	Contingency Plan, dated March 31, 2012

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

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

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

Reviewed by Ecology:
A. L. Prignano 6/18/12 Date

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form

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

Description of Modification:
Addendum A, Part A Form

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process (1) Process Codes (enter)									D. Process (2) Process Description [If a code is not entered in D (1)]
26	D	0	4	3		K	S	0	4	T	0	2				
27	F	0	0	1		K	S	0	4	T	0	2				
28	F	0	0	2		K	S	0	4	T	0	2				
29	F	0	0	3		K	S	0	4	T	0	2				
30	F	0	0	4		K	S	0	4	T	0	2				
31	F	0	0	5		K	S	0	4	T	0	2				
32	F	0	3	9		K	S	0	4	T	0	2				
33	W	T	0	1		K	S	0	4	T	0	2				
34	W	T	0	2		K	S	0	4	T	0	2				
35	U	2	1	0		K	S	0	4	T	0	2				
~~35~~36	D	0	0	1	298,434,296	K	T	0	1							
~~36~~37	D	0	0	2		K	T	0	1							
~~37~~38	D	0	0	3		K	T	0	1							

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

Enter relevant WAC 173-303-830, Appendix I Modification citation number: H.5(d)
Enter wording of WAC 173-303-830, Appendix I Modification citation: Treatment, storage, or disposal of different wastes in surface impoundments (d). That are residues from wastewater treatment or incineration, provided that disposal occurs in a unit that meets the minimum technological requirements stated in 40 CFR 268.5 (h)(2), and provided further that the surface impoundment has previously received wastes of the same type (for example, incinerator scrubber water). This modification is not applicable to dioxin-containing wastes (F020, 021, 022, 023, 026, 027, and 028) . . .
Justification: These changes are necessary to manage purgewater at LERF/ETF after discontinuation of the Purgewater Strategy [justification required by WAC 173-303-830(4)(a)(i)(A)]. No need for addition of units or a change in the treatment process. LERF/ETF has previously accepted waste of the same type, including a variety of aqueous waste waters, and has managed purgewater at ETF prior to discontinuation of the Purgewater Strategy. Documentation of the necessity is the revision of IDW Strategy and discontinuation of the Purgewater Strategy.

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

Reviewed by Ecology: A. L. Prignano — Date: 6/18/12

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form

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

Description of Modification:
Addendum A, Part A Form

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process (1) Process Codes (enter)									D. Process (2) Process Description [If a code is not entered in D (1)]
—	-	-	-	-	---	---	-	-	-	-	-	-	-	-	-	---
~~65~~66	F	0	0	5		K	T	0	1							
~~66~~67	F	0	3	9		K	T	0	1							
~~67~~68	W	T	0	1		K	T	0	1							
~~68~~69	W	T	0	2		K	T	0	1							
70	U	2	1	0		K	T	0	1							
~~69~~71	D	0	0	1	30,433,326	K	S	0	2							
—	-	-	-	-	---	---	-	-	-	-	-	-	-	-	-	---
~~101~~103	W	T	0	1		K	S	0	2							
~~102~~104	W	T	0	2		K	S	0	2							
105	U	2	1	0		K	S	0	2							
~~103~~106	D	0	0	1	1,986,735	K	S	0	1							Includes Debris
~~104~~107	D	0	0	2		K	S	0	1							Includes Debris
~~105~~108	D	0	0	3		K	S	0	1							Includes Debris

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

Enter relevant WAC 173-303-830, Appendix I Modification citation number: G.5(d)
Enter wording of WAC 173-303-830, Appendix I Modification citation: (d) That do not require the addition of units or a change in the treatment process or management standards, and provided that the units have previously received waste of the same type (e.g., incinerator scrubber water). This modification is not applicable to dioxin-containing wastes (F020, 021, 022, 023, 026, 027, and 028) . . . . . .
Justification: These changes are necessary to manage purgewater at LERF/ETF after discontinuation of the Purgewater Strategy [justification required by WAC 173-303-830(4)(a)(i)(A)]. No need for addition of units or a change in the treatment process. LERF/ETF has previously accepted waste of the same type, including a variety of aqueous waste waters, and has managed purgewater at ETF prior to discontinuation of the Purgewater Strategy. Documentation of the necessity is the revision of IDW Strategy and discontinuation of the Purgewater Strategy.

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

Reviewed by Ecology: A. L. Prignano — Date: 6/10/17

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

Hanford Facility RCRA Permit Modification Notification Form

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

Description of Modification:
Addendum A, Part A Form

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process (1) Process Codes (enter)									D. Process (2) Process Description [If a code is not entered in D (1)]
—	-	-	-	-	---	---	-	-	-	-	-	-	-	-	-	---
~~133~~136	F	0	0	5		K	S	0	1							Includes Debris
~~134~~137	F	0	3	9		K	S	0	1							Includes Debris
~~135~~138	W	T	0	1		K	S	0	1							Includes Debris
~~136~~139	W	T	0	2		K	S	0	1							Includes Debris
140	U	2	1	0		K	S	0	1							Includes Debris
~~137~~141	D	0	0	1	81,310	K	T	0	4							Includes Debris
~~138~~142	D	0	0	2		K	T	0	4							Includes Debris
~~139~~143	D	0	0	3		K	T	0	4							Includes Debris
—	-	-	-	-	---	---	-	-	-	-	-	-	-	-	-	---
~~169~~173	W	T	0	1		K	T	0	4							Includes Debris
~~170~~174	W	T	0	2		K	T	0	4							Includes Debris
~~171~~175	U	2	1	0		K	T	0	4							Includes Debris
~~172~~176																

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: F.4(b)
Enter wording of WAC 173-303-830, Appendix I Modification citation: Storage or treatment of different wastes in containers: b. That do not require the addition of units or a change in the treatment process or management standards, and provided that the units have previously received wastes of the same type (e.g., incinerator scrubber water). This modification is not applicable to dioxin-containing wastes (F020, 021, 022, 023, 026, 027, and 028) . . . . .
Justification: These changes are necessary to manage purgewater at LERF/ETF after discontinuation of the Purgewater Strategy [justification required by WAC 173-303-830(4)(d)(i)]. No need for addition of units or a change in the treatment process. LERF/ETF has previously accepted waste of the same type, including a variety of aqueous waste waters, and has managed purgewater at ETF prior to discontinuation of the Purgewater Strategy. Documentation of the necessity is the revision of IDW Strategy and discontinuation of the Purgewater Strategy.

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

Reviewed by Ecology:
A. L. Prignano — Date: 6/18/12

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

Hanford Facility RCRA Permit Modification Notification Form

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

Description of Modification:
Addendum G, 200 Area Liquid Waste Processing Facilities Training Matrix

200 Area Liquid Waste Processing Facilities Training Matrix

	Training Category						
Permit Attachment 5, Training Category	**General Hanford Facility Training**	**Contingency Plan Training**	**Emergency Coordinator Training**	**Operations Training**			
200 Area Liquid Waste Processing Facilities DWTP implementing category	Orientation Program	Emergency Response (contingency plan)	Emergency Coordinator Training	General Waste Management	Container Management	Tank System Management	Surface Impoundment
JOB TITLE/POSITION							
Nuclear Chemical Operator (NCO)	X	X		X	X	X	X
Hazardous Waste Coordinator (HWC)	X			X	X		
~~Operations Technical Advisor (OTA)~~	~~X~~	~~X~~	~~X~~		~~X~~		
Operations Supervisor Shift Operations Manager (SOM)	X	X	X		~~X~~		
Engineer/Scientist	X			X			
Environmental Compliance Officer	X			X			
~~Resident Waste Service Provider~~	~~X~~			~~X~~	~~X~~		
~~Non Resident~~ Waste Service Provider	X			X	X		
~~Non-Resident~~ Sampler	X			X			X

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

Enter relevant WAC 173-303-830, Appendix I Modification citation number: B.5.b

Enter wording of WAC 173-303-830, Appendix I Modification citation: Other changes. Changes in position responsibilities that do not affect the type or decrease the amount of training given to employees. Permittee is combining positions with the Operations Supervisor. Container management duty is not performed by Supervisor (performed by other positions). Engineer/Scientist performs waste acceptance and data assessment duties. Resident Waste Service Provider is no longer a valid position (duties combined with Nonresident Service Provider). Nonresident Waste Service Provider position has changed and is combined with the Resident Waste Service Provider. Nonresident Sampler position has changed.

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

Reviewed by Ecology: A. L. Prignano 6/18/12 Date

[1] Class 1 modifications requiring prior Agency approval.

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

Remove and Replace the Following Sections:

Remove Part III Permit Conditions, dated March 31, 2012, and replace with Permit Conditions dated June 30, 2012.

Remove Addendum A, Part A Form dated June 30, 2011, and replace with Addendum A, Part A Form dated June 30, 2012.

Remove Addendum G, dated June 30, 2011, and replace with Addendum G, dated June 30, 2012.

PART III, OPERATING UNIT GROUP 3 PERMIT CONDITIONS

Liquid Effluent Retention Facility & 200 Area Effluent Treatment Facility

Unit Description:

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

The LERF consists of three lined surface impoundments, or basins. Aqueous waste from LERF is pumped to the 200 Area ETF for treatment in a series of process units, or systems, that remove or destroy essentially all of the dangerous waste constituents. The treated effluent is discharged to a State-Approved Land Disposal Site (SALDS) north of the 200 West Area, under the authority of a Washington State Waste Discharge Permit (Ecology 2000) and 200 Area ETF Delisting (40 CFR 261, Appendix IX, Table 2). Construction of the LERF began in 1990. Waste management operations began at LERF in April 1994. Construction of the 200 Area ETF began in 1992. Waste management operations began at 200 Area ETF in November of 1995.

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

List of Addenda Specific to Operating Unit Group 3

Addendum A	Part A Form, dated June 30, 2012
Addendum B	Waste Analysis Plan, dated March 31, 2012
Addendum C	Process Information, dated December 31, 2011
Chapter 5.0	Groundwater Monitoring (PNNL-11620 & WHC-SD-EN-AP-024), dated June 30, 2008
Addendum E	Security Requirements, dated, June 30, 2011
Addendum F	Preparedness and Prevention, dated June 30, 2011
Addendum G	Personnel Training, dated June 30, 2012
Addendum H	Closure Plan, dated June 30, 2011
Addendum I	Inspection Requirements, dated June 30, 2011
Addendum J	Contingency Plan, dated March 31, 2012

Definitions

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

Acronyms

LERF and 200 Area ETF 200-Area Liquids Processing Facility

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

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

III.3.B GENERAL WASTE MANAGEMENT

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

III.3.B.2 The Permittees are authorized to manage dangerous and/or mixed wastes physically present in the dangerous waste management units in LERF and 200 Area ETF as of the effective date of this Permit according to the requirements of Permit Condition III.15.B.1.

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

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

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

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

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

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

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

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

III.3.B.5 The Permittees are authorized to use treated effluent for recycle/makeup water purposes at the 200 Area ETF as outlined in Permit Addendum C, Section C.2.5.5, and the letters dated August 19, 2005, EPA Region 10 to Keith A. Klein; and August 8, 2005, Department of Ecology to Keith A. Klein. [WAC 173-303-815 (2)(b)(ii)]

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

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

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

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

III.3.B.7.c The written waste processing strategy required by Permit Condition III.3.B.7.a must demonstrate that the projected treated effluent characteristics satisfy the delisting exclusion limits in State and Federal Delisting Condition (5) of the state and federal delisting actions, and the discharge limits of the State Discharge Permit ST-4500.

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

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

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

III.3.B.10 The Permittees will manage treated effluent from the 200 Area ETF according to the requirements of the State Waste Discharge Permit ST 4500 and State and Federal Delisting Condition (7). [WAC 173-303-815(2)(b)(ii)]

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

III.3.C WASTE ANALYSIS

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

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

III.3.C.3 The Permittees will place a copy of each waste profile required by Permit Condition III.15.C.2 in the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.2. [WAC 173-303-380 (1)(a), (b)]

III.3.C.4 The Permittees will make a copy of the waste profile required by Permit Condition III.15.C.2 available upon request. [WAC 173-303-380 (1)(a), (b)]

III.3.C.5 Records and results of waste analysis described in this Permit will be maintained in the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.2. [WAC 173-303-380 (1)(a), (b)]

III.3.D RECORDKEEPING AND REPORTING

III.3.D.1 The Permittees will place the following into the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.2:

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

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

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

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

III.3.E SECURITY

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

III.3.F PREPAREDNESS AND PREVENTION

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

III.3.G CONTINGENCY PLAN

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

III.3.H INSPECTIONS

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

III.3.I TRAINING PLAN

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

III.3.J GENERAL REQUIREMENTS

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

III.3.K CLOSURE

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

III.3.L POST CLOSURE – RESERVED

III.3.M CRITICAL SYSTEMS – RESERVED

III.3.N RESERVED

III.3.O CONTAINERS

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

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

III.3.O.1.a.1 Include documentation of any damage and subsequent repairs in the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.2.

III.3.O.2 Container Management Standards

III.3.O.2.a The Permittees will maintain and manage wastes in accordance with the requirements of Addendum C, Section 4.3.2, and Section 4.3.2. [WAC 173-303-630(2)]

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

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

III.3.O.2.d The Permittees will ensure wastes are compatible with containers and with other wastes stored or treated in containers within the 200 Area ETF according to the requirements of Addendum C, Section C.3.4.3. [WAC 173-303-630(4), WAC 173-303-630(9)]

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

III.3.O.2.f The Permittees will remove any accumulated liquids from container storage areas in 200 Area ETF according to the requirements of Addendum C, Section C.3.4.2, to ensure containers are not in contact with free liquids and to prevent overflow of the container storage area secondary containment.

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

III.3.P TANK SYSTEMS

III.3.P.1 Tank System Requirements

III.3.P.1.a The Permittees will develop a schedule for conducting integrity assessments (IA). The schedule will meet the requirements of Addendum C, Section C.4.2, and consideration of the factors in WAC 173-303-640(2)(e) or WAC 173-303-640(3)(b) as applicable:

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

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

III.3.P.2 Tank System Operating Requirements

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

III.3.P.2.b The Permittees will comply with the requirements of Addendum C, Section C.4.5.2. [WAC 173-303-640(5)(b)]

III.3.P.2.c The Permittees will comply with the requirements of Addendum C, Section C.4.6. [WAC 173-303-640(5)(d)]

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

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

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

III.3.Q SURFACE IMPOUNDMENTS

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

III.3.Q.2 The Permittees will operate the LERF basins according to the requirements of Addendum C, Section C.5.3, and Addendum I, Section I.2.2.3.1 to prevent over-topping. [WAC 173-303-650 (2)(c)]

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

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

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

III.3.Q.6 The Permittees will comply with the requirements of WAC 173-303-650 (4)(c), incorporated by reference. The certification required by this Permit Condition must be provided to Ecology no later than seven calendar days after the date of the certification. A copy of the certification will be placed in the Hanford Facility Operating Record, LERF and 200 Area ETF file required by Permit Condition II.I.2. [WAC 173-303-650 (4)(c)]

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

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

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

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

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

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

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

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

III.3.Q.15 Groundwater Monitoring

III.3.Q.15.a The Permittees will comply with the requirements of Chapter 5.0. [WAC 173-303-645]

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WASHINGTON STATE DEPARTMENT OF ECOLOGY

Addendum A
Part A Form

Date Received	Reviewed by: Frederick A. Bond	Date: 06 01 2011
Month Day Year	Approved by: [signature]	Date: 06 08 2011

I. This form is submitted to: (place an "X" in the appropriate box)

- [X] Request modification to a final status permit (commonly called a "Part B" permit)
- [ ] Request a change under interim status
- [ ] Apply for a final status permit. This includes the application for the initial final status permit for a site or for a permit renewal (i.e., a new permit to replace an expiring permit).
- [ ] Establish interim status because of the wastes newly regulated on: (Date)

List waste codes:

II. EPA/State ID Number

W A 7 8 9 0 0 0 8 9 6 7

III. Name of Facility

US Department of Energy – Hanford Facility

IV. Facility Location (Physical address not P.O. Box or Route Number)

A. Street

825 Jadwin

City or Town	State	ZIP Code
Richland	WA	99352

County Code (if	County Name
0 0 5	Benton

B. Land Type	C. Geographic Location Latitude (degrees, mins, secs)	Longitude (degrees, mins, secs)	D. Facility Existence Date Month Day Year
F	Refer to TOPO Map (Section XV.)		0 3 0 2 1 9 4 3

V. Facility Mailing Address

Street or P.O. Box

P.O. Box 550

City or Town	State	ZIP Code
Richland	WA	99352

VI. Facility contact (Person to be contacted regarding waste activities at facility)	
Name (last)	**(first)**
McCormick	Matthew
Job Title	**Phone Number (area code and number)**
Manager	(509) 376-7395
Contact Address	
Street or P.O. Box	
P.O. Box 550	

City or Town	State	ZIP Code
Richland	WA	99352

VII. Facility Operator Information	
A. Name	**Phone Number**
Department of Energy Owner/ Operator CH2M HILL Plateau Remediation Company Co-Operator for LERF & 200 Area ETF*	(509) 376-7395 (509) 376-0556*
Street or P.O. Box	
P.O. Box 550 P.O. Box 1600 *	

City or Town	State	ZIP Code
Richland	WA	99352

B. Operator Type	F
C. Does the name in VII.A reflect a proposed change in operator?	☐ Yes ☒ No Co-Operator* change
If yes, provide the scheduled date for the change:	Month 10 Day 01 Year 2008
D. Is the name listed in VII.A. also the owner? If yes, skip to Section VIII.C.	☐ Yes ☒ No

VIII. Facility Owner Information	
A. Name	**Phone Number (area code and number)**
Matthew S. McCormick, Operator/ Facility-Property Owner	(509) 376-7395
Street or P.O. Box	
P.O. Box 550	

City or Town	State	ZIP Code
Richland	WA	99352

B. Owner Type	F
C. Does the name in VIII.A reflect a proposed change in owner?	☐ Yes ☒ No
If yes, provide the scheduled date for the change:	Month Day Year

IX. NAICS Codes (5/6 digit codes)

A. First		B. Second	
562121	Waste Treatment & Disposal	924110	Administration of Air & Water Resource & Solid Waste Management Programs
C. Third		**D. Fourth**	
541711	Research & Development in the Physical, Engineering, & Life Sciences		

X. Other Environmental Permits (see instructions)

A. Permit Type	B. Permit Number	C. Description
E	TSCA02-1027	TSCA approval, 40 CFR 761
E	WCM-127	40 CFR 761.61(c), TSCA risk-based approval 2003-10-22
E	NOC-93-3	WAC 173-400, General Regulations for Air Pollution Sources/ WAC 173-460, Controls for New Sources of Toxic Air Pollutants
E	NOC-96N-W-1-301	WAC 173-400, General Regulations for Air Pollution Sources/ WAC 173-460, Controls for New Sources of Toxic Air Pollutants
E	AIR-04-1-01	WAC 246-247, Radiation Protection -- Air Emissions
U	ST 4500	WAC 173-216, State Waste Discharge Permit Program, Sitewide Permit for miscellaneous streams
U	ST 4511	WAC 173-216, State Waste Discharge Permit Program, Sitewide Permit for miscellaneous streams

XI. Nature of Business (provide a brief description that includes both dangerous waste and non-dangerous waste areas and activities)

Construction of the Liquid Effluent Retention Facility (LERF) began in 1990. Waste management operations began at LERF in April 1994. Construction of the 200 Area Effluent Treatment Facility (ETF) began in 1992. Waste management operations began at ETF in November of 1995.

The LERF and ETF comprise an aqueous waste treatment system located in the 200 East Area that provides storage and treatment for a variety of aqueous mixed waste. This aqueous waste includes process condensate from the 242-A Evaporator and other aqueous waste generated from onsite remediation and waste management activities.

The LERF consists of three lined surface impoundments, or basins. Aqueous waste from LERF is pumped to the ETF for treatment in a series of process units, or systems, that remove or destroy dangerous waste constituents. The treated effluent is discharged to a State-Approved Land Disposal Site (SALDS) north of the 200 West Area, under the authority of a Washington State Waste Discharge Permit (ST4500) and the Final Delisting (40 CFR 261, Appendix IX, Table 2)

Sludge that accumulates in the bottoms of ETF process tanks is removed periodically and placed into containers. The waste is solidified by decanting the supernate from the container and the remainder of the liquid is allowed to evaporate, or absorbents are added, as necessary, to address the residual liquid. The process design capacity for treatment of waste in containers (T04) is 18,927 liters per day.

EXAMPLE FOR COMPLETING ITEMS XII and XIII (shown in lines numbered X-1, X-2, and X-3 below): A facility has two storage tanks that hold 1200 gallons and 400 gallons respectively. There is also treatment in tanks at 20 gallons/hr. Finally, a one-quarter acre area that is two meters deep will undergo *in situ vitrification.*

Section XII. Process Codes and Design Capacities								Section XIII. Other Process Codes								
Line Number		A. Process Codes (enter code)			B. Process Design Capacity		C. Process Total Number of Units	Line Number		A. Process Codes (enter code)			B. Process Design Capacity		C. Process Total Number of Units	D. Process Description
					1. Amount	2. Unit of Measure (enter code)							1. Amount	2. Unit of Measure (enter code)		
X	1	S	0	2	1,600	G	002	X	1	T	0	4	700	C	001	In situ vitrificatio n
X	2	T	0	3	20	E	001									
X	3	T	0	4	700	C	001									
	1	S	0	4	88,500,000	L	003		1	T	0	4	18,927	V	001	container treatment
	2	T	0	2	88,500,000	V	003		2							
	3	S	0	2	7,608,654	L	017		3							
	4	T	0	1	817,646	V	017		4							
	5	S	0	1	147,630	L	003		5							
	6	T	0	4	18,927	V	001		6							
	7								7							
	8								8							
	9								9							
1	0							1	0							
1	1							1	1							
1	2							1	2							
1	3							1	3							
1	4							1	4							
1	5							1	5							
1	6							1	6							
1	7							1	7							
1	8							1	8							
1	9							1	9							
2	0							2	0							
2	1							2	1							
2	2							2	2							
2	3							2	3							
2	4							2	4							
2	5							2	5							

XIV. Description of Dangerous Wastes

Example for completing this section: A facility will receive three non-listed wastes, then store and treat them on-site. Two wastes are corrosive only, with the facility receiving and storing the wastes in containers. There will be about 200 pounds per year of each of these two wastes, which will be neutralized in a tank. The other waste is corrosive and ignitable and will be neutralized then blended into hazardous waste fuel. There will be about 100 pounds per year of that waste, which will be received in bulk and put into tanks.

Line Number	A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Processes									
							(1) Process Codes (enter)									(2) Process Description [If a code is not entered in D (1)]
X 1	D	0	0	2	400	P	S	0	1	T	0	1				
X 2	D	0	0	1	100	P	S	0	2	T	0	1				
X 3	D	0	0	2												Included with above
1	D	0	0	1	88,497,000	K	S	0	4	T	0	2				
2	D	0	0	2		K	S	0	4	T	0	2				
3	D	0	0	3		K	S	0	4	T	0	2				
4	D	0	0	4		K	S	0	4	T	0	2				
5	D	0	0	5		K	S	0	4	T	0	2				
6	D	0	0	6		K	S	0	4	T	0	2				
7	D	0	0	7		K	S	0	4	T	0	2				
8	D	0	0	8		K	S	0	4	T	0	2				
9	D	0	0	9		K	S	0	4	T	0	2				
10	D	0	1	0		K	S	0	4	T	0	2				
11	D	0	1	1		K	S	0	4	T	0	2				
12	D	0	1	8		K	S	0	4	T	0	2				
13	D	0	1	9		K	S	0	4	T	0	2				
14	D	0	2	2		K	S	0	4	T	0	2				
15	D	0	2	8		K	S	0	4	T	0	2				
16	D	0	2	9		K	S	0	4	T	0	2				
17	D	0	3	0		K	S	0	4	T	0	2				
18	D	0	3	3		K	S	0	4	T	0	2				
19	D	0	3	4		K	S	0	4	T	0	2				
20	D	0	3	5		K	S	0	4	T	0	2				
21	D	0	3	6		K	S	0	4	T	0	2				
22	D	0	3	8		K	S	0	4	T	0	2				
23	D	0	3	9		K	S	0	4	T	0	2				
24	D	0	4	0		K	S	0	4	T	0	2				
25	D	0	4	1		K	S	0	4	T	0	2				

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process									
							(1) Process Codes (enter)									(2) Process Description [If a code is not entered in D (1)]
26	D	0	4	3		K	S	0	4	T	0	2				
27	F	0	0	1		K	S	0	4	T	0	2				
28	F	0	0	2		K	S	0	4	T	0	2				
29	F	0	0	3		K	S	0	4	T	0	2				
30	F	0	0	4		K	S	0	4	T	0	2				
31	F	0	0	5		K	S	0	4	T	0	2				
32	F	0	3	9		K	S	0	4	T	0	2				
33	W	T	0	1		K	S	0	4	T	0	2				
34	W	T	0	2		K	S	0	4	T	0	2				
35	U	2	1	0		K	S	0	4	T	0	2				
36	D	0	0	1	298,434,296	K	T	0	1							
37	D	0	0	2		K	T	0	1							
38	D	0	0	3		K	T	0	1							
39	D	0	0	4		K	T	0	1							
40	D	0	0	5		K	T	0	1							
41	D	0	0	6		K	T	0	1							
42	D	0	0	7		K	T	0	1							
43	D	0	0	8		K	T	0	1							
44	D	0	0	9		K	T	0	1							
45	D	0	1	0		K	T	0	1							
46	D	0	1	1		K	T	0	1							
47	D	0	1	8		K	T	0	1							
48	D	0	1	9		K	T	0	1							
49	D	0	2	2		K	T	0	1							
50	D	0	2	8		K	T	0	1							
51	D	0	2	9		K	T	0	1							
52	D	0	3	0		K	T	0	1							
53	D	0	3	3		K	T	0	1							
54	D	0	3	4		K	T	0	1							
55	D	0	3	5		K	T	0	1							
56	D	0	3	6		K	T	0	1							
57	D	0	3	8		K	T	0	1							

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process									
							(1) Process Codes (enter)									(2) Process Description [If a code is not entered in D (1)]
58	D	0	3	9		K	T	0	1							
59	D	0	4	0		K	T	0	1							
60	D	0	4	1		K	T	0	1							
61	D	0	4	3		K	T	0	1							
62	F	0	0	1		K	T	0	1							
63	F	0	0	2		K	T	0	1							
64	F	0	0	3		K	T	0	1							
65	F	0	0	4		K	T	0	1							
66	F	0	0	5		K	T	0	1							
67	F	0	3	9		K	T	0	1							
68	W	T	0	1		K	T	0	1							
69	W	T	0	2		K	T	0	1							
70	U	2	1	0		K	T	0	1							
71	D	0	0	1	30,433,326	K	S	0	2							
72	D	0	0	2		K	S	0	2							
73	D	0	0	3		K	S	0	2							
74	D	0	0	4		K	S	0	2							
75	D	0	0	5		K	S	0	2							
76	D	0	0	6		K	S	0	2							
77	D	0	0	7		K	S	0	2							
78	D	0	0	8		K	S	0	2							
79	D	0	0	9		K	S	0	2							
80	D	0	1	0		K	S	0	2							
81	D	0	1	1		K	S	0	2							
82	D	0	1	8		K	S	0	2							
83	D	0	1	9		K	S	0	2							
84	D	0	2	2		K	S	0	2							
85	D	0	2	8		K	S	0	2							
86	D	0	2	9		K	S	0	2							
87	D	0	3	0		K	S	0	2							
88	D	0	3	3		K	S	0	2							
89	D	0	3	4		K	S	0	2							

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process									
							(1) Process Codes (enter)									(2) Process Description [If a code is not entered in D (1)]
90	D	0	3	5		K	S	0	2							
91	D	0	3	6		K	S	0	2							
92	D	0	3	8		K	S	0	2							
93	D	0	3	9		K	S	0	2							
94	D	0	4	0		K	S	0	2							
95	D	0	4	1		K	S	0	2							
96	D	0	4	3		K	S	0	2							
97	F	0	0	1		K	S	0	2							
98	F	0	0	2		K	S	0	2							
99	F	0	0	3		K	S	0	2							
100	F	0	0	4		K	S	0	2							
101	F	0	0	5		K	S	0	2							
102	F	0	3	9		K	S	0	2							
103	W	T	0	1		K	S	0	2							
104	W	T	0	2		K	S	0	2							
105	U	2	1	0		K	S	0	2							
106	D	0	0	1	1,986,735	K	S	0	1							Includes Debris
107	D	0	0	2		K	S	0	1							Includes Debris
108	D	0	0	3		K	S	0	1							Includes Debris
109	D	0	0	4		K	S	0	1							Includes Debris
110	D	0	0	5		K	S	0	1							Includes Debris
111	D	0	0	6		K	S	0	1							Includes Debris
112	D	0	0	7		K	S	0	1							Includes Debris
113	D	0	0	8		K	S	0	1							Includes Debris
114	D	0	0	9		K	S	0	1							Includes Debris
115	D	0	1	0		K	S	0	1							Includes Debris
116	D	0	1	1		K	S	0	1							Includes Debris
117	D	0	1	8		K	S	0	1							Includes Debris
118	D	0	1	9		K	S	0	1							Includes Debris
119	D	0	2	2		K	S	0	1							Includes Debris
120	D	0	2	8		K	S	0	1							Includes Debris
121	D	0	2	9		K	S	0	1							Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process									
							(1) Process Codes (enter)									(2) Process Description [If a code is not entered in D (1)]
122	D	0	3	0		K	S	0	1							Includes Debris
123	D	0	3	3		K	S	0	1							Includes Debris
124	D	0	3	4		K	S	0	1							Includes Debris
125	D	0	3	5		K	S	0	1							Includes Debris
126	D	0	3	6		K	S	0	1							Includes Debris
127	D	0	3	8		K	S	0	1							Includes Debris
128	D	0	3	9		K	S	0	1							Includes Debris
129	D	0	4	0		K	S	0	1							Includes Debris
130	D	0	4	1		K	S	0	1							Includes Debris
131	D	0	4	3		K	S	0	1							Includes Debris
132	F	0	0	1		K	S	0	1							Includes Debris
133	F	0	0	2		K	S	0	1							Includes Debris
134	F	0	0	3		K	S	0	1							Includes Debris
135	F	0	0	4		K	S	0	1							Includes Debris
136	F	0	0	5		K	S	0	1							Includes Debris
137	F	0	3	9		K	S	0	1							Includes Debris
138	W	T	0	1		K	S	0	1							Includes Debris
139	W	T	0	2		K	S	0	1							Includes Debris
140	U	2	1	0		K	S	0	1							Includes Debris
141	D	0	0	1	81,310	K	T	0	4							Includes Debris
142	D	0	0	2		K	T	0	4							Includes Debris
143	D	0	0	3		K	T	0	4							Includes Debris
144	D	0	0	4		K	T	0	4							Includes Debris
145	D	0	0	5		K	T	0	4							Includes Debris
146	D	0	0	6		K	T	0	4							Includes Debris
147	D	0	0	7		K	T	0	4							Includes Debris
148	D	0	0	8		K	T	0	4							Includes Debris
149	D	0	0	9		K	T	0	4							Includes Debris
150	D	0	1	0		K	T	0	4							Includes Debris
151	D	0	1	1		K	T	0	4							Includes Debris
152	D	0	1	8		K	T	0	4							Includes Debris
153	D	0	1	9		K	T	0	4							Includes Debris

EPA/State ID Number	W	A	7	8	9	0	0	0	8	9	6	7

Continuation of Section XIV. Description of Dangerous Waste

Line Number	A. Dangerous Waste No. (enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Process									
							(1) Process Codes (enter)									(2) Process Description [If a code is not entered in D (1)]
154	D	0	2	2		K	T	0	4							Includes Debris
155	D	0	2	8		K	T	0	4							Includes Debris
156	D	0	2	9		K	T	0	4							Includes Debris
157	D	0	3	0		K	T	0	4							Includes Debris
158	D	0	3	3		K	T	0	4							Includes Debris
159	D	0	3	4		K	T	0	4							Includes Debris
160	D	0	3	5		K	T	0	4							Includes Debris
161	D	0	3	6		K	T	0	4							Includes Debris
162	D	0	3	8		K	T	0	4							Includes Debris
163	D	0	3	9		K	T	0	4							Includes Debris
164	D	0	4	0		K	T	0	4							Includes Debris
165	D	0	4	1		K	T	0	4							Includes Debris
166	D	0	4	3		K	T	0	4							Includes Debris
167	F	0	0	1		K	T	0	4							Includes Debris
168	F	0	0	2		K	T	0	4							Includes Debris
169	F	0	0	3		K	T	0	4							Includes Debris
170	F	0	0	4		K	T	0	4							Includes Debris
171	F	0	0	5		K	T	0	4							Includes Debris
172	F	0	3	9		K	T	0	4							Includes Debris
173	W	T	0	1		K	T	0	4							Includes Debris
174	W	T	0	2		K	T	0	4							Includes Debris
175	U	2	1	0		K	T	0	4							Includes Debris
176																
177																
178																
179																
180																
181																
182																
183																
184																

XV. Map

Attach to this application a topographic map of the area extending to at least one (1) mile beyond property boundaries. The map must show the outline of the facility; the location of each of its existing and proposed intake and discharge structures; each of its dangerous waste treatment, storage, recycling, or disposal units; and each well where fluids are injected underground. Include all springs, rivers, and other surface water bodies in this map area, plus drinking water wells listed in public records or otherwise known to the applicant within ¼ mile of the facility property boundary. The instructions provide additional information on meeting these requirements.

Topographic map is located in the Ecology Library

XVI. Facility Drawing

All existing facilities must include a scale drawing of the facility (refer to Instructions for more detail).

XVII. Photographs

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment, recycling, and disposal areas; and sites of future storage, treatment, recycling, or disposal areas (refer to Instructions for more detail).

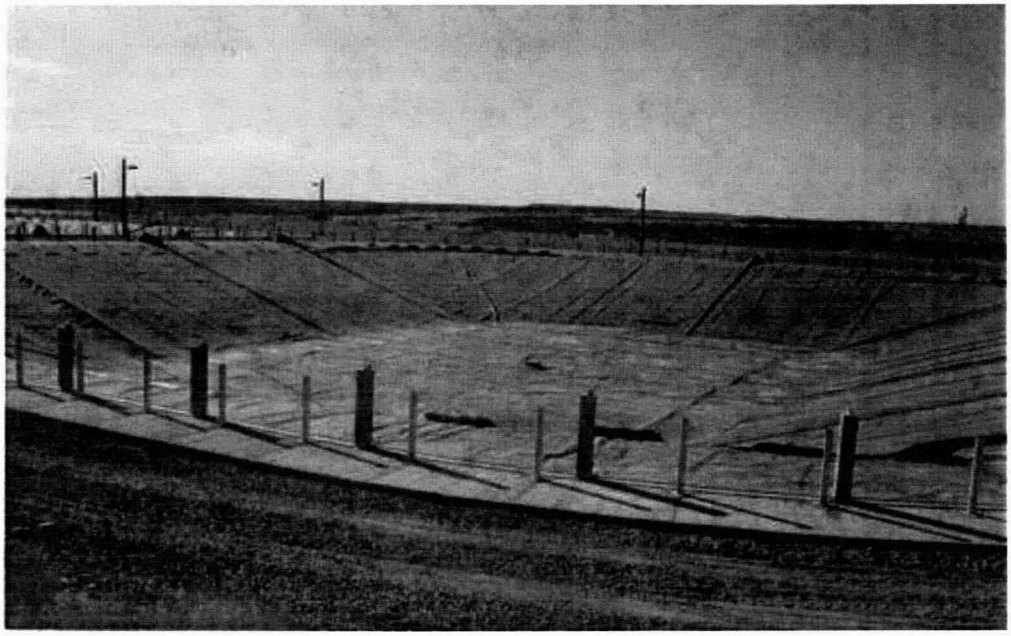
XVIII. Certifications

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

Operator Name and Official Title (type or print) Matthew S. McCormick, Manager U.S. Department of Energy Richland Operations Office	**Signature** Doug D. Shoop for	**Date Signed** 5/27/11
Co-Operator* Name and Official Title (type or print) John G. Lehew, III President and Chief Executive Officer CH2M HILL Plateau Remediation Company	**Signature**	**Date Signed** 5/12/11
Co-Operator – Address and Telephone Number* P.O. Box 1600 Richland, WA 99352 (509) 376-0556		
Facility-Property Owner Name and Official Title (type or print) Matthew S. McCormick, Manager U.S. Department of Energy Richland Operations Office	**Signature** Doug D. Shoop	**Date Signed** 5/27/11

Comments

Liquid Effluent Retention Facility



Typical Basin

Photo Taken 1992

200 Area Effluent Treatment Facility

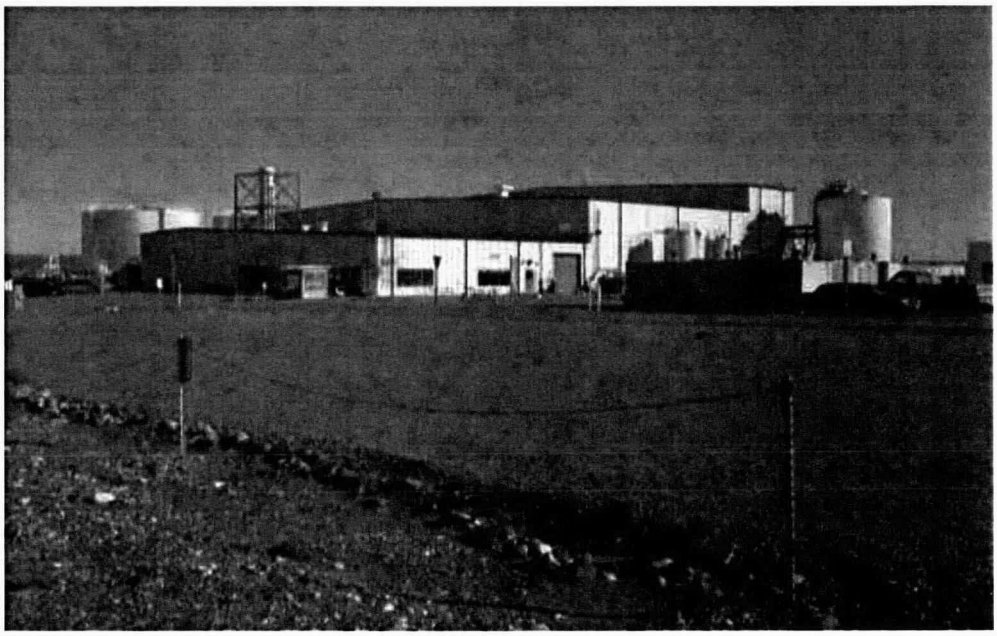
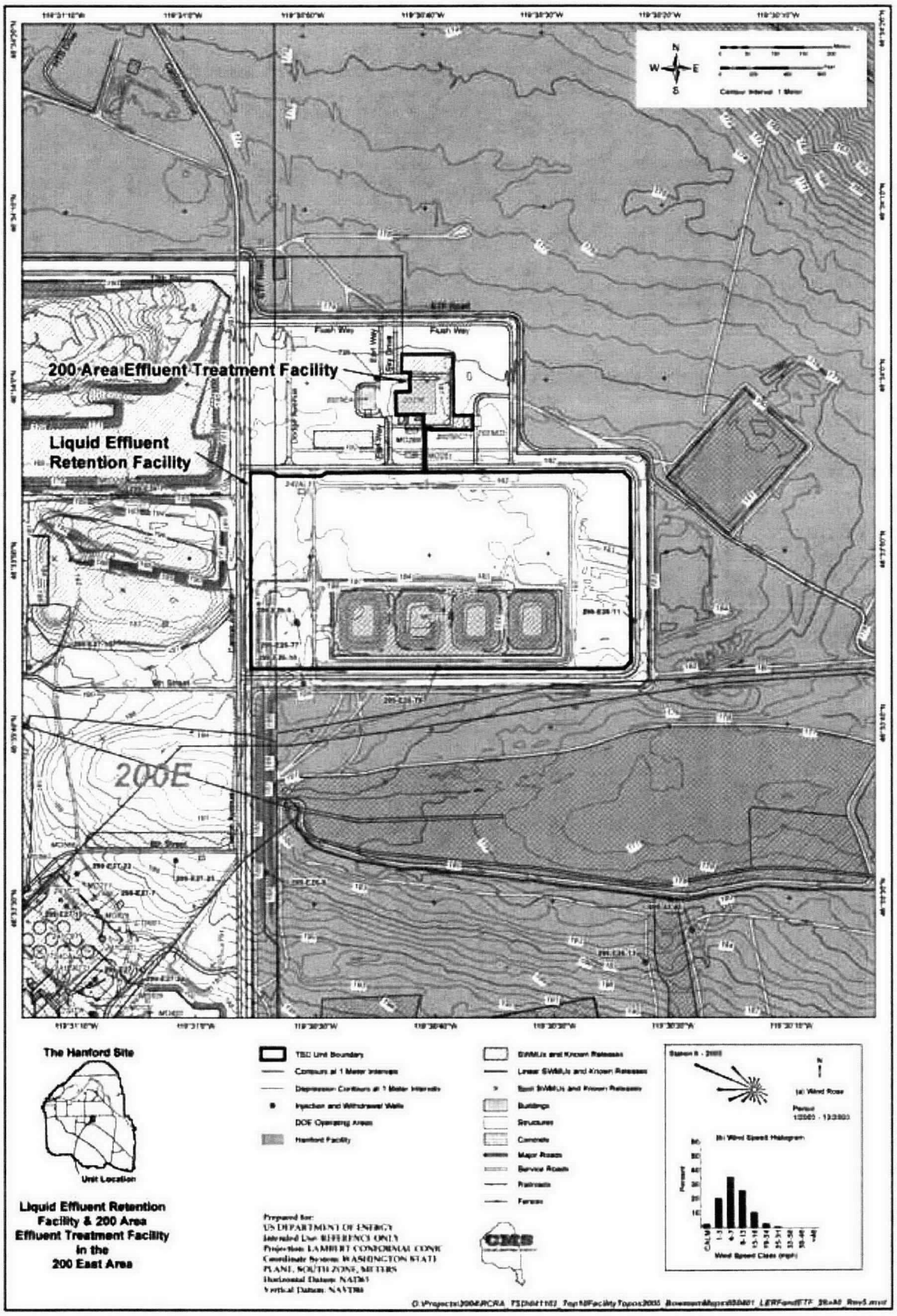


Photo Taken 2005


200 Area Effluent Treatment Facility
Liquid Effluent Retention Facility
200E
The Hanford Site
Unit Location
Liquid Effluent Retention Facility & 200 Area Effluent Treatment Facility in the 200 East Area

Hanford Facility RCRA Permit Modification Notification Forms

Part III, Operating Unit 11

Integrated Disposal Facility

Index

Page 2 of 4 Hanford Facility RCRA Permit III.11 Conditions

Page 3 of 4 Addendum J.1, Table J.1

Page 4 of 4 Addendum J.2, Table J.1

Submitted by Co-Operator: _____ 6/20/12 Date

Reviewed by RL Program Office: 6-21-12 _____ 6.21.12 Date

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
Integrated Disposal Facility	**Part III, Operating Unit 11**

Description of Modification:
Hanford Facility RCRA Permit III.11:

PART III, OPERATING UNIT 11 UNIT-SPECIFIC CONDITIONS
INTEGRATED DISPOSAL FACILITY

This document sets forth the operating conditions for the Integrated Disposal Facility (IDF).

III.11.A COMPLIANCE WITH APPROVED PERMIT

The Permittees shall comply with all requirements set forth in the Integrated Disposal Facility (IDF) Permit conditions, the Appendices specified in Permit Condition III.11.A and the Amendments specified in Permit Conditions III.11.B through III.11.I. All subsections, figures, and tables included in these portions are enforceable unless stated otherwise:

OPERATING UNIT 11:

Chapter 1.0	Part A Form, dated October 1, 2008
Chapter 3.0	Waste Analysis Plan, dated April 9, 2006
Chapter 4.0	Process Information, dated December 31, 2008
Appendix 4A	Design Report (as applicable to critical systems), dated March 31, 2008
Appendix 4B	Construction Quality Assurance Plan, dated April 9, 2006
Appendix 4C	Response Action Plan, dated April 9, 2006
Appendix 4D	Technical specifications document (RPP-18-489 Rev 0), dated December 31, 2006
Chapter 5.0	Ground Water Monitoring, dated June 30, 2010
Chapter 6.0	Procedure to Prevent Hazards dated December 31, 2008
Addendum J.1	Contingency Plan – Pre-Active Life, dated June 30, 2012~~March 31, 2012~~
Addendum J.2	Contingency Plan – Active Life, dated June 30, 2012~~March 31, 2012~~
Chapter 8.0	Personnel Training, dated November 21, 2007
Chapter 11.0	Closure and Post Closure Requirements, dated December 31, 2008

General and Standard Hanford Facility RCRA Permit, WA7 89000 8967 (Permit) conditions (Part I and Part II Conditions) applicable to the IDF are identified in Permit Attachment 3 (Permit Applicability Matrix).

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

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

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

Reviewed by Ecology:
S. L. Dahl 6/19/12
S. L. 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 appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
Integrated Disposal Facility	**Part III, Operating Unit 11**

Description of Modification:
Addendum J.1, Table J.1

Table J.1. Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3)

Requirement	Permit Attachment 4, Hanford Emergency Management Plan (DOE/RL-94-02):	Building Emergency Plan[1] *(HNF-39903~~IP-0263-IDF~~)*	Addendum J
-350(3)(a) - A description of the actions which facility personnel must take to comply with this section and WAC 173-303-360	X[2] Section 1.3.4	X[2] Sections 7.1, 7.2 through 7.2.5, and 7.3[3] Sections 4.0, 8.2, 8.3, 8.4, and 11.0	X[2] Sections J.3.1, J.3.2 through J.3.2.5, and J.3.3[3] Sections J.3, J.3.4, J.3.5, J.3.6, and J.5
-350(3)(b) - A description of the actions which shall be taken in the event that a dangerous waste shipment, which is damaged or otherwise presents a hazard to the public health and the environment, arrives at the facility, and is not acceptable to the owner or operator, but cannot be transported pursuant to the requirements of WAC 173-303-370(5), Manifest system, reasons for not accepting dangerous waste shipments	X[2] Section 1.3.4	X[2,4] Section 7.2.5.1	X[2,4] Section J.3.2.5.1

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

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

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

Reviewed by Ecology:
S. L. Dahl
6/19/12
Date

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
Integrated Disposal Facility	**Part III, Operating Unit 11**

Description of Modification:
Addendum J.2, Table J.1

Table J.1. Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3)

Requirement	Permit Attachment 4, Hanford Emergency Management Plan (DOE/RL-94-02):	Building Emergency Plan[1] *(HNF-39904IP-0263-IDF)*	Addendum J
-350(3)(a) - A description of the actions which facility personnel must take to comply with this section and WAC 173-303-360	X[2] Section 1.3.4	X[2] Sections 7.1, 7.2 through 7.2.5, and 7.3[3] Sections 4.0, 8.2, 8.3, 8.4, and 11.0	X[2] Sections J.3.1, J.3.2 through J.3.2.5, and J.3.3[3] Sections J.3, J.3.4, J.3.5, J.3.6, and J.5
-350(3)(b) - A description of the actions which shall be taken in the event that a dangerous waste shipment, which is damaged or otherwise presents a hazard to the public health and the environment, arrives at the facility, and is not acceptable to the owner or operator, but cannot be transported pursuant to the requirements of WAC 173-303-370(5), Manifest system, reasons for not accepting dangerous waste shipments	X[2] Section 1.3.4	X[2,4] Section 7.2.5.1	X[2,4] Section J.3.2.5.1

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

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

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

Reviewed by Ecology:
S. L. Dahl 6/19/12
Date

[1] Class 1 modifications requiring prior Agency approval.

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

Remove and Replace the Following Sections:

Remove Part III Permit Conditions, dated March 31, 2012, and replace with Permit Conditions dated June 30, 2012.

PART III, OPERATING UNIT 11 UNIT-SPECIFIC CONDITIONS
INTEGRATED DISPOSAL FACILITY

This document sets forth the operating conditions for the Integrated Disposal Facility (IDF).

III.11.A COMPLIANCE WITH APPROVED PERMIT

The Permittees shall comply with all requirements set forth in the Integrated Disposal Facility (IDF) Permit conditions, the Appendices specified in Permit Condition III.11.A and the Amendments specified in Permit Conditions III.11.B through III.11.I. All subsections, figures, and tables included in these portions are enforceable unless stated otherwise:

OPERATING UNIT 11:

Chapter 1.0	Part A Form, dated October 1, 2008
Chapter 3.0	Waste Analysis Plan, dated April 9, 2006
Chapter 4.0	Process Information, dated December 31, 2008
Appendix 4A	Design Report (as applicable to critical systems), dated March 31, 2008
Appendix 4B	Construction Quality Assurance Plan, dated April 9, 2006
Appendix 4C	Response Action Plan, dated April 9, 2006
Appendix 4D	Technical specifications document (RPP-18-489 Rev 0), dated December 31, 2006
Chapter 5.0	Ground Water Monitoring, dated June 30, 2010
Chapter 6.0	Procedure to Prevent Hazards dated December 31, 2008
Addendum J.1	Contingency Plan – Pre-Active Life, dated June 30, 2012
Addendum J.2	Contingency Plan – Active Life, dated June 30, 2012
Chapter 8.0	Personnel Training, dated November 21, 2007
Chapter 11.0	Closure and Post Closure Requirements, dated December 31, 2008

General and Standard Hanford Facility RCRA Permit, WA7 89000 8967 (Permit) conditions (Part I and Part II Conditions) applicable to the IDF are identified in Permit Attachment 3 (Permit Applicability Matrix).

III.11.B AMENDMENTS TO THE APPROVED PERMIT

III.11.B.1 Portions of Permit Attachment 4, *Hanford Emergency Management Plan* that are not made enforceable by inclusion in the applicability matrix for that document, are not made enforceable by reference in this document.

III.11.B.2 Permittees must comply with all applicable portions of the Permit. The facility and unit-specific recordkeeping requirements are distinguished in the General Information Portion of the Permit, and are tied to the Permit conditions.

III.11.B.3 The scope of this Permit is restricted to the landfill construction and operation as necessary to dispose of: 1) immobilized low activity waste from the WTP, and 2) the Demonstration Bulk Vitrification System and IDF operational waste as identified in Chapter 4.0. Future expansion of the RCRA trench, or disposal of other wastes not specified in this Permit, is prohibited unless authorized via modification of this Permit.

III.11.B.4 In accordance with WAC 173-303-806(11)(d), this Permit shall be reviewed every five (5) years after the effective date and modified, as necessary, in accordance with WAC 173-303-830(3).

III.11.B.5 Inspection Requirements – Pre-Active Life Period and Active Life Period

III.11.B.5.a The Permittees will conduct inspections of the IDF according to the following requirements:

III.11.B.5.a.1 Prior to the start of the active life of the IDF as defined in WAC 173-303-040, according to Chapter 6.0, Table 6.2.

III.11.B.5.a.2 Following the start of the active life of the IDF as defined in WAC 173-303-040, according to Chapter 6.0, Table 6.2A.

III.11.B.5.b The Permittees will remedy any problems revealed by inspections conducted pursuant to Permit Condition III.11.B.5.a on a schedule, which prevents hazards to the public health and the environment and as agreed to in writing, by Ecology. Where a hazard is imminent or has already occurred, remedial action must be taken immediately.

III.11.B.5.c Reserved

III.11.B.5.d Rainwater Management

III.11.B.5.e Prior to the start of the active life of the IDF, the Permittees will manage the discharge of such water in accordance with the pollution prevention and best management practices required by State Waste Discharge Permit Number ST 4511.

III.11.B.5.e.1 Management of Liquids Collected in the Leachate Collection and Removal System (LCRS), Leak Detection System (LDS), and Secondary Leak Detection System (SLDS) prior to the start of the active life of the IDF.

III.11.B.5.e.2 Permittees shall manage the liquid in the LCRS system in a manner that does not allow the fluid head to exceed 30.5 cm above the flat 50-foot by 50-foot LCRS sump HDPE bottom liner, and the LCRS sump trough, except for storms that exceed the 25-year, 24-hour storm event [(WAC 173-303-665(2)(h)(ii)(B). Liquid with a depth greater than 30.5 cm above the LCRS liner will be removed at the earliest practicable time after detection (not to exceed 5 working days).

III.11.B.5.e.3 Accumulated liquid of pumpable quantities in the LDS and SLDS will be managed in a manner that does not allow the fluid head to exceed 30.5 cm above the LDS liner or SLDS liner [WAC 173-303-665(2)(h)(i)(C)(iii)]. Liquid with a depth greater than 30.5 cm above a liner will be removed at the earliest practicable time after detection (not to exceed 5 working days).

III.11.B.5.e.4 The Permittees will use a flow meter to check if the amount of actual liquid pumped corresponds to the amount accumulated in the leachate collection tank to verify the proper function of the leachate collection and removal sump pumps with each use. The Permittees will document in the IDF portion of the facility operating record appropriate quality assurance/quality control requirements for selection and operation of the flow meter based on the required verification. In addition, the Permittees will evaluate the leachate transfer lines for freeze and thaw damage when ambient conditions may cause such damage to occur. The Permittees will document the methods and criteria used for purposes of this evaluation, along with an appropriate justification.

III.11.B.5.e.5 The Permittee will inspect for liquids after significant rainfall events.

III.11.B.5.e.6 The Permittee will annually verify monitoring gauges and instruments are in current calibration; calibration will be performed annually or more frequently at intervals suggested by the manufacturer (refer to Chapter 4.0, §4.3.7.4)

III.11.B.5.f The Permittees will monitor liquids in the Leachate Collection and Removal System and Leak Detection System to ensure the action leakage rate (Chapter 4.0, Appendix 4A) is not exceeded. The Leachate Collection and Removal System will be inspected per Permit Condition III.11.B.5.c.

III.11.B.5.g Soil Stabilization

Prior to the first placement of waste in the IDF, the Permittee will apply soil stabilization materials as needed to prevent soil erosion in and around the landfill.

III.11.C DESIGN REQUIREMENTS

III.11.C.1 IDF is designed in accordance with WAC 173-303-665 and WAC 173-303-640 as described in Chapter 4.0. Design changes impacting IDF critical systems shall be performed in accordance with Permit Conditions III.11.D.1.d.i and III.11.D.1.d.ii.

III.11.C.1.a IDF Critical Systems include the following: The leachate collection and removal system (LCRS), leachate collection tank (LCT), leak detection system (LDS), liner system (LS), and closure cap. H-2 Drawings for the LCRS, LCT, LDS, and LS are identified in Appendix 4A, Section 3 of this Permit. Drawings for the closure cap will be provided pursuant to Permit Condition III.11.C.1.b.

The Permittees shall construct and operate the IDF in accordance with all specifications contained in RPP-18489 Rev 0. Critical systems, as defined in the definitions section of the Site-Wide RCRA Permit, are identified in Appendix 4A, Section 1 of this Permit.

III.11.C.1.b Landfill Cap

At final closure of the landfill, the Permittees shall cover the landfill with a final cover (closure cap) designed and constructed [WAC 173-303-665(6), WAC 173-303-806(4)(h)] to: Provide long-term minimization of migration of liquids through the closed landfill; Function with minimum maintenance; Promote drainage and minimize erosion or abrasion of the cover; Accommodate settling and subsidence so that the cover's integrity is maintained; and have a permeability less than or equal to the permeability of any bottom liner system or natural sub soils present.

III.11.C.1.c Compliance Schedule

Proposed conceptualized final cover design is presented in Chapter 11, Closure and Financial Assurance. Six months prior to start of construction of IDF landfill final cover (but no later than 6 months prior to acceptance of the last shipment of waste at the IDF), the Permittees shall submit IDF landfill final cover design, specifications and CQA plan to Ecology for review and approval. No construction of the final cover may proceed until Ecology approval of the final design is given, through a permit modification.

III.11.C.1.d The Permittees shall notify Ecology at least sixty (60) calendar days prior to the date it expects to begin closure of the IDF landfill in accordance with WAC 173-303-610(c).

III.11.C.2 Design Reports

III.11.C.2.a New Tank Design Assessment Report

Permittees shall generate a written report in accordance with WAC 173-303-640(3)(a), providing the results of the leachate collection tank system design assessment. The report shall be reviewed and certified by an Independent Qualified Registered Professional Engineer (IQRPE)[1] in accordance with WAC-173-303-810(13)(a).

[1] "Independent qualified registered professional engineer," as used here and elsewhere with respect to Operating Unit 11, means a person who is licensed by the state of Washington, or a state which has reciprocity with the state of Washington as defined in RCW 18.43.100, and who is not an employee of the owner or operator of the facility for which construction or modification certification is required. A qualified professional engineer is an engineer with expertise in the specific area for which a certification is given.

III.11.C.2.b Compliance Schedule

Permittees shall submit the leachate collection tank design assessment report to Ecology along with the IQRPE certification, prior to construction of any part of the tank system including ancillary equipment.

III.11.D CONSTRUCTION REQUIREMENTS

III.11.D.1 Construction Quality Assurance

III.11.D.1.a Ecology shall provide field oversight during construction of critical systems. In cases where an Engineering Change Notice (ECN) and/or Non Conformance Report (NCR) are required, Ecology and the Permittees shall follow steps for processing changes to the approved design per Permit Conditions III.11.D.1.d.i and III.11.D.1.d.ii.

III.11.D.1.b Permittees shall implement the Construction Quality Assurance Plan (CQA plan) (Appendix 4B of the permit) during construction of IDF.

III.11.D.1.b.1 The Permittees will not receive waste in the IDF until the owner or operator has submitted to Ecology by certified mail or hand delivery a certification signed by the CQA officer that the approved CQA plan has been successfully carried out and that the unit meets the requirements of WAC 173-303-665(2)(h) or (j); and the procedure in WAC 173-303-810(14)(a) has been completed. Documentation supporting the CQA officer's certification shall be furnished to Ecology upon request.

III.11.D.1.c Construction inspection reports

Permittees shall submit a report documenting the results of the leachate tank installation inspection. This report must be prepared by an independent, qualified installation inspector or a professional independent, qualified, registered, professional engineer either of whom is trained and experienced in the proper installation of tank systems or components. The Permittees will remedy all discrepancies before the tank system is placed in use. This report shall be submitted to Ecology 90 days prior to IDF operation and be included in the IDF Operating Record. [WAC 173-303-640(3)(h)].

III.11.D.1.d ECN/NCR Process for Critical Systems

Portions of the following conditions for processing engineering change notices and non-conformance reporting were extracted from and supersede Site Wide General Permit Condition II.L.

III.11.D.1.d.1 Engineering Change Notice for Critical Systems

During construction of the IDF, the Permittees shall formally document changes to the approved designs, plans, and specifications, identified in Appendices 4A, 4B, 4C, and 4D of this permit, with an Engineering Change Notice (ECN). The Permittees shall maintain all ECNs in the IDF unit-specific Operating Record and shall make them available to Ecology upon request or during the course of an inspection. The Permittees shall provide to Ecology copies of proposed ECNs affecting any critical system within five (5) working days of initiating the ECN. Identification of critical systems is included in Permit Condition III.11.C.1 and Appendix 4A of this permit. Within five (5) working days,

Ecology will review a proposed ECN modifying a critical system and inform the Permittees whether the proposed ECN, when issued, will require a Class 1, 2, or 3 Permit modification.

III.11.D.1.d.2 Non-conformance Reporting for Critical Systems

III.11.D.1.d.2.a During construction of the IDF, the Permittees shall formally document with a Nonconformance Report (NCR), any work completed which does not meet or exceed the standards of the approved design, plans and specifications, identified in Appendices 4A, 4B, 4C and 4D of this Permit. The Permittees shall maintain all NCRs in the IDF unit-specific Operating Record and shall make them available to Ecology upon request, or during the course of an inspection.

III.11.D.1.d.2.b The Permittees shall provide copies of NCRs affecting any critical or regulated system to Ecology within five (5) working days after identification of the nonconformance. Identification of critical systems is included in Permit Condition III.11.C.1 and Appendix 4A of this permit. Ecology will review a NCR affecting a critical system and notify the Permittees within five (5) working days, in writing, whether a Permit modification is required for any nonconformance, and whether prior approval is required from Ecology before work proceeds, which affects the nonconforming item.

III.11.D.1.d.2.c As-Built Drawings

Upon completing construction of IDF, the Permittees shall produce as-built drawings of the project, which incorporate the design and construction modifications resulting from all project ECNs and NCRs, as well as modifications made pursuant to WAC 173-303-830. The Permittees shall place the drawings into the Operating Record within twelve (12) months of completing construction.

III.11.D.2 The Permittees shall not reduce the minimum frequency of destructive testing less than one test per 500 feet of seam, without prior approval in writing from Ecology

III.11.E GROUND WATER AND GROUND WATER MONITORING

Ground water shall be monitored in accordance with WAC 173-303 and the provisions contained in the Ecology-approved facility ground water monitoring plan (Chapter 5.0). All wells used to monitor the ground water beneath the unit shall be constructed in accordance with the provisions of WAC 173-160.

III.11.E.1 Ground Water Monitoring Program

III.11.E.1.a Prior to initial waste placement in the IDF landfill, the Permittees shall sample all ground water monitoring wells in the IDF network twice quarterly for one first year to determine baseline conditions. For the first sampling event (and only the first), samples for each well will include all constituents in 40 CFR 264 Appendix IX. Thereafter, sampling will include only those constituents as specified in Chapter 5.0, Table 5-2: chromium (filtered and unfiltered the first year to compare results), specific conductance, TOC, TOX, and pH. Other constituents to be monitored but not statistically compared include alkalinity, anions, ICP metals, and turbidity. These will provide important information on hydrogeologic characteristics of the aquifer and may provide indications of encroaching contaminants from other facilities not associated with IDF.

III.11.E.1.b After the baseline monitoring is completed, and data is analyzed, the Permittees and Ecology shall assess revisions to Chapter 5.0, Table 5-2. Subsequent samples will be collected annually and will include constituents listed in Table 5-2 as approved by Ecology. All data analysis will employ Ecology approved statistical methods pursuant to WAC 173-303-645. Changes to Chapter 5.0 will be subject to the permit modification procedures under WAC 173-303-830.

III.11.E.1.c All constituents used as tracers to assess performance of the facility through computer modeling should be sampled at least annually to validate modeling results. Groundwater monitoring data and analytes to be monitored will be reviewed periodically as defined in Chapter 5.0 of this Permit.

III.11.E.1.d Upon Ecology approval of the leachate monitoring plan, leachate monitoring and groundwater monitoring activities should be coordinated as approved by Ecology to form an effective and efficient means of monitoring the performance of the IDF facility.

III.11.E.1.e Groundwater monitoring data shall be reported to Ecology annually by July 30.

III.11.F LEACHATE COLLECTION COMPONENT MANAGEMENT

Permittees shall design, construct, and operate all leachate collection systems to minimize clogging during the active life and post closure period

III.11.F.1 Leachate Collection and Removal System (LCRS)

III.11.F.1.a At least 120 days prior to initial waste placement in the IDF, the Permittees shall submit a Leachate monitoring plan to Ecology for review, approval, and incorporation into the permit. Upon approval by Ecology, this plan will be incorporated into the Permit as a class 1' modification. The Permittees shall not accept waste into the IDF until the requirements of the leachate monitoring plan have been incorporated into this permit.

III.11.F.1.b Leachate in the LCRS (primary sump) shall be sampled and analyzed monthly for the first year of operation of the facility and quarterly thereafter (pursuant to WAC 173-303-200). Additionally, leachate shall be sampled and analyzed to meet waste acceptance criteria at the receiving treatment storage and disposal facility.

III.11.F.1.c Permittees shall manage the leachate in the LCRS system in a manner that does not allow the fluid head to exceed 30.5 cm above the flat 50-foot by 50-foot LCRS sump HDPE bottom liner except for rare storm events as discussed in Chapter 4.0, §4.3.6.1 and the LCRS sump trough [(WAC 173-303-665(2)(h)(ii)(B). Liquid with a depth greater than 30.5 cm above the SLDS liner will be removed at the earliest practicable time after detection (not to exceed 5 working days).

III.11.F.1.d After initial waste placement, Permittees shall manage all leachate from the permitted cell as dangerous waste (designated with Dangerous Waste Number F039) in accordance with WAC 173-303.

III.11.F.2 Monitoring and Management of Leak Detection System (LDS/ secondary sump)

III.11.F.2.a Permittees shall manage the leachate in the LDS system in a manner that does not allow the fluid head to exceed 30.5 cm above the LDS liner (WAC 173-303-665(2)(h)(ii)(B).

III.11.F.2.b Permittees shall monitor and record leachate removal for comparison to the Action Leakage Rate (ALR) as described in Appendix 4C, Response Action Plan. If the leachate flow rate in the LDS exceeds the ALR, the Permittees shall implement the Ecology approved response action plan (Appendix 4C).

III.11.F.2.c Leachate from the LDS (secondary sump) shall be sampled semi-annually if a pumpable quantity of leachate is available for sampling.

III.11.F.2.d Accumulated liquid of pumpable quantities in the LDS will be managed in a manner that does not allow the fluid head to exceed 30.5 cm above the LDS liner [WAC 173-303-665(2)(h)(i)(C)(iii)]. Liquid with a depth greater than 30.5 cm above the LDS liner will be removed at the earliest practicable time after detection (not to exceed 5 working days).

III.11.F.3 Monitoring and Management of the Secondary Leak Detection System (SLDS)

III.11.F.3.a At least 180 days prior to initial waste placement, the, the Permittees shall submit to Ecology for approval a sub-surface liquids monitoring and operations plan (SLMOP) for the SLDS to include the following: monitoring frequency, pressure transducer configuration, liquid collection and storage processes, sampling and analysis and response actions. The SLMOP shall be approved by Ecology prior to placement of waste in the IDF, and incorporated into the Permit as a Class 1' modification.

III.11.F.3.b Permittees shall monitor and manage the SLDS (tertiary sump) pursuant to the approved sub-surface liquids monitoring and operations plan.

III.11.F.3.c Accumulated liquid of pumpable quantities in the SLDS will be managed in a manner that does not allow the fluid head to exceed 30.5 cm above the SLDS liner [WAC 173-303-665(2)(h)(i)(C)(iii)]. Liquid with a depth greater than 30.5 cm above the SLDS liner will be removed at the earliest practicable time after detection (not to exceed 5 working days).

III.11.F.3.d After initial waste placement, Permittees shall manage all leachate from the permitted cell as dangerous waste in accordance with WAC 173-303.

III.11.G CONSTRUCTION WATER MANAGEMENT

III.11.G.1 During construction, it is anticipated that liquids will accumulate on top of all liners and sumps. Permittees shall manage the construction wastewater in accordance with State Waste Discharge Permit ST 4511.

III.11.G.2 Liquid accumulation within the LCRS, LDS, and SLDS prior to initial waste placement will be considered construction wastewater (i.e., not leachate).

III.11.H LANDFILL LINER INTEGRITY MANAGEMENT & LANDFILL OPERATIONS

III.11.H.1 Permittees shall design, construct, and operate the landfill in a manner to protect the liners from becoming damaged. Temperature: Waste packages with elevated temperatures shall be evaluated and managed in a manner to maintain the primary (upper) liner below the design basis temperature for the liner (e.g.,160 F). Weight: Waste, fill material and closure cover shall be placed in a manner that does not exceed the allowable load bearing capacity of the liner (weight per area 13,000 lb/ft^2). Puncture: At least 3 feet of clean backfill material shall be placed as an operations layer over the leachate collection and removal system to protect the system from puncture damage.

III.11.H.1.a All equipment used for construction and operations inside of the IDF shall meet the weight limitation as specified in Permit Condition III.H.1. Only equipment that can be adequately supported by the operations layer as specified in Permit Condition III.H.1 (e.g., will not have the potential to puncture the liner) shall be used inside of the IDF. All equipment used for construction and operations outside of the IDF shall not damage the berms. Changes to any equipment will follow the process established by condition II.R of the site wide permit. Within 120 days from the effective date for the permit, a process for demonstrating compliance with this condition shall be submitted for review by Ecology. This process will be incorporated into appropriate IDF operating procedures prior to IDF operations.

III.11.H.2 The Permittees shall construct berms and ditches to prevent run-on and run-off in accordance with the requirements of Section 4.3.8 of this permit. Before the first placement of waste in the IDF, the Permittees shall submit to Ecology a final grading and topographical map on a scale sufficient to identify berms and ditches used to control run-on and run-off. Upon approval, Ecology will incorporate these maps into the permit as a Class 1' modification.

III.11.H.3 The Permittees shall operate the RCRA IDF Cell (Cell1) in accordance with WAC 173-303-665(2) and the operating practices described in Chapters 3.0, 4.0, 6.0, 7.0, 8.0 and Appendix 4A, §1, subsection 7, except as otherwise specified in this Permit.

III.11.H.4 The Permittees shall maintain a permanent and accurate record of the three-dimensional location of each waste type, based on grid coordinates, within the RCRA IDF Cell (Cell1) in accordance with WAC 173-303-665(5).

III.11.I WASTE ACCEPTANCE CRITERIA

The only acceptable waste form approved for disposal at the RCRA cell of IDF are IDF operational waste, Immobilized Low Activity Waste (ILAW) in glass form from the Waste Treatment Plant (WTP) Low Activity Waste (LAW) Vitrification facility and ILAW from the Bulk Vitrification Research Demonstration and Development facility (up to 50 boxes). Specifics about waste acceptance criteria for each of these wastes are detailed below.

No other waste forms may be disposed at the RCRA cell of IDF unless authorized via a Final Permit modification decision. Requests for Permit modifications must be accompanied by an analysis adequate for Ecology to comply with SEPA, as well as by a risk assessment and groundwater modeling to show the environmental impact. Permit Condition III.11.I.5 outlines the process by which waste sources in the IDF are modeled in an ongoing risk budget and a ground water impact analysis.

III.11.I.1 Six months prior to IDF operations Permittees shall submit to Ecology for review, approval, and incorporation into the permit, all waste acceptance criteria to address, at a minimum, the following: physical/chemical criteria, liquids and liquid containing waste, land disposal restriction treatment standards and prohibitions, compatibility of waste with liner, gas generation, packaging, handling of packages, minimization of subsidence.

III.11.I.1.a All containers/packages shall meet void space requirements pursuant to WAC 173-303-665(12).

III.11.I.1.b Compliance Schedule

III.11.I.1.b.1 Six months prior to IDF operations, the Permittees shall submit to Ecology for review, approval, and incorporation into the permit any necessary modifications to the IDF Waste Acceptance Plan (Appendix 3A of the permit application, DOE/RL-2003-12, Rev 1).

III.11.I.2 ILAW Waste Acceptance Criteria

The only ILAW forms acceptable for disposal at IDF are: (1) approved glass canisters that are produced in accordance with the terms, conditions, and requirements of the WTP portion of the Permit, and (2) the 50 bulk vitrification test boxes as specified in the DBVS test plans.

To assure protection of human health and the environment, it is necessary that the appropriate quality of glass be disposed at IDF. The LDR Treatment Standard for eight metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver), when associated with High Level Waste, is HLVIT (40 CFR 268). Because these metals are constituents in the Hanford Tanks Waste, the LDR standard for ILAW disposed to IDF is HLVIT.

For any ILAW glass form(s) that DOE intends to dispose of in IDF, DOE will provide to Ecology for review, an ILAW Waste Form Technical Requirements Document (IWTRD). The IWTRD will contain:

III.11.I.2.a WTP ILAW Waste Acceptance Criteria

III.11.I.2.a.1 A description of each specific glass formulation that DOE intends to use including a basis for why each specific formulation is proposed for use, which specific tank wastes the glass formulation is proposed for use with, the characteristics of the glass that are key to satisfactory performance (e.g., VHT, PCT, and TCLP and/or other approved performance testing methodologies that the parties agree are appropriate and necessary), the range in key characteristics anticipated if the specific glass formulation is produced on a production basis with tank waste, and the factors that DOE must protect against in producing the glass to ensure the intended glass characteristics will exist in the actual ILAW.

III.11.I.2.a.2 A performance assessment that provides a reasonable basis for assurance that each glass formulation will, once disposed of in IDF in combination with the other waste volumes and waste forms planned for disposal at the entire Integrated Disposal Facility, be adequately protective of human health and the environment; and will not violate or be projected to violate all applicable state and federal laws, regulations and environmental standards.

Within 60 days of a request by Ecology, the Permittees shall provide a separate model run using Ecology's assumptions and model input.

III.11.I.2.a.3 A description of production processes including management controls and quality assurance/quality control requirements that assure that glass produced for each formulation will perform in a reasonably similar manner to the waste form assumed in the performance assessment for that formulation.

The Permittees shall update the IWTRD consistent with the above requirements for review by Ecology consistent with their respective roles and authority as provided under the TPA. Ecology comments shall be dispositioned through the Review Comment Record (RCR) process and will be reflected in further modeling to modify the IDF ILAW Chapter 3.0, Waste Analysis Plan as appropriate.

The initial IWTRD contained glass formulation data as required by Permit Condition III.11.I.2.a.1, and was submitted on December 18, 2006 (AR Accession # 0906020182). The performance assessment required by Permit Condition III.11.I.2.a.2, and the quality assurance/quality control requirements process required by Permit Condition III.11.I.2.a.3 shall be submitted for Ecology review as soon as possible after issuance of the Final Tank Closure and Waste Management EIS and receipt of underlying codes and data packages, and at least 180 days prior to the date DOE expects to receive waste at IDF. At a minimum, the Permittees shall submit updates to the IWTRD to Ecology every five years or more frequently with the next one due December 31, 2012, if any of the following conditions exist:

- The Permittees submits a permit modification request allowing additional waste forms to be disposed of at IDF,
- The WTP or other vitrification facility change their glass formulations from those previously included in the IWTRD
- An unanticipated event or condition occurs that Ecology determines would warrant an update to the IWTRD.

III.11.I.2.a.4 The Permittees shall not dispose of any WTP ILAW not described and evaluated in the IWTRD.

III.11.I.3 ILAW Waste Acceptance Criteria Verification

III.11.I.3.a Six months prior to disposing of ILAW in the IDF, the Permittees will submit an ILAW verification plan to Ecology for review and approval. This plan will be coordinated with WTP, Ecology, and the Permittees personnel. This plan will outline the specifics of verifying ILAW waste acceptance through WTP operating parameters, and/or glass sampling. The Plan will include physical sampling requirements for batches, glass formulations, and/or feed envelopes.

III.11.I.4 Demonstration Bulk Vitrification System (DBVS) Bulk Vitrification Waste Acceptance Criteria

III.11.I.4.a Bulk Vitrification waste forms that are acceptable to be disposed of at IDF are up to 50 boxes of vitrified glass produced pursuant to the DBVS RD&D Permit from processing Hanford Tank S-109 tank waste.

III.11.I.4.b If Bulk Vitrification is selected as a technology to supplement the Waste Treatment Plant, the IDF portion of the Permit will need to be modified to accept Bulk Vitrification Full Scale production waste forms. This modification will need to be accompanied by appropriate TPA changes (per M-062 requirements) and adequate risk assessment information sufficient for the Department of Ecology to meet its SEPA obligations.

III.11.I.4.c DBVS Waste Acceptance Verification will occur on 100% of the waste packages. Pursuant to the DBVS RD&D Permit, a detailed campaign test report will be produced and submitted to Ecology detailing results of all testing performed on each waste package that is produced. IDF personnel shall review these reports to verify that the waste packages meet IDF Waste Acceptance Criteria.

III.11.I.4.d The Permittees shall not dispose of any waste forms that do not comply with all appropriate and applicable treatment standards, including all applicable Land Disposal Restrictions (LDR).

III.11.I.5 Modeling – Risk Budget Tool

III.11.I.5.a The Permittees must create and maintain a modeling - risk budget tool, which models the future impacts of the planned IDF waste forms (including input from analyses performed as specified in Permit Conditions III.11.I.2.a through III.11.I.2.a.ii) and their impact to underlying vadose and ground water. This software tool will be submitted for Ecology review as soon as possible after issuance of Final Tank Closure and Waste Management EIS and receipt of underlying codes and data packages, and at least 180 days prior to the date DOE expects to receive waste at IDF. The risk budget tool shall be updated at least every 5 years. The model will be updated more frequently if needed, to support permit modifications or SEPA Threshold Determinations whenever a new waste stream or significant expansion is being proposed for the IDF. This risk budget tool shall be conducted in manner that is consistent with state and federal requirements, and represents a risk analysis of all waste previously disposed of in the entire IDF (both cell 1 and cell 2) and those wastes expected to be disposed of in the future for the entire IDF to determine cumulative impacts. The groundwater impact should be modeled to evaluate fate and transport in the groundwater aquifer(s) and should be compared against various performance standards including but not limited to drinking water standards (40 CFR 141 and 40 CFR 143). Ecology will review modeling assumptions, input parameters, and results and will provide comments to the Permittees. Ecology comments shall be dispositioned through the Review Comment Record (RCR) process and will be reflected in further modeling to modify the IDF ILAW waste acceptance criteria as appropriate.

III.11.I.5.a.1 The modeling-risk budget tool will include a sensitivity analysis reflecting parameters and changes to parameters as requested by Ecology.

III.11.I.5.a.2 If these modeling efforts indicate results within 75% of a performance standard [including but not limited to federal drinking water standards (40 CFR 141 and 40 CFR 143)], Ecology and the Permittees will meet to discuss mitigation measures or modified waste acceptance criteria for specific waste forms.

III.11.I.5.a.3 When considering all the waste forms to be disposed of in IDF, the Permittees shall not dispose of any waste that will result (through forward looking modeling or in real groundwater concentrations data) in a violation of any state or federal regulatory limit, specifically including but not limited to drinking water standards for any constituent as defined in 40 CFR 141 and 40 CFR 143.

III.11.I.6 The Permittees shall not dispose of any waste that is not in compliance with state and federal requirements as identified in Chapter 13.0.

III.11.I.6.a In accordance with DOE's authority under the Atomic Energy Act of 1954, as amended and other applicable law, prior to disposing of any mixed immobilized low-activity waste (ILAW) in the IDF, DOE will certify to the State of Washington that it has determined that such ILAW is not high-level waste and meets the criteria and requirements outlined in DOE's consultation with the U.S. Nuclear Regulatory Commission beginning in 1993 (Letter from R.M. Bernero, USNRC to J. Lytle, USDOE, dated March 2, 1993; Letter from J. Kinzer, USDOE, to C. J. Paperiello, USNRC, Classification of Hanford Low-Activity Tank Waste Fraction, dated March 7, 1996; and Letter from C.J. Paperiello, USNRC, to J. Kinzer, USDOE, Classification of Hanford Low-Activity Tank Waste Fraction, dated June 9, 1997). While the requirement to provide such certification is an enforceable obligation of this permit, the provision of such certification does not convey, or purport to convey, authority to Ecology to regulate the radioactive hazards of the waste under this permit.

III.11.I.7 IDF Operational Waste Acceptance Criteria

III.11.I.7.a IDF operational activities (including decontamination, cleanup, and maintenance) will generate a small amount of waste. Waste that can meet IDF waste acceptance without treatment will be disposed of at the IDF. All other IDF operational waste will be managed pursuant to WAC 173-303-200.

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Hanford Facility RCRA Permit Modification Notification Forms

Part III, Operating Unit 2
PUREX Storage Tunnels

Index

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Page 5 of 5 Addendum G, PUREX Storage Tunnels Training Matrix

Submitted by Co-Operator: _____ 6/20/12 Date

Reviewed by RL Program Office: _____ 6.21.12 Date

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.11:

PART III, OPERATING UNIT 2 PERMIT CONDITIONS
PUREX Storage Tunnels

Unit Description:

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
Addendum E	Procedures to Prevent Hazards, dated September 30, 2010
Addendum F	Preparedness and Prevention, dated September 30, 2010
Addendum G	Personnel Training, dated June 30, 2012~~September 30, 2010~~
Addendum I	Inspection Requirements, dated September 30, 2010
Addendum J	Contingency Plan, dated September 30, 2010
Chapter 11.0	Closure and Financial Assurance, dated October 2006
Chapter 12.0	Reporting and Recordkeeping (refer to Permit Attachment 33, Table 12.1)

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

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

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

Reviewed by Ecology:
A. L. Prignano 6/19/12
Date

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
PUREX Storage Tunnels	**Part III, Operating Unit 2**

Description of Modification:
Addendum G, PUREX Storage Tunnels Training Matrix

PUREX Storage Tunnels Training Matrix

Permit (WA7890008967) Training Category	Training Category[1]					
	General Hanford Facility Training	Contingency Plan Training	Emergency Coordinator Training	Operations Training		
PUREX Storage Tunnels DWTP Implementing Plan	Orientation Program	Emergency Response (Contingency Plan)	Emergency Coordinator Training	General Waste Management	Containment Building	Misc. Unit
Job title/position						
Nuclear Chemical Operator	X	X		X		X
D&D worker	X	X				
Operations Manager	X	X				
Field Work Supervisor	X	X				
Environmental Compliance Officer	X			X		X
Building Emergency Director	X		X			
Stationary Operating Engineer (SOE)	X				X	

[1] Refer to the Dangerous Waste Training Plan (DWTP) prepared for PUREX Storage Tunnels for a complete description

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

Enter relevant WAC 173-303-830, Appendix I Modification citation number: A.1
Enter wording of WAC 173-303-830, Appendix I Modification citation:
Administrative and informational changes. Text added to correspond to title of the training matrix.

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

Reviewed by Ecology:
A. L. Prignano 6/18/12
Date

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

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
PUREX Storage Tunnels	**Part III, Operating Unit 2**

Description of Modification:
Addendum G, PUREX Storage Tunnels Training Matrix

PUREX Storage Tunnels Training Matrix

Permit (WA7890008967) Training Category	Training Category[1]					
	General Hanford Facility Training	Contingency Plan Training	Emergency Coordinator Training	Operations Training		
PUREX DWTP Implementing Plan	Orientation Program	Emergency Response (Contingency Plan)	Emergency Coordinator Training	General Waste Management	~~Containment Building~~	Misc. Unit
Job title/position						
Nuclear Chemical Operator	X	X		X		X
D&D worker	X	X				
Operations Manager	X	X				
Field Work Supervisor	X	X				
Environmental Compliance Officer	X			X		X
Building Emergency Director	X		X			
~~Stationary Operating Engineer (SOE)~~	~~X~~				~~X~~	

[1] Refer to the Dangerous Waste Training Plan (DWTP) prepared for PUREX Storage Tunnels for a complete description

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

Enter relevant WAC 173-303-830, Appendix I Modification citation number: A.2

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

Correction of typographical errors. There are no containment buildings at PUREX Storage Tunnels, but there is one in the PUREX Canyon, which is not part of Rev. 8C and is operating to interim status standards. During revisions to the training matrix to the storage tunnels in 2010, this column was incorrectly added. This deletion corrects this. SOE job title/position is not required for this unit as the storage tunnels do not have a containment building. The only duty for this position is related to the differential pressure monitoring in the canyon for the containment building. During revisions to the training matrix to the storage tunnels in 2010, this job title/position was incorrectly added

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

Reason for denial:

Reviewed by Ecology:

A. L. Prignano 6/18/12

Date

[1] Class 1 modifications requiring prior Agency approval.

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

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part
PUREX Storage Tunnels	**Part III, Operating Unit 2**

Description of Modification:
Addendum G, PUREX Storage Tunnels Training Matrix

PUREX Storage Tunnels Training Matrix

Permit (WA7890008967) Training Category	Training Category[1]					
	General Hanford Facility Training	Contingency Plan Training	Emergency Coordinator Training	Operations Training		
PUREX DWTP Implementing Plan	Orientation Program	Emergency Response (Contingency Plan)	Emergency Coordinator Training	General Waste Management	Containment Building	Misc. Unit
Job title/position						
Nuclear Chemical Operator	X	X		X		X
D&D worker	X	X				
Operations Manager	X	X				
Field Work Supervisor	X	X				
Environmental Compliance Officer	X			X		X
Building Emergency Director	X		X			
Stationary Operating Engineer (SOE)	X				X	

[1] Refer to the Dangerous Waste Training Plan (DWTP) prepared for PUREX Storage Tunnels for a complete description

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

Enter relevant WAC 173-303-830, Appendix I Modification citation number: B.5.b

Enter wording of WAC 173-303-830, Appendix I Modification citation: Other changes. Changes in position responsibilities that do not affect the type or decrease the amount of training given to employees. Annual surveillance performed by the NCO, not the ECO.

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

Reason for denial:

Reviewed by Ecology:

A. L. Prignano 6/28/12 Date

[1] Class 1 modifications requiring prior Agency approval.

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

Remove and Replace the Following Sections:

Remove Part III Permit Conditions, dated September 30, 2010, and replace with Permit Conditions dated June 30, 2012.

Remove Addendum G, dated September 30, 2010, and replace with Addendum G, dated June 30, 2012.

PART III, OPERATING UNIT 2 PERMIT CONDITIONS

PUREX Storage Tunnels

Unit Description:

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
Addendum E	Procedures to Prevent Hazards, dated September 30, 2010
Addendum F	Preparedness and Prevention, dated September 30, 2010
Addendum G	Personnel Training, dated June 30, 2012
Addendum I	Inspection Requirements, dated September 30, 2010
Addendum J	Contingency Plan, dated September 30, 2010
Chapter 11.0	Closure and Financial Assurance, dated October 2006
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 will comply with all conditions in this Chapter and its addenda and chapters with respect to storage of waste in the miscellaneous units, (PUREX Storage Tunnels), in addition to applicable requirements in Permit Parts I and II.

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

III.2.B UNIT SPECIFIC CONDITIONS

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

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Addendum G

Personnel Training

PUREX Storage Tunnels Training Matrix

Permit (WA7890008967) Training Category	Training Category[1]					
	General Hanford Facility Training	Contingency Plan Training	Emergency Coordinator Training	Operations Training		
PUREX Storage Tunnels DWTP Implementing Plan	Orientation Program	Emergency Response (Contingency Plan)	Emergency Coordinator Training	General Waste Management		Misc. Unit
Job title/position						
Nuclear Chemical Operator	X	X		X		X
D&D worker	X	X				
Operations Manager	X	X				
Field Work Supervisor	X	X				
Environmental Compliance Officer	X			X		
Building Emergency Director	X		X			

[1] Refer to the Dangerous Waste Training Plan (DWTP) prepared for PUREX Storage Tunnels for a complete description

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Quarter Ending June 30, 2012

24590-LAW-PCN-ENV-11-004

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

Index

Page 2 of 3: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant
Replace Piping and Instrumentation Diagrams (P&ID) for the LAW Concentrate Receipt Process System (LCP) in Appendix 9.2 of the Dangerous Waste Permit (DWP).

Submitted by Co-Operator:

Donna Busche 3/12/12

D. M. Busche Date

Reviewed by ORP Program Office:

DLN 3/28/12

D. L. Noyes Date

Quarter Ending June 30, 2012 24590-LAW-PCN-ENV-11-004

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

Description of Modification:

The purpose of this Class 1 prime modification is to update and replace the following P&IDs for the LCP in Appendix 9.2 of the DWP. The additional drawings are the result of converting each of the source drawings into multiple sheets in an effort to provide clearer representation of the LCP equipment, including additional details for instrumentation and logic controls.

Appendix 9.2			
Replace:	24590-LAW-M6-LCP-P0001, Rev. 3	With:	24590-LAW-M6-LCP-00001001, Rev. 0
			24590-LAW-M6-LCP-00001002, Rev. 0
			24590-LAW-M6-LCP-00001003, Rev. 0
			24590-LAW-M6-LCP-00001004, Rev. 0
			24590-LAW-M6-LCP-00001005, Rev. 0
			24590-LAW-M6-LCP-00001006, Rev. 0
	24590-LAW-M6-LCP-P0002, Rev. 2		24590-LAW-M6-LCP-00002001, Rev. 0
			24590-LAW-M6-LCP-00002002, Rev. 0
			24590-LAW-M6-LCP-00002003, Rev. 0
			24590-LAW-M6-LCP-00002004, Rev. 0

This modification requests Ecology approval and incorporation into the permit the specific changes to the P&IDs that are indicated by revision notes and clouds. The P&IDs include changes provided in applicable document change forms (e.g., DCN, SCN, SDDR, FCN, FCR, etc.) that were submitted to Ecology in accordance with Condition III.10.C.9.h. In addition, these P&IDs include changes associated with the resolution to comments on change documents since the issuance of the last revision of the permitted documents.

Significant changes to the P&IDs are summarized below:

- Converted drawing from a single sheet to multi-sheet drawings
- Modified, deleted, and added notes, holds, and references
- Modified, identified, and added support/utility system lines, valves, in-line components, instruments, and logic controls
- Incorporated changes from change documentation identified in the Notes section on each drawing

This modification requests Ecology approval and incorporation of the following list of outstanding change documents into the permit. Although not yet incorporated into the revised documents attached to this PCN, this list of outstanding DCNs are intended to be incorporated into this modification.

For 24590-LAW-M6-LCP-00001002:
24590-LAW-M6N-LCP-00038

For 24590-LAW-M6-LCP-00001004:
24590-LAW-M6LN-LCP-00004

For 24590-LAW-M6-LCP-00001005:
24590-LAW-M6N-LCP-00038

For 24590-LAW-M6-LCP-00002002:
24590-LAW-M6N-LCP-00038

Quarter Ending June 30, 2012 24590-LAW-PCN-ENV-11-004

For 24590-LAW-M6-LCP-00002004:
24590-LAW-M6N-LCP-00038

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

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

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

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

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

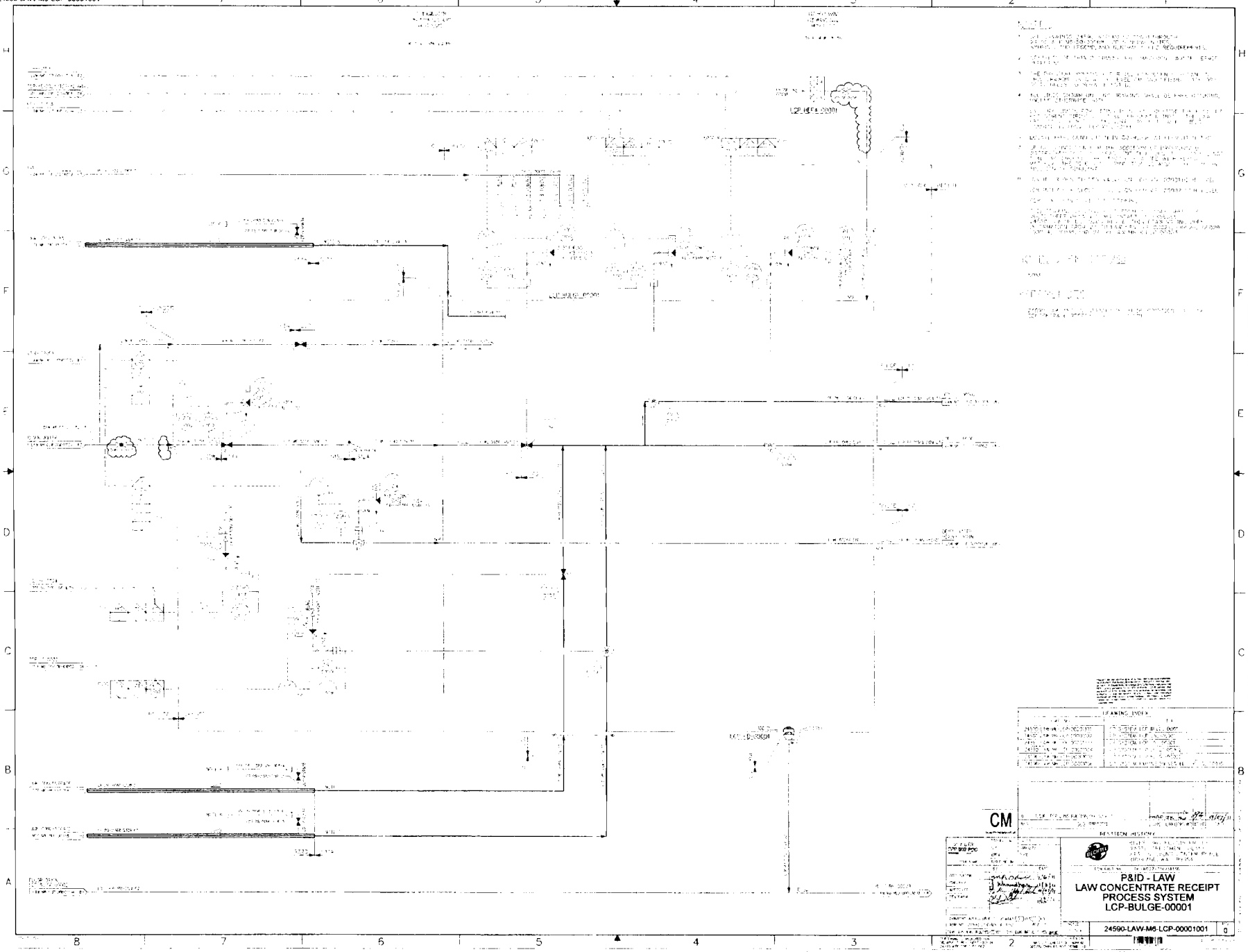
Reason for denial:

Reviewed by Ecology:

Annette Carlson 4-19-12

A. Carlson Date

24590-LAW-M6-LCP-00001001



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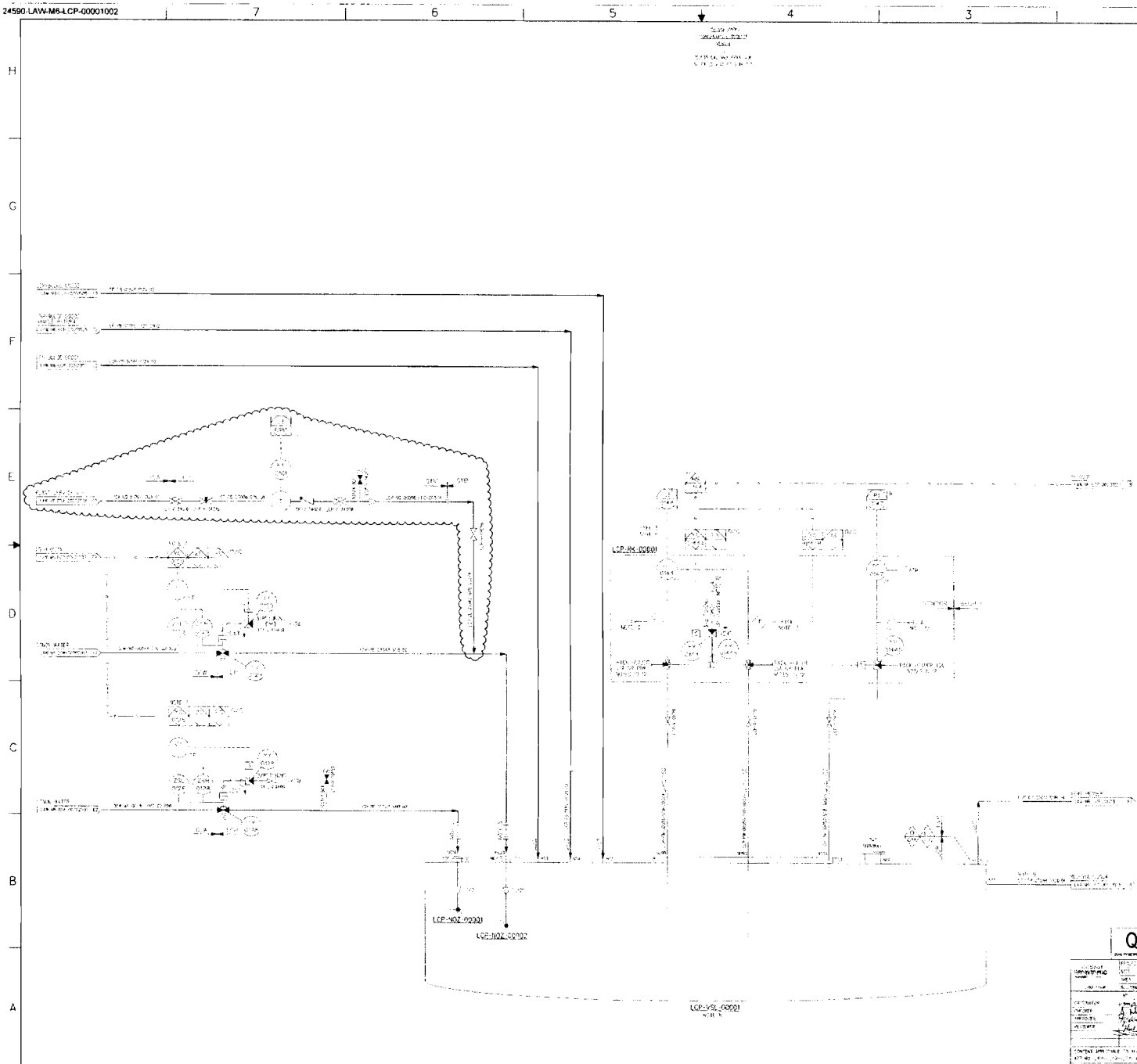


NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00002 FOR GENERAL NOTES, SYMBOLS AND PROCEDURAL CLASS REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE LAWRENCE WASTE STRING DATA.
3. THE LINE CLIPS BOUNDARY FOR ALL COMPONENTS SHOWN ON THIS DRAWING IS ADAPTED EXCEPT AND SPECIFIC CATEGORY SCHEDULE FILE NO. OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING ARE SEE DRAWING, UNLESS OTHERWISE NOTED.
5. GRADE PROVIDED FACILITY STORAGE SUPPLY [illegible]
6. [illegible] TRANSMITTER SERIES A [illegible] SENSE VALVE, [illegible] IS USED TO DETERMINE LENGTH.
7. [illegible] CLOSED VALVE [illegible] LEVEL.
8. [illegible]
9. DO NOT SCALE.
10. [illegible] LCP-00002[illegible]
11. [illegible]
12. [illegible]
13. [illegible]

LOLO/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-M6-LCP-00001 SYSTEM DESCRIPTION FOR LAW CONCENTRATE RECEIPT PROCESS (LCP)

Q

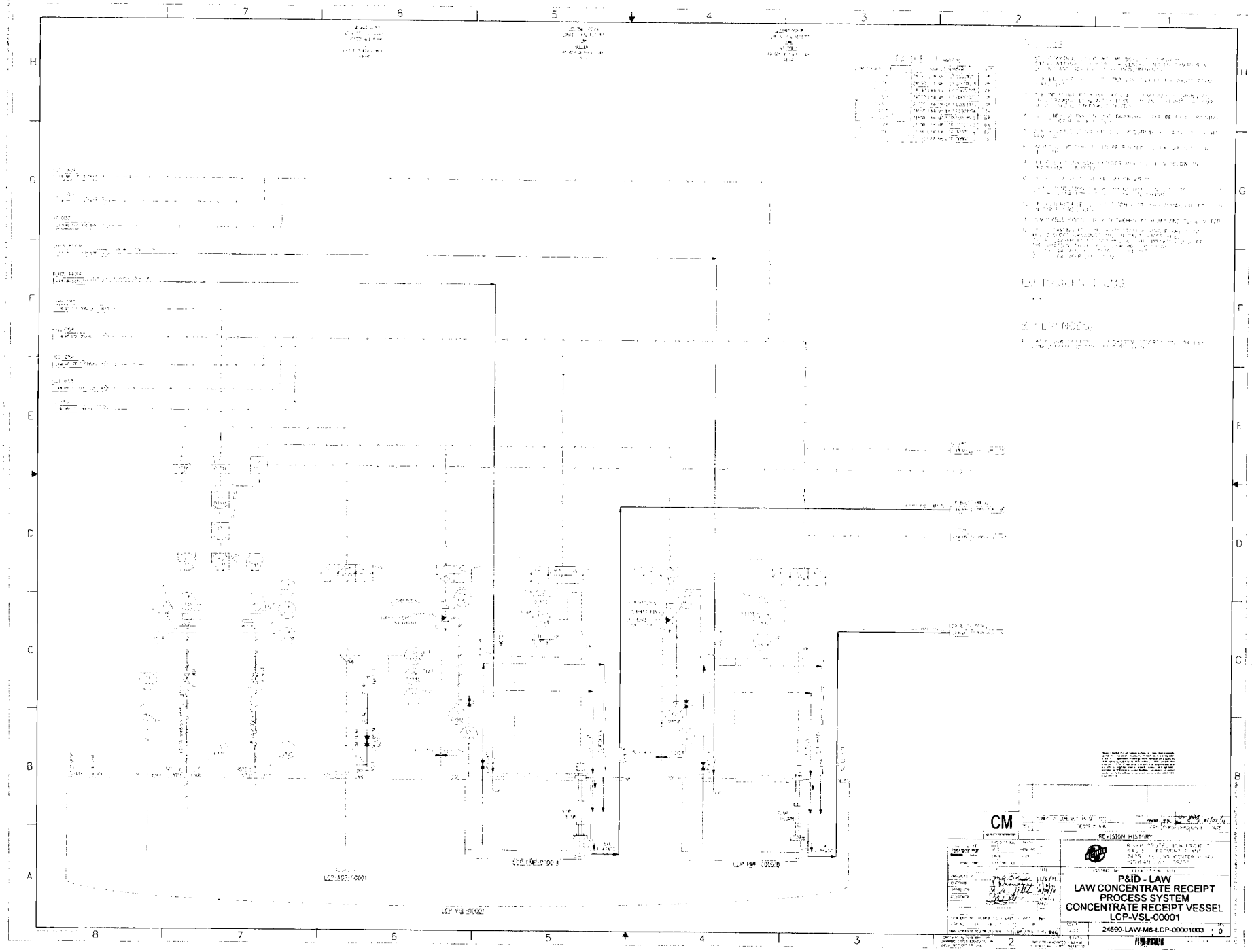
REVISION HISTORY

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
24 HOUR TRAVEL CENTER PLACE
RICHLAND, WA 99354

CONTRACT NO. DE-AC27-01RV14136

P&ID - LAW
LAW CONCENTRATE RECEIPT
PROCESS SYSTEM
CONCENTRATE RECEIPT VESSEL
LCP-VSL-00001

24590-LAW-M6-LCP-00001002 | REV 0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P&ID - LAW
LAW CONCENTRATE RECEIPT
PROCESS SYSTEM
CONCENTRATE RECEIPT VESSEL
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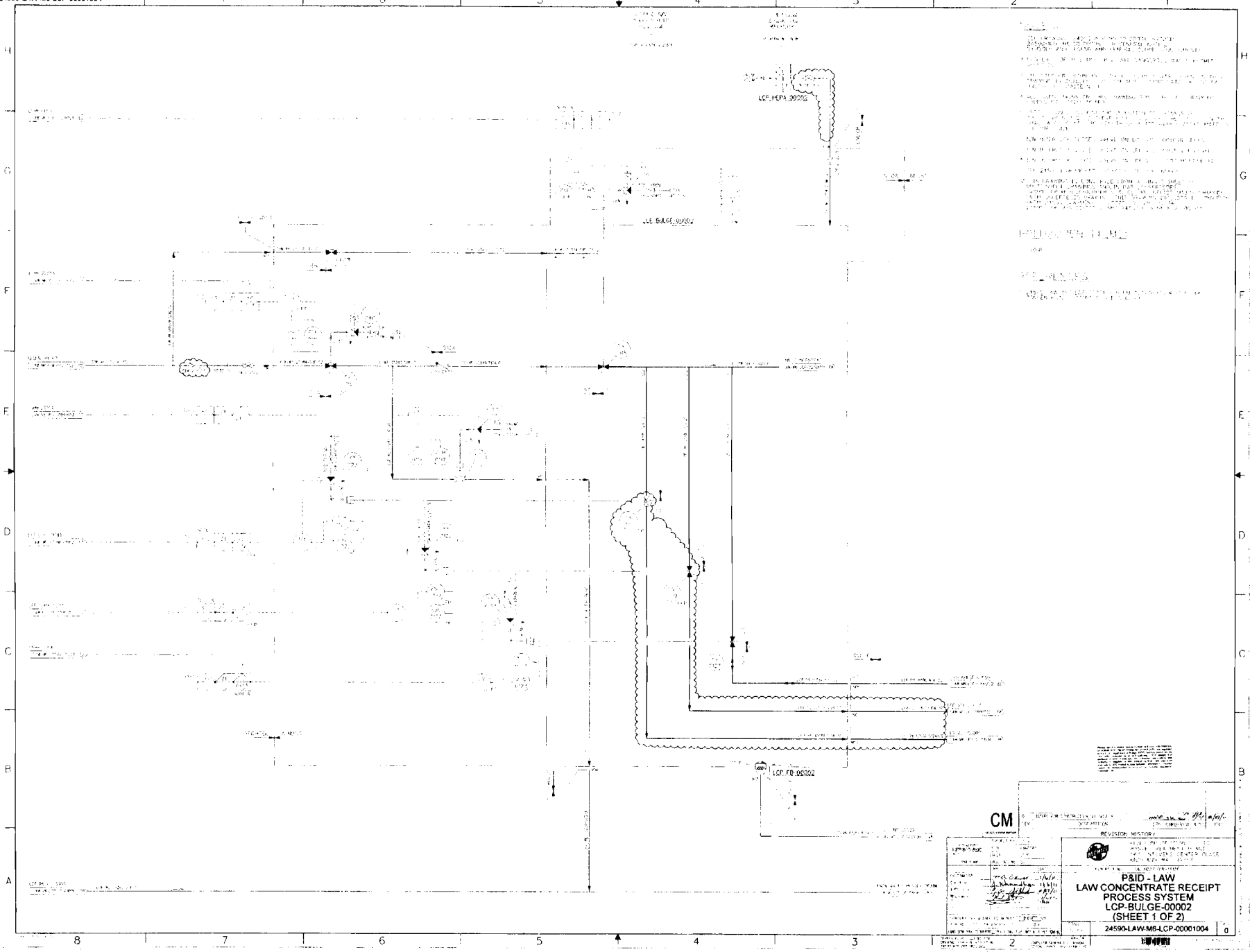
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LCP-BULGE-00002
LCP-FD-00202
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P&ID - LAW
LAW CONCENTRATE RECEIPT
PROCESS SYSTEM
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(SHEET 1 OF 2)
24590-LAW-M6-LCP-00001004
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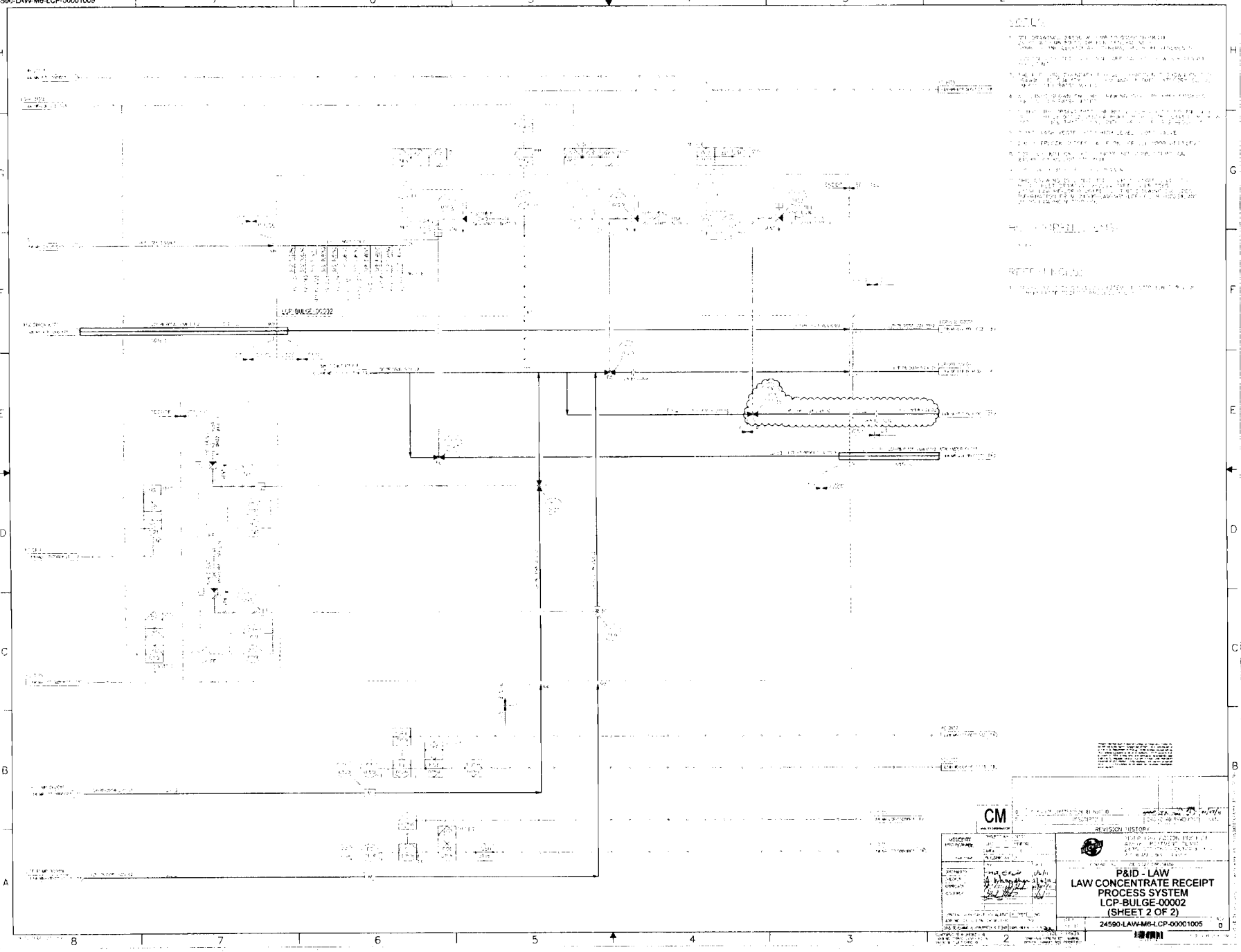
24590-LAW-M6-LCP-00001005



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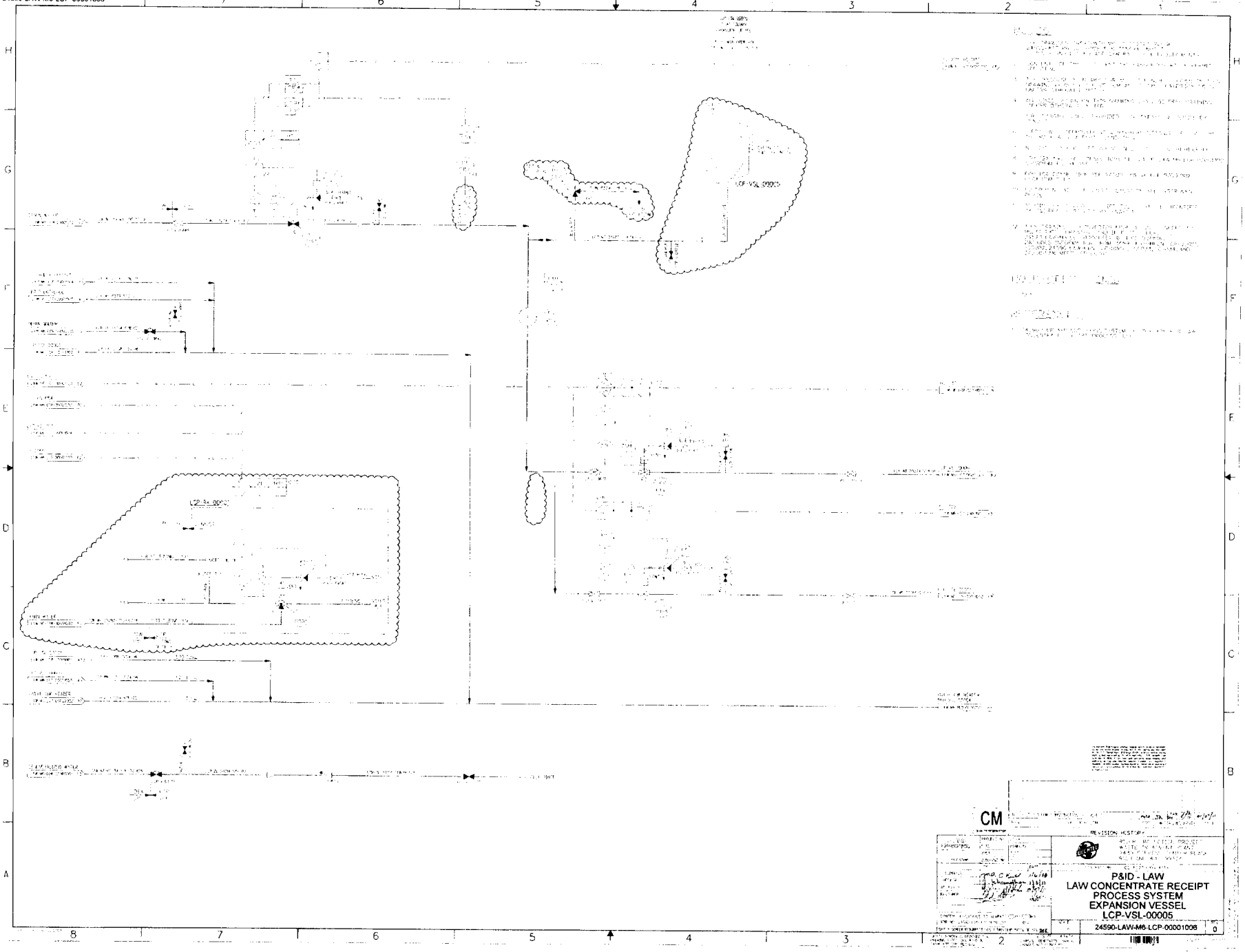

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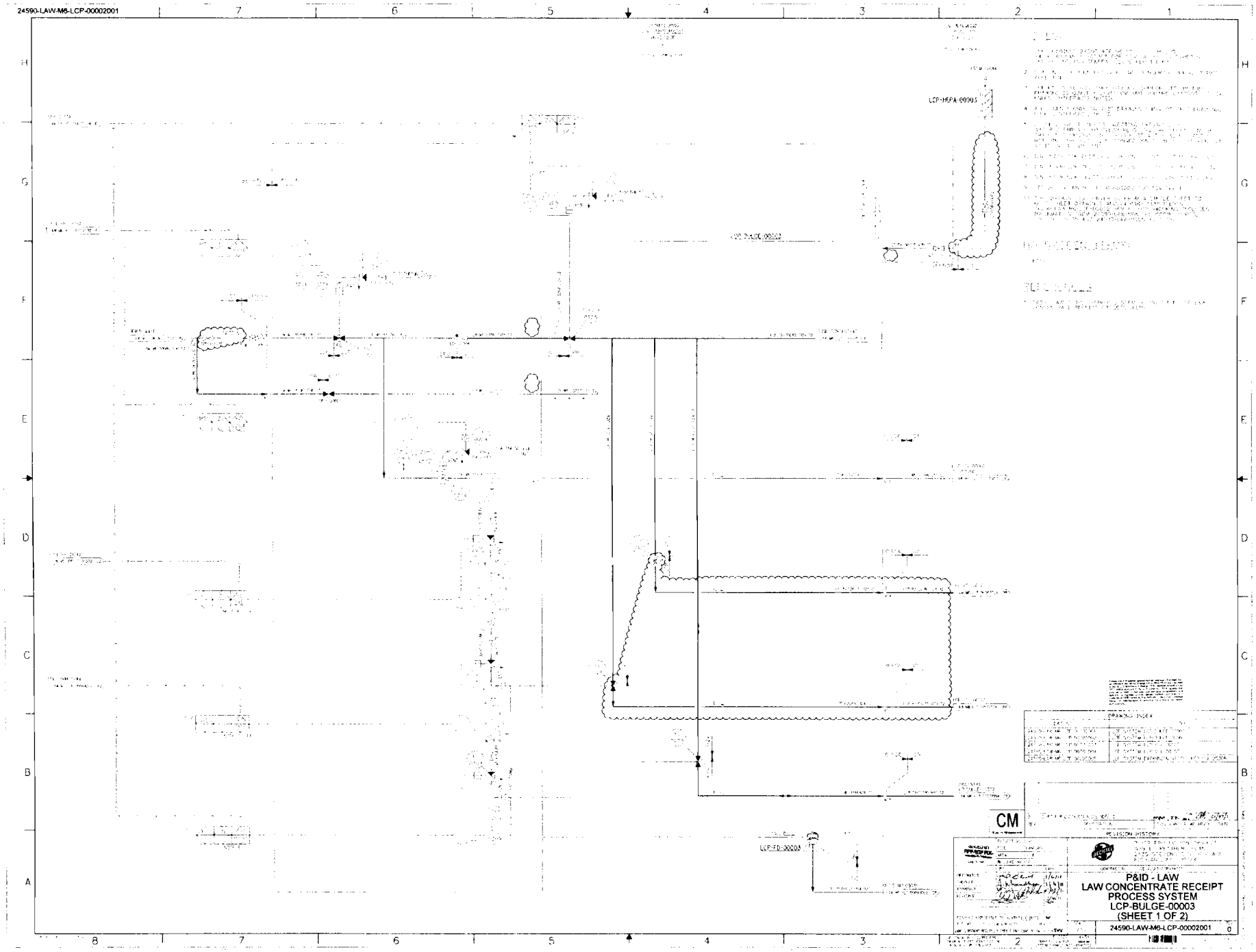

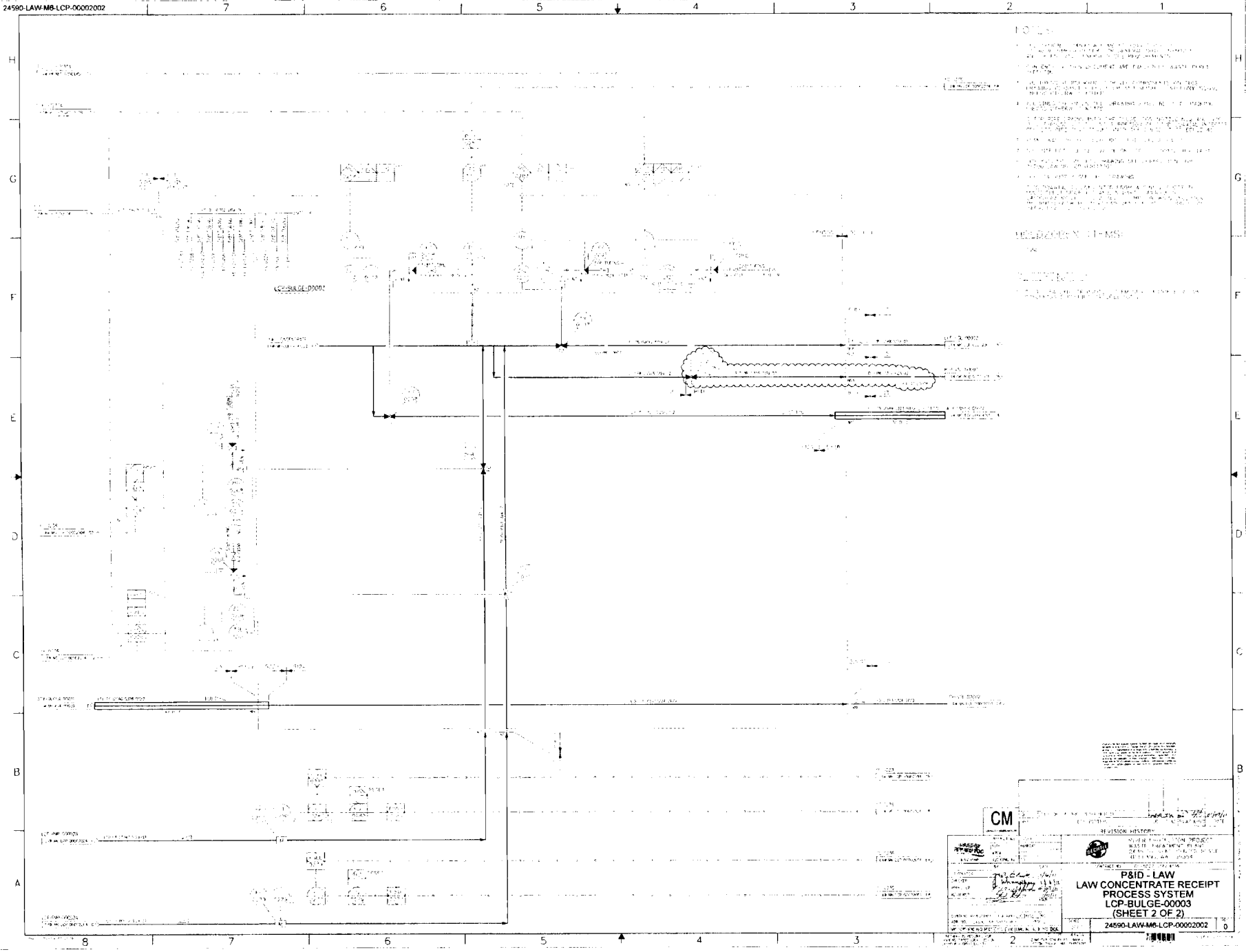
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P&ID - LAW
LAW CONCENTRATE RECEIPT
PROCESS SYSTEM
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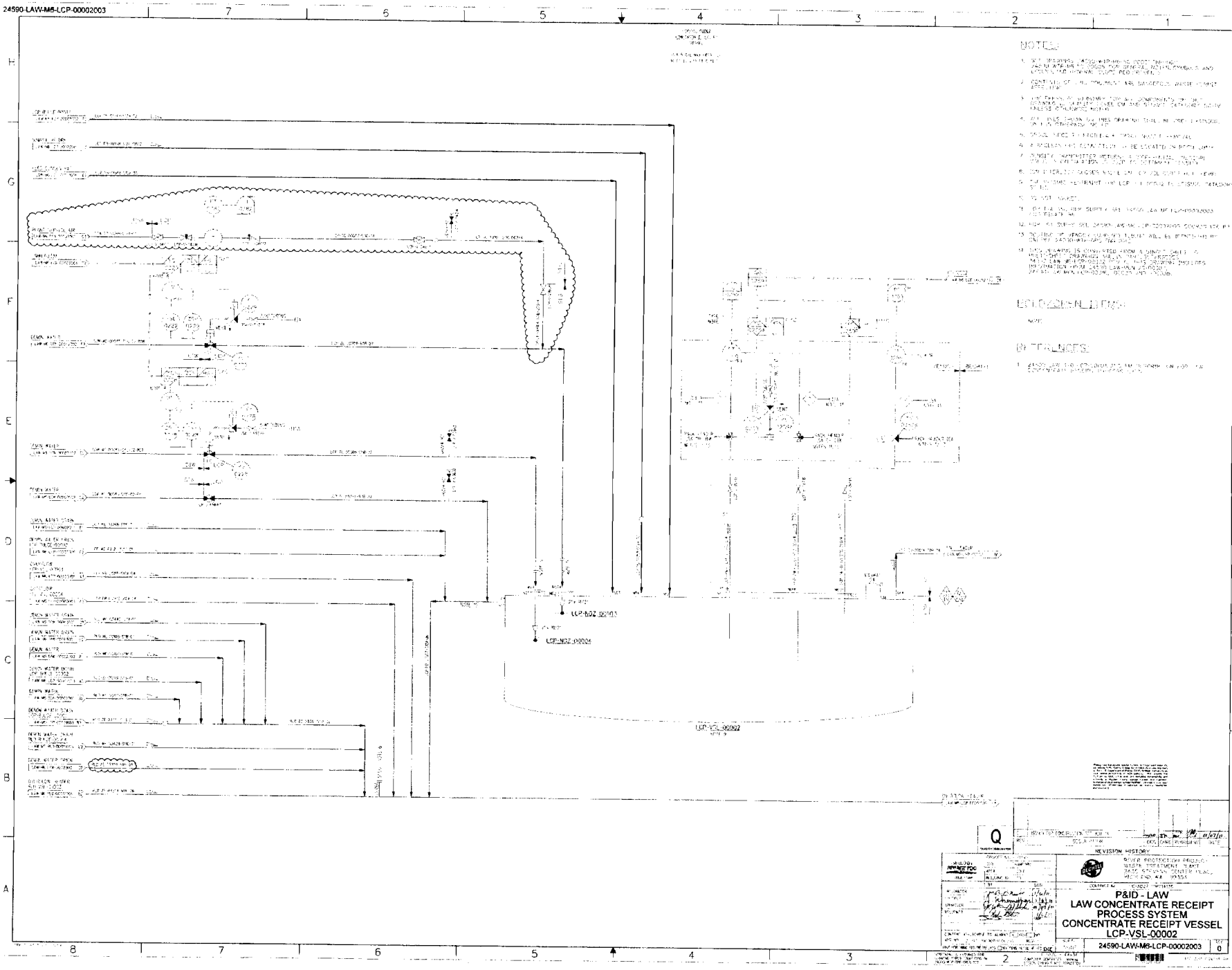
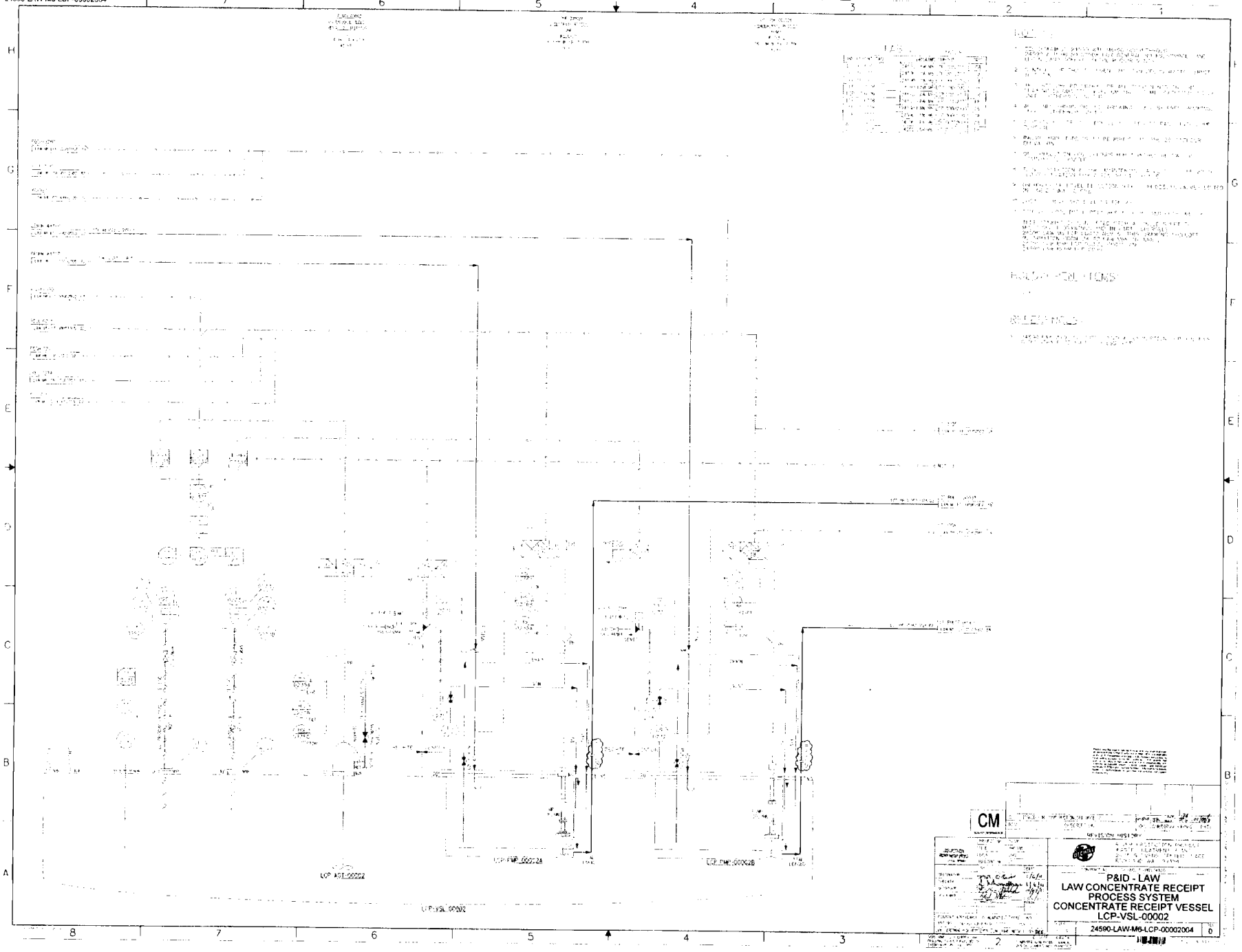
24590-LAW-M6-LCP-00002003



24590-LAW-M6-LCP-00002004



RCRA Operating Record Cover Sheet

Document Number: 24590-LAW-PCN-ENV-11-004

Waste Management Records:

- ☐ **R101** List of Waste Management Areas
- ☐ **R102** Waste Analysis Records
- ☐ **R103** Waste Designation Information
- ☐ **R104** Waste Transfer Records
- ☐ **R105** Movement of Containerized Waste Onsite
- ☐ **R106** Release/Spill Records
- ☐ **R114** Field Change Request/Field Change Notice
- ☐ **R116** Field Monitoring / Surveillance Checklists
- ☐ **R119** Reserved
- ☐ **R120** Reserved
- ☐ **R126** Satellite and 90-Day Accumulation Area

Compliance Schedule Submittals:

- ☐ **R401** Pretreatment Facility
- ☐ **R402** LAW Facility
- ☐ **R403** HLW Facility
- ☐ **R404** Laboratory
- ☐ **R405** Balance of Facility
- ☐ **R406** WTP All Facilities
- ☐ **R407** Human Health & Ecological Risk Assessment

Other Operating Record Documents:

- ☐ **R601** Outgoing Correspondence (RCRA Permit Relating)
- ☐ **R602** Contingency Plan Implementation
- ☐ **R603** Closure Plan Deviation
- ☐ **R604** Permit Equivalency Notice (PEN)
- ☒ **R605** Permit Change Notice (PCN)
- ☐ **R606** Annual RCRA Permit Closure and Post-Closure Cost Adjustment Report
- ☐ **R607** Permit Modification
- ☐ **R608** Incoming Correspondence (RCRA Permit Relating)

Non-Operating Record Documents:

- ☐ **N101** Meeting Minutes
- ☐ **N102** Memoranda

Special Instructions to PDC:

Link CCNs:

243309

245493

246599

247326

Quarter Ending March 31, 2012 24590-PTF-PCN-ENV-11-007

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

Index

Page 2 of 3: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant
Replace Piping and Instrumentation Diagrams (P&ID) for the PTF Waste Feed Receipt Process System (FRP) Vessels FRP-VSL-00002A, B, C, and D; and associated Utility Systems Plant Service Air (PSA) Rack PSA-RK-00014 and vessel Pulse Jet Mixers (PJM) in Appendix 8.2 of the Dangerous Waste Permit (DWP).

Submitted by Co-Operator:

D. M. Busche — 3/7/2012 Date

GRANT W. RYAN for

Reviewed by ORP Program Office:

D. L. Noyes — 3/30/12 Date

Quarter Ending March 31, 2012 24590-PTF-PCN-ENV-11-007

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

Description of Modification:

The purpose of this Class 1 prime modification is to update and replace the following P&IDs for the PTF vessels FRP-VSL-00002A, FRP-VSL-00002B, FRP-VSL-00002C, and FRP-VSL-00002D; and associated Utility Systems PSA Rack PSA-RK-00014 and vessel PJMs in Appendix 8.2 of the DWP. The four P&IDs incorporated into the permit are being replaced with 18 P&IDs as indicated in the table below. The additional drawings are the result of converting each of the source drawings into multiple sheets in an effort to provide clearer representation of the vessels, rack, and PJMs, including additional details for instrumentation and logic controls.

Appendix 8.2			
Replace:	24590-PTF-M6-FRP-00001, Rev. 3	With:	24590-PTF-M6-FRP-00001001 Rev. 0
			24590-PTF-M6-FRP-00001002 Rev. 0
	24590-PTF-M6-FRP-00002, Rev 3		24590-PTF-M6-FRP-00002001 Rev. 0
			24590-PTF-M6-FRP-00002002 Rev. 0
	24590-PTF-M6-FRP-00008, Rev 3		24590-PTF-M6-FRP-00008001 Rev. 0
			24590-PTF-M6-FRP-00008002 Rev. 0
			24590-PTF-M6-FRP-00008003 Rev. 0
			24590-PTF-M6-FRP-00008004 Rev. 0
			24590-PTF-M6-FRP-00008005 Rev. 0
			24590-PTF-M6-FRP-00008006 Rev. 0
			24590-PTF-M6-FRP-00008007 Rev. 0
	24590-PTF-M6-FRP-00020, Rev 0		24590-PTF-M6-FRP-00020001 Rev. 0
			24590-PTF-M6-FRP-00020002 Rev. 0
			24590-PTF-M6-FRP-00020003 Rev. 0
			24590-PTF-M6-FRP-00020004 Rev. 0
			24590-PTF-M6-FRP-00020005 Rev. 0
			24590-PTF-M6-FRP-00020006 Rev. 0
			24590-PTF-M6-FRP-00020007 Rev. 0

This modification requests Ecology approval and incorporation into the permit the specific changes to the P&IDs that are indicated by revision notes and clouds. The P&IDs include changes provided in applicable document change forms (e.g., DCN, SCN, SDDR, FCN, FCR, etc.) that were submitted to Ecology in accordance with Condition III.10.C.9.h. In addition, these P&IDs include changes associated with the resolution to comments on change documents since the issuance of the last revision of the permitted documents.

Significant changes to the P&IDs are summarized below:

- Converted drawing from a single sheet to multi-sheet drawings
- Modified, deleted, and added notes, holds, and references
- Modified, identified, and added support/utility system lines, valves, in-line components, instruments, and logic controls
- Incorporated changes from change documentation identified in the Notes section on each drawing

This modification requests Ecology approval and incorporation of the following list of outstanding change documents into the permit. Although not yet incorporated into the revised documents attached to this PCN, this list of outstanding DCNs are intended to be incorporated into this modification.

None

Quarter Ending March 31, 2012 24590-PTF-PCN-ENV-11-007

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

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

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

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

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

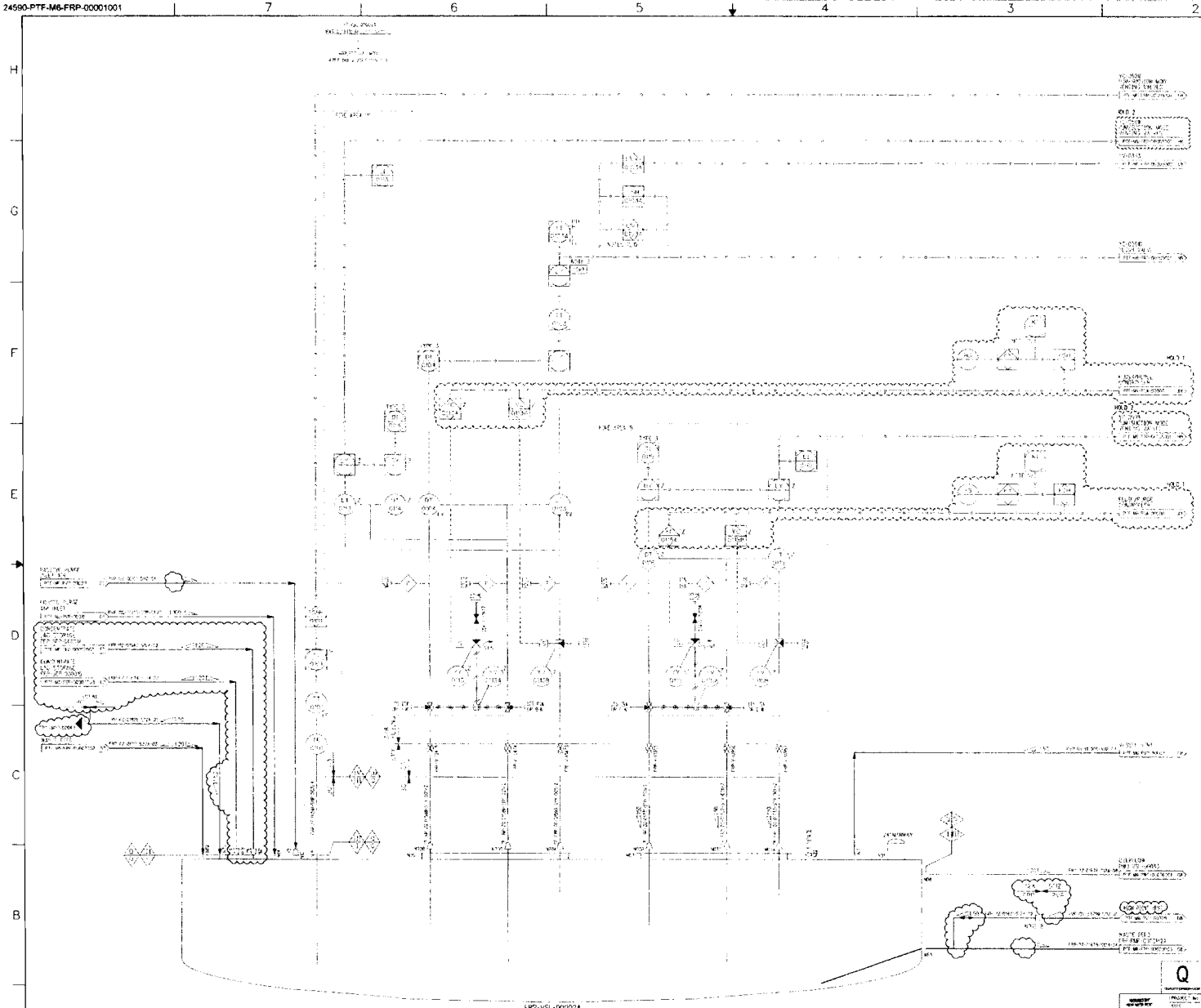
Reason for denial:

Reviewed by Ecology:

Annette Carlson 5-11-12

A. Carlson Date

24590-PTF-M6-FRP-00001001



NOTES:

1. THIS DRAWING 24590-PTF-M6-FRP-00001001 PROVIDES GRAPHICAL REPRESENTATION OF THE SYSTEM FOR GENERAL INFORMATION, SYMBOLS AND LEGEND AND GENERAL PLANT PROCEDURES.
2. CONTENTS OF THIS SEGMENT ARE DANGEROUS WASTE PER 40 CFR 261.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL 3 AND SEISMIC CATEGORY QL-3, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING ARE 1 INCH, UNLESS OTHERWISE NOTED.
5. REFER TO DRAWING 24590-PTF-M6-FRP-00001002 FOR INSTRUMENTATION, 24590-PTF-M6-FRP-00001003 FOR PROCESS MIXING SIMULATION OF 3 SATELLITE DISTILLATE.
6. REFER TO DRAWING 24590-PTF-M6-FRP-00001002 FOR PLANT WASTE AND NOZZLE INTERCONNECTION.
7. REFER TO DRAWING 24590-PTF-M6-FRP-00001002 FOR PROCESS WATER AND SYSTEM CONNECTIONS.
8. MINIMUM HEIGHT GREATER THAN OR EQUAL TO 12 INCHES.
9. CONNECTED INDICES TO 24590-PTF-M6-FRP-00001002.
10. ALL NOZZLES FROM ALL ELEMENTS STATE OF FLOW PROCESS (FLOW ELIMINATE, FLUSH IN PROGRESS, AND FLOW COMPLETE INDICATORS).
11. ON LOW-LOW LEVEL DETECTION (RFP 1) OPTIMAL VALUES LISTED IN TABLE TWO (2) ONLY.
12. SHUT OFF FEED PUMP DURING WHEN 10 FT LEVEL IN VESSEL IS ACTIVATED AND CLOSE VIOLATION VALVE TO OPEN. REFER TO TABLE TWO FOR PUMP RESET OPERATION.
13. THIS DRAWING IS GENERATED FROM A SINGLE SHEET TO ALL ELEMENT DRAWINGS AND IN POST SUBMITTAL REVISIONS WHEN ADDITIONAL ELEMENTS ARE ADDED. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-M6-FRP-00001002, 00001003, 00001004, 24590-PTF-M6-FRP-00001005, 24590-PTF-M6-FRP-00001006, AND 24590-PTF-M6-FRP-00001007.

PID 0/OPEN ITEMS:

1. PENDING BUMPER FLUSH/PURGE FEEDER COMPLETION
2. PENDING PTF MIXING DESIGN

REFERENCES:

1. 24590-PTF-M3-FEF-P0001 SYSTEM DESCRIPTION FOR WASTE FEED RECEIPT PROCESS (FRP)

TAG #	DRAWING
FRP-VSL-00002A/B	PTF-M6-FRP-00001001
FRP-TK-00002A/B/C	PTF-M6-FRP-00001002
FRP-VSL-00002D/E/F	PTF-M6-FRP-00001002
FRP-VSL-00002G/H/I	PTF-M6-FRP-00001004
FRP-VSL-00002J/K/L	PTF-M6-FRP-00001002
FRP-VSL-00002M/N/O	PTF-M6-FRP-00001005
FRP-VSL-00002P/Q/R	PTF-M6-FRP-00001006
FRP-VSL-00002S/T/U	PTF-M6-FRP-00001007
FRP-VSL-00002V/W/X	PTF-M6-FRP-00001007
FRP-VSL-00002Y/Z	PTF-M6-FRP-00001007
FRP-VSL-00002AA/AB	PTF-M6-FRP-00001007
FRP-VSL-00002AC/AD	PTF-M6-FRP-00001007
FRP-VSL-00002AE/AF	PTF-M6-FRP-00001007

DWG NO	TITLE
24590-PTF-M6-FRP-00001001	FRP SYSTEM P&ID VSL 00002A
24590-PTF-M6-FRP-00001002	FRP SYSTEM P&ID VSL 00002B

REV	DESCRIPTION	BY	DATE
0	INITIAL ISSUE		

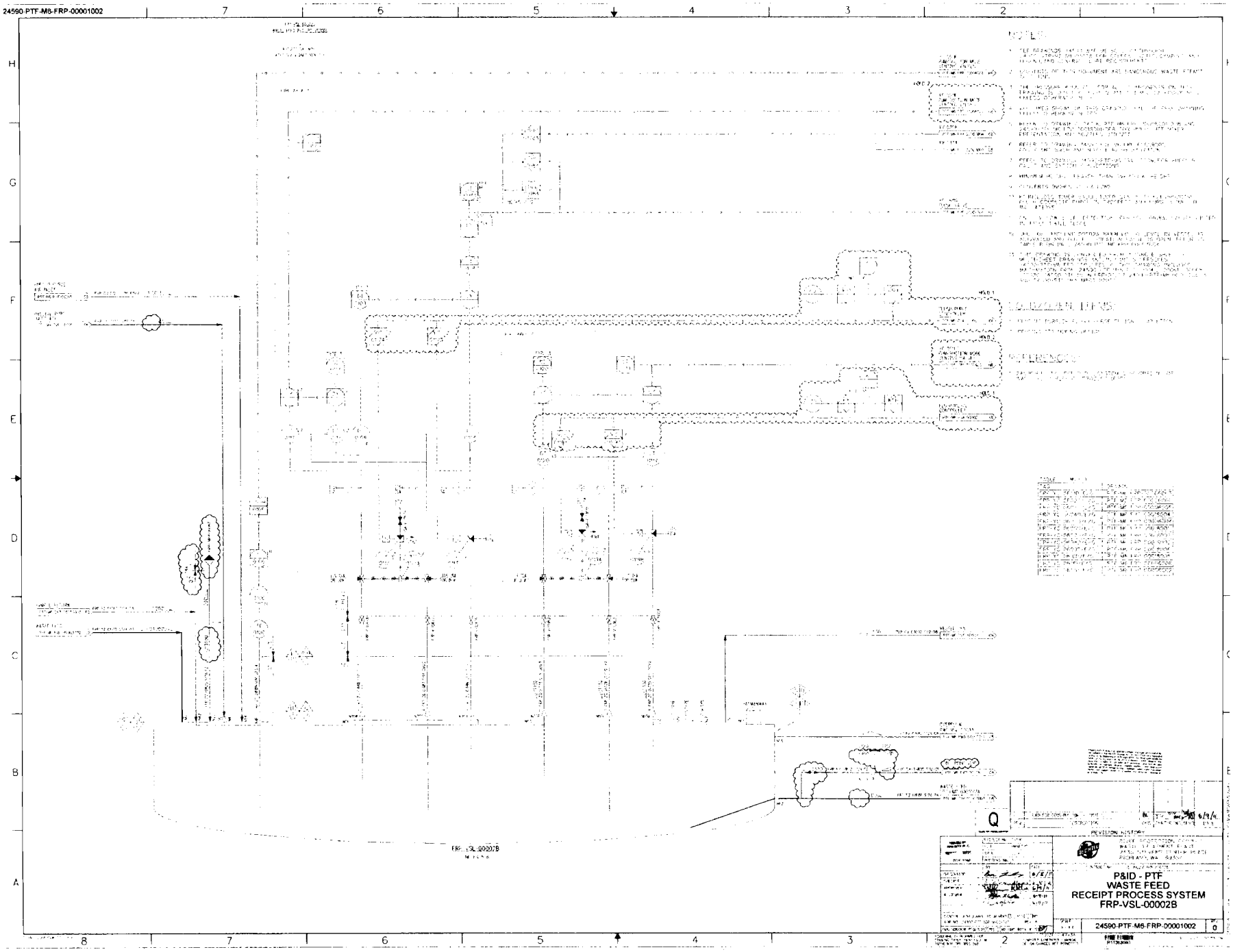
REVISION HISTORY

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

CONTRACT NO. DE-AC27-01RV14136

P&ID - PTF WASTE FEED RECEIPT PROCESS SYSTEM FRP-VSL-00002A

24590-PTF-M6-FRP-00001001 | 0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REFERENCES:
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P&ID - PTF
WASTE FEED
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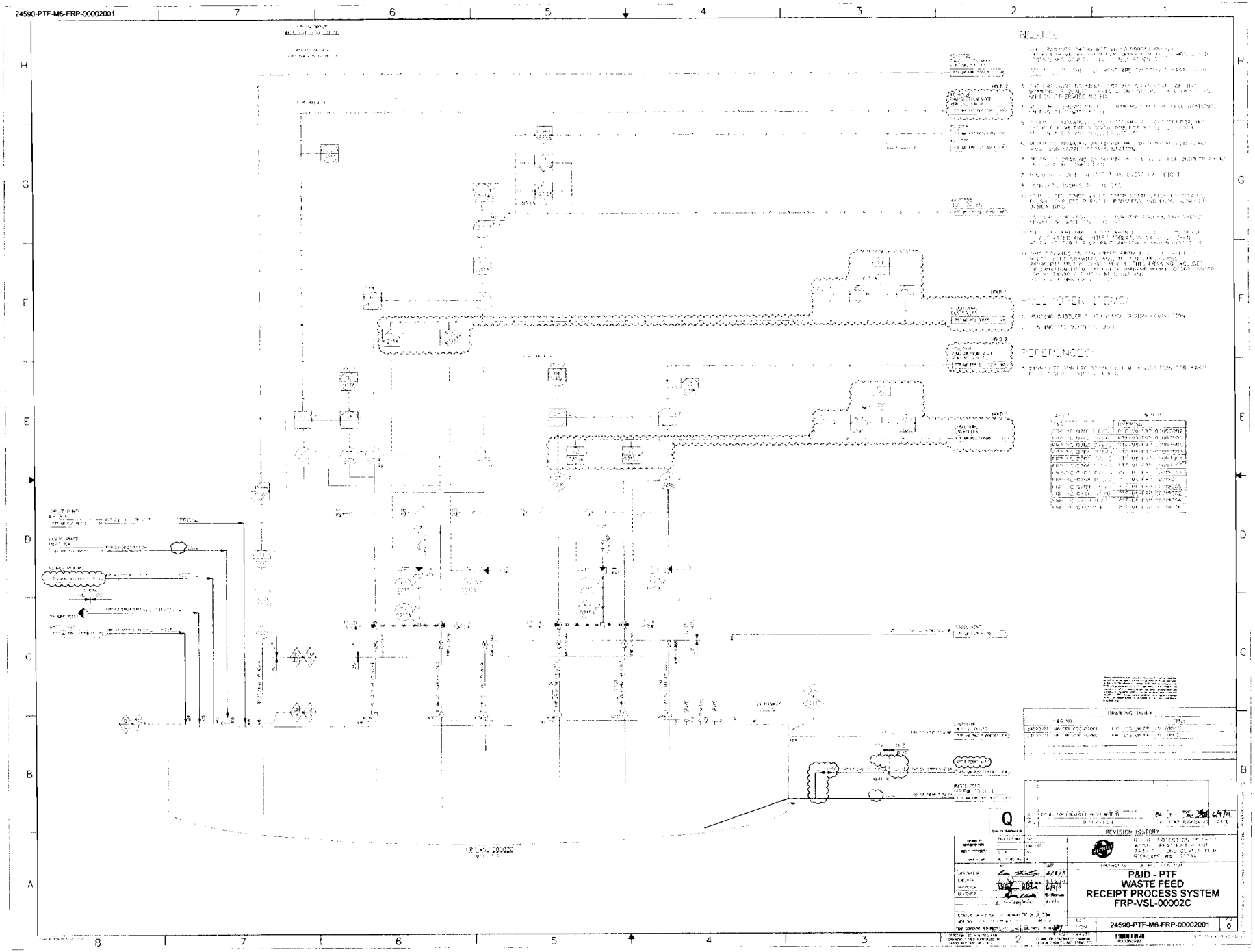
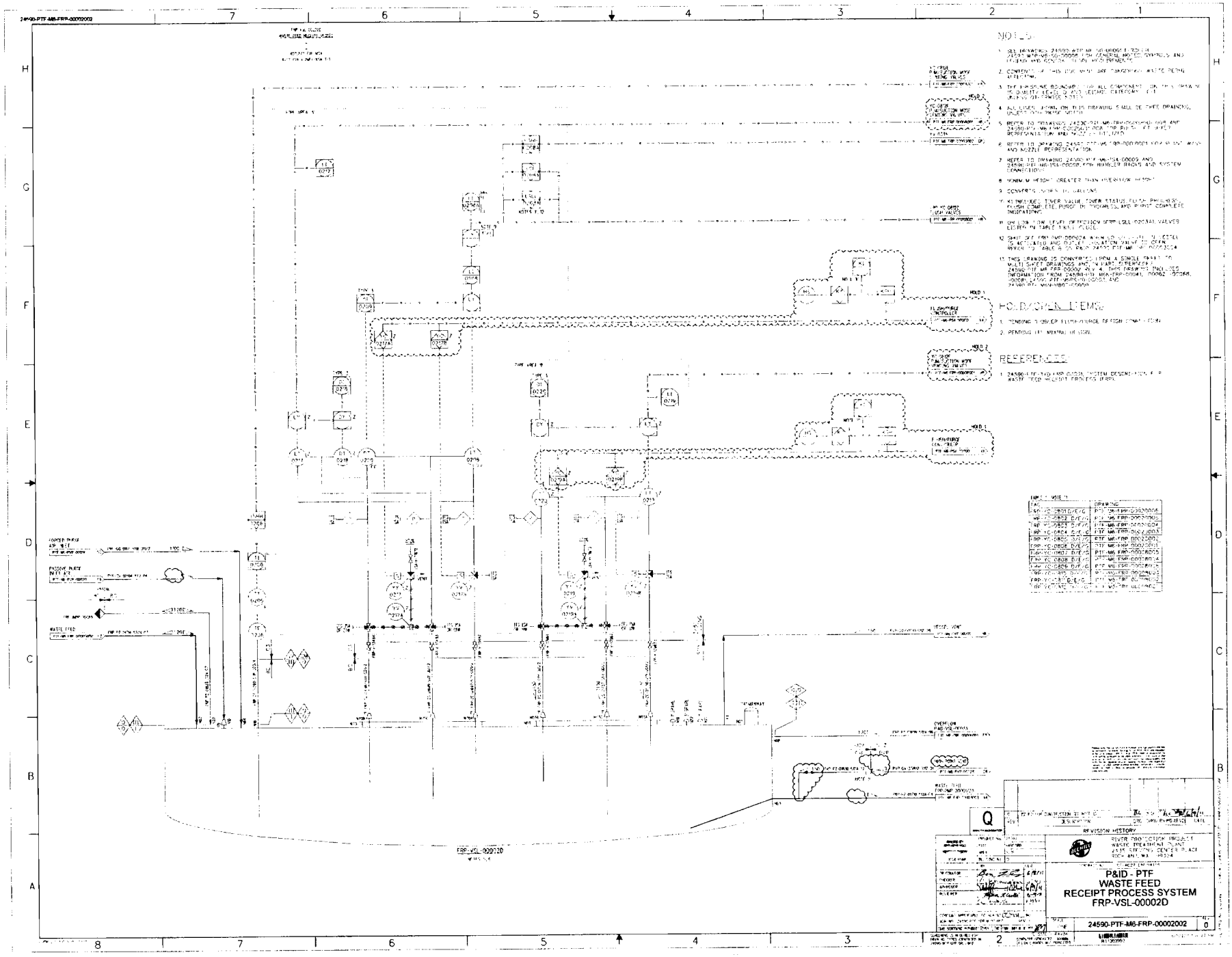
24590-PTF-M6-FRP-00002001

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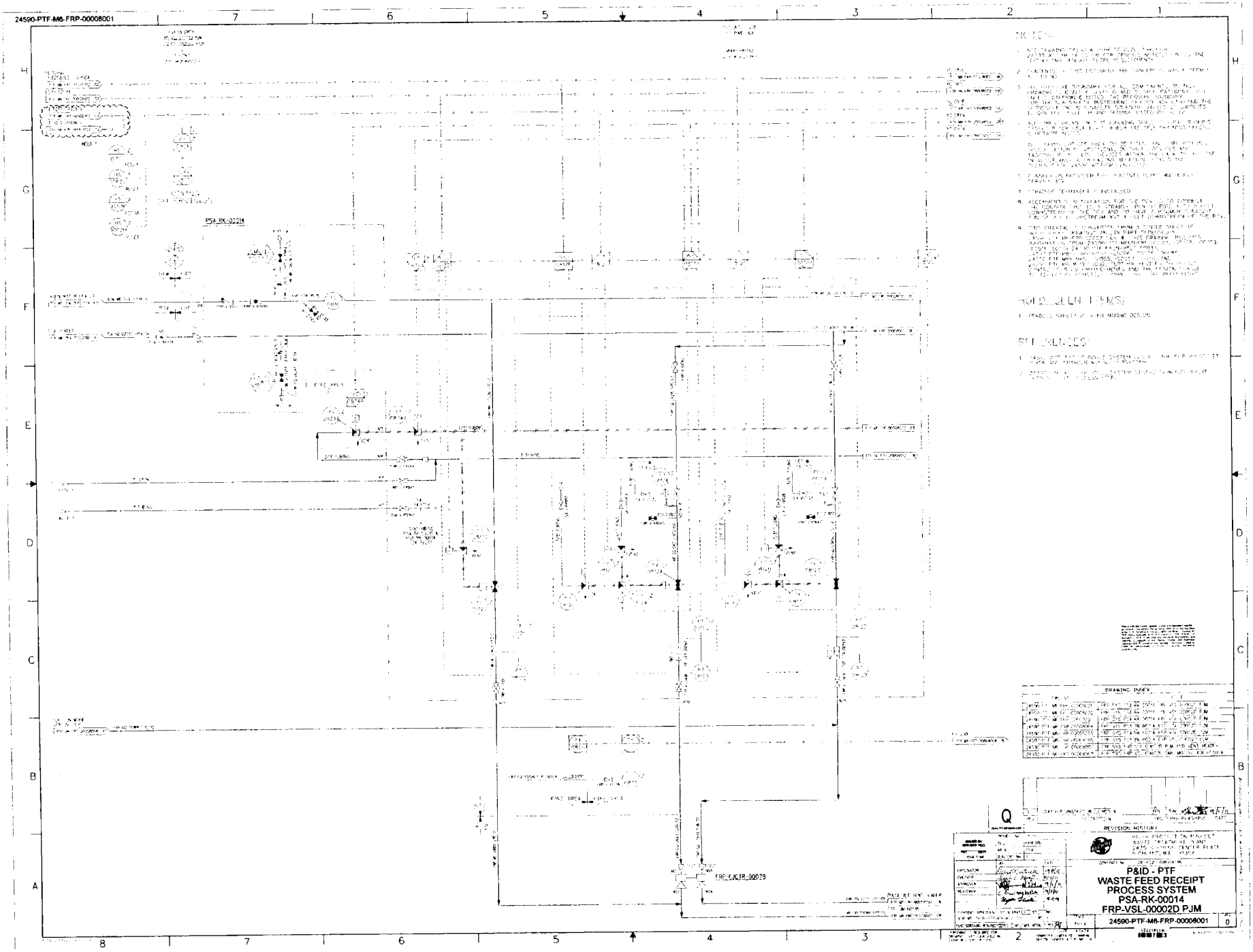

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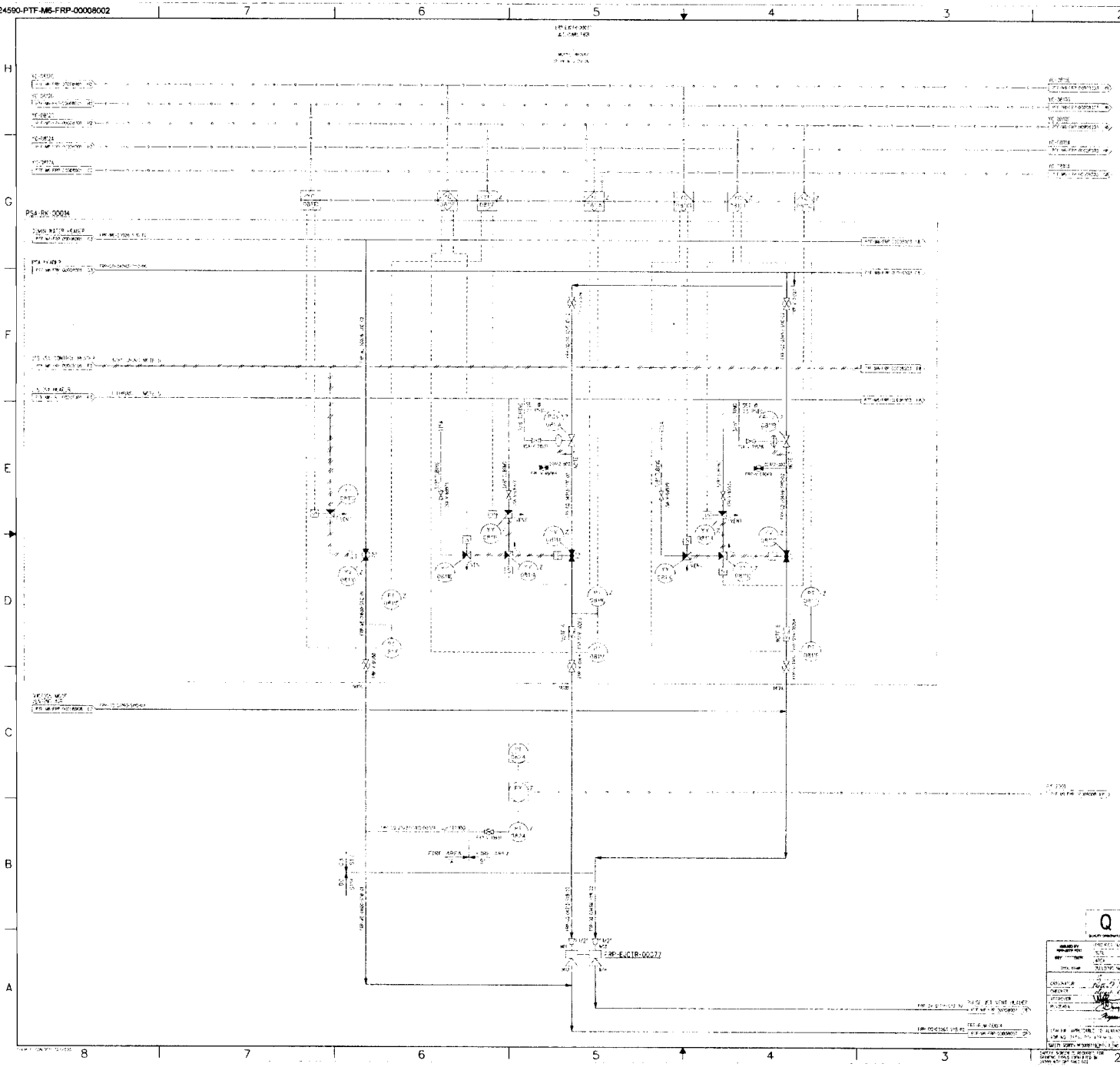


NOTES:

1. SEE DRAWING 24590-WTP-M6-S-00007 (REV. 0) 24590-WTP-M6-S-00008 FOR GENERAL NOTES, DIMENSIONS AND LEGEND, AND GENERAL SCOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE GOVERNING WASTE PERMIT BASIS DOC.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALIFIED AND DEFINED CATEGORY SCI. WASTE STREAMS NOT ON THE PRESSURE BOUNDARY ARE THE NON-SAFETY INSTRUMENT STREAM (ON TOP) AND THE CONTROL SIGNAL SELECTOR SOLENOID VALVE (BELOW).
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING EXCEPT BLACK CELL LINES WHICH ARE SELF-DRAINING UNLESS OTHERWISE NOTED.
5. TUBE FITTING SPECIFICATION OF ADDITIONAL INSTRUMENTS, DEVICES, AND TAGGING OF INSTRUMENTS WITHIN THE "BOX" TO BE DONE IN ACCORDANCE WITH CAD INDEX SYSTEM (CIS) AND DESIGN GUIDE 24-01-WTP-DES-ENG-012.
6. STRAINER PERMANENTLY INSTALLED.
7. RECOMMENDED INSTALLATION FOR THE PCV IS TO CONNECT THE VENTING LINE TO A STRAIGHT RUN OF PIPE 3 TO 5 FEET (DIAMETER) OF THE PCV AND TO HAVE A MINIMUM STRAIGHT RUN OF 7 TO 10 PIPE DIAMETERS AND 4 FEET DOWNSTREAM OF THE PCV.
8. THIS DRAWING IS CONVERTED FROM A 22X34 SHEET TO MULTI-SHEET DRAWING AND IN PART SUPERSEDES 24590-WTP-M6-S-00005 (SH. 4, TWO DRAWING INDEXES INFORMATION, 00007, 00008, 00009, 00010, 00011, 00012, 00013, 00014, 00015, 24590-WTP-M6-M-00001, 00002, 24590-PTF-MER-TP-00053, 00066, 00067, 00068, 00069, 24590-PTF-MER-MAT-00000, 00001, 00002, 00003, 00004, 24590-PTF-MER-ID-00002. FURTHER REVISED TO REFLECT CLOSING A NUMBER OF COMMENTS AND THE FINAL CHANGES TO ARE LOCATED IN THE REVISED INDEX, AND ADDED.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-WTP-PFD-M6-00001 SYSTEM DESCRIPTION FOR PULSE JET MIXER AND EDUCTOR MIXING SYSTEMS
2. 24590-WTP-PFD-MER-00001 SYSTEM DESCRIPTION FOR WASTE FEED RECEIPT PROCESS (WFR)

REV	DESCRIPTION	DRN	CHK	REVIEWED	DATE
0	ISSUED FOR CONSTRUCTION SET NO. 8	[illegible]	[illegible]	[illegible]	[illegible]

REVISION HISTORY

Q

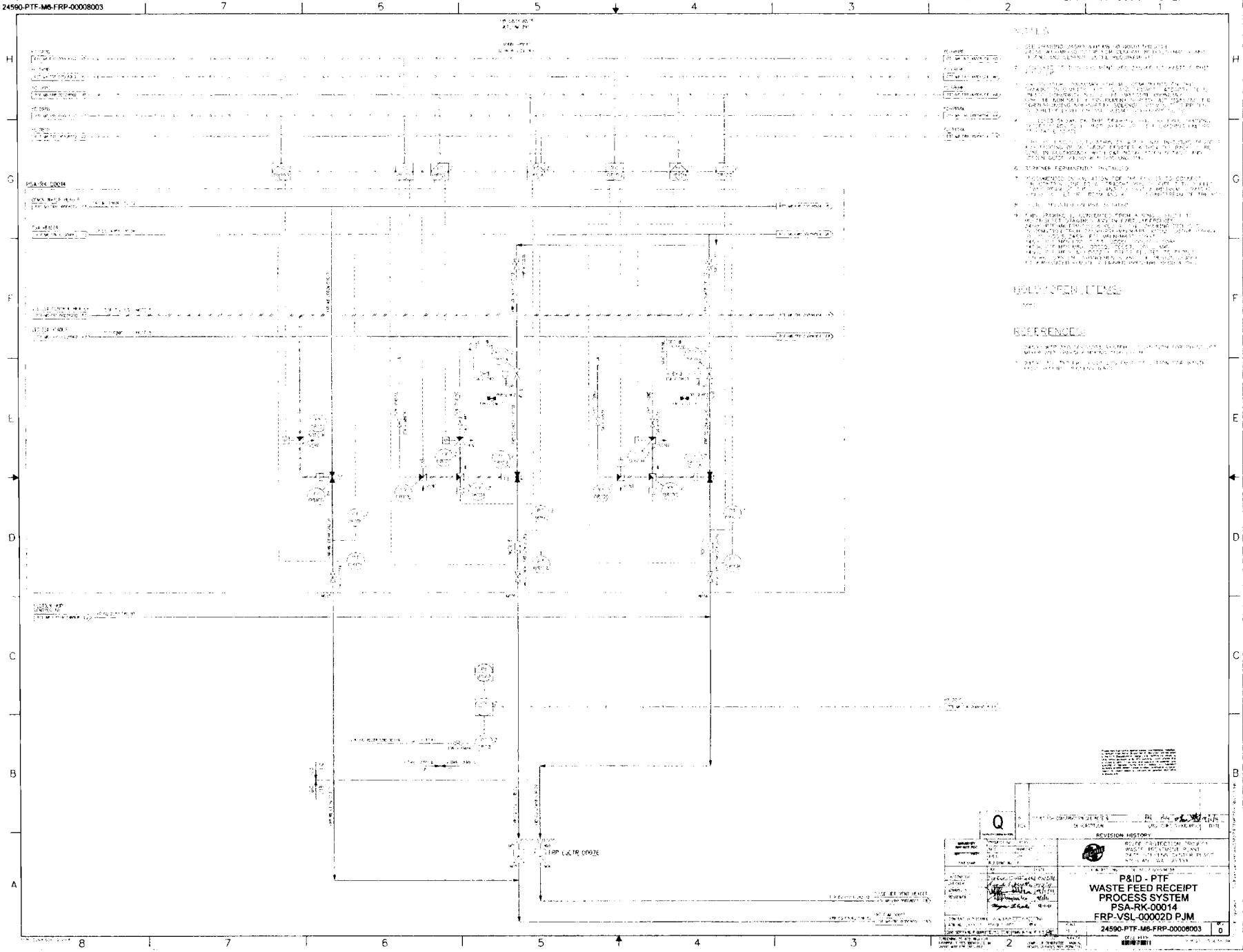
RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
SAINT STEVENS CENTER PLAZE
RICHLAND, WA 99352

CONTRACT NO. DE-AC27-01RV14136

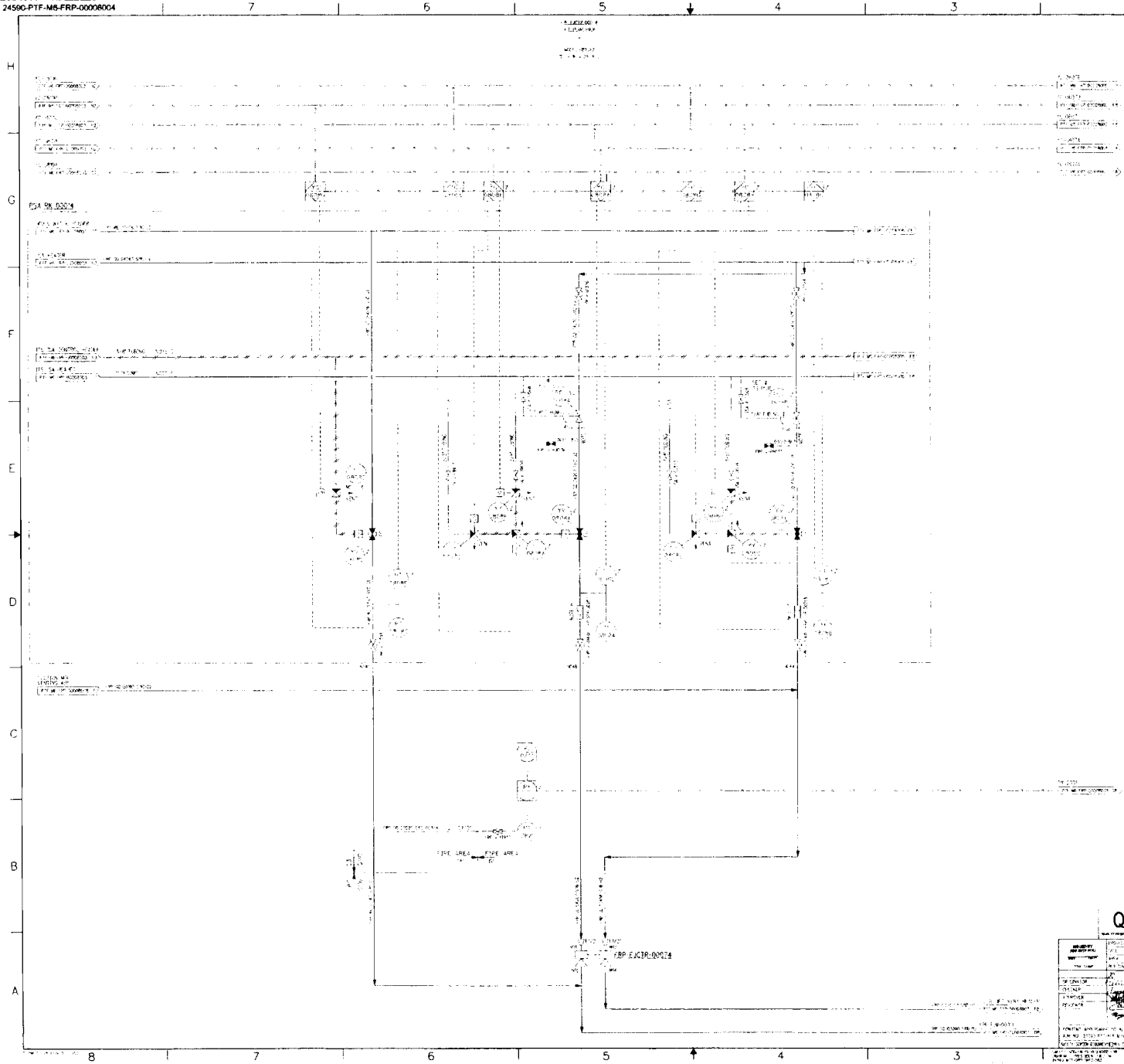
P&I - PTF
WASTE FEED RECEIPT
PROCESS SYSTEM
PSA-RK-00014
FRP-VSL-00002D PJM

24590-PTF-M6-FRP-00008002 | 0

24590-PTF-M6-FRP-00008003



24590-PTF-M6-FRP-00008004



NOTES:

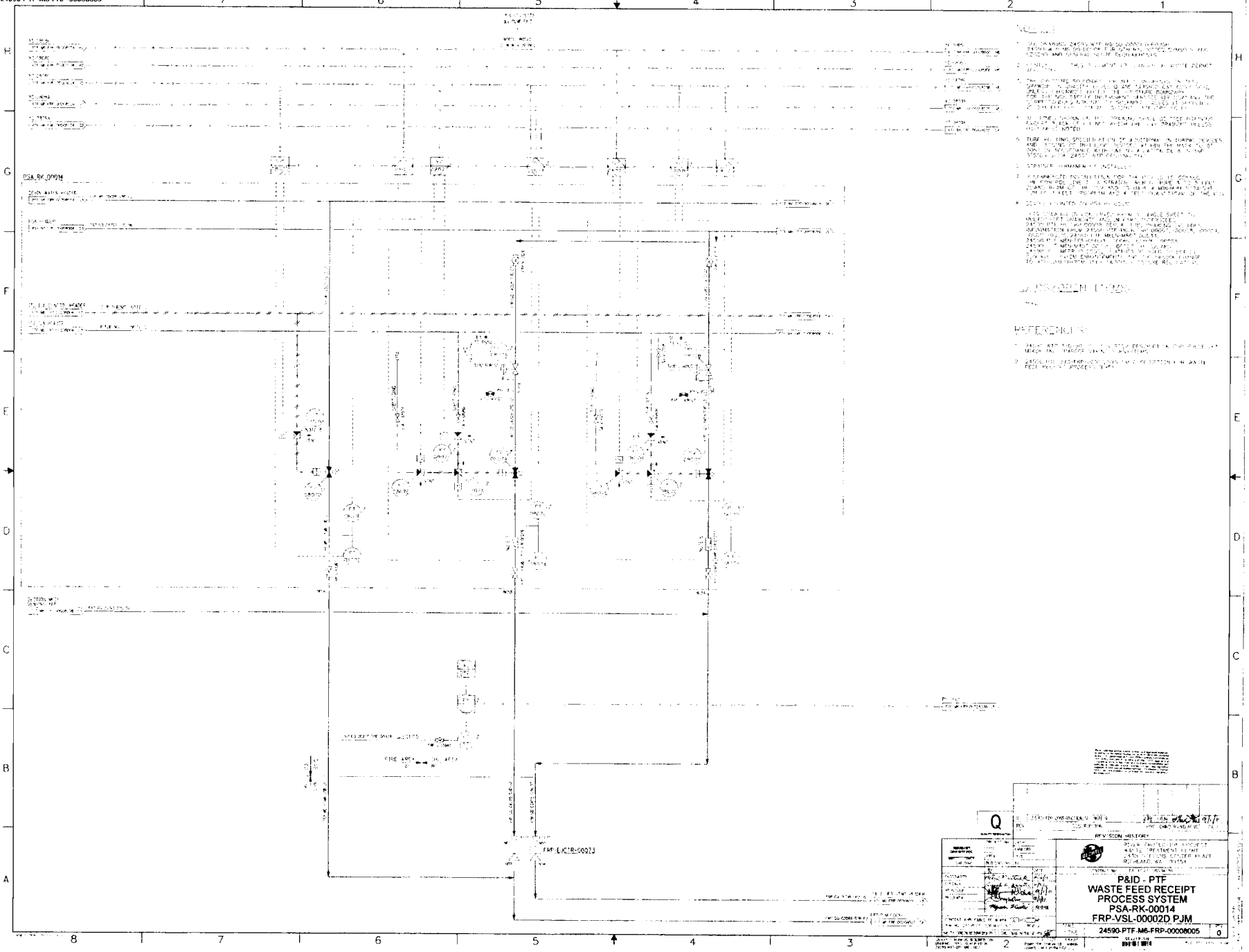
REFERENCES:

REVISION HISTORY

P&ID - PTF
WASTE FEED RECEIPT
PROCESS SYSTEM
PSA-RK-00014
FRP-VSL-00002D PJM

24590-PTF-M6-FRP-00008004 | 0

24590-PTF-M6-FRP-00008005



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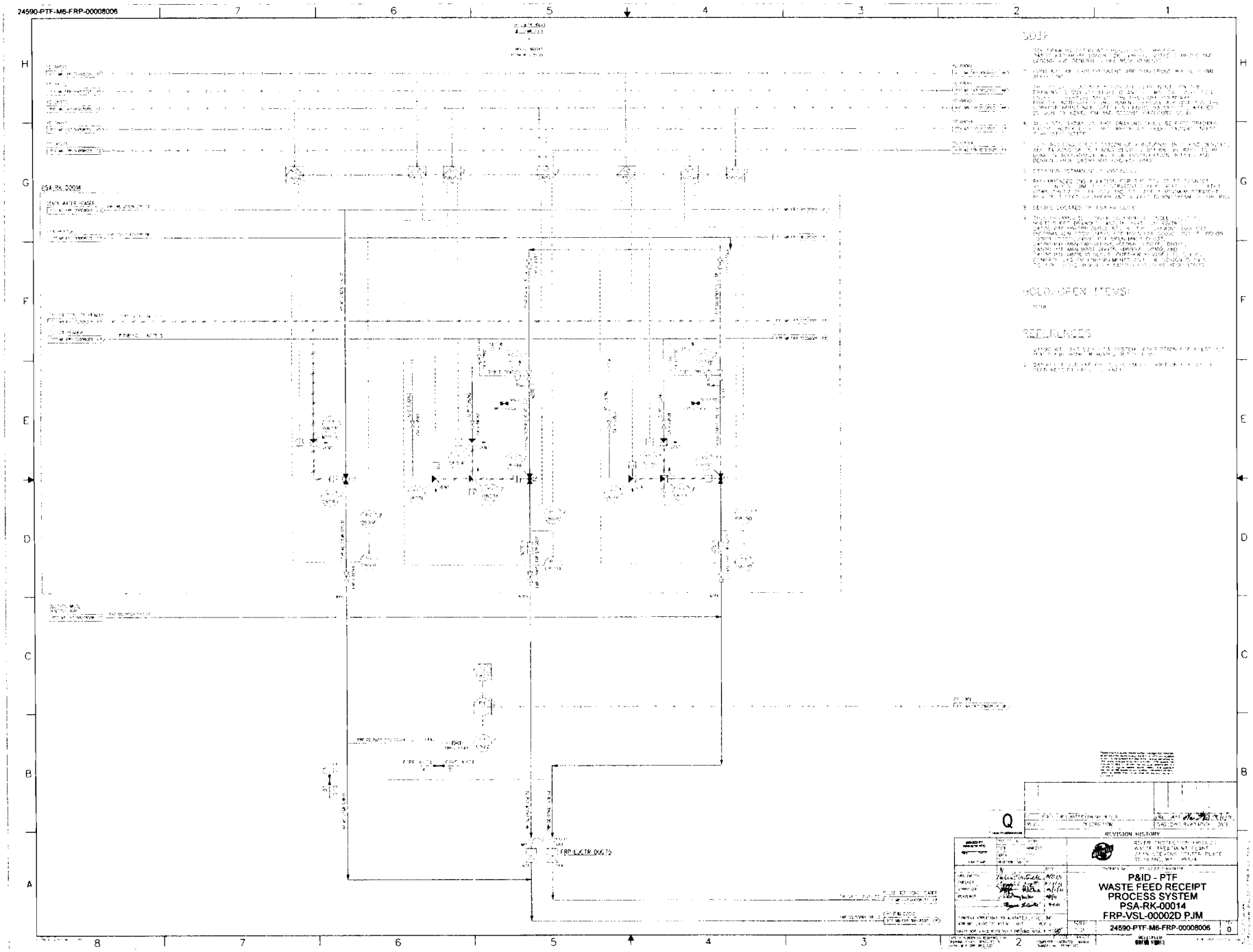
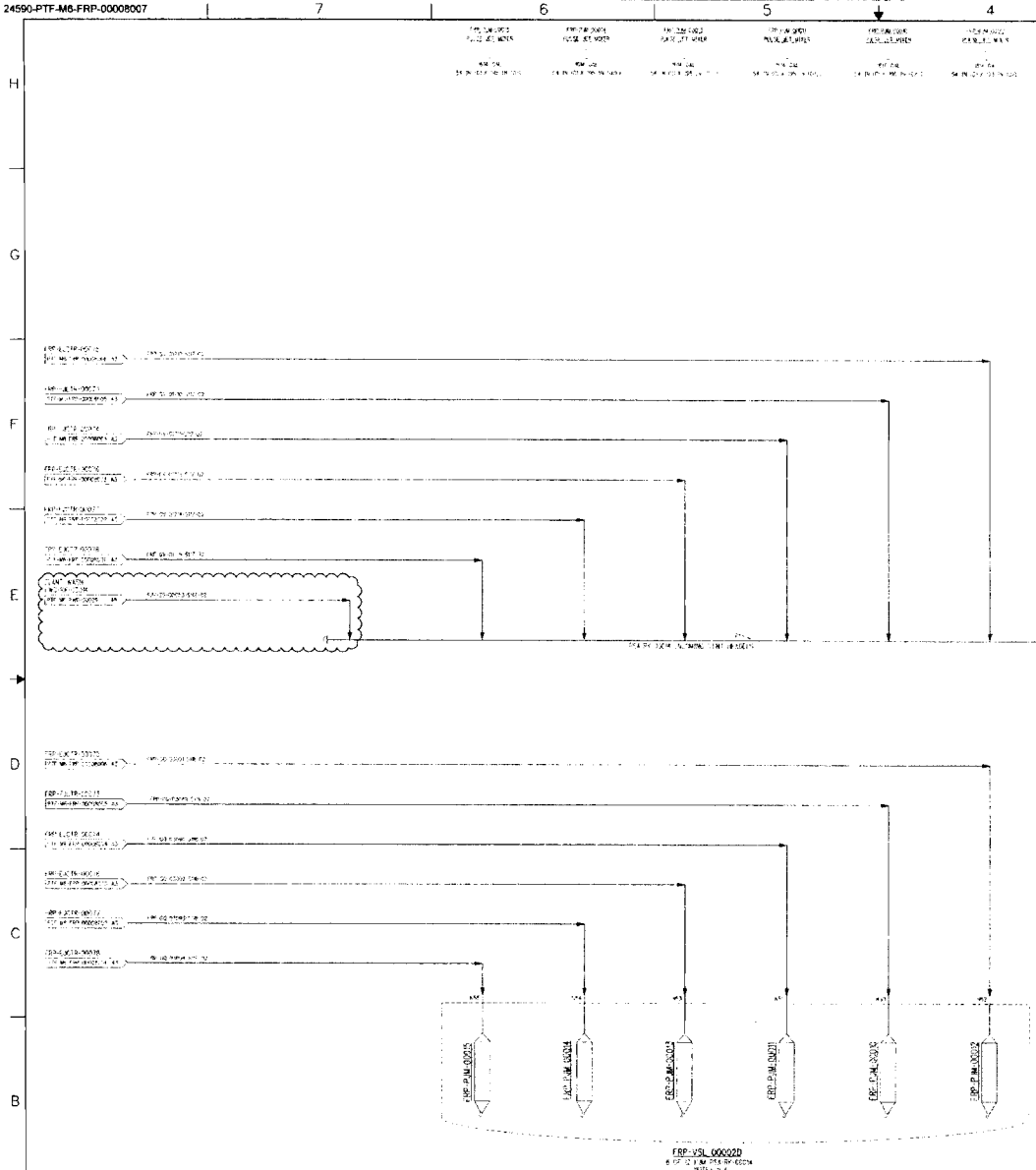


24590-PTF-M6-FRP-00008007



NOTES:

1. THE DRAWING 24590-WTP-MS-TD-00001 (REV 004) PROVIDES INFORMATION ON INTERFACE CONDITIONS, SYMBOLS AND LEGEND, AND GENERAL SCOPE OF DEVELOPMENT.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE (MIXED) CONTENT.
3. THE DESCRIPTIVE BOUNDARY FOR ALL COMPONENTS OF THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY BOILERPLATE. SEE GENERAL NOTES.
4. ALL LINES SHOWN ON THIS DRAWING ARE BLACK EXCEPT LINES WHICH ARE SHOWN DRAWING LINE STYLE HAVING NOTES.
5. REFER TO DRAWING 24590-PTF-M6-FRP-00016 (REV 0) FOR PROCESS VESSEL.
6. THE BALANCE OF THE PJM FOR FRP-VSL-00002D CONTINUE ON 24590-PTF-M6-FRP-00016 (REV 0).
7. THIS DRAWING IS CONJUNCTED FROM A PENCILS SHEET TO ONE PIECE DRAWING. ANALOG PARTS OF PROCESS 24590-PTF-M6-FRP-00006 (REV 4). THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-M6-FRP-00015 (REV 0) AND 24590-PTF-M6-FRP-00002.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-WTP-PT-PI-00003, SYSTEM DESCRIPTION FOR PULSE JET MIXER AND SPARGER MIXING (PJM) SYSTEMS
2. 24590-WTP-PT-PI-00001, SYSTEM DESCRIPTION FOR WASTE FEED RECEIPT PROCESS (WFRP)

REV	DESCRIPTION	BY	DATE
A	ISSUED FOR CONSTRUCTION (REV 0)	[illegible]	[illegible]

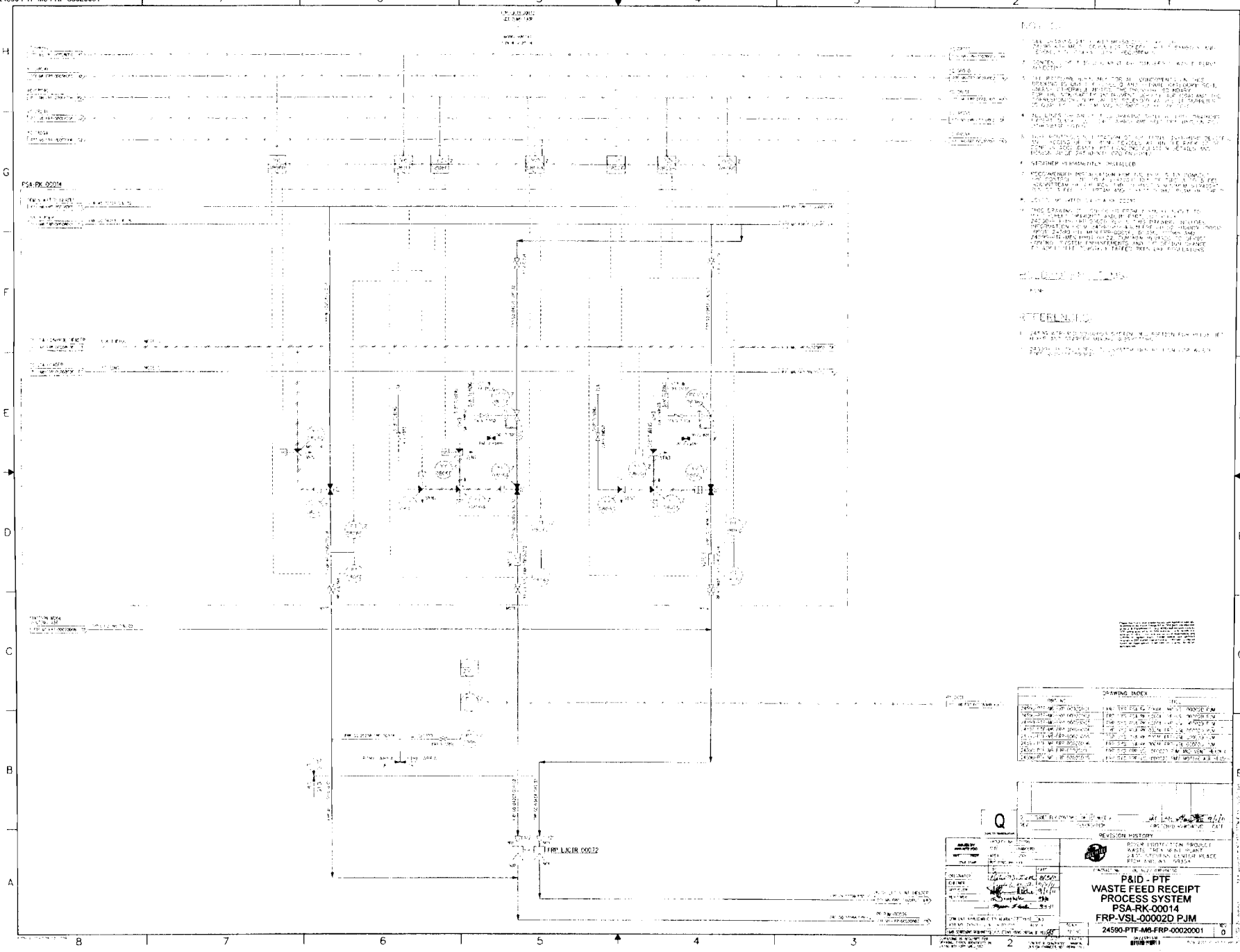
REVISION HISTORY

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

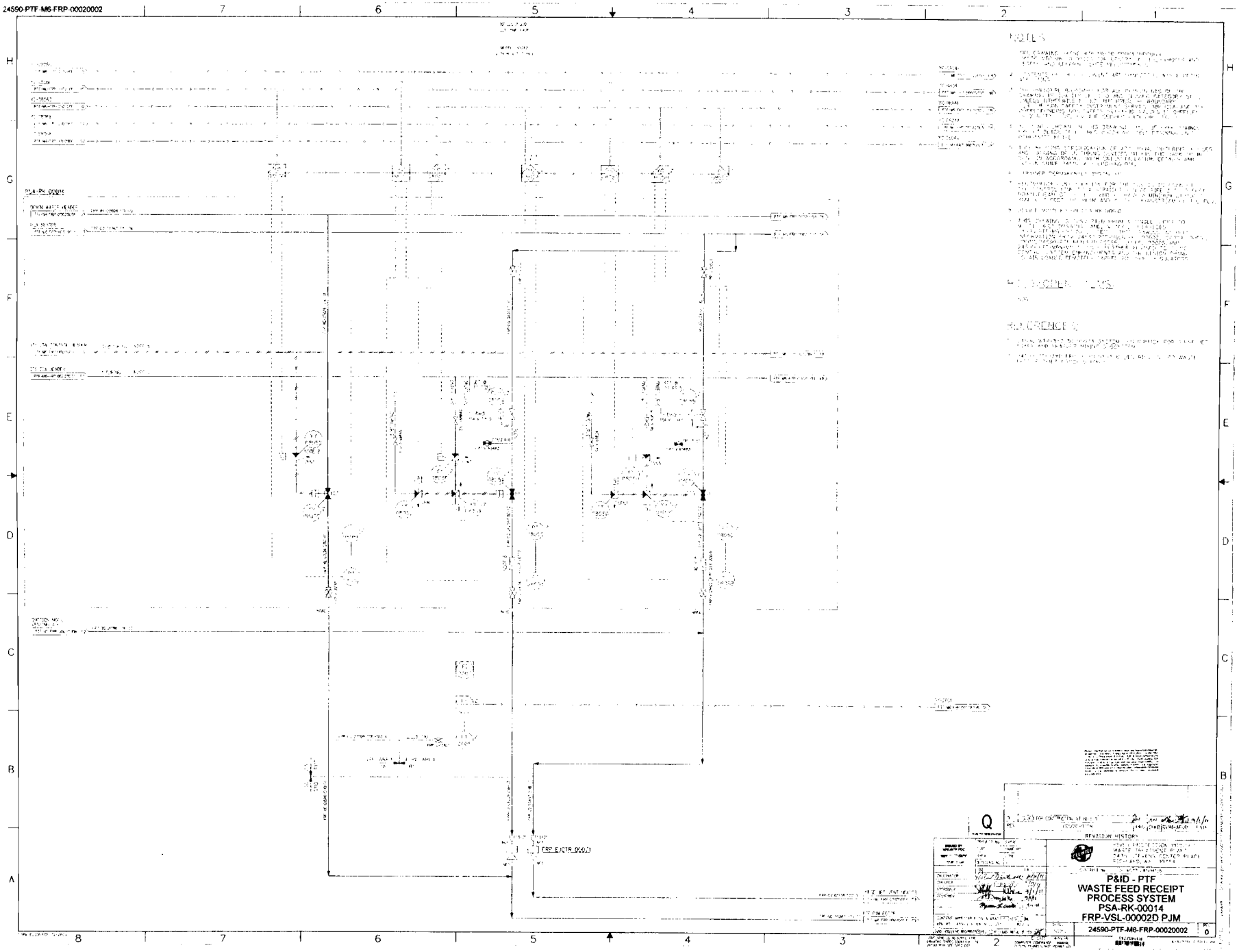
P&ID - PTF
WASTE FEED RECEIPT PROCESS SYSTEM FRP-VSL-00002D PJM AND VENT HEADER

24590-PTF-M6-FRP-00008007 | REV 0

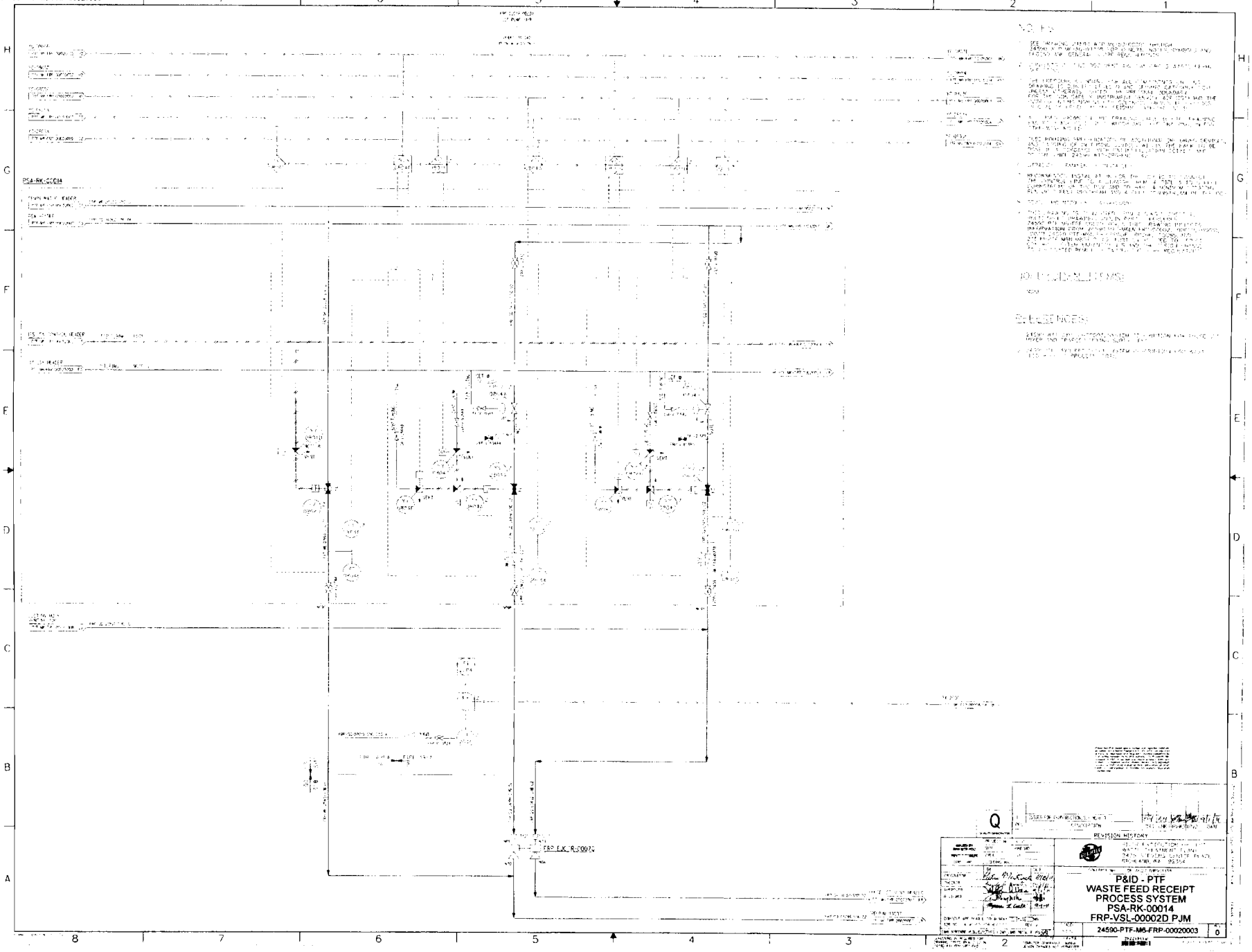
24590-PTF-M6-FRP-00020001



24590-PTF-M6-FRP-00020002



24590-PTF-M6-FRP-00020003



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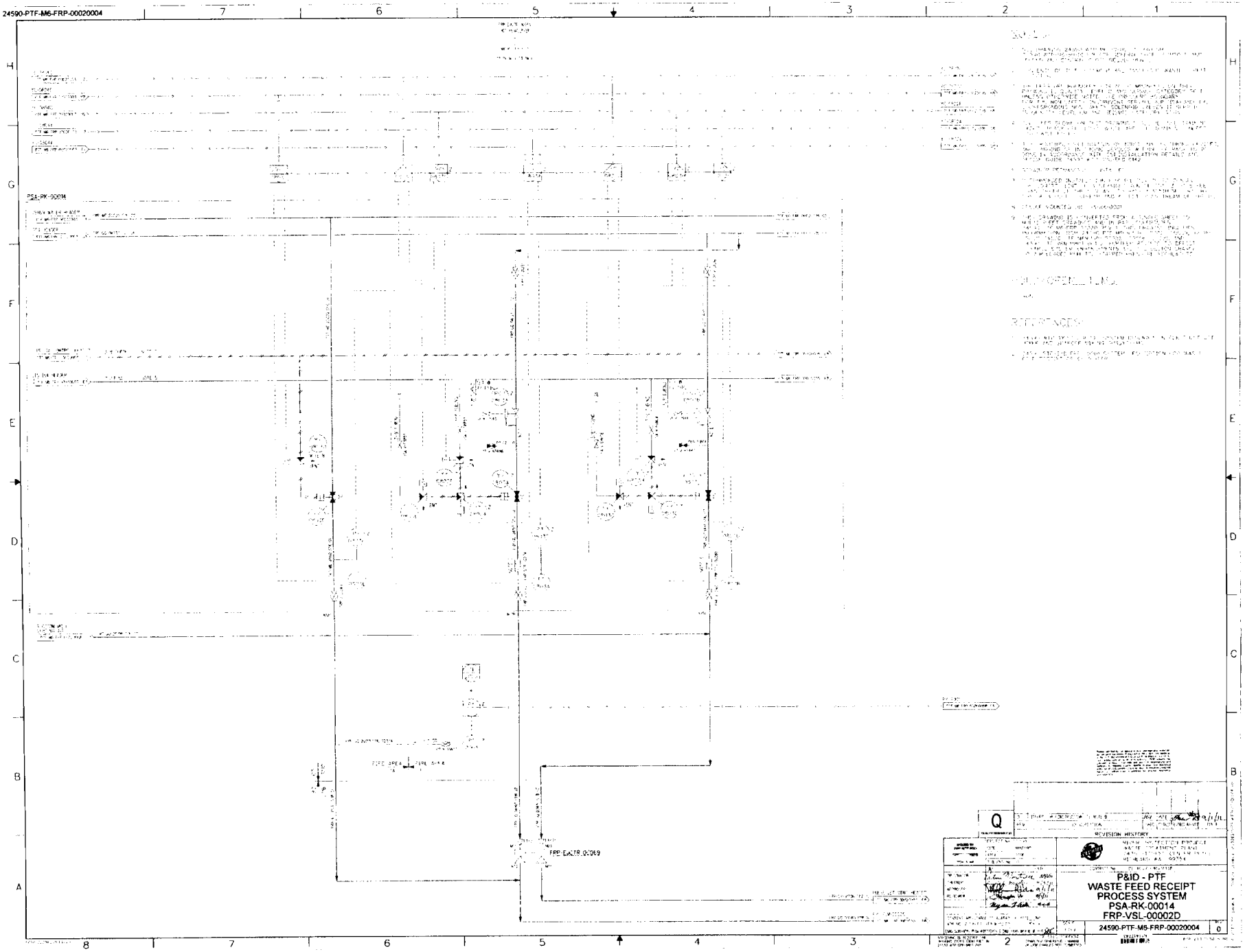
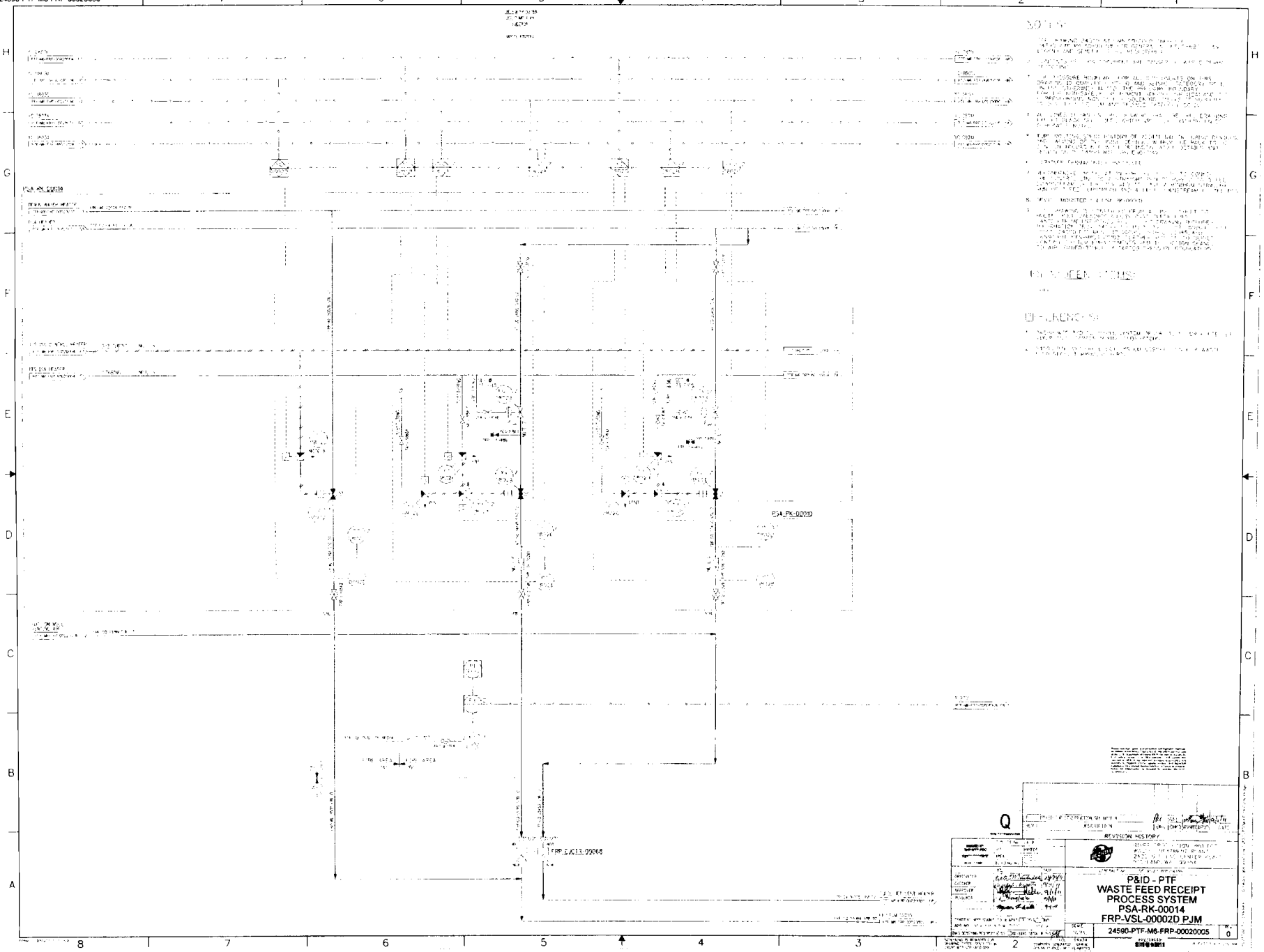
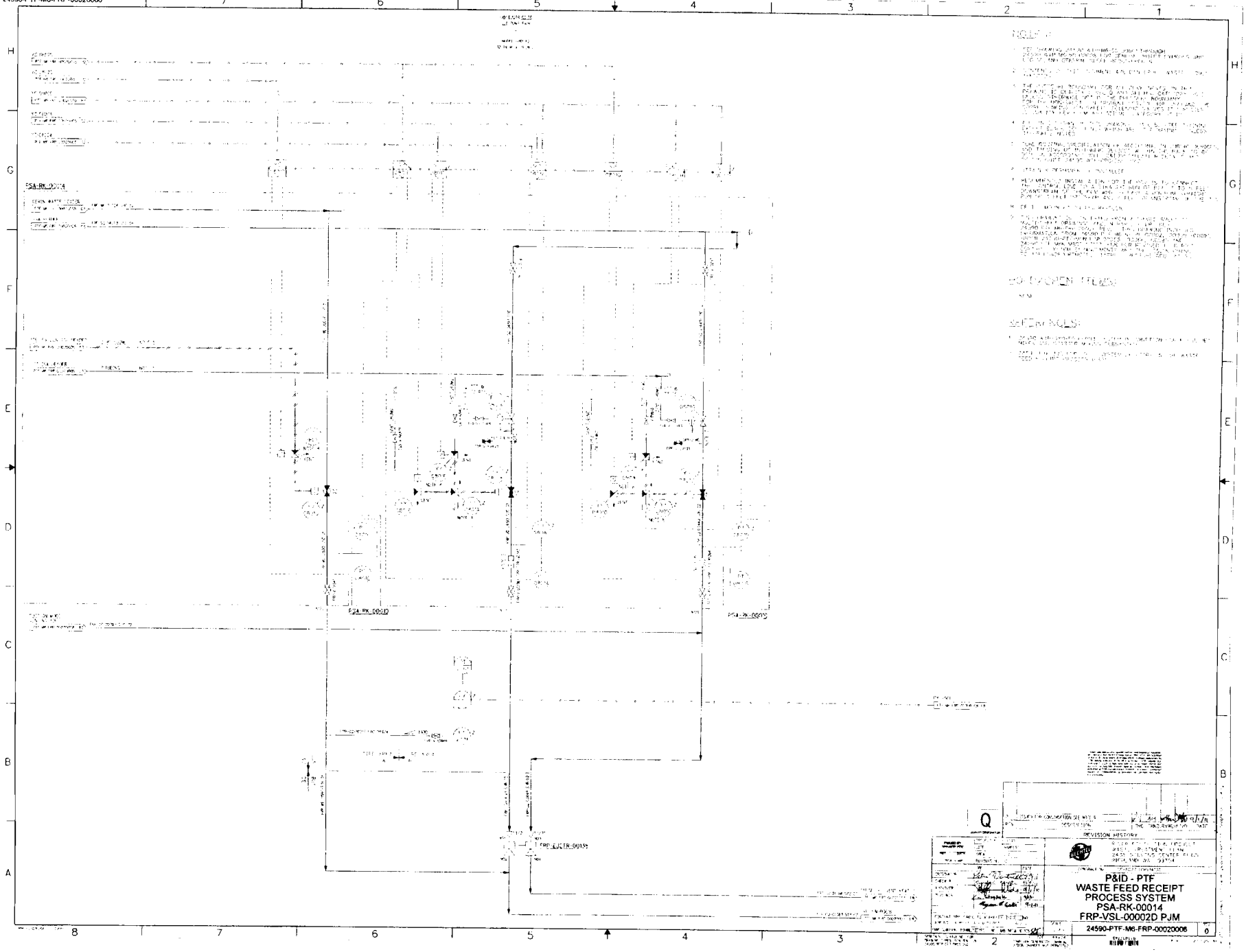


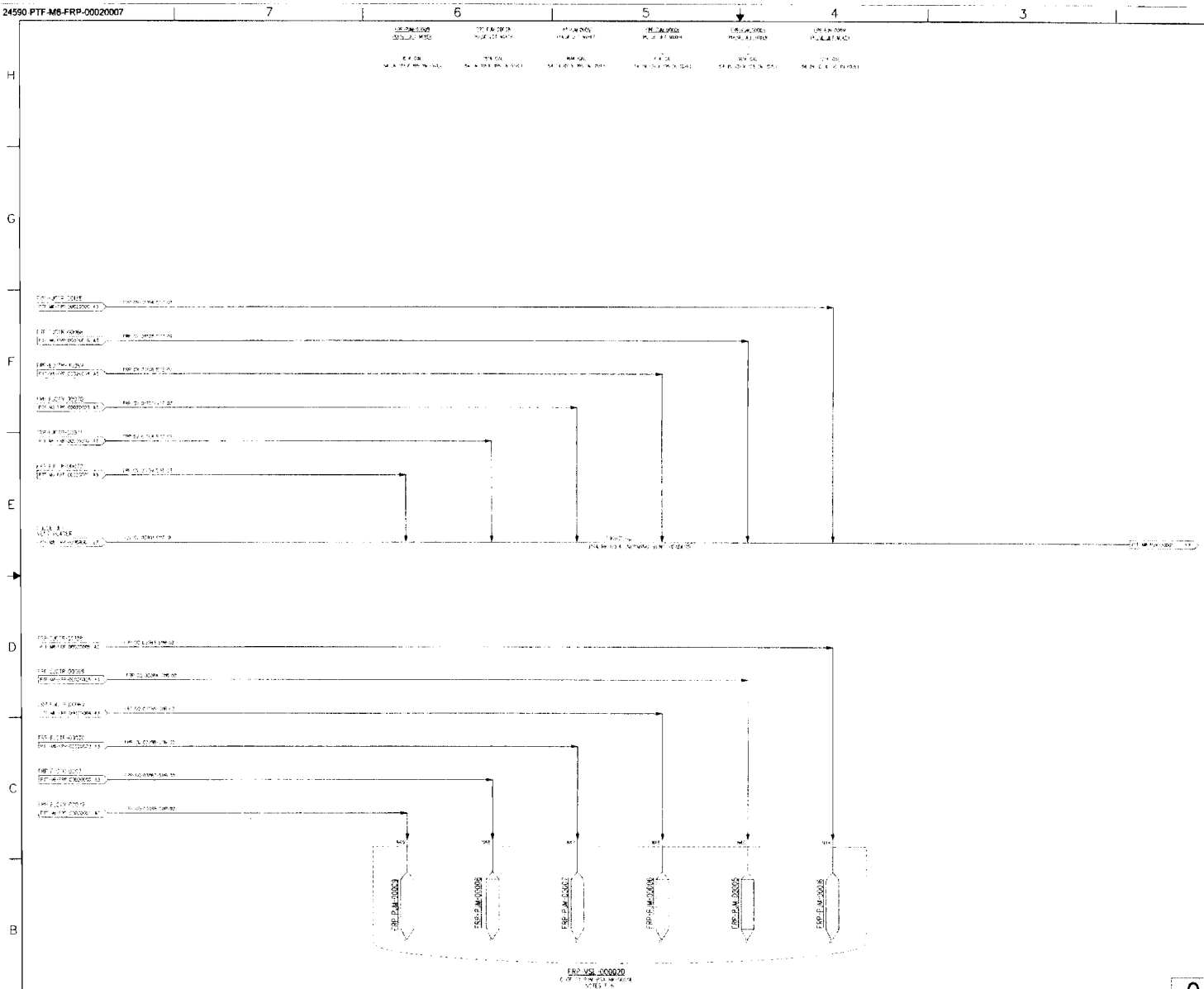
24590-PTF-M6-FRP-00020005



24590-PTF-M6-FRP-00020006



24590-PTF-M6-FRP-00020007



NOTES:

1. SEE DRAWING 24590-PTF-M6-00001 THROUGH 24590-PTF-M6-00004 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL CODE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WHEN IMPLEMENTED.
3. THE PROCESSING SUMMARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL D AND SEISMIC CATEGORY SEE PLEASE OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING ARE BLACK, ALL LINES WHICH ARE SELF DRAWING, ARE SUPERIMPOSED OTHERWISE NOTED.
5. REFER TO DRAWING 24590-PTF-M6-FRP-00020002 FOR PROCESS NOTES.
6. DETAIL SHEET OF FRP-PJM FOR FRP-VSL-00002D CONTINUATION 24590-PTF-M6-FRP-00020007.
7. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI SHEET DRAWINGS AND IN PART REPRESENTS 24590-PTF-M6-FRP-00020 REV.

HOLD/OPEN ITEMS

NONE

REFERENCES:

1. 24590-WTP-TXD-00-00002, SYSTEM DESCRIPTION FOR PULSE JET NOZZLE AND SPARGER HIGHER SUBSYSTEMS.
2. 24590-PTF-TXD-FRP-00001, SYSTEM DESCRIPTION FOR WASTE FEED RECEIPT PROCESS (FRP).

REV.	DESCRIPTION	DRS	CHKD	PLANNING	DATE
0	ISSUED FOR CONSTRUCTION IN MOTE				

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 RECEIPT
PROCESS SYSTEM
FRP-VSL-00002D PJM AND
VENT HEADER

24590-PTF-M6-FRP-00020007 REV. 0

Quarter Ending 12/31/2011 24590-PTF-PCN-ENV-11-008

Hanford Facility RCRA Permit Modification Notification Form

Part III, Operating Unit 10

Waste Treatment and Immobilization Plant

Index

Page 2 of 3: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant
Replace Piping and Instrumentation Diagrams (P&ID) for the PTF Cesium Nitric Acid Recovery Process (CNP) System Evaporator; Heat Exchanger; Ejectors and Condensers; and Rectifier, Pump, and Filters in Appendix 8.2 of the Dangerous Waste Permit (DWP).

Submitted by Co-Operator:

D. M. Busche 12/6/11 Date

Reviewed by ORP Program Office:

for D. L. Noyes 1/16/12 Date

Quarter Ending 12/31/2011 24590-PTF-PCN-ENV-11-008

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

Description of Modification:

The purpose of this Class 1 prime modification is to update the P&IDs for the PTF CNP Cesium Evaporator Separator vessel (CNP-EVAP-00001), Cesium Evaporator Concentrate Reboiler (CNP-HX-00001); Ejectors (CNP-EJCTR-00010A/B) and Condensers (CNP-HX-00002, CNP HX-00003, and CNP-HX-00004), and Rectifier (CNP-DISTC-00001), Pump (CNP-PMP-00002), and Filters (CNP-FILT-00002) in Appendix 8.2 of the DWP.

The following P&IDs are being submitted to replace the documents currently in Appendix 8.2 of the DWP. The increase in the number of P&IDs submitted results from converting each source drawing into two drawings to provide a clearer representation of the system, including details for newly added Condensate Duplex Cartridge Filter (CNP-FILT-00002).

Appendix 8.2			
Replace:	24590-PTF-M6-CNP-00008, Rev. 2	With:	24590-PTF-M6-CNP-00008001, Rev. 0
			24590-PTF-M6-CNP-00008002, Rev. 0
	24590-PTF-M6-CNP-00010, Rev. 2		24590-PTF-M6-CNP-00010001, Rev. 0
			24590-PTF-M6-CNP-00010002, Rev. 0

This modification requests Ecology approval and incorporation into the permit the specific changes to the above DWP documents. Conversion from one to two drawings expands the drawings to provide better detail; revision clouds are used to show changes. Revisions are the result of ongoing design (changes from vendor preliminary data to vendor detailed design), quality/seismic flag changes, and general criteria from design verification review.

The following identifies the significant changes that have been incorporated:

P&ID sheet 24590-PTF-M6-CNP-00008001:

- Updated notes and references
- Revised details related to demister portion of CNP-EVAP-00001
- Added flow transmitter (FT) and flow indicator (FI), and revised details on lines and valves

P&ID sheet 24590-PTF-M6-CNP-00008002:

- Updated notes and references
- Revised details of CNP-HX-00001, changed symbology to reflect shell and tube exchanger
- Revised details on lines and valves; and added lines and valves for venting

P&ID sheet 24590-PTF-M6-CNP-00010001:

- Updated notes and references
- Added temperature element and indicator (TE/TI) and pressure transmitter and indicator
- Revised details of CNP-HX-00002, CNP-HX-00003, and CNP-HX-00004; changed symbology to reflect shell and tube exchanger
- Added steam traps and associated piping near CNP-HX-00003 and CNP-HX-00004; added vortex breaker near CNP-HX-00002
- Added FT and FI; revised details on lines; and added lines and valves
- Deleted drain collection header and associated lines

Quarter Ending 12/31/2011 24590-PTF-PCN-ENV-11-008

P&ID sheet 24590-PTF-M6-NCP-00010002:

- Updated notes and references
- Replaced in-line filter CNP-SP-00012 with Duplex Cartridge filter CNP-FILT-00002
- Revised details related to CNP-DISTC-00001
- Added TE, TI, FE, and FI
- Added drain line and check valve associated with CNP-PMP-00002

This modification requests Ecology approval and incorporation of the following outstanding change document(s) into the permit. Although not yet incorporated into the revised documents included in the PCN, the listed outstanding change document(s) are intended to be incorporated into the permit:

24590-PTF-M6-CNP-00010001:
24590-PTF-M6LN-CNP-00018

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: 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 modification. WAC 173-303-830(4)(d)(II)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

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

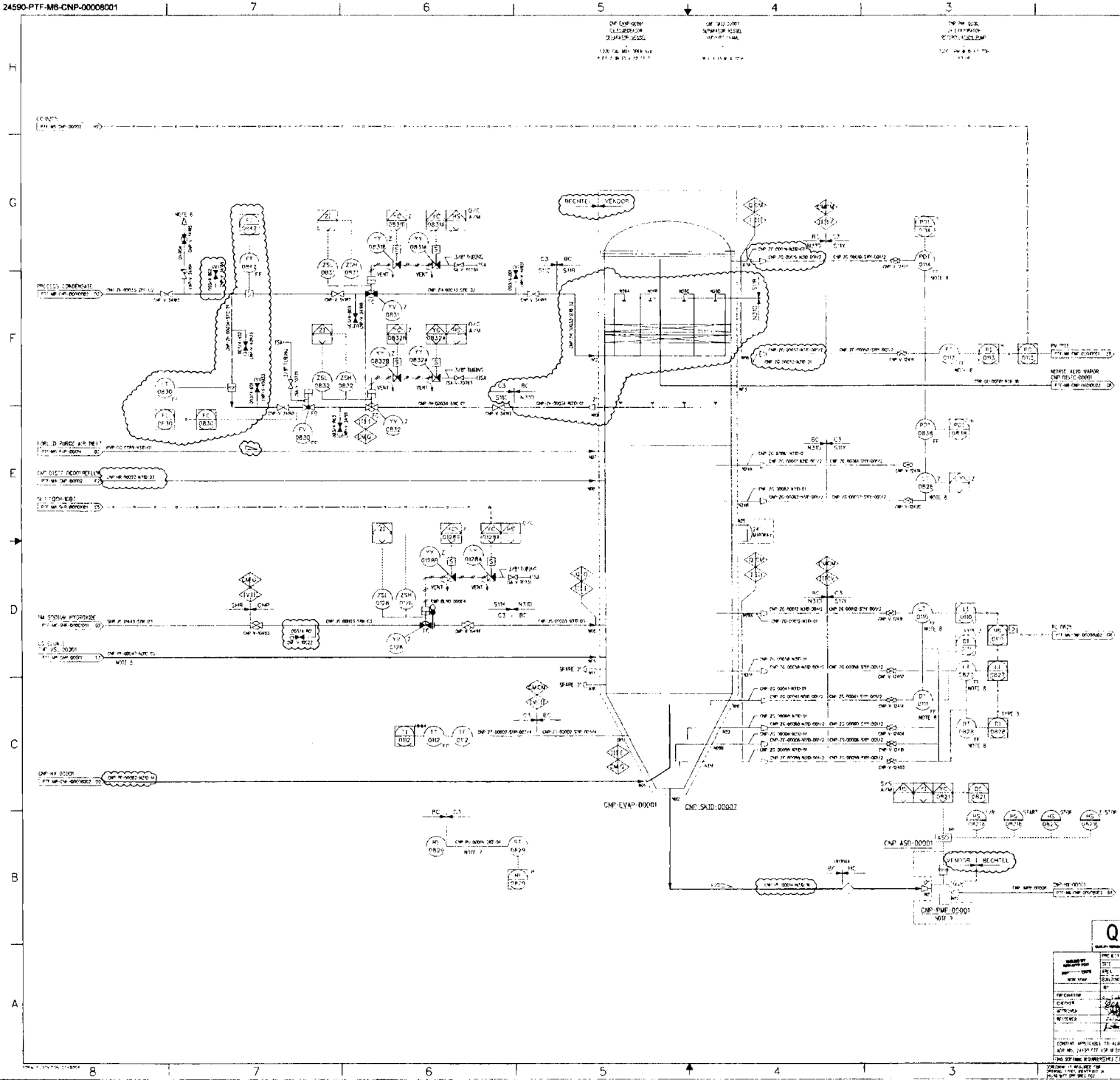
Reason for denial:

Reviewed by Ecology:

A. Carlson 4-10-12

Date

24590-PTF-M6-CNP-00008001



NOTES:

1. SEE DRAWING 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 2 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. THIS LINE ALSO IS USED TO CHARGE NITRIC ACID TO CNP-EVAP-00001 VIA CNP-RXRPT-00002 SHOWN ON 24590-PTF-M6-CNP-00001 ON STARTUP. IT IS NORMALLY 5M NITRIC ACID BUT MAY RANGE IN CONCENTRATION UP TO 8M NITRIC ACID.
6. CONNECTION PROVIDED FOR REAGENTS, PLANT WASH AND SERVICE AIR.
7. PIPE IS TO BE USED AS A GUIDE TUBE TO FACILITATE INSTALLATION AND REMOVAL OF RADIATION INSTRUMENTS. PIPELINE WILL BE QUALITY LEVEL 2 AND SEISMIC CATEGORY SC-III.
8. SEE 24590-PTF-M6-ISA-00008 FOR RUBBLER RACKS AND SYSTEM CONNECTIONS.
9. SEE 24590-PTF-M6-DSW-00008002 FOR PUMP SEAL WATER CONNECTIONS.
10. MINIMIZE HORIZONTAL RUNS IN RUBBLER PIPING BELOW THE NOZZLE NOA ELEVATION.
11. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-PTF-M6-CNP-00008 REV 3. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-MEN-CNP-00005, -00081, -00097, -00102, 24590-PTF-MEN-CNP-00003, 24590-PTF-MEN-MRDT-00080, -00112 AND 24590-PTF-MPEN-CNP-00001.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-PTF-3YD-CNP-00001, SYSTEM DESCRIPTION FOR THE CESIUM NITRIC ACID RECOVERY PROCESS - SYSTEM CNP

DRAWING INDEX	
DWG NO	TITLE
24590-PTF-M6-CNP-00008001	CNP SYSTEM CNP-EVAP-00001
24590-PTF-M6-CNP-00008002	CNP SYSTEM CNP-HX-00001

REV	DESCRIPTION	ORIG	CHKD	RVWD	APVD	DATE
0	ISSUED FOR CONSTRUCTION SEE NOTE 0	SS				

REVISION HISTORY

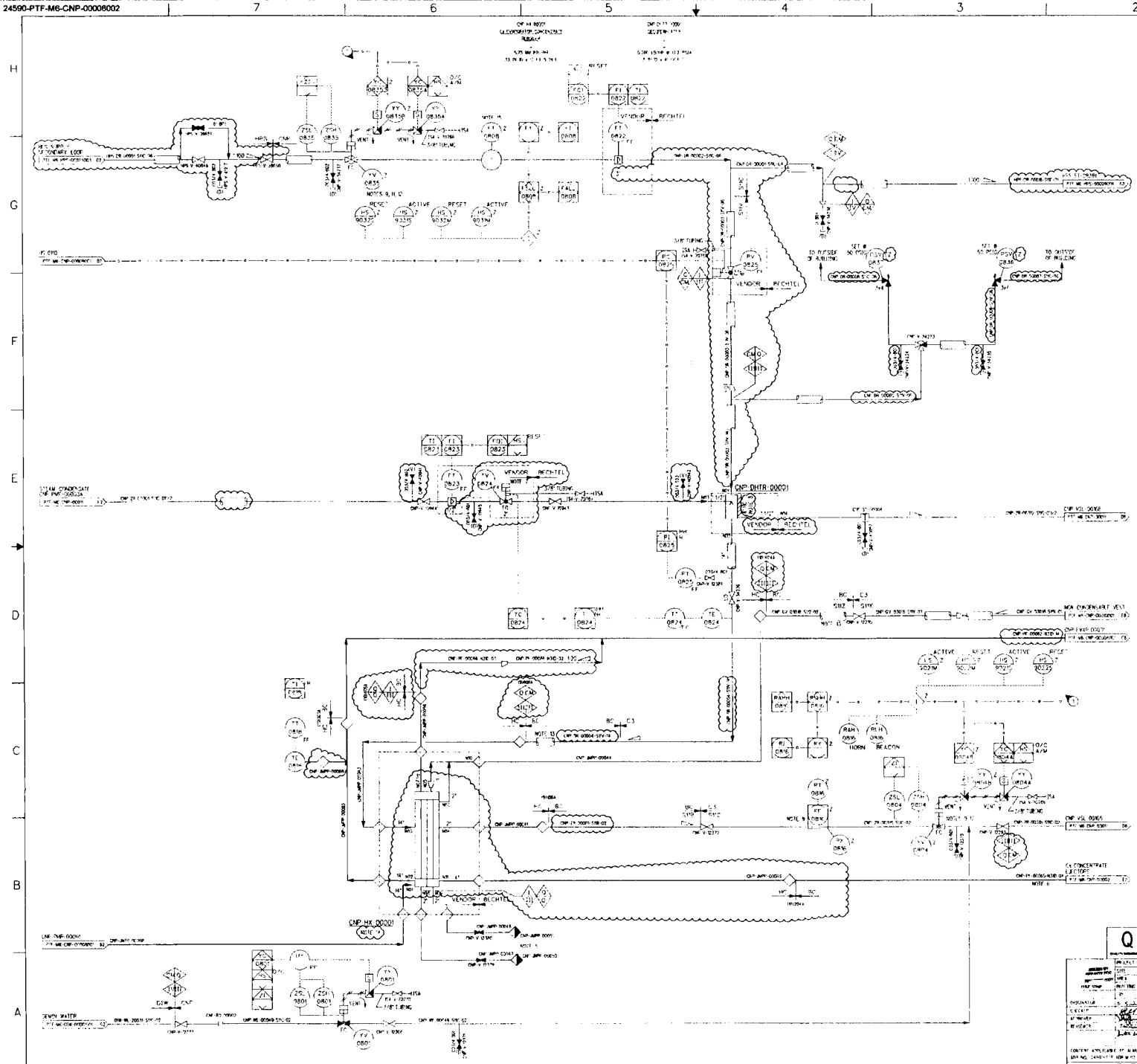
RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT NO. DE-AC27-01RV14136

P&ID-PTF
CESIUM NITRIC ACID RECOVERY PROCESS SYSTEM
CNP-EVAP-00001

24590-PTF-M6-CNP-00008001 REV 0

R1130C181



NOTES:

1. SEE DRAWING 24590-WTP-ME-00-00001 THROUGH 24590-WTP-ME-00-00008 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 ARE FREE DRAINING UNLESS OTHERWISE NOTED BY JUST PLACE COLLETTE WHICH ARE SELF DRAINING UNLESS OTHERWISE NOTED.
5. BLANKED JUMPER DRAIN.
6. PLANT DESIGN TO MAXIMIZE SLOPE WITH SPACE AVAILABLE.
7. ALL EQUIPMENT WITHIN VENDOR BOUNDARY SUPPLIED BY VENDOR EXCEPT PIPING, MANUAL VALVES, AND PIPE SUPPORT TO BE SUPPLIED BY BECHTEL EQUIPMENT DESIGN DEPENDENT ON VENDOR SYSTEM DESIGN.
8. CNP-DHTR-00001 IS DESIGNED WITH PROVISIONS FOR 3 INCHES THICKNESS OF HEAT CONSERVATION INSULATION. THE INSULATION IS PROVIDED AND INSTALLED UNDER AN INSULATION SUBCONTRACT.
9. VALVES YV-0804 AND YV-0835 TO CLOSE TO ISOLATE STEAM INLET AND CONDENSATE OUTLET IF PADDITION MONITOR RCDRS IS ACTIVATED.
10. DELETED.
11. HI-HI DESUPERHEATER TEMPERATURE CLOSES VALVE YV-0833.
12. VALVE YV-0835 AND YV-0804 SHALL BE SLOW CLOSING.
13. INSULATE WITH REFLECTIVE METAL INSULATION.
14. CNP-HX-00001 SHELL SIDE (STEAM) QUALITY/SEISMIC CLASSIFICATION IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III. THE TUBE SIDE (PROCESS) IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I.
15. INSTRUMENT IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III.
16. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-PTF-M6-CNP-00008 REV. 3. THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-M6A-CNP-00006, -00082, -00084, -00095, -00097, -00102, -00103, -00105, 24590-PTF-M7-N1CNP-00007, -00011, 24590-PTF-MEN-MCT-00080, AND -00089.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-PTF-3YD-CNP-00001 SYSTEM DESCRIPTION FOR THE CESIUM NITRIC ACID RECOVERY PROCESS - SYSTEM CNP.

Q	0	ISSUED FOR CONSTRUCTION	
	REV	DESCRIPTION	ORIG CHK/REVIEW/APPR DATE

REVISION HISTORY

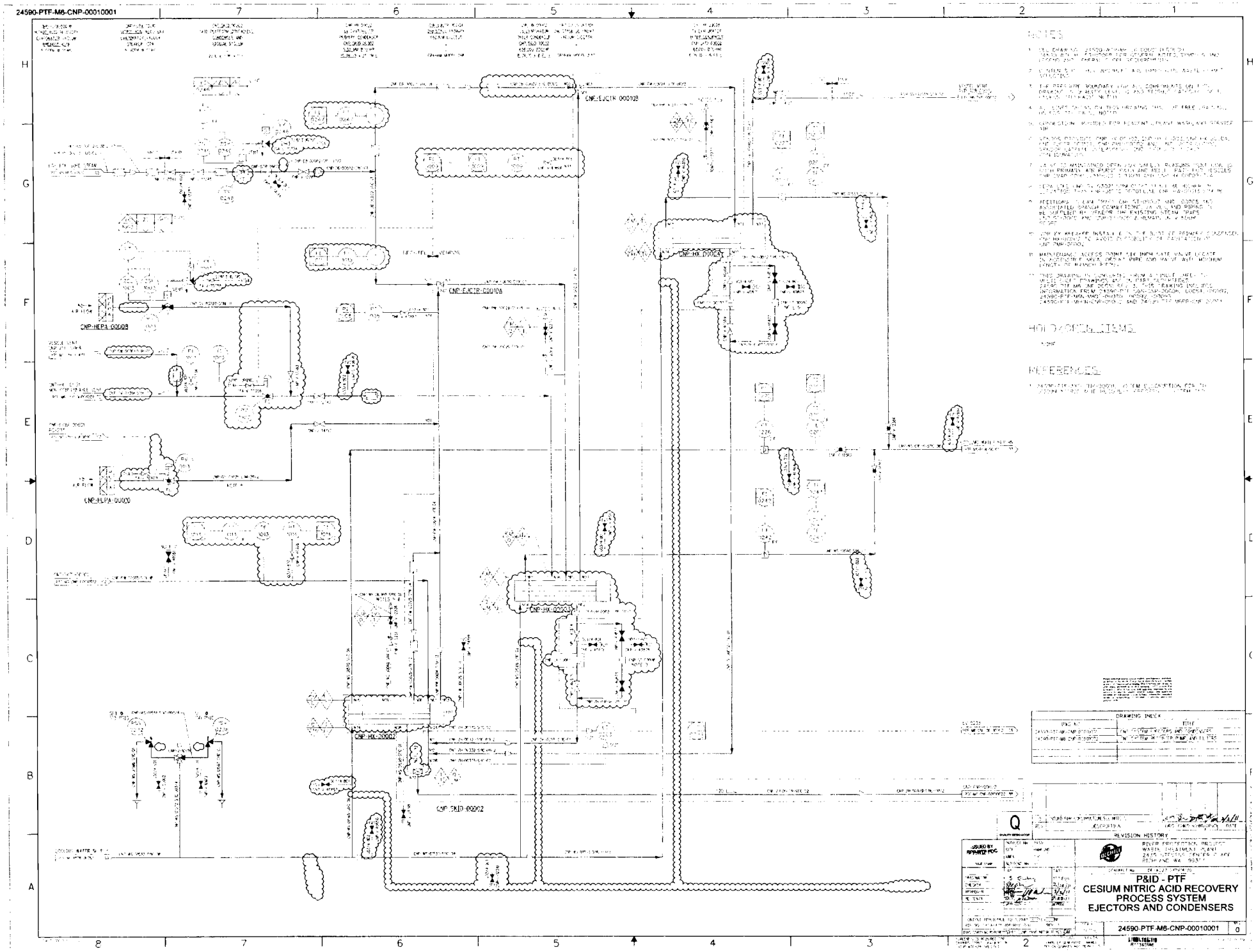
RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

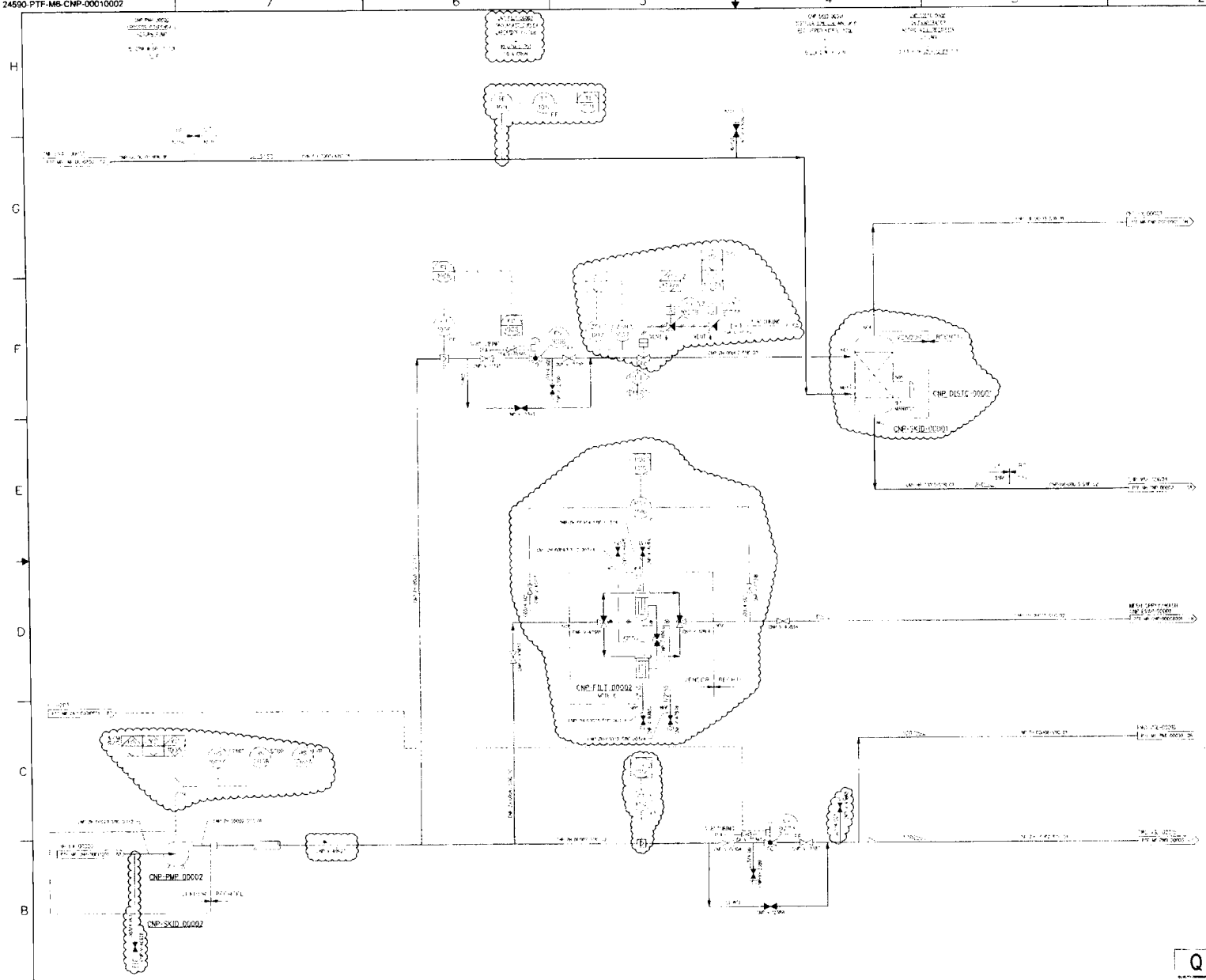
CONTRACT NO DE-AC27-01RV14136

P&ID-PTF
CESIUM NITRIC ACID RECOVERY PROCESS SYSTEM CNP-HX-00001

SIZE NONE | 24590-PTF-M6-CNP-00008002 | REV 0

24590-PTF-M6-CNP-00010001





NOTES:

1. THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO BECHTEL NATIONAL, INC. AND ITS SUBSIDIARIES AND AFFILIATES. DISCLOSURE, REPRODUCTION OR USE FOR ANY PURPOSE OTHER THAN THE PROJECT FOR WHICH IT IS FURNISHED IS PROHIBITED WITHOUT WRITTEN PERMISSION.
2. LICENSING: IF THIS DOCUMENT ARE PERTINENT TO STATE PERMIT REPORTING.
3. THE PRESSURE BOUNDARY IS A SEMI-WELDED PLATE. DRAWING IS QUARTER (1/4) SCALE AND NOT ACCURATE (UNLESS OTHERWISE NOTED).
4. ALL LINES SHOWN ON THIS DRAWING SHOULD BE PIPE (TRAILING, SCREW, BLACK, ETC.) UNLESS WHICH ARE REFERRED TO AS SOLENOID OPERATED VALVES.
5. WATER TRAP SHOULD HAVE SIX PIPE (1 1/2 IN.) START IN AND EXIT FOR 6 INCH (MAX) AND 1 1/2 IN. FOR 1 1/2 INCH IN LENGTH OF BRAZING FITTING.
6. WATER CONTROL (1 1/2 IN.) VALVE ROUGH SIZE FOR PARTIALLY OPEN (ON MICRON AND LEAKAGE FIT FOR PROPER FLOW, BUT PREFERRED WITH 1/2 INCH NODULAR).
7. DELETE PRESSURE (PRIMARY CHANGE) (PRIMARY DRAWING CNP-HX-00004 CONNECTS DIRECTLY, CNP-PMP-00002 AND CNP-FILT-00002 DRAWING SHOWN IN PLACE OF DISTILLATION) INTERCONNECTION POINTING IN A SAME DISTILLATION.
8. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PARTICULAR REFERENCE 24590-PTF-M6-CNP-00010-REV 0 THIS DRAWING INCLUDES INFORMATION FROM 24590-PTF-M6-CNP-00009, CNP-00010 (24590-PTF-M6-CNP-00010-REV 0) AND 24590-PTF-M6-CNP-00009 AND 24590-PTF-M6-CNP-00010.

HOLD/OPEN ITEMS:

NONE

SIGNOFFS:

1. 24590-PTF-M6-CNP-00009 SYSTEM IN OPERATION FOR THE CESIUM NITRIC ACID RECOVERY PROCESS SYSTEM CNP

Q			

REVISION HISTORY

ISSUED BY: RPP-WTP PDC

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

CONTRACT NO. DE-AC27-01RL14136

P&ID - PTF
CESIUM NITRIC ACID RECOVERY PROCESS SYSTEM
RECTIFIER, PUMP, AND FILTERS

24590-PTF-M6-CNP-00010002 | 0

RCRA Operating Record Cover Sheet

Document Number: 24590-PTF-PCN-ENV-11-008

Waste Management Records:

- ☐ **R101** List of Waste Management Areas
- ☐ **R102** Waste Analysis Records
- ☐ **R103** Waste Designation Information
- ☐ **R104** Waste Transfer Records
- ☐ **R105** Movement of Containerized Waste Onsite
- ☐ **R106** Release/Spill Records
- ☐ **R114** Field Change Request/Field Change Notice
- ☐ **R116** Field Monitoring / Surveillance Checklists
- ☐ **R119** Reserved
- ☐ **R120** Reserved
- ☐ **R126** Satellite and 90-Day Accumulation Area

Compliance Schedule Submittals:

- ☐ **R401** Pretreatment Facility
- ☐ **R402** LAW Facility
- ☐ **R403** HLW Facility
- ☐ **R404** Laboratory
- ☐ **R405** Balance of Facility
- ☐ **R406** WTP All Facilities
- ☐ **R407** Human Health & Ecological Risk Assessment

Other Operating Record Documents:

- ☐ **R601** Outgoing Correspondence (RCRA Permit Relating)
- ☐ **R602** Contingency Plan Implementation
- ☐ **R603** Closure Plan Deviation
- ☐ **R604** Permit Equivalency Notice (PEN)
- ☒ **R605** Permit Change Notice (PCN)
- ☐ **R606** Annual RCRA Permit Closure and Post-Closure Cost Adjustment Report
- ☐ **R607** Permit Modification
- ☐ **R608** Incoming Correspondence (RCRA Permit Relating)

Non-Operating Record Documents:

- ☐ **N101** Meeting Minutes
- ☐ **N102** Memoranda

Special Instructions to PDC:

Link CCNs:

239282

244188

246921

Quarter Ending June 30, 2012 24590-PTF-PCN-ENV-11-009

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 Immoblilization Plant
Replace Piping and Instrumentation Diagrams (P&ID) for the PTF Plant Wash and Disposal System (PWD) Effluent Vessels PWD-VSL-00015 and PWD-VSL-00016 in Appendix 8.2 of the Dangerous Waste Permit (DWP).

Submitted by Co-Operator:

Donna Busche 4/5/12
D. M. Busche Date

Reviewed by ORP Program Office:

5/24/12
D. L. Noyes Date

Quarter Ending June 30, 2012

24590-PTF-PCN-ENV-11-009

Hanford Facility RCRA Permit Modification Notification Form

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

Description of Modification:

The purpose of this Class 1 prime modification is to update and replace the following P&IDs for vessels PWD-VSL-00015 and PWD-VSL-00016 in Appendix 8.2 of the DWP.

Appendix 8.2			
Replace:	24590-PTF-M6-PWD-00003, Rev. 4	With:	24590-PTF-M6-PWD-00003001, Rev. 0
			24590-PTF-M6-PWD-00003002, Rev. 0
			24590-PTF-M6-PWD-00003003, Rev. 0
			24590-PTF-M6-PWD-00003004, Rev. 0

This modification requests Ecology approval and incorporation into the permit the specific changes to the P&IDs that are indicated by revision notes and clouds. The P&IDs include changes provided in applicable document change forms (e.g., DCN, SCN, SDDR, FCN, FCR, etc.) that were submitted to Ecology in accordance with Condition III.10.C.9.h. In addition, these P&IDs include changes associated with the resolution to comments on change documents since the issuance of the last revision of the permitted documents.

Significant changes to the P&IDs are summarized below:

- Converted drawing from a single sheet to multi-sheet drawings
- Modified, deleted, and added notes, holds, and references
- Expanded instruments and logic controls information
- Incorporated changes from change documentation identified in the Notes section on each drawing

This modification requests Ecology approval and incorporation of the following list of outstanding change documents into the permit. Although not yet incorporated into the revised documents attached to this PCN, this list of outstanding DCNs are intended to be incorporated into this modification.

None

In accordance with Permit Condition III.10.C.2.e, this permit modification may include page changes to the Permit, attachments, and permit application supporting documentation. Necessary permit changes are attached to this PCN. Ecology is requested to approve the attached permit changes and incorporate in the next revision of the WTP Dangerous Waste Permit.

Attached.

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

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

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

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

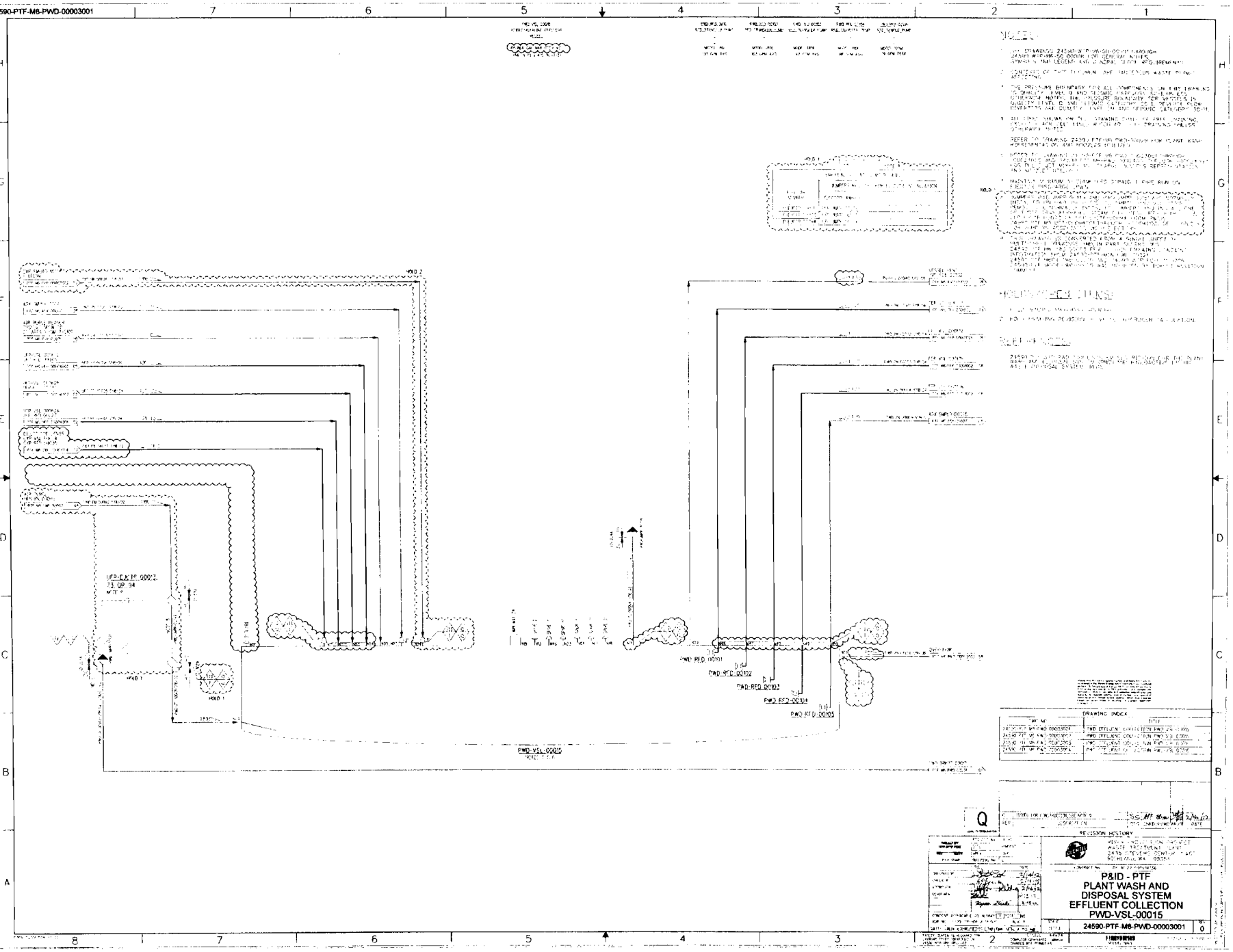
Modification Approved/Concur: ☑ Yes ☐ Denied (state reason below)

Reason for denial:

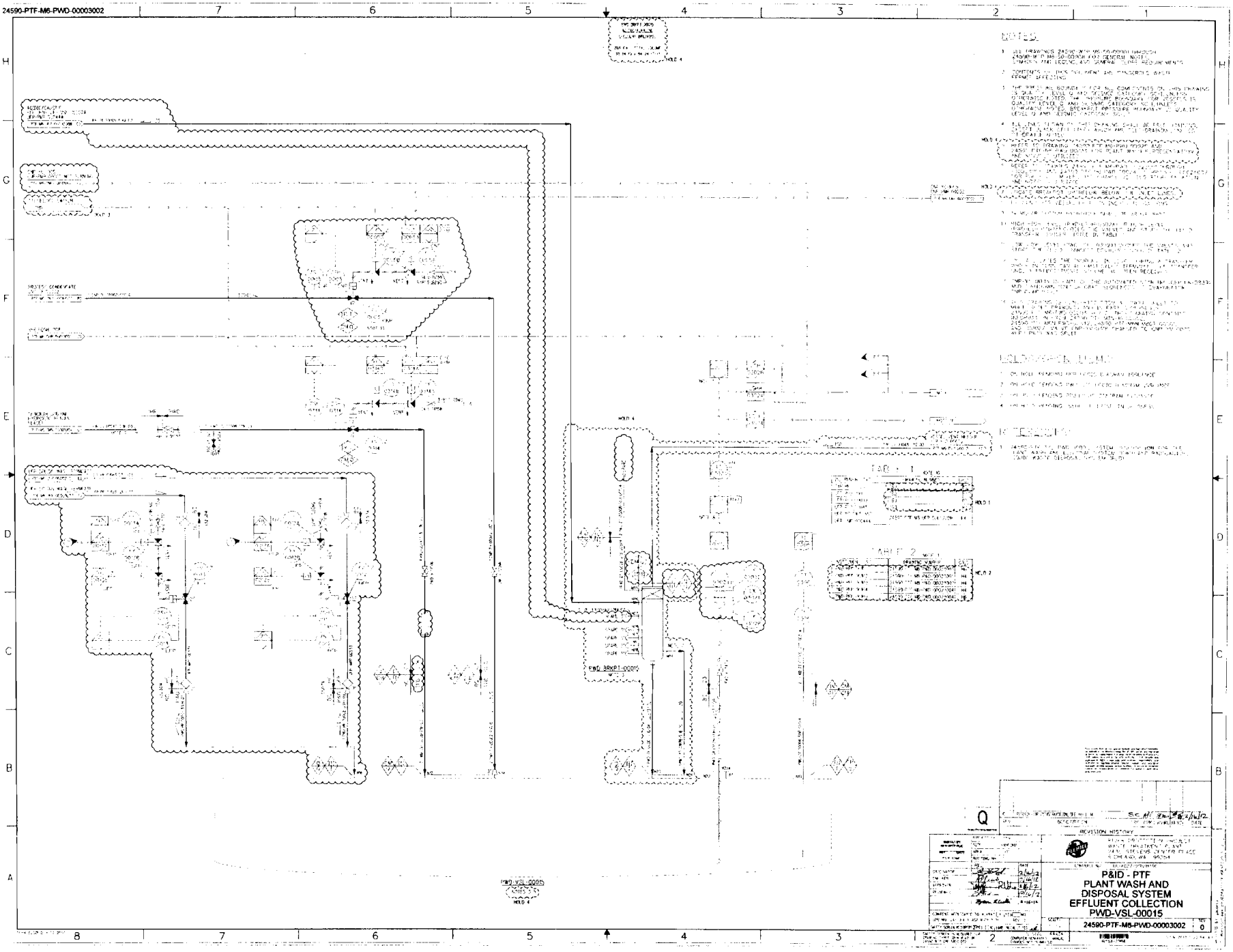
Reviewed by Ecology:

A. Carlson — Date 6/19/12

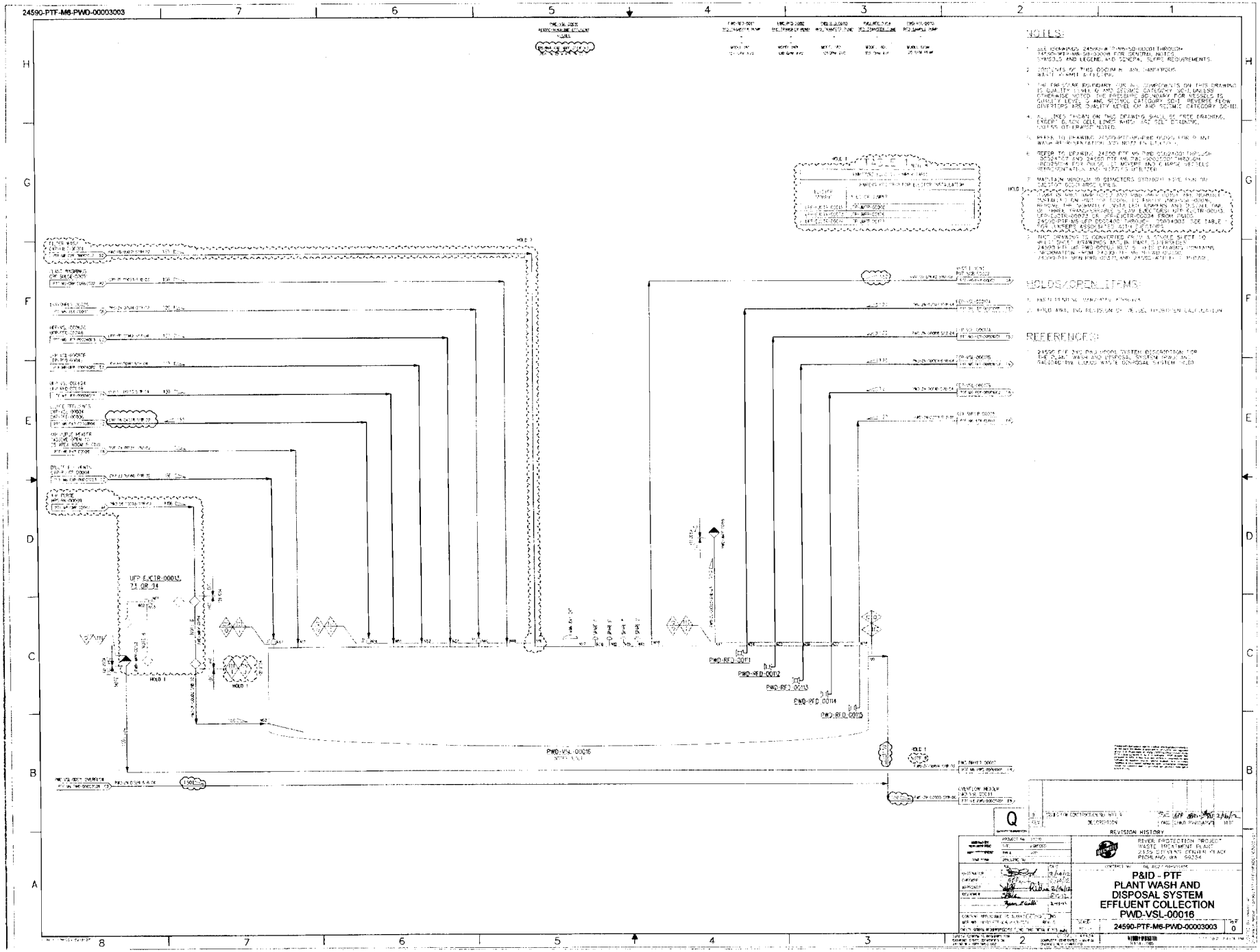
24590-PTF-M6-PWD-00003001



24590-PTF-M6-PWD-00003002



24590-PTF-M6-PWD-00003003



24590-PTF-M6-PWD-00003004

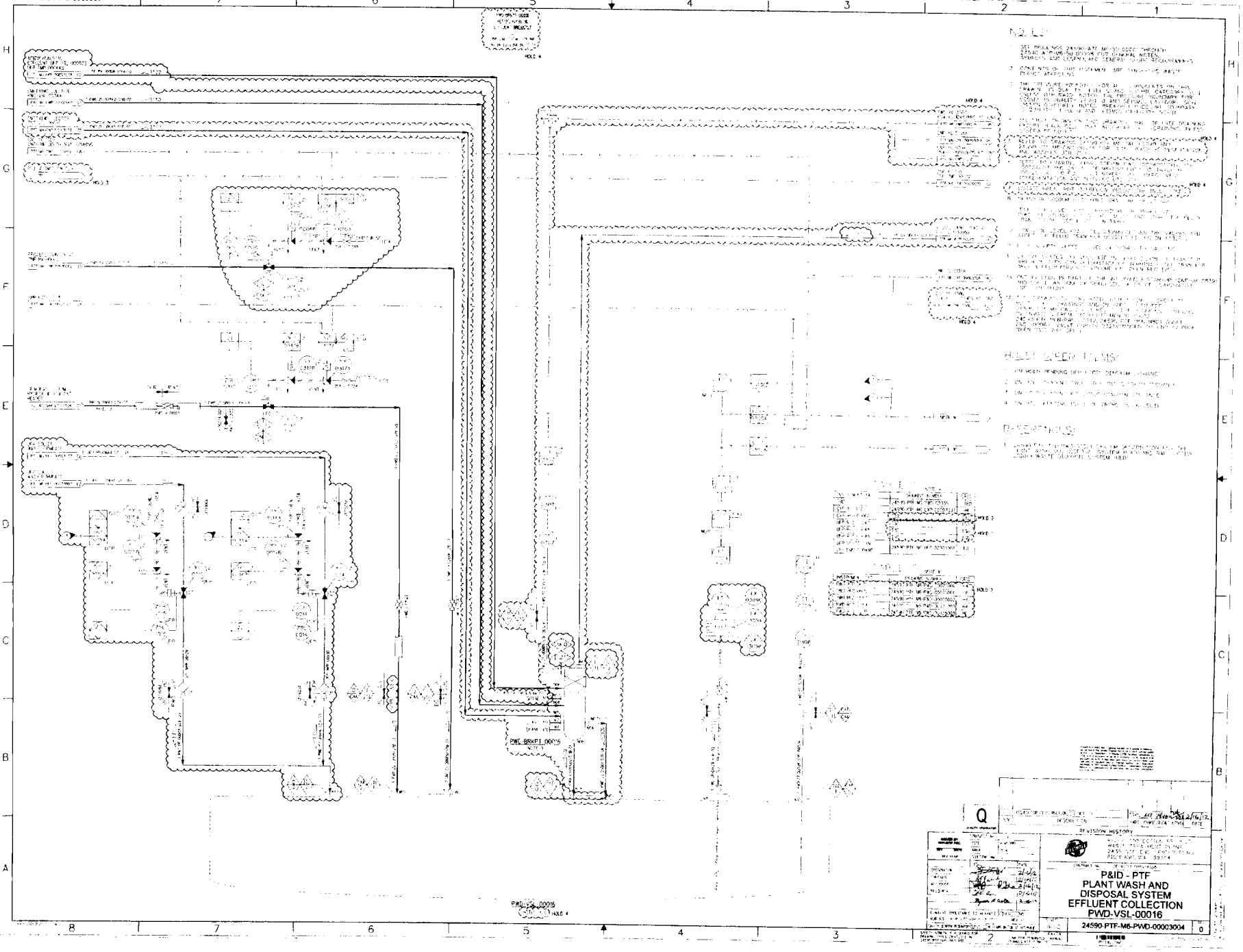


Table III.10.E.A – Pretreatment Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	System Designation	Engineering Description (Drawing Nos., Specifications Nos., etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		~~-N1D-RLD-P0002, Rev 2~~ -P1-P01T-00001, Rev 7 **24590-WTP** -3PS-G000-T0002, Rev 8 -3PS-MV00-T0001, Rev 4 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		
Pretreatment Plant Wash and Disposal System PWD-VSL-00015 (Acidic/Alkaline Effluent Vessel) PWD-VSL-00016 (Acidic/Alkaline Effluent Vessel) PWD-VSL-00033 (Ultimate Overflow Vessel) PWD-VSL-00043 (HLW Effluent Transfer Vessel) PWD-VSL-00044 (Plant Wash Vessel) PWD-VSL-00046 (C3 Floor Drain Collection Vessel)	PWD	**24590-PTF** -M5-V17T-00022001, Rev 2 -M5-V17T-00022002, Rev 2 -M6-PWD-00001, Rev 2 -M6-PWD-00002001, Rev 0 -M6-PWD-00002002, Rev 0 ~~-M6-PWD-00003, Rev 4~~ -M6-PWD-00003001, Rev 0 -M6-PWD-00003002, Rev 0 -M6-PWD-00003003, Rev 0 -M6-PWD-00003004, Rev 0 -M6-PWD-00005, Rev 3 -M6-PWD-00006, Rev 2 -M6-PWD-00007, Rev 3 -M6-PWD-00008, Rev 3 -M6-PWD-00009, Rev 3 -M6-PWD-00010, Rev 3 -M6-PWD-00011, Rev 2 -M6-PWD-00012, Rev 2 -M6-PWD-00014, Rev 3 -M6-PWD-P0018, Rev 0 -M6-PWD-P0019, Rev 0 -M6-PWD-00020001, Rev 0	Section 4.1.2.15; Tables 4-2 and 4-6; and Figures C1-1, C1-2, and C1-02A of Operating Unit Group 10, Addendum C of this Permit.	PWD-VSL-00015 = 119,150 PWD-VSL-00016 = 119,150 PWD-VSL-00033 = 41,650 PWD-VSL-00043 = 41,650 PWD-VSL-00044 = 103,024 PWD-VSL-00046 = 4,982

Quarter Ending March 31, 2012 24590-PTF-PCN-ENV-11-011

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 PTF General Arrangement (GA) Plan for the 0 ft-0 in. elevation in Appendix 8.4 of the Dangerous Waste Permit (DWP).

Submitted by Co-Operator:

D. M. Busche — Date 3/9/12

Reviewed by ORP Program Office:

D. L. Noyes — Date 3/30/12

Quarter Ending March 31, 2012

24590-PTF-PCN-ENV-11-011

Hanford Facility RCRA Permit Modification Notification Form

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

Description of Modification:

The purpose of this Class 1 prime modification is to update the PTF GA Plan for the 0 ft-0 in. elevation in Appendix 8.4 of the DWP. The following GA Drawing is submitted to replace the permitted GA Drawing currently in Appendix 8.4.

Appendix 8.4			
Replace:	24590-PTF-P1-P01T-00001 Rev. 7	With:	24590-PTF-P1-P01T-00001 Rev. 8

This modification requests Ecology approval and incorporation into the permit the specific changes to this GA Drawing that are identified by Revision 8 note, clouds, and revision triangles shown on the GA Drawing that have been issued since the last revision of the permit version. The revisions are the result of ongoing design. The following identifies the significant types of changes on the attached drawing:

PTF GA Plan at El. 0 ft-0 in. (24590-PTF-P1-P01T-00001):

- Added R3/C5/C3 rated enclosures P-0110F, P-110H, P-0116A
- Partial plan at El. 15 ft added
- Added hatching for curb below gypsum wall South of rooms P-0101, P-0101A, P-0103, P-0105, P-0105A/B/C
- Added hatching for curb below gypsum wall North of P-0110, P-0110 B/C/D, P-0115, P-0116 R2/C2 designation in area P-0150
- Added new wall in PC0102 at COL. 3, corridor PC0101A
- Relocated CXP-PMP-00001A/B & CXP-PMP-00002A/B
- Deleted CXP-VSL-00001

This modification requests Ecology approval and incorporation of the following change document(s) into the permit:
None

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: 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 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

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

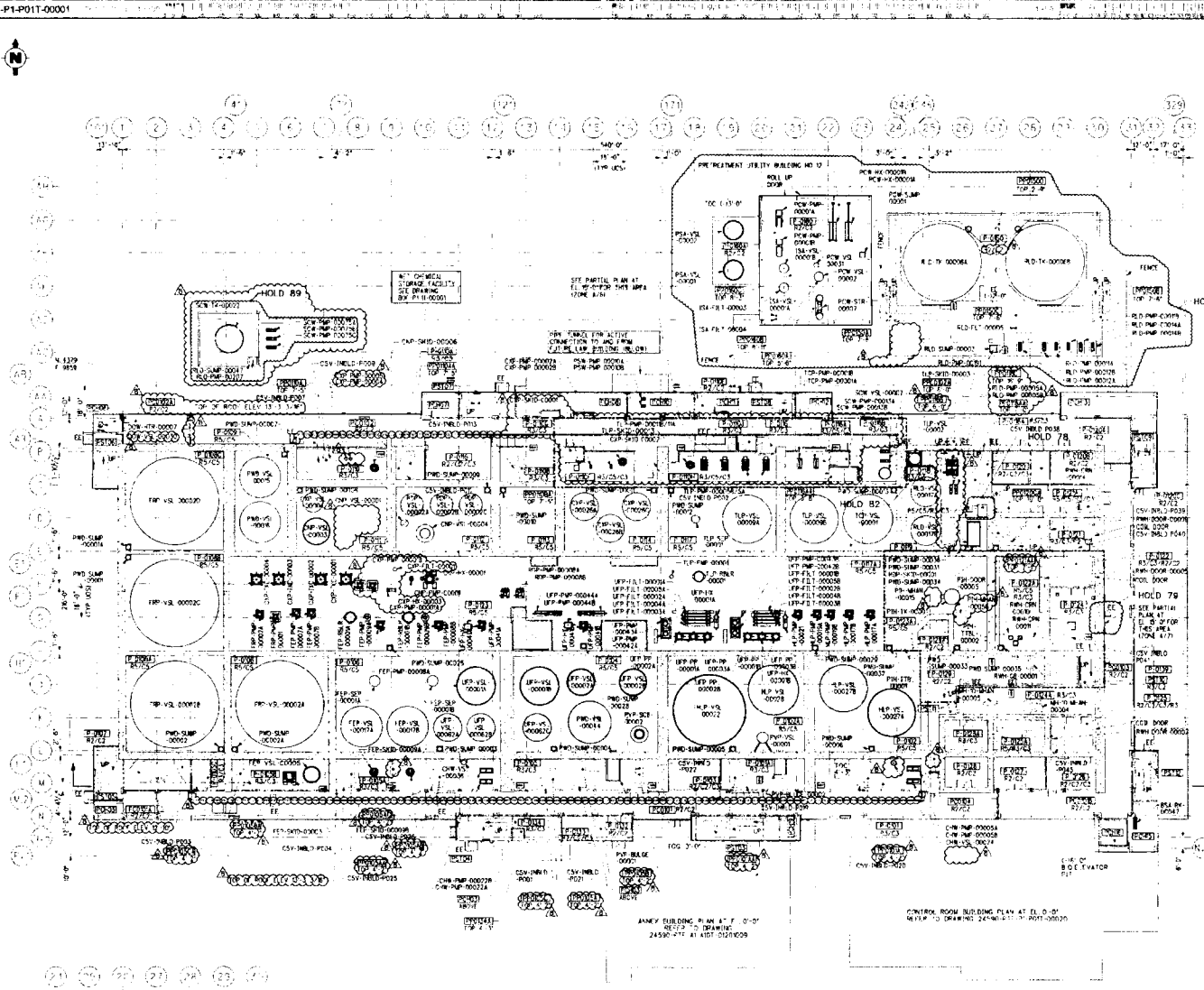
Reason for denial:

Reviewed by Ecology:

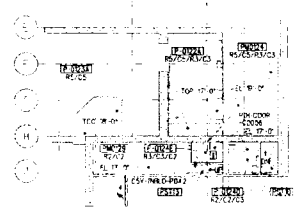
A. Carlson 5-23-12

A. Carlson Date

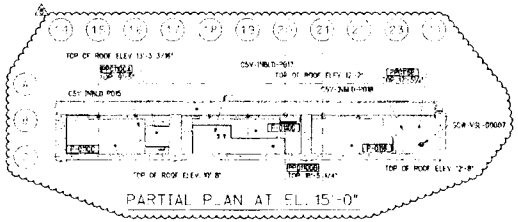
24590-PTF-P1-P01T-00001



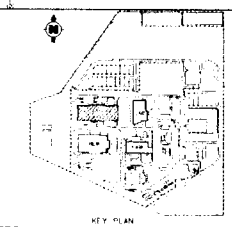
PLAN AT EL. 0'-0"



PARTIAL PLAN AT EL. 15'-0"



PARTIAL PLAN AT EL. 15'-0"



KEY PLAN

GENERAL NOTES:

1. FOR REFERENCE SEE PI01 PLAN DRAWING No. 24590-BOF-P1-F0-00001
2. ALL OPERATING AREAS ARE DESIGNATED R2/C2 UNLESS NOTED OTHERWISE
3. ALL SUB-CHANGE ROOMS ARE DESIGNATED R2/C2/C3 UNLESS NOTED OTHERWISE.
4. DELETED
5. REFER TO DRAWING No. 24590-BOF-P2-L01-00002 FOR CONVERSIONS FROM PT FACILITY TO SITE ELEVATIONS PT FACILITY ELEVATION 0'-0" EQUALS SITE ELEVATION 678' 0" ABOVE SEA LEVEL
6. DELETED
7. ROOMS ARE OFFICIALLY IDENTIFIED BY ROOM NUMBERS ONLY. ROOM NUMBERS ARE ESTABLISHED AND CONTROLLED ON GENERAL ARRANGEMENT AND ASSOCIATED EQUIPMENT LOCATION DRAWINGS. ONLY ROOM NUMBERS ARE USED TO IDENTIFY ROOMS ON ENGINEERING DISCIPLINE DOCUMENTS. WHILE ROOM NUMBERS ARE CONTROLLED, THE MOST COMMON NAME OF ROOMS ASSOCIATED WITH EACH ROOM NUMBER IS SHOWN, WHILE FOR REFERENCE ONLY ON ARCHITECTURAL FLOOR PLANS.
8. CONTENTS OF THIS DOCUMENT ARE HAZARDOUS WASTE PERMIT AFFECTING.
9. DELETED
10. DELETED
11. DELETED
12. FOR RADIOLOGICAL CLASSIFICATION REFER TO DOCUMENT No. 24590-WTP-GPP-RAD-00002
13. FLOOR/WALL SLOPE IS REQUIRED IN ROOMS WITH SUMPS, EXCEPT FOR ROOMS P-0124 AND P-0140 SLOPE IS A MINIMUM OF 1% TOWARD THE SUMP.

LEGEND:

CA	CONTROLLED ACCESS
EE	EMERGENCY EXIT
FD	FIRE DOOR
TOC	TOP OF CONCRETE
TOG	TOP OF GRATING
P-0-0	ROOMS/CELLS/TUNNELS
24-A-1	ANNEX/CONTROL BUILDING NUMBERING
00-0-0	CORRIDORS & CONNECTING VESTIBULES
0-0-0	CHASES
0-0-0	MEZZANINES
0-0-0	STAIRS
	EQUIPMENT REMOVAL/LAY DOWN AREA
	OPENING
	CONCRETE
	EMERGENCY SHOWER/EYEWASH (PLAN VIEW)
	GRATING
	GYPSUM WALLBOARD
	GYPSUM WALLBOARD W/CURB AT BASE
	TOP OF PLATFORM

HOLDS:

78. HOLD FOR MECHANICAL DOOR RESOLUTION.
79. HOLD FOR TREND ENG-1628 ADDITION OF NEW SURCHARGE ROOM
81. PENDING CONFIRMED R/C CLASSIFICATION
82. PENDING CONFIRMED R/C CLASSIFICATION
89. PENDING DESIGN FINALIZATION/VENDOR DATA

REVISION 8 NOTE:

1. INCORPORATED 24590-WTP-FO-M-11-0099
2. ADDED R3/C5/C3 RATED ENCLOSURES P-0110F, P-0110H, P-0118A.
3. ADDED AIR LOCKS P-0110G, P-0110J, P-0118B
4. ADDED HOLD 89, CXP-PMP-00004/5, CXP-SKID-00001, CXP-SKID-00002, PIH-MIXM-00056, PR01005, PR01006, PR01044, PR01085/6, SCW-VSL-00010, CXP-HX-00003, CXP-PMP-00001, RLD-PMP-00007, RLD-SUMP-00047, SCW-PMP-00075A/B/C, SCW-TK-00032.
5. ORIENTATION REVISED RLD-PMP-00005A/B
6. PARTIAL PLAN AT ELEV 15'-0" ADDED
7. REVISED SAFETY SHOWERS, INBLEEDS CSV-INBLD-P015, CSV-INBLD-P017, CSV-INBLD-P018, PLATFORMS PR01004, PR01011, PR01014, PR01015A/B, PR01044A/AB/AC/BA/CA, PR01044, PR01185, PR01184 AND PIH-MIXM-00015.
8. DELETED CXP-VSL-00001, CXP-HX-00001A/B, PR01001A, PR01018, PR01184, SCW-PMP-00014, SCW-TK-00021A, TCP-BULGE-00004
9. ADDED HATCHING FOR CURB BELOW GYPSUM WALL SOUTH OF ROOMS P-0111, P-0104, P-0103, P-0105, P-0105A/B/C AND NORTH OF P-0110, P-0110F/C/D, P-0115, P-0116, R2/C2 DESIGNATION, IN AREA P-0160 NEW WALL IN ROOM2 AT EL-0'-0, CORRIDOR P-0001A
10. RELOCATED CXP-PMP-00001A/B & CXP-PMP-00002A/B

R	SITE REVISION 8 NOTE A, DWG ZONE D/2							
	MAJOR REVISION 12 REVISION 7 NOTE D							
	DWG ZONE D/2							
	ISSUED FOR REVIEW							
	ISSUED FOR OPTIONS							

REVISION HISTORY

PROCESS DESIGN
CONTRACT NO. 24590
DATE
DESIGNED
DRAWN
CHECKED
REVIEWED
APPROVED
DATE

PACIFIC NORTHWEST NATIONAL LABORATORY
BATTELLE

PACIFIC NORTHWEST NATIONAL LABORATORY
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT NO. 24590-WTP-PE-M-00

PRETREATMENT FACILITY GENERAL ARRANGEMENT PLAN AT EL. 0'-0"

24590-PTF-P1-P01T-00001 | 8

Quarter Ending March 31, 2012 24590-PTF-PCN-ENV-11-012

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 PTF Equipment Assembly Drawings for HLP-VSL-00022 in Appendix 8.6 of the Dangerous Waste Permit (DWP).

Submitted by Co-Operator:

Donna Busche 3/9/12

D. M. Busche Date

Reviewed by ORP Program Office:

3/30/12

D. L. Noyes Date

Quarter Ending March 31, 2012 24590-PTF-PCN-ENV-11-012

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

Description of Modification:

The purpose of this Class 1 prime modification is to update PTF Equipment Assembly Drawings for HLP-VSL-00022 views in Appendix 8.6 of the DWP. The following Equipment Assembly Drawings are submitted to replace the permitted Equipment Assembly Drawings currently in Appendix 8.6:

Appendix 8.6			
Replace:	24590-PTF-MV-HLP-00003001 Rev. 0	With:	24590-PTF-MV-HLP-00003001 Rev. 1
	24590-PTF-MV-HLP-00003002 Rev. 0		24590-PTF-MV-HLP-00003002 Rev. 1
	24590-PTF-MV-HLP-00003003 Rev. 0		24590-PTF-MV-HLP-00003003 Rev. 1
	24590-PTF-MV-HLP-00003004 Rev. 0		24590-PTF-MV-HLP-00003004 Rev. 1

This modification requests Ecology approval and incorporation into the permit the specific changes to these Equipment Assembly Drawings that are identified by Revision Notes. Revisions are the result of ongoing design. The following identifies the significant types of changes on the attached drawings:

24590-PTF-MV-HLP-00003001 Rev. 1:

- Revised PJM Vessel Assembly Configuration shown in elevation view for N05 Nozzle size & N05 Connection size

24590-PTF-MV-HLP-00003002 Rev. 1:

- Revised PJM Vessel Assembly Configuration shown in elevation view and N33/N44 Outlet Support Configuration shown in elevation view

24590-PTF-MV-HLP-00003003 Rev. 1:

- Revised vessel assembly configuration
- Added PJM assembly bill of materials
- Added new PJM assembly bill of material
- Added NDE requirement for 6" & 3" pipe
- Added PJM vessel assembly configuration section view R-R for N05 integral reinforcement detail
- Added capped connection on N44

24590-PTF-MV-HLP-00003004 Rev. 1:

- Revised PJM vessel assembly configuration
- Revised weld requirement for 4" X 1/2" THK plate
- Added NDE requirements for 6", 3", and 2" pipe.

This modification requests Ecology approval and incorporation of the following change document(s) into the permit:
None.

Quarter Ending March 31, 2012 24590-PTF-PCN-ENV-11-012

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

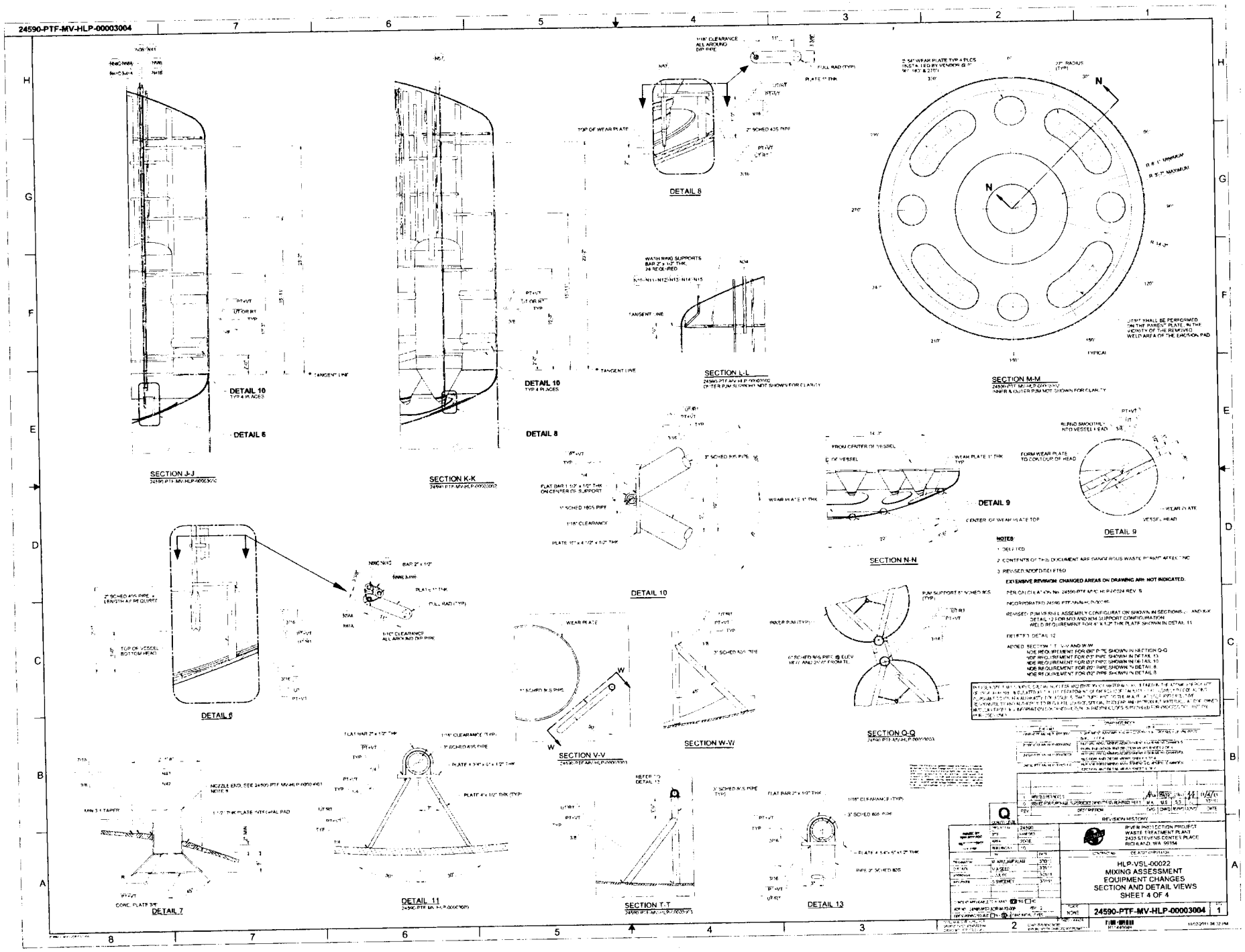
Enter relevant WAC 173-303-830, Appendix I Modification citation number: NA

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

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

Modification Approved/Concur: ☑ Yes ☐ Denied (state reason below) Reason for denial:	Reviewed by Ecology: Arnette Carlson 5-7-12 A. Carlson. Date

24590-PTF-MV-HLP-00003004



NOTES:

1. DELETED
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING
3. REVISED AND DELETED

EXTENSIVE REVISION: CHANGED AREAS ON DRAWING ARE NOT INDICATED.

PER CALCULATION No. 24590-PTF-MVC-HLP-00024 REV. 0

INCORPORATED 24590-PTF-MV-HLP-00016

REVISED PJM VESSEL ASSEMBLY CONFIGURATION SHOWN IN SECTIONS L-L AND K-K
DETAIL 12 FOR M-M AND N-N SUPPORT CONFIGURATION
WELD REQUIREMENT FOR 4" x 1/2" THK PLATE SHOWN IN DETAIL 11

DELETED DETAIL 12

ADDED SECTION T-T, V-V AND W-W
NDE REQUIREMENT FOR 60" PIPE SHOWN IN SECTION Q-Q
NDE REQUIREMENT FOR 03" PIPE SHOWN IN DETAIL 13
NDE REQUIREMENT FOR 03" PIPE SHOWN IN DETAIL 10
NDE REQUIREMENT FOR 02" PIPE SHOWN IN DETAIL 8
NDE REQUIREMENT FOR 02" PIPE SHOWN IN DETAIL 8

REV	DESCRIPTION	TYPE	CHKD	REVIEWED	DATE
1	REVISED PER PJM	MA	MS	SS	11/4/11
0	ISSUED FOR PURCHASE SUPPORT DWG TO BE ISSUED WITH	MA	MS	SS	10/21/11

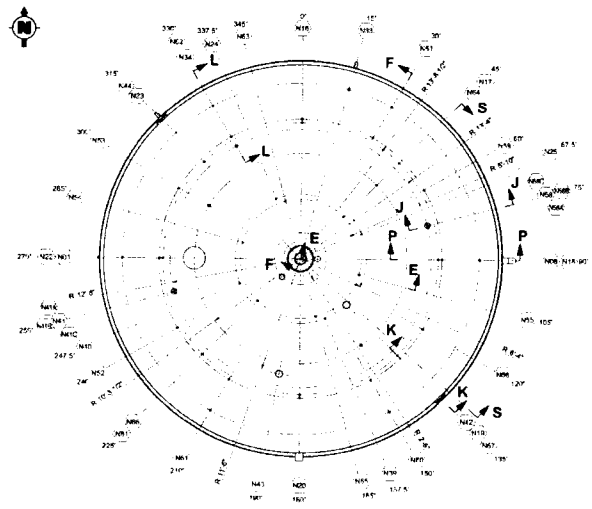
REVISION HISTORY

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

HLP-VSL-00022
MIXING ASSESSMENT
EQUIPMENT CHANGES
SECTION AND DETAIL VIEWS
SHEET 4 OF 4

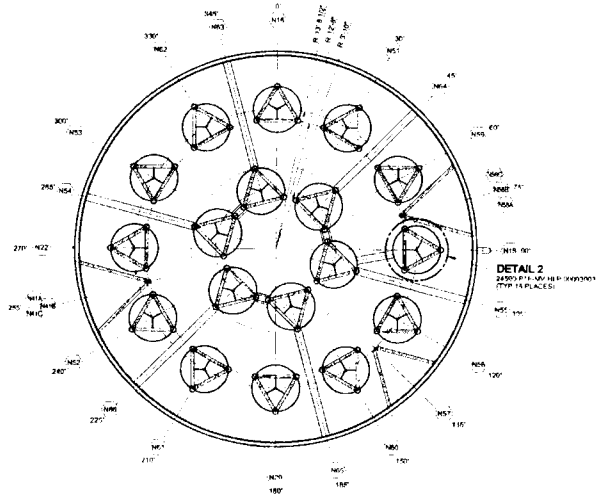
SCALE: NONE | 24590-PTF-MV-HLP-00003004 | 1

24590-PTF-MV-HLP-00003002



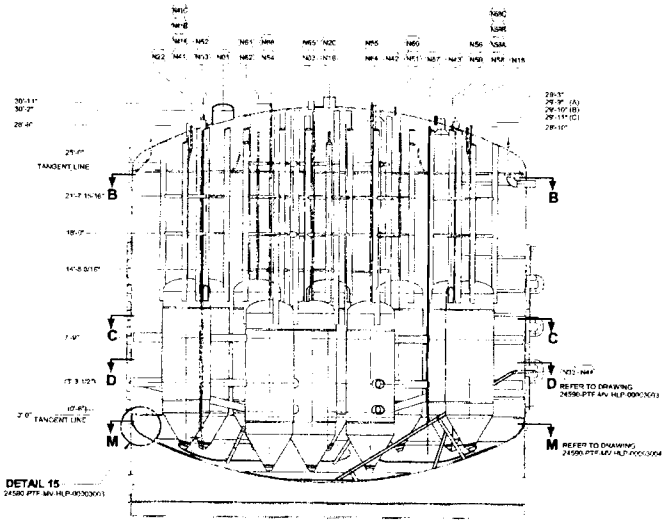
PLAN (VAPOR SPACE NOZZLES ARE NOT IDENTIFIED)

FOR SECTIONS E-E, F-F, P-P & S-S REFER TO DWG 24590-PTF-MV-HLP-00003003 AND FOR SECTIONS J-J, L-L & K-K REFER TO DWG 24590-PTF-MV-HLP-00003004



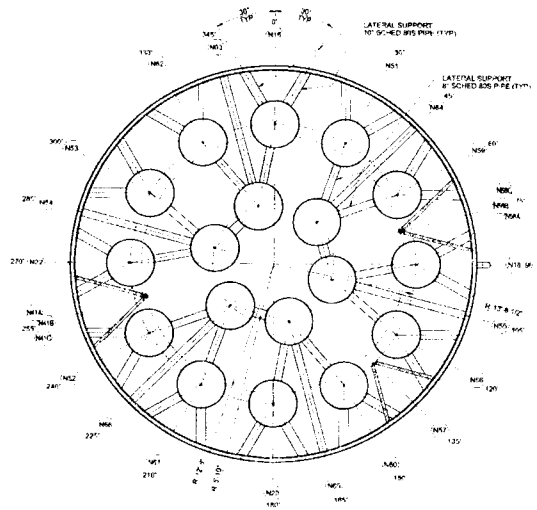
DETAIL 2
24590-PTF-MV-HLP-00003003 (TYP 15 PLACES)

SECTION B-B



DETAIL 15
24590-PTF-MV-HLP-00003003

ELEVATION
FOR TRUE ORIENTATION, SEE PLAN



SECTION C-C

NOTES:

1. VENDOR SHALL BREAK ALL INSIDE AND OUTSIDE CORNERS AT THE SUCTION POINT OF PUMP INTERNAL PIPING AND PROVIDE MINIMUM OF 1/8" RAD 1/8 ON ALL CORNERS.
2. REVISED/ADDED/DELETED. SEE ARCHIVE REVISION 0 FOR LISTED CHANGES
3. DELETED
4. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING
5. REVISED/ADDED/DELETED

EXTENSIVE REVISION: CHANGED AREAS ON DRAWING ARE NOT INDICATED

PER CALCULATION No. 24590-PTF-MVC-HLP-00024 REV. B.

INCORPORATED 24590-PTF-MVN-HLP-00059

REVISED PUM VESSEL ASSEMBLY CONFIGURATION SHOWN IN ELEVATION VIEW
8033N44 OUTLET SUPPORT CONFIGURATION SHOWN IN ELEVATION VIEW

ADDED SECTION S-S SHOWN ON PLAN VIEW

DELETED: NOTE 3

REV	DESCRIPTION	DWN	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 5					
2	ISSUED FOR PURCHASE, DESCRIPTION 24590-PTF-MV-HLP-00003 REV 1	MA	MS	SS	JJ	5/31/11

REVISION HISTORY

PROJECT NO.	24590	
SITE		
AREA	200E	
DESIGN NO.		
DESIGNATOR	M. ARIA MIRALIAM	5/31/11
CHECKER	M.A. SSED	5/31/11
APPROVER	J. JEAN	5/31/11
REVIEWER	S. SWEENEY	5/31/11

CONTENT APPLICABLE TO NEXT USE ☐ NO ☐ YES
ACTIVE NO. 24590-PTF-MV-HLP-00003002 REV. 2
DOCUMENT NO. 24590-PTF-MV-HLP-00003002 REV. 1

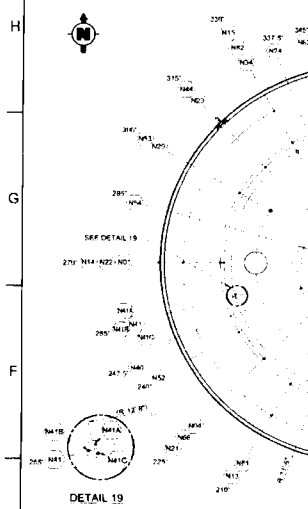
RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

DESIGN AGENCY: DE-A-027-01-00-01-00

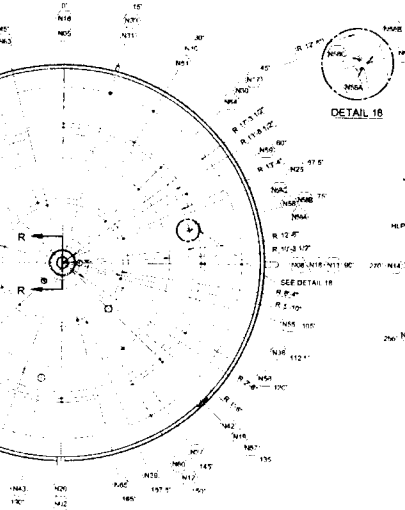
HLP-VSL-00022
MIXING ASSESSMENT
EQUIPMENT CHANGES
PLAN, ELEVATION AND SECTION VIEWS
SHEET 2 OF 4

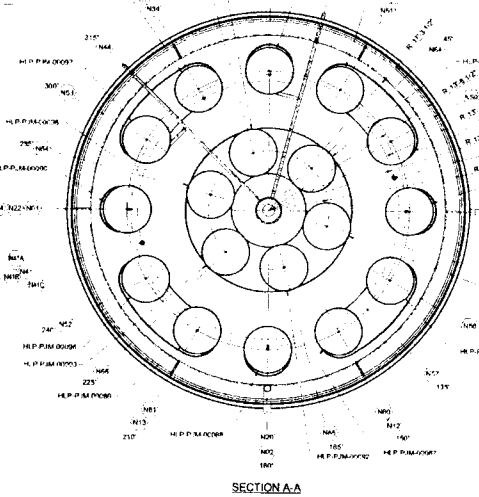
SCALE: NONE
24590-PTF-MV-HLP-00003002
REV: 1

24590-PTF-MV-HLP-00003001



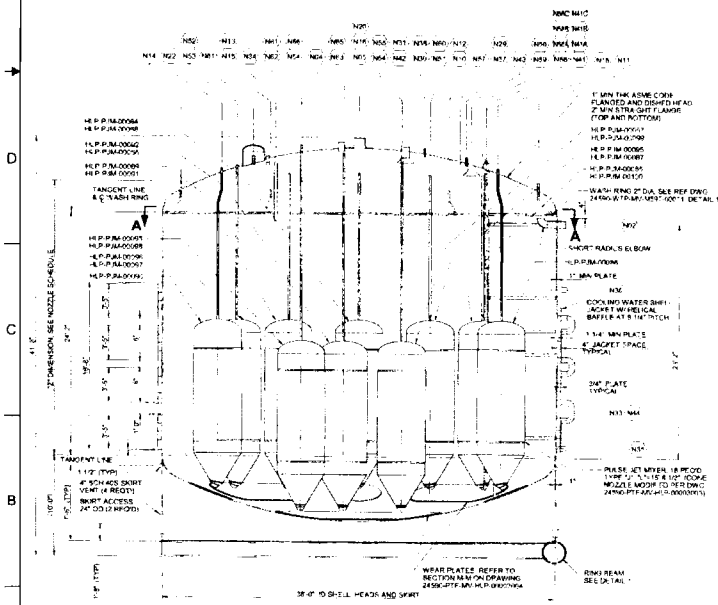
PLAN





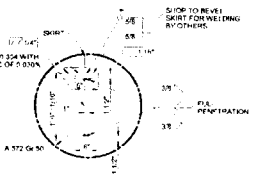
SECTION A-A

NOZZLE	SIZE	SCHEDULE	SERVICE/REMARKS	"Z" DIM	DETAILS	CONNECTION
N01	24"	0.625"	MANWAY	70'-2"	24590-WTP-MV-M97-00017 DET 1	CAPPED
N02	8"	80S	OVERFLOW	73'-2"	24590-WTP-MV-M97-00016001 DET 1	8"-40S
N03			DELETED			
N04	6"	80S	INLET AIR PURGE	31'-8"	24590-WTP-MV-M97-00016001 DET 2	6"-10S
N05A	14"	0.375"	VESSEL VENT	31'-8"	24590-WTP-MV-M97-00016001 DET 1	14"-0.25" WALL
N06			DELETED			
N07			DELETED			
N08	6"	10S	CAPPED ABANDONED IN PLACE	31'-8"	24590-PTF-MV-HLP-00003003, DET 14	CAPPED
N09			DELETED			
N10	2"	160S	INLET TO WASH RING	27'-3"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N11	2"	160S	INLET TO WASH RING	27'-3"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N12	2"	160S	INLET TO WASH RING	27'-3"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N13	2"	160S	INLET TO WASH RING	27'-3"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N14	2"	160S	INLET TO WASH RING	27'-3"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N15	2"	160S	INLET TO WASH RING	27'-3"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N16	2"	160S	AIR/VACUUM TO HLP-PJM-00084	28'-8"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N17	2"	160S	CAPPED ABANDONED IN PLACE	28'-8"	24590-PTF-MV-HLP-00003003, DET 14	CAPPED
N18	2"	160S	AIR/VACUUM TO HLP-PJM-00086	28'-8"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N19	2"	160S	CAPPED ABANDONED IN PLACE	28'-8"	24590-PTF-MV-HLP-00003003, DET 14	CAPPED
N20	2"	160S	AIR/VACUUM TO HLP-PJM-00088	28'-8"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N21	2"	160S	CAPPED ABANDONED IN PLACE	28'-8"	24590-PTF-MV-HLP-00003003, DET 14	CAPPED
N22	2"	160S	AIR/VACUUM TO HLP-PJM-00090	28'-8"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N23	2"	160S	CAPPED ABANDONED IN PLACE	28'-8"	24590-PTF-MV-HLP-00003003, DET 14	CAPPED
N24	2"	160S	CAPPED ABANDONED IN PLACE	30'-10"	24590-PTF-MV-HLP-00003003, DET 14	CAPPED
N25	2"	160S	CAPPED ABANDONED IN PLACE	30'-11"	24590-PTF-MV-HLP-00003003, DET 14	CAPPED
N26			DELETED			
N27			DELETED			
N28			DELETED			
N29	3"	80S	INLET FROM FIRE SYSTEM	30'-0"	24590-WTP-MV-M97-00016001 DET 2	3"-80S
N30	2"	160S	INLET	30'-0"	24590-WTP-MV-M97-00016001 DET 2	2"-80S
N31	2"	80S	INLET	27'-3"	24590-WTP-MV-M97-00016001 DET 2	2"-40S
N32			DELETED			
N33	3"	80S	OUTLET (HLP-PMP-00021)	4'-7"	24590-WTP-MV-M97-00016001 DET 3	3"-40S
N34	3"	80S	INLET (RECIRCULATION LOOP)	29'-3"	24590-WTP-MV-M97-00016001 DET 3	3"-40S
N35	6"	10S	INLET TO COOLING JACKET	47-11 5/8"	24590-WTP-MV-M97-00016001 DET 1	6"-10S
N36	6"	10S	OUTLET FROM COOLING JACKET	16-8 1/2"	24590-WTP-MV-M97-00016001 DET 1	6"-10S
N37	3"	80S	INLET FROM AUTOSAMPLER BACK UP	30'-0"	24590-WTP-MV-M97-00016001 DET 2	3"-40S
N38	1 1/2"	160S	SAFETY AIR PURGE	30'-10"	24590-WTP-MV-M97-00016001 DET 2	1 1/2"-40S
N39	2"	160S	CAPPED ABANDONED IN PLACE	30'-10"	24590-PTF-MV-HLP-00003003, DET 14	CAPPED
N40	2"	160S	CAPPED ABANDONED IN PLACE	30'-10"	24590-PTF-MV-HLP-00003003, DET 14	CAPPED
N41	6"	120S	INSTRUMENTATION	29'-3"	24590-WTP-MV-M97-00016001 DET 26	N/A
N41A	1"	160S	BALANCE	29'-3"	24590-WTP-MV-M97-00016001 DET 26, SEE NOTE 8	1"-40S
N41B	1"	160S	DENSITY	29'-11"	24590-WTP-MV-M97-00016001 DET 26, SEE NOTE 8	1"-40S
N41C	1"	160S	LEVEL	29'-11"	24590-WTP-MV-M97-00016001 DET 26, SEE NOTE 8	1"-40S
N42	8"	80S	ACCESS PORT	30'-10"	24590-PTF-MV-HLP-00003004, DET 7	8"-40S
N43	8"	80S	ACCESS PORT	22'-8"	24590-PTF-MV-HLP-00003004, DET 7	8"-40S
N44	3"	80S	SPARE OUTLET PUMP	4'-7"	24590-WTP-MV-M97-00016001 DET 3, SEE NOTE 8	3"-40S
N51	2"	160S	AIR/VACUUM TO HLP-PJM-00084	26'-8"	24590-WTP-MV-M97-00016001 DET 3, SEE NOTE 8	2"-40S
N52	2"	160S	AIR/VACUUM TO HLP-PJM-00086	26'-8"	24590-WTP-MV-M97-00016001 DET 3, SEE NOTE 8	2"-40S
N53	2"	160S	AIR/VACUUM TO HLP-PJM-00087	26'-8"	24590-WTP-MV-M97-00016001 DET 3, SEE NOTE 8	2"-40S
N54	2"	160S	AIR/VACUUM TO HLP-PJM-00088	30'-11"	24590-WTP-MV-M97-00016001 DET 3, SEE NOTE 8	2"-40S
N55	2"	160S	AIR/VACUUM TO HLP-PJM-00089	30'-11"	24590-WTP-MV-M97-00016001 DET 3, SEE NOTE 8	2"-40S
N56	2"	160S	AIR/VACUUM TO HLP-PJM-00090	30'-11"	24590-WTP-MV-M97-00016001 DET 3, SEE NOTE 8	2"-40S
N57	2" OD x 1"	160S	TEMPERATURE	28'-10"	24590-WTP-MV-M97-00027 ASSY 1 DET 1	1/2"-10S
N58	6"	120S	INSTRUMENTATION	20'-3"	24590-WTP-MV-M97-00016003 DET 26	N/A
N58A	1"	160S	BALANCE	27'-8"	24590-WTP-MV-M97-00016003 DET 26	1"-40S
N58B	1"	160S	DENSITY	29'-10"	24590-WTP-MV-M97-00016003 DET 26	1"-40S
N58C	1"	160S	LEVEL	29'-10"	24590-WTP-MV-M97-00016003 DET 26	1"-40S
N59	2"	160S	AIR/VACUUM TO HLP-PJM-00085	28'-8"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N60	2"	160S	AIR/VACUUM TO HLP-PJM-00087	28'-8"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N61	2"	160S	AIR/VACUUM TO HLP-PJM-00089	28'-8"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N62	2"	160S	AIR/VACUUM TO HLP-PJM-00091	28'-8"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N63	2"	160S	AIR/VACUUM TO HLP-PJM-00086	30'-11"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N64	2"	160S	AIR/VACUUM TO HLP-PJM-00087	30'-11"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N65	2"	160S	AIR/VACUUM TO HLP-PJM-00092	30'-11"	24590-WTP-MV-M97-00016001 DET 3	2"-40S
N66	2"	160S	AIR/VACUUM TO HLP-PJM-00091	30'-11"	24590-WTP-MV-M97-00016001 DET 3	2"-40S

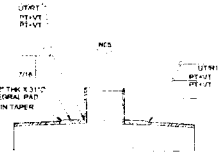


ELEVATION

FOR TRUE ORIENTATION SEE PLAN



DETAIL 1



SECTION R-R

GENERAL NOTES:

1. DELETED
2. FOR DISTANCE OF DIPPER TO BOTTOM HEAD USE 2" CLEARANCE UNLESS OTHERWISE SPECIFIED
3. ALL "Z" DIMENSIONS MEASURED FROM BTM TANGENT LINE UNLESS OTHERWISE NOTED. FOR SHELL NOZZLES "Z" DIMENSION MEASURED FROM ℄ OF NOZZLE FACE
4. RING BEAM TO BE FABRICATED & SHIPPED AHEAD OF VESSEL TO FIELD CONSTRUCTION FOR INSTALLATION BY CONTRACTORS
5. DELETED
6. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING
7. SELLER SHALL PROVIDE AND INSTALL TIE-DOWN SWIVEL LUG MOUNTING STUDS PER DRAWING 24590-WTP-MV-M97-00001
8. NEW NOZZLE END SHALL BE PLAIN END TO A LOW CONTRACTION TO MATCH CONNECTING PIPING SCHEDULE
9. REVISED/ADDED/DELETED

SEE ARCHIVE REVISION 3 FOR LISTED CHANGES

10. REVISED/ADDED/DELETED

EXTENSIVE REVISION. CHANGED AREAS OR DRAWING ARE NOT INDICATED.

PER CALCULATION No. 24590-PTF-MVC-H-F-0024 REV. B

INCORPORATED 24590-PTF-MVN-HLP-00002 24590-WTP-MVN-M97-00001

REVISED PUMP VESSEL ASSEMBLY CONFIGURATION SHOWN IN ELEVATION VIEW
MOP NOZZLE SIZE
NIS CONNECTION SIZE

ADDED SECTION R-R DETAIL FOR NEW INTERNAL REINFORCEMENT DETAILS 18 AND 19

DELETED HOLD NOTE 1
HOLD NOTE 2
CAPPED CONNECTION ON N44

HOLD NOTES:

1. DELETED
2. DELETED

THIS DRAWING TO BE READ IN CONJUNCTION WITH THE MECHANICAL DATA SHEET No. 24590-PTF-MVD-LHP-00006

REV.	DESCRIPTION	DRN.	CHKD.	REVIEW	APPR.	DATE
1	REVISED PER ECN 13					
0	ISSUED FOR PURCHASE & FURTHER DEVELOPMENT	MA	MS	RA		04/17

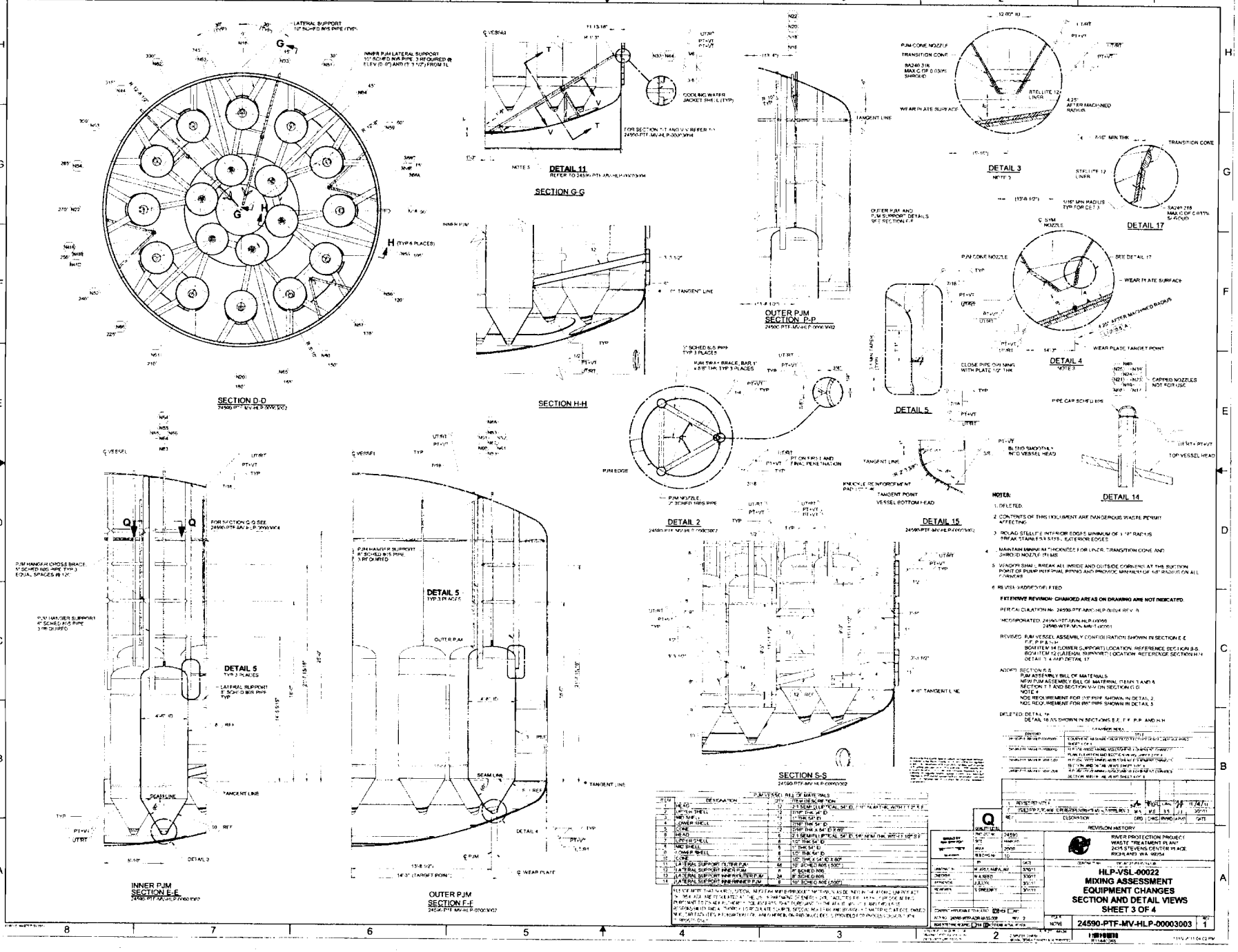
REVISION HISTORY

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

EQUIPMENT ASSEMBLY
HLW FEED RECEIPT
VESSEL HLP-VSL-00022
SHEET 1 OF 4

24590-PTF-MV-HLP-00003001 | 1

24590-PTF-MV-HLP-00003003



Quarter Ending June 30, 2012 24590-WTP-PCN-ENV-09-003

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

Index

Page 2 of 3: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant
Update the WTP common Piping and Instrumentation Diagrams (P&ID) Symbols and Legends in Appendix 7.2 of the Dangerous Waste Permit (DWP).

Submitted by Co-Operator:

D. M. Busche 3/23/12 Date

Reviewed by ORP Program Office:

D. L. Noyes 4/24/12 Date

Quarter Ending June 30, 2012

24590-WTP-PCN-ENV-09-003

Hanford Facility RCRA Permit Modification Notification Form

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

Description of Modification:

The purpose of this Class 1 modification is to update the WTP P&ID Symbols and Legends in Appendix 7.2 of the DWP. The 8 permit P&IDs incorporated into the DWP are being replaced with the 8 source P&IDs as indicated in the table below:

Appendix 7.2			
Replace:	24590-WTP-M6-50-P0001, Rev. 2	With:	24590-WTP-M6-50-00001, Rev. 4
	24590-WTP-M6-50-P0002, Rev. 2		24590-WTP-M6-50-00002, Rev. 4
	24590-WTP-M6-50-P0003, Rev. 2		24590-WTP-M6-50-00003, Rev. 4
	24590-WTP-M6-50-P0004, Rev. 2		24590-WTP-M6-50-00004, Rev. 4
	24590-WTP-M6-50-P0005, Rev. 2		24590-WTP-M6-50-00005, Rev. 4
	24590-WTP-M6-50-P0006, Rev. 2		24590-WTP-M6-50-00006, Rev. 5
	24590-WTP-M6-50-P0007, Rev. 0		24590-WTP-M6-50-00007, Rev. 3
	24590-WTP-M6-50-P0008, Rev. 0		24590-WTP-M6-50-00008, Rev. 3

The referenced P&IDs have been revised and incorporate changes provided in applicable document change forms (e.g., DCN, etc.) since the issuance of the last revision of the permitted drawing. This modification requests Ecology approval and incorporation into the permit, the specific changes to these P&IDs that are indicated by the last note in each drawing, clouds, and revision triangles. Revisions are the result of ongoing design changes. The following identifies the types of changes on the attached document:

- Editorial changes to Abbreviations
- Editorial changes to Notes and General Notes
- Editorial changes to drawing symbols
- Editorial changes to typical control valve arrangements

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

24590-WTP-M6-50-00001

- 24590-WTP-M6LN-50-00002

24590-WTP-M6-50-00002

- 24590-WTP-M6LN-50-00002
- 24590-WTP-M6LN-M80T-00002
- 24590-WTP-M6N-50-00052

24590-WTP-M6-50-00003

- 24590-WTP-M6LN-50-00002
- 24590-WTP-M6N-50-00056

24590-WTP-M6-50-00004

- 24590-WTP-M6LN-50-00002
- 24590-WTP-M6LN-50-00003
- 24590-WTP-M6N-50-00056

Quarter Ending June 30, 2012

24590-WTP-PCN-ENV-09-003

24590-WTP-M6-50-00005

- 24590-WTP-M6LN-50-00002
- 24590-WTP-M6LN-50-00003
- 24590-WTP-M6N-50-00056

24590-WTP-M6-50-00008

- 24590-WTP-FC-P-11-0716
- 24590-WTP-M6N-50-00064

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

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

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

A.1. Administrative and informational changes

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

Reason for denial:

Reviewed by Ecology:

Annette Carlson 5-24-12

A. Carlson Date

24590-WTP-M6-50-00001

PUMPS

- AIR DRIVEN PUMP
- CENTRIFUGAL PUMP
- HAND PUMP
- MOTOR DRIVEN DIAPHRAGM PUMP
- VACUUM PUMP
- POSITIVE DISPLACEMENT PUMP
- ROTARY PUMP
- VERTICAL PUMP
- PERISTALTIC PUMP
- VERTICAL CAN PUMP
- SUMP PUMP
- JET PUMP (AIR LIFT)
- REVERSE FLOW DIVERTER (RFD) PUMP
- EJECTOR/EDUCTOR
- AXIAL FLOW PUMP
- AXIAL FLOW PUMP W/ FAN
- SUBMERSIBLE SUMP PUMP
- INLINE/ CONDENSATE PUMP
- GEAR PUMP
- ADS PUMP
- AIR OR STEAM DRIVEN CONDENSATE RETURN PUMPING TRAP
- ELECTRIC CONDENSATE RETURN PUMP SET (DUPLEX PUMPS SHOWN)

TANKS AND VESSELS

- LINED SUMP (NOTE 4)
- UNLINED SUMP (NOTE 3)
- FLAT TOP TANK
- TANK CONICAL BOTTOM
- TANK CONE ROOF
- VESSEL
- DIAPHRAGM TYPE EXPANSION VESSEL WITH AIR CHARGING CONNECTION
- VESSEL
- JACKETED VESSEL
- DUAL JACKETED VESSEL
- EVAPORATOR VESSEL (SEPARATOR)
- SAMPLE POT
- LIFT POT
- PULSE POT
- BREAK POT
- SURGE VESSEL
- CLOSED LIQUID SEAL POT
- OPEN LIQUID SEAL POT
- SEPARATOR (AIR OR STEAM)

COMPRESSORS

- CENTRIFUGAL COMPRESSOR
- POSITIVE DISPLACEMENT COMPRESSOR
- ROTARY SCREW COMPRESSOR
- AIR AMPLIFIER COMPRESSOR

MISCELLANEOUS EQUIPMENT

- PULSE JET MIXER (PJM)
- JET MIXER
- MIXER / AGITATOR
- VORTEX BREAKER
- ULTRAFILTER OR REVERSE OSMOSIS UNIT
- AIR COOLED CONDENSER
- AIR BLOWN COOLER/CONDENSER
- CARTRIDGE FILTER
- GAS BOTTLE
- SILENCER

EQUIPMENT NOZZLES

BLIND FLANGED — FLANGED — WELDED

MAINTENANCE ACCESS/MANWAY (FLANGED) (WELDED SHUT)

- ELECTROSTATIC PRECIPITATOR
- WALL BOX / FLOOR BOX / BULKHEAD / MODULE PENETRATION (ONE OR MANY PIPE(LINES) NOTES 6, 7, 8)
- ROTATING SPRAY NOZZLE
- ELECTRIC MOTOR
- ADJUSTABLE SPEED DRIVE
- SPECIALITY ITEM
- 3-WAY JUMPER SPARE SHOWN SHADED
- RIGID JUMPER (DUAL OR MULTIPLE ENDS)
- FLEXIBLE JUMPER (DUAL OR MULTIPLE ENDS)
- BLIND/SPARE JUMPER
- ELECTRICAL JUMPER
- PNEUMATIC JUMPER
- P JOGGLE

WBOX, FBOX NUMBER OR P JOGGLE NUMBER (JOGGLE PENETRATION) NOTE 10

NOTE 10 (P JOGGLE) — NOTES 10, 14 (WBOX)

MISCELLANEOUS EQUIPMENT (CONT.)

- LEAK DETECTION BOX
- DEMISTER
- PJM HIGH EFFICIENCY MIST ELIMINATOR (HEME)
- HLW HIGH EFFICIENCY MIST ELIMINATOR (HEME)
- MOISTURE SEPARATOR
- MIST ELIMINATOR
- RESIN SHIPPING CONTAINER
- LAW CAUSTIC SCRUBBER
- PTF CAUSTIC SCRUBBER
- TRANSFORMER
- ELECTRIC HEAT COIL
- LAW HEATER
- LAW OFFGAS PREHEATER
- PTF SPENT RESIN DEWATERING DISPOSAL TRANSPORT CASK

MISCELLANEOUS EQUIPMENT (CONT.)

- COOLING PANEL
- CYCLONE SEPARATOR
- SCREEN/ CATALYTIC BED
- LAW WET ELECTRO-STATIC PRECIPITATOR (WESP)
- HLW WET ELECTRO STATIC PRECIPITATOR (WESP)
- PACKED FILTER
- HLW CARBON ABSORBER

COLUMNS

- SILVER MORDENITE COLUMN
- DISTILLATION COLUMN
- TRAY COLUMN
- PACKED COLUMN
- ION EXCHANGE COLUMN

HEAT EXCHANGERS

- SHELL AND TUBE/ SPIRAL HEAT EXCHANGER (NOTE 5)
- U-TUBE HEAT EXCHANGER
- PLATE & FRAME EXCHANGER/ MORDENITE PREHEATER (FLOW PATHS MAY BE SHOWN FOR CLARITY AS DASHED LINES)
- CONCENTRIC PIPE HEAT EXCHANGERS
- REBOILER
- AFTERCOOLER
- SAMPLE COOLER (CONDENSER)
- COOLER/VAPORIZER COIL
- HEATING/COOLING COIL
- WATER COOLED CENTRIFUGAL CHILLER
- STEAM DESUPERHEATER
- THERMAL OXIDIZER

MELTER AND RELATED EQUIPMENT

- HLW CANISTER
- LAW CONTAINER
- FEED COOLER
- LAW CONTAINER TURNTABLE

NOTES:

1-3. DELETED

4. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.

5. MULTI-PASS HEAT EXCHANGERS MAY BE SHOWN WITH SPLIT CHANNEL(S).

6. PIPING WITHIN WALL MODULES HAS THE SAME SEISMIC CATEGORY AND QUALITY LEVEL AS THE ATTACHED PIPE.

7. BULKHEAD STRUCTURES ARE SEISMIC CATEGORY SC-II AND QUALITY LEVEL Q.

8. THESE ITEMS ARE NOT LISTED IN THE COMPONENT INFORMATION SYSTEM (CIS) AND ARE SHOWN FOR CONSTRUCTION REFERENCE ONLY.

9. SHOWN AS COVERED (GRATE OR OTHER) SUMP.

10. THE GEOMETRY OF JOGGLED (OFFSET) PENETRATION IS QUALITY LEVEL Q FOR RADIATION PROTECTION. THE QUALITY LEVEL AND SEISMIC CATEGORY DESIGNATIONS OF PIPING WITHIN JOGGLES ARE THE SAME AS CONNECTING PIPING UNLESS OTHERWISE SHOWN OR NOTED. PIPING WITHIN SPARE JOGGLES IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I.

11. INSULATED VESSEL/TANK/HEAT EXCHANGER. REFER TO INDIVIDUAL P&ID FOR INSULATING THICKNESS WHERE REQUIRED.

12. THE NUMBER IN PARENTHESIS AT THE JUMPER BREAK IS THE HOT CELL AREA NUMBER AND THE ADJACENT NUMBER IS THE PIPING ISOMETRIC/JUMPER SUPPORT FRAME INTERFACE NOZZLE NUMBER.

13. REVISION 3 REVISED TO INCORPORATE 24590-WTP-MSN-50-00039 REVISED/ADDED EQUIPMENT INSULATION NOZZLES, ULTRAFILTER OR REVERSE OSMOSIS UNIT NOTES AND MINOR EDITORIAL COMMENTS.

14. ALTERNATE SYMBOLOGY FOR 3-WAY JUMPER SINGLE PORT (A, B, OR C) AS SHOWN. FOR 3-WAY JUMPER NUMBER, SEE ASSOCIATED SYSTEM BLOCK DIAGRAM (FLOWSHEETS DRAWINGS).

15. REVISION 4 REVISED TO INCORPORA L 24590-WTP-MSN-50-00041 AND 00049 REVISED/ADDED NOTES, DIAPHRAGM TYPE EXPANSION VESSEL, PNEUMATIC JUMPER, AND MINOR EDITORIAL CHANGES.

4	REVISED TO NOTE 13				
3	REVISE FOR NOTE 13				
2	SHEET 1 OF 10				
REV	DESCRIPTION				DATE

REVISION HISTORY

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

P&ID SYMBOLS AND LEGEND SHEET 1 OF 8

24590-WTP-M6-50-00001

REV 4

VALVES

NORMALLY OPEN — NOTE 13 — NORMALLY CLOSED

- GATE VALVE
- GLOBE VALVE
- BALL VALVE
- PLUG VALVE
- STOP CHECK VALVE
- DIAPHRAGM VALVE
- ANGLE PLUG VALVE
- ANGLE VALVE
- NEEDLE VALVE
- CIRCUIT SETTER/BALANCING VALVE (NOTE 19)
- HYDRONIC BALANCING VALVE
- CHECK VALVE
- CHECK VALVE, SPRING LOADED
- EXCESS FLOW CHECK VALVE
- FOOT CHECK VALVE
- FLOAT VALVE
- PINCH VALVE
- BUTTERFLY VALVE (NOTE 14)
- ANGLE CHECK VALVE
- 3-WAY MIXING GATE VALVE
- 3-WAY PLUG VALVE (NOTE 11)
- 3-WAY BALL VALVE (NOTE 11)
- 3-WAY GATE SPLITTER VALVE
- 4-WAY PLUG VALVE (NOTE 12)
- 4-WAY BALL VALVE (NOTE 12)
- PRESSURE RELIEF VALVE (SEE 24590-WTP-M6-50-00003)
- VACUUM RELIEF VALVE (SEE 24590-WTP-M6-50-00003)
- AIR FLOW
- NOTE 10 — FC - VALVE FAILS CLOSED (SHOWN); FI - VALVE FAILS INDETERMINATE
- NOTE 15 — FL - VALVE FAILS LAST POSITION; FO - VALVE FAILS OPEN (NOTE 14)
- NOTE 10 / NOTE 15 — CONTROL VALVE W/HANDWHEEL; FC - VALVE FAILS CLOSED (SHOWN)
- MULTIWAY DIVERTER VALVE WITH PISTON ACTUATOR
- STANDARD DIVERTER VALVE WITH PISTON ACTUATOR
- ROTARY VALVE
- 2 WAY DIVERTER VALVE W/PISTON ACTUATOR

VALVES (CONT.)

- INSTRUMENT ROOT VALVE (3/4" WHEN SHOWN ON THE PROCESS LINE AND 1/2" WHEN SHOWN ON THE INSTRUMENT LINE). PIPING IS RESPONSIBLE FOR UP TO AND INCLUDING ROOT VALVE.
- SHOWN IN VALVE DETAILED
- GLOBE VALVE WITH SEAL
- SLIDE VALVE
- VACUUM BREAKING VALVE, CHECK DRIP, CHECK VALVE WITH AUTOMATIC DRAIN
- HIGH PRESSURE/TEMPERATURE THREE WAY ROOT VALVES

IN-LINE ITEMS

- WYE / LATERAL
- Y-STRAINER
- BASKET STRAINER
- DUPLEX STRAINER
- START-UP STRAINER/ PILGRIM HAT STRAINER
- SCREEN STRAINER
- T-TYPE STRAINER
- REMOVABLE SPOOL PIECE
- REMOVABLE FLEXIBLE CONNECTION
- SCREWED CAP
- WELDED CAP
- BREATHABLE CAP
- VICTAULIC CAP
- VICTAULIC FITTING
- CONCENTRIC REDUCER
- (NOTE 18)
- ECCENTRIC REDUCER
- (NOTE 18)
- EXPANSION JOINT/ BELLOWS
- (IF OR ITC NOTE 21)
- INSULATING FLANGES OR INSULATING FREADED CONNECTOR (AS REQ'D)
- FLANGE - BLINDS
- UNION
- RESTRICTION ORIFICE (RO)
- HOSE CONNECTION
- HOSE COUPLER
- FLEX HOSE/ HOSE ASSEMBLY
- QUICK DISCONNECT
- IN-LINE FILTER
- IN-LINE TRAP
- IN-LINE MIXER
- MIXING TEE
- SPARK/FLAME ARRESTOR
- UV STERILIZER
- PUMP SUCTION DIFFUSER
- DEMISTER
- (CLOSED) — (OPEN) — SPECTACLE BLIND

VENT/DRAIN COMPONENTS

- VENT
- VENT WITH FLAME TRAP AND HOODER
- VENT WITH MESH GUARD
- AUTOMATIC VENT
- VACUUM BREAKER OR PRESSURE/VACUUM BREAKER
- FLOOR DRAIN (WITH STRAINER)
- FLOOR DRAIN (OPEN)
- FLOOR DRAIN (PLUGGED)
- WSIP/DRAIN (WITH DOUBLE STRAINER SHOWN FOR BLADE AND SAMPLER)
- FLOOR SEAL/P-TRAP (LEFT)
- WATER HAMMER ARRESTOR
- CUPSINK
- FILL FUNNEL

FLOW LINES

- PRIMARY FLOW
- SECONDARY FLOW
- DRAIN LINE
- INSULATED LINE
- INSULATED AND HEAT TRACED LINE
- COAXIAL LINE FOR SECONDARY CONTAINMENT
- HEAT TRACED PRIMARY FLOW WITHOUT INSULATION
- BURIED

BOUNDARIES

- PIPELINE BREAK

USE PIPELINE BREAKS TO INDICATE TRANSITIONS IN:
- PIPING MATERIAL CLASS SPECIFICATION
- ABOVE GROUND / UNDERGROUND PIPING
- HOT CELL / BLACK CELL PIPING
- VENDOR / BECHTEL SCOPE CHANGE INTERFACE
- OTHER PIPELINE ATTRIBUTES (SEE ABBREVIATIONS FOR APPROPRIATE NOTATION)

- QUALITY LEVEL (Q, QM)
- SEISMIC CATEGORY (I, II, III, IV, V)

REFERENCE TO EQUIPMENT OR COMPONENT SHOWN ON ANOTHER DRAWING

- EQUIPMENT SKID OR VENDOR PACKAGE (NOTE 9)
- FIRE AREA BOUNDARY
- GRAYSCALE

NAMING CONVENTIONS

DRAWING NUMBERS

24590-WTP-M6-50-00002

- RWP-WTP KIN NUMBER
- FACILITY
- DOCUMENT TYPE
- SYSTEM LOCATOR
- DRAWING SEQUENTIAL NUMBER
- DRAWING SHEET NUMBER (AS APPLICABLE)

EQUIPMENT NUMBERS

HX-00001

- SYSTEM LOCATOR
- COMPONENT IDENTIFIER
- SEQUENCE NUMBER

PIPELINE/BRANCH NUMBERS

- SECTION NUMBER
- (NORMALLY NOT SHOWN)
- SYSTEM LOCATOR
- FLUID SERVICE
- SEQUENCE NUMBER
- PIPE SPEC
- PIPE SIZE
- BRANCH NUMBER (AS APPLICABLE)

- SECTION NUMBER
- (NORMALLY NOT SHOWN)
- PIPE SIZE
- BRANCH NUMBER

PIPING SPECIALTY NUMBERS

- SYSTEM LOCATOR
- COMPONENT IDENTIFIER
- SEQUENCE NUMBER

VALVE NUMBERS

- SYSTEM LOCATOR
- COMPONENT IDENTIFIER
- SEQUENCE NUMBER

ROOT VALVE NUMBERS

NOTE 8

- COMPONENT IDENTIFIER
- SEQUENCE NUMBER

IN LINE COMPONENT NUMBERS

- SYSTEM LOCATOR
- COMPONENT IDENTIFIER
- SEQUENCE NUMBER

OFF SHEET CONNECTOR

SERVICE DESCRIPTION ORIGIN/DESTINATION

- DRAWING COORDINATES
- DRAWING SHEET NUMBER (AS APPLICABLE)
- DRAWING SEQUENTIAL NUMBER
- SYSTEM LOCATOR
- DOCUMENT TYPE
- FACILITY

SAFETY

- EYE WASH
- SHOWER/EYE WASH

FANS AND BLOWERS

- CENTRIFUGAL FAN
- BLOWER

HUMIDIFIERS

- S - LOW PRESSURE STEAM GRID (SHOWN)
- S - STEAM PAN
- H - HOT WATER PAN
- E - ELECTRIC PAN
- W - WATER

COILS

- H - HEATING COIL (SHOWN)
- PH - PRE HEATING COIL
- HW - HOT WATER (SHOWN)
- S - STEAM
- E - ELECTRIC
- G - GAS
- HR - HEAT RECOVERY
- C - COOLING COIL (SHOWN)
- CHW - REFRIG COOLED CHILLED WATER (SHOWN)
- CW - COOLING WATER
- DX - REFRIGERANT DIRECT EXPANSION

IN-BLEED

- IN-BLEED UNIT

AIR CLEANING DEVICES

- LOW — AIR FLOW — LOW EFFICIENCY ROUGHING FILTER 20% TO 35% EFFICIENCY BY ASHRAE WEIGHT TEST (SHOWN)
- MOD — AIR FLOW — MODERATE EFFICIENCY FILTER 20% TO 80% EFFICIENCY BY ASHRAE STAIN TEST
- HIGH — AIR FLOW — HIGH EFFICIENCY FILTER 85% EFFICIENCY BY ASHRAE STAIN TEST TO 99% EFFICIENCY FOR 0.30 MICROMETER DOP
- HEPA — AIR FLOW — HIGH EFFICIENCY PARTICULATE AIR FILTER 99.97% EFFICIENCY FOR 0.30 MICROMETER DOP
- OR — AIR FLOW — (NUMBER OF FILTER ELEMENTS IN HOUSING)
- ULPA — AIR FLOW — ULTRALOW PENETRATION AIR FILTER 99.999% EFFICIENCY FOR 0.12 MICROMETER DOP

DAMPERS

- LOUVER DAMPER

NOTES

1. DELETED
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3-6. DELETED
7. DELETED
8. ROOT VALVE SYSTEM IDENTIFIER IS NOT SHOWN BUT SHALL MATCH THE SAME SYSTEM IDENTIFIER AS THE LINE NUMBER IT IS ATTACHED TO.
9. EQUIPMENT SKID OR VENDOR PACKAGE DESIGNED BY VENDOR WILL INDICATE THIS LINE STYLE (BY VENDOR PACKAGE OR VENDOR AND BECHTEL WITH APPROVAL FOR EXAMPLE). SKID OR PACKAGE TO BE DESIGNED BY BECHTEL WILL NOT INDICATE VENDOR WILL SHOW BOUNDARY LINE ONLY.
10. VALVE EITHER DIAPHRAGM OR PISTON ACTUATED.
11. 3-WAY VALVES ARE SHOWN WITH ONE PATH NORMALLY CLOSED.
12. 4-WAY VALVES ARE SHOWN WITH TWO PATHS NORMALLY CLOSED.
13. DRAIN VALVES ARE SHOWN ON P&ID'S AS HALF SIZE.
14. BUTTERFLY VALVE SHALL BE DESIGNATED NO (NORMALLY OPEN) OR NC (NORMALLY CLOSED) LO (LOCKED OPENED) OR LC (LOCKED CLOSED).
15. DISPLAY VALVE SIZE WHEN VALVE IS DIFFERENT THAN THE INTERFACING PIPING.
16. CONTROL VALVE FAIL POSITION TO BE SHOWN ON ALL P&ID'S.
17. REVISION 1 REVISED TO INCORPORATE 24590-WTP-M6-50-00039 AND CONTAINS ADDED NOTES, VACUUM BREAKING VALVE/CHECK VALVE WITH AUTOMATIC DRAIN SYMBOL, SHEET NUMBER TO OFF SHEET CONNECTOR SYMBOL AND DRAWING NUMBER UNDER NAMING CONVENTIONS, REVISED ROOT VALVES DETAIL TO SHOW DETAILED AND SIMPLIFIED ROOT VALVES AND MINOR EDITORIAL CHANGES.
18. A CONNECTING PIPE SHALL BE REQUIRED BETWEEN REDUCERS AND EQUIPMENT (E.G., TO EXCEED 2 INCHES IN DIAMETER) OR IN THE EQUIPMENT CONNECTIONS (NOT TO EXCEED 12 INCHES IN LENGTH OR 15 PIPE DIAMETERS, WHICH EVER IS GREATER) NEED NOT BE SHOWN ON P&IDS AND LINE LISTS. DESIGN PRESSURE, TEMPERATURE, MATERIAL, INSULATION TYPE AND PAINT CODE SHALL BE THE SAME AS THE ADJACENT CONNECTING PIPE SHOWN ON THE P&ID AND REPRESENTED IN THE LIST. THE INSULATION THICKNESS OF THE CONNECTING PIPE MAY BE AS REQUIRED FOR THE PIPE SIZE OR MAY BE THE SAME THICKNESS AS THE ADJACENT CONNECTING PIPE. SEE DWG 24590-WTP-50-00002 FOR IN-LINE FLOW DEVICES STRAIGHT PIPE REQUIREMENTS.
19. TO RETAIN CALIBRATED ACCURACY A MINIMUM LENGTH OF UNRESTRICTED 5 PIPE DIAMETERS OF STRAIGHT PIPE UPSTREAM AND 2 PIPE DIAMETERS OF STRAIGHT PIPE DOWNSTREAM OF THE VALVE SHALL BE MAINTAINED.
20. VALVE BODY SYMBOL MAY BE SHOWN USING A GENERAL VALVE SYMBOL (WATER) IN ACCORDANCE WITH ISA S5.1, SECTION 8.4) OR THE VALVE BODY SYMBOL MAY BE SHOWN AS THE SPECIFIC PURCHASED TYPE (I.E., BALL, NEEDLE, ETC.). VALVES MAY BE SHOWN NORMALLY CLOSED IF THE INSTRUMENT IS NOT CONTINUALLY IN USE.
21. INSULATING FLANGE KIT HARDWARE OF EQUAL OR BETTER THAN SPEC FLANGE HARDWARE MAY BE USED IN LIEU OF A SPEC FLANGE HARDWARE.
22. REVISION 4 REVISED TO INCORPORATE 24590-WTP-M6N-50-00045 (00050 AND FURTHER REVISES REVISED/ADDED/DELETED NOTES, DRAWING TABLE, INSULATING THREADED CONNECTOR, ADDED WAY ROOT VALVES, BACKFLOW PREVENTER AND HIGH PRESSURE/TEMPERATURE THREE WAY ROOT VALVES FROM SHEET 4 AND MINOR EDITORIAL CHANGES.

BACKFLOW PREVENTER

NOTE 20

- WATER SUPPLY
- SUPPLY
- RETURN
- VENDOR PACKAGE
- SIMPLIFIED PIPE

DRAWING TABLE

DRAWING INDEX	
DWG NO	TITLE

REVISION HISTORY

4	REVISED PER NOTE 22		
3	REVISED PER NOTE 17		
2	SHEET 2 OF 8		
1			
0	ORIGINAL		
REV	DESCRIPTION	BY	DATE

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

COMPANY NO. — PROJECT DRAWING NO.

ORIGINATOR — CHECKED — APPROVED — DATE

P&ID SYMBOLS AND LEGEND SHEET 2 OF 8

SCALE — DWG NO. 24590-WTP-M6-50-00002 — REV. 4

INSTRUMENT DISCRETE DEVICE SYMBOLS

INSTRUMENT OR DEVICE TYPE	INSTRUMENT OR DEVICE LOCATION: FIELD MOUNTED (NO PANEL)	FIELD MOUNTED (ON PANEL)	ANY CONTROL ROOM (MAIN, FACILITY, STAND-BY)
HARDWARE			
CONTINUOUS SOFTWARE			
DISCRETE SOFTWARE			

NOTE: FOR INSTRUMENT FUNCTION CODE OR LOOP NUMBER THAT OVERLAPS THE DISCRETE DEVICE SYMBOL, THE DEVICE SYMBOL MAY BE NOTCHED (BROKEN) FOR CLARITY AS SHOWN.

INSTRUMENT LINE SYMBOLS

- INSTRUMENT SUPPLY OR CONNECTION TO PROCESS
- PNEUMATIC SIGNAL
- ELECTRIC SIGNAL
- HYDRAULIC SIGNAL
- CAPILLARY TUBE
- RADAR, SONIC SIGNAL, OR CONDUCTIVITY PROBE
- RADAR OR SONIC SIGNAL (NOT GUIDED)
- INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK)
- MECHANICAL LINK

FUNCTION SYMBOLS (NOTE 3, POSITION J3)

- INTEGRATE
- SQUARE ROOT EXTRACTOR
- GAIN (OR ATTENUATE (INPUT/OUTPUT))
- ADD OR SUMMATION
- AVERAGE
- DIFFERENCE
- DIVIDE
- MULTIPLY
- CHARACTERIZE
- LOW SELECTOR
- HIGH SELECTOR
- BIAS
- REVERSE
- DIRECT
- MATHEMATIC CALCULATION FUNCTION
- SELECT

TYP. INSTRUMENT TO PROCESS CONNECTIONS (ANY VARIABLES)

- DIRECT CONNECTION
- IN-LINE DEVICE
- ELECTROMAGNETIC OR SONIC
- DIRECT CONNECTION WITH PURGE (AIR) NOTE 19
- ATTACHED TO PROCESS PIPE BUT DOES NOT PENETRATE

MISCELLANEOUS SYMBOLS AND EXAMPLES

- PILOT LIGHT
- SIGNAL CONTINUATION. ON THE SAME DRAWING, THE POINTER ON THE CIRCLE INDICATES THE DIRECTION THE PAIR POINTS ON THE DRAWING
- DAMPENER
- CCTV CAMERA
- HORN (NOTE 16)
- LIGHT
- INTERLOCK
- SAFETY SYSTEM INTERLOCK (SIS OR SIL)

FLOW (NOTE 19)

- FLOW ORIFICE WITH DIFFERENTIAL TYPE FLOW TRANSMITTER (CORNER TAPS, FLANGE TAPS OR PIPE TAPS) (SEE 24590-WTP-M6-50-00004)
- VENTURI TUBE OR FLOW NOZZLE WITH DIFFERENTIAL TYPE FLOW TRANSMITTER
- SINGLE PORT PITOT OR PITOT - VENTURI TUBE WITH DIFFERENTIAL TYPE FLOW TRANSMITTER
- AVERAGING PITOT TUBE WITH DIFFERENTIAL TYPE FLOW TRANSMITTER
- (LOCAL ONLY)
- POSITIVE DISPLACEMENT FLOW METER
- NOTE 17: TURBINE OR PROPELLER TYPE FLOW TRANSMITTER
- NOTE 17: SWIRL METER
- NOTE 17: SWIRL METER WITH FLOW ELEMENT
- VARIABLE AREA FLOW INDICATOR WITH INTEGRAL VALVE
- VARIABLE AREA FLOW TRANSMITTER WITH INTEGRAL VALVE
- VARIABLE AREA FLOW INDICATOR WITHOUT INTEGRAL VALVE
- VARIABLE AREA FLOW TRANSMITTER WITHOUT INTEGRAL VALVE
- NOTE 17: MAGNETIC TYPE FLOW TRANSMITTER
- NOTE 17: MAGNETIC TYPE FLOW ELEMENT
- NOTE 17: CORIOLIS MULTI-VARIABLE TYPE FLOW TRANSMITTER
- NOTE 17: CORIOLIS TYPE FLOW ELEMENT
- NOTE 17: THERMAL TYPE FLOW ELEMENT (REPLACE FT WITH FS FOR SWITCH)
- FLOW SIGHT GLASS
- FLOW STRAIGHTENER
- INTEGRAL FLOW ORIFICE ASSEMBLY WITH DIFFERENTIAL TRANSMITTER (ONE SINGLE UNIT)

LEVEL

- GAUGE GLASS EXTERNAL FLOAT OR DISPLACEMENT TYPE LEVEL INSTRUMENT
- DIFFERENTIAL PRESSURE PRESSURIZED TANK
- DIFFERENTIAL PRESSURE ATMOSPHERIC TANK (NOTE 4)
- DIFFERENTIAL PRESSURE LEVEL MEASUREMENT INVERTED TYPE
- TYPE MOUNTED ON SIDE OF TANK INTERNAL FLOAT DISPLACER
- TYPE MOUNTED ABOVE TANK (NUMBER OF DISPLACERS OPTIONAL) INTERNAL FLOAT OR DISPLACER
- PROBE TYPE (UTP TUBE, CONDUCTIVE, CAPACITANCE ETC) MOUNTED ABOVE TANK (NUMBER OF PROBES IS OPTIONAL)

PRESSURE

- SIMPLIFIED P&ID — DIRECT CONNECTED
- DIRECT CONNECTED
- CAPILLARY FILLED SYSTEM WITH REMOTE DIAPHRAGM SEAL PIPE MOUNTED
- CAPILLARY FILLED SYSTEM WITH FLUSH MOUNTED DIAPHRAGM SEAL
- PRESSURE MONITOR WITH ATMOSPHERIC REFERENCE (APV)

TEST POINTS

- ANALYTICAL POINT NOTE 13
- FLOW POINT NOTE 13
- SAMPLE PROBE NOTE 13
- PRESSURE POINT NOTE 14
- TEMPERATURE POINT NOTES 13, 14
- TEMPERATURE & PRESSURE POINT NOTES 13, 14

SELF - ACTUATED DEVICES - PRESSURE

- PRESSURE REDUCING REGULATOR, SELF CONTAINED
- PRESSURE REDUCING REGULATOR WITH EXTERNAL PRESSURE TAP FOR 3" AND ABOVE NEEDING ROOT VALVE
- DIFFERENTIAL PRESSURE REDUCING REGULATOR, WITH INTERNAL AND EXTERNAL PRESSURE TAPS
- BACKPRESSURE REGULATOR SELF-CONTAINED
- BACKPRESSURE REGULATOR WITH EXTERNAL PRESSURE TAP FOR 3" AND ABOVE NEEDING ROOT VALVE
- PRESSURE RELIEF OR SAFETY VALVE (ANGLE PATTERN, SPRING OR WEIGHT-LOADED) OR WITH INTEGRAL PILOT
- VACUUM RELIEF VALVE (ANGLE PATTERN, SPRING OR WEIGHT-LOADED) OR WITH INTEGRAL PILOT
- RUPTURE DISK FOR VACUUM RELIEF
- RUPTURE DISK FOR PRESSURE RELIEF

SELF ACTUATED DEVICES-FLOW

- FLOW REGULATOR SELF-CONTAINED

SELF-ACTUATED DEVICES-LEVEL

- LEVEL REGULATOR WITH MECHANICAL LINKAGE

SELF-ACTUATED DEVICES-TEMPERATURE

- TEMPERATURE REGULATOR, FILLED-SYSTEM TYPE

SOLENOID OPERATED PILOT VALVE - TYPICAL SYMBOLS

MOTOR OPERATED ROTARY VALVE

ANALYSIS AND RADIATION

- FLOW THROUGH TYPE (EXAMPLE FOR OXYGEN ANALYZER)
- RETURN TO PROCESS
- SAMPLE DRAW TYPE
- RADIATION ALPHA BETA OR GAMMA MONITOR LIQUID PROCESS INDICATION (IN LINE)
- RADIATION GAMMA MONITOR LIQUID PROCESS INDICATION (ADJACENT TO LINE)

VALVES - ACTUATORS

- DIAPHRAGM SPRING OPPOSED
- DIAPHRAGM PRESSURE BALANCED
- ROTARY MOTOR (SHOWN TYPICALLY WITH ELECTRIC SIGNAL)
- PNEUMATIC CYLINDER SINGLE-ACTING, SPRING OPPOSED
- HYDRAULIC CYLINDER DOUBLE-ACTING
- PNEUMATIC CYLINDER DOUBLE-ACTING
- SINGLE SOLENOID
- SINGLE SOLENOID (SHOWN WITH MANUAL RESET)
- ELECTRO-HYDRAULIC
- ELECTRO-PNEUMATIC
- HAND ACTUATOR (MOUNTED AT TOP, SIDE OR BOTTOM OF ACTUATED DEVICE AS APPLICABLE)
- UNASSIGNED (TYPE OF ACTUATOR TO BE WRITTEN ADJACENT TO THE SYMBOL)
- VALVE WITH INTEGRAL ELECTRO-PNEUMATIC (E/P) POSITIONER
- PNEUMATIC CYLINDER SINGLE ACTING, SPRING OPPOSED (DUAL VALVE)

TEMPERATURE

- NOTE 8
- IN LINE TEMPERATURE ELEMENT WITH REMOTE TRANSMITTER
- NOTE 8
- IN LINE TEMPERATURE ELEMENT WITH INTEGRAL TRANSMITTER
- NOTE 8
- VESSEL
- VESSEL TEMPERATURE ELEMENT WITH TRANSMITTER
- NOTE 8
- LOCAL TEMPERATURE INDICATOR
- NOTE 8
- RESISTANCE TEMPERATURE DETECTOR (RTD) OR THERMOCOUPLE (T/C)
- SURFACE MOUNTED TEMPERATURE ELEMENT
- THERMOWELL

NOTES:

1. THE SYMBOLS AND LEGENDS SHOWN ARE BASED ON ISA STANDARD ANSI/ISA-5.1-1984 (R1992) INSTRUMENTATION SYMBOLS AND IDENTIFICATION AND STANDARD ISA-S5.3-1983 GRAPHIC SYMBOLS FOR DISTRIBUTED CONTROL/SHARED DISPLAY INSTRUMENTATION, LOGIC AND COMPUTER SYSTEMS.
2. DELETED
3. TEXT LOCATION AROUND INSTRUMENTATION SYMBOLS ARE:
   - J1 INSTRUMENT FUNCTION CODE (E.G. PDSH)
   - J2 UNIQUE LOOP NUMBER, TRANSPARENT FOR SOME SOFTWARE TAGS
     - F - FACILITY CONTROL ROOM (FHLW)
     - M - MAIN CONTROL ROOM (MHLW/PRT)
     - S - STANDBY CONTROL ROOM (SHLW)
   - J3 FUNCTION (E.G. PV, CV, OR DEVICE DESIGNATION, SEE POSITION J3 DESIGNATION TABLE ON DRAWING 24590-WTP-M6-50-00008)
   - J4 CIS GIN ASSOCIATES CIS DATABASE ENTRY WITH GRAPHIC UNIQUELY TRANSPARENT ON P&ID(s)
   - J5 ALPHA SYSTEM NUMBER NORMALLY NON-TRANSPARENT ON P&ID (EXCEPTION IS DIFFERENT SYSTEM DESIGNATOR ON A GIVEN SYSTEM P&ID)
   - J6 DEVICE DIGITAL BUS TECHNOLOGY
     - FF - FOUNDATION FIELD BUS
     - PB - PROFIBUS
   - NOTE X: A NOTE SHOULD BE ADDED IF THE INSTRUMENT PERFORMS AN AIR PURGE FUNCTION
4. THE UPPER IMPULSE LINE IS OMITTED IF LEVEL IS MEASURED USING ATMOSPHERIC PRESSURE AS REFERENCE.
5. NORMAL OPERATION MEANS PLANT EQUIPMENT IS IN OPERATING MODE FOR A CONTINUOUS OR BATCH PROCESS.
6. EXAMPLES OF USE OF TANGENTIAL INSTRUMENT CIRCLES TO DENOTE A SINGLE INSTRUMENT WITH TWO VARIABLES AND/OR TWO FUNCTIONS:
   - TWO VARIABLES - "T" FOR TOP BALLOON AND "P" IN THE BOTTOM - MULTI-VARIABLE VORTEX FLOW METER.
   - TWO FUNCTIONS - "L" FOR TOP BALLOON AND "LC" IN THE BOTTOM - A DUAL FUNCTION LEVEL INSTRUMENT, ONE A TRANSMITTER, ONE A CONTROLLER.
7. INSTRUMENT NUMBERS ON P&IDs USE THE INSTRUMENT FUNCTION CODE AND THE UNIQUE LOOP IDENTIFIER.
8. THERMOWELL INFERRED (NOT TO BE SHOWN)
9. MAIN CONTROL ROOM SYMBOLOGY SAME AS FOR INDIVIDUAL FACILITY CONTROL ROOM AND STAND-BY CONTROL ROOM.
10. THE FOLLOWING ABBREVIATIONS ARE SUGGESTED TO DENOTE THE TYPES OF POWER SUPPLY AND PURGE FLUID:
    - IS/AP/SA - AIR SUPPLY
    - NS - NITROGEN SUPPLY
    - ES - ELECTRIC SUPPLY
    - GS - GAS SUPPLY
    - WS - WATER SUPPLY
11. DELETED
12. RX - SHIELDING (IN THIS USAGE ONLY)
13. A TEST POINT IS A PROCESS CONNECTION TO WHICH NO INSTRUMENT IS PERMANENTLY CONNECTED, BUT WHICH IS INTENDED FOR TEMPORARY (INTERMITTENT OR FUTURE CONNECTION OF AN INSTRUMENT.
    - AP - ANALYTICAL POINT
    - PP - PRESSURE POINT
    - SW - SAMPLE PROBE
    - TP - TEMPERATURE POINT
    - NOTE: TP/PP MAY BE USED IN THE CASE OF A HOT TAP TESTING DEVICE WHERE NO THERMOWELL EXISTS (UTILITY SYSTEM ONLY) OR WHERE THERMOWELL USED FOR TEST POINT, IT MUST HAVE AN INSTRUMENT TAG
14. TEST POINTS NOT ASSOCIATED WITH AN INSTRUMENT TAG
15. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING
16. FOR OTHER AUDIBLE ALARM DEVICE REPLACE "HORN" WITH APPROPRIATE NAME OF DEVICE
17. FOR INSTRUMENTS WITH INTEGRAL TRANSMITTER THE "T" BUBBLE IS REMOVED AND THE LINE STYLE FROM SYMBOL TO "T" BUBBLE IS SOLID.
18. THE SOFTWARE TAGS WILL INDICATE THE ADDITIONAL PROCESS VARIABLES MONITORED BY TRANSMITTERS WITH MULTI VARIABLE OPTIONS.
19. DISPLAY FLOW DEVICE SIZE WHEN SIZE IS DIFFERENT THAN THE INTERFACING PIPING. SEE DWG 24590-WTP-M6-50-00017 FOR IN-LINE FLOW DEVICES STRAIGHT RUN REQUIREMENTS.
20. PCV, POCV, FCV, LCV, AND TCV VALVE BODY SYMBOL MAY BE SHOWN USING A GENERAL VALVE SYMBOL (ATE IN ACCORDANCE WITH ISA S5.1 SECTION 4.4 AND 8.6) OR THE VALVE BODY SYMBOL MAY BE SHOWN AS THE SPECIFIC PURCHASED TYPE (I.E. BALL, GLOBE ETC.)
21. REVISION 3 REVISED TO INCORPORATE 24590-WTP-MAN-50-00039 REVISED/DELETED/ADDED NOTES AND SYMBOLS UNDER FUNCTION SYMBOLS, CAPILLARY FILLED SYSTEM WITH DIAPHRAGM SEAL, INTERLOCKS, INSTRUMENT OR DEVICE LOCATION TABLE, ENHANCED DETAIL VERSION OF PRESSURE INSTRUMENT WITH ROOT VALVES, SOFTWARE OR DATA LINK LINE TYPES AND MINOR EDITORIAL CHANGES.
22. FOR CONTROL VALVES 3" AND ABOVE, THE PCV CONTROL LINE CONNECTED TO A STRAIGHT RUN OF PIPE 3 TO 5 FEET DOWNSTREAM OF THE PCV. THE PCV MUST HAVE 3 FEET OF STRAIGHT PIPE RUN ON BOTH SIDES OF THE CONTROL VALVE.
23. REVISION 4 REVISED TO INCORPORATE 24590-WTP-MAN-50-00044, -00046 AND TWR-FER REVISED. REVISED/DELETED/ADDED NOTES, INSTRUMENT SYMBOLS AND DESCRIPTION, AND PRESSURE MONITOR WITH ATMOSPHERIC REFERENCE.

REV.	DESCRIPTION	CHK	MGR	DATE
4	REVISED PER NOTE 23			8/6/07
3	REVISED PER NOTE 22			
2	REVISED PER NOTE 21			
1	REVISED PER NOTE 20			

REVISION HISTORY

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
BAY 15, EXCESS LABORATORY PLACE
RICHLAND, WA 99354

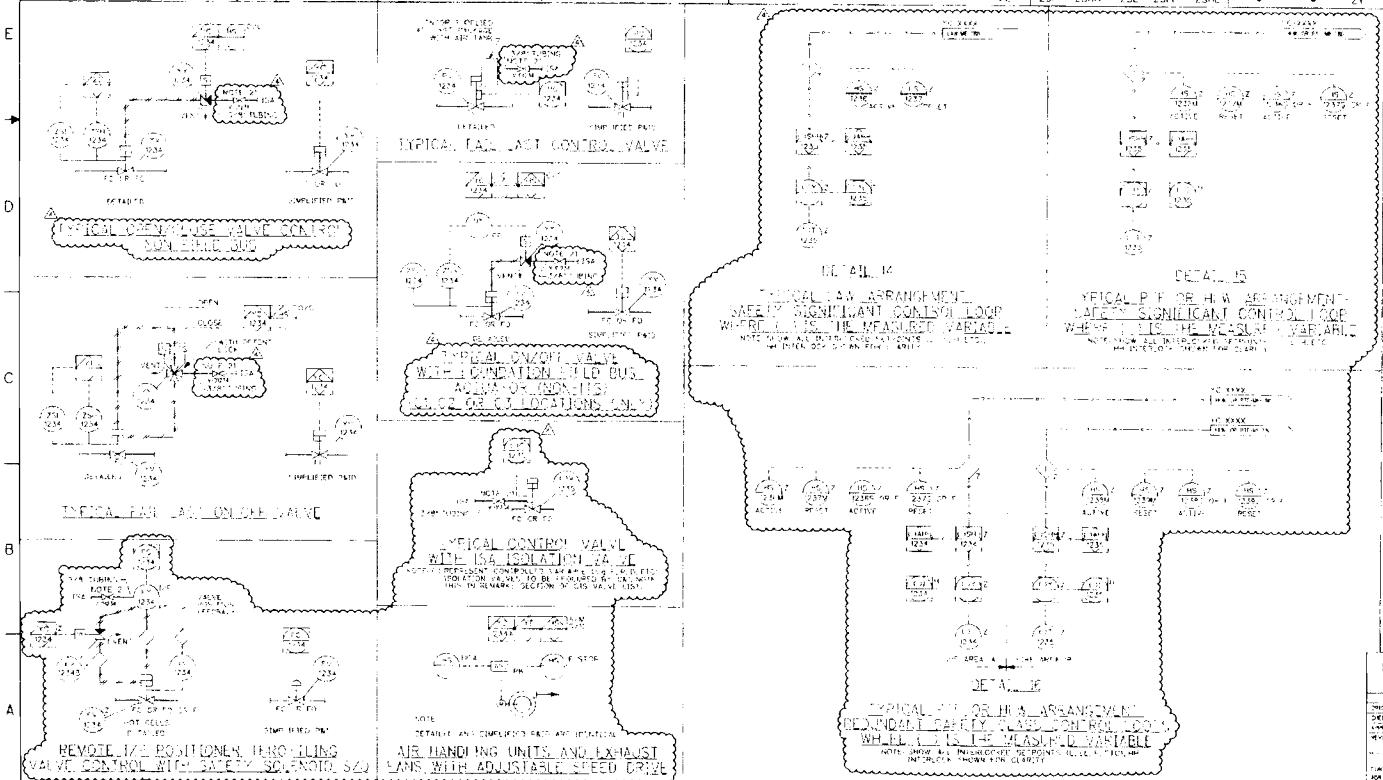
P&ID SYMBOLS AND LEGEND SHEET 3 OF 8

24590-WTP-M6-50-00003 REV 4

INSTRUMENT CODE LETTER IDENTIFICATION

FIRST LETTER — SUCCEEDING LETTERS (• FUNCTION IDENTIFIER COMBINATION IS NOT USED - NOTE 13)

MEASURED OR INITIATING VARIABLE (NOTE 1)	SYMBOL	SENSING DEVICE: PRIMARY ELEMENT	SENSING DEVICE: TRANSMITTER (NOTE 9)	DISPLAY DEVICE (NOTE 2): INDICATOR	RECORDER	INTEGRATING INDICATOR	ALARM: HIGH	ALARM: HIGH HIGH	ALARM: LOW	ALARM: LOW LOW	ALARM: HIGH LOW (COMB)	CONTROL DEVICE: CONTROL STATION	CONTROLLER (NOTE 15)	CONTROL DAMPER (NOTE 12)	SELF ACTUATED VALVE	CONTROL VALVE	FINAL CONTROL ELEMENT (NOTE 5)	SWITCH: HIGH	SWITCH: HIGH HIGH	SWITCH: LOW	SWITCH: LOW LOW	SWITCH: HIGH LOW (COMB)	MISCELLANEOUS DEVICE: LOCAL OBSERVATION GLASS	TEST POINT (NOTE 8)	RELAY/COMPUTE
TYPICAL SYMBOLS	( )	( )E	( )T	( )I	( )R	( )QI	( )AH	( )AHH	( )AL	( )ALL	( )AHL	( )K	( )C	( )D	( )CV	( )V	( )Z	( )SH	( )SHH	( )SL	( )SLL	( )SHL	( )G	( )P	( )Y
ANALYSIS (NOTE 3)	A	AE	AT	AI	AR	•	AAH	AAHH	AAL	AALL	AAHL	AK	AC	•	•	AV	AZ	ASH	ASHH	ASL	ASLL	ASHL	•	AP	AY
ANALYSIS DIFFERENTIAL	AD	•	•	ADI	•	•	ADAH	•	•	•	•	•	•	•	•	•	•	•	ADSHH	•	•	•	•	•	•
BURNER COMBUSTION (NOTE 7)	B	BE	BT	BI	BR	•	•	BAHH	BAL	BALL	•	•	BC	BD	•	•	•	BSH	BSHH	BSL	BSLL	BSHL	BG	BP	BY
CONDUCTIVITY	C	CE	CT	CI	CR	•	CAH	CAHH	CAL	CALL	CAHL	CK	•	•	•	CV	CZ	CSH	CSHH	CSL	CSLL	CSHL	•	CP	CY
DENSITY	D	DE	DT	DI	DR	•	DAH	DAHH	DAL	DALL	DAHL	DK	DC	•	•	DV	DZ	DSH	DSHH	DSL	DSLL	DSHL	•	DP	DY
VOLTAGE (EMF)	E	EE	ET	EI	ER	•	EAH	EAHH	EAL	EALL	EAHL	EK	EC	•	•	•	EZ	ESH	ESHH	ESL	ESLL	ESHL	•	•	EY
FLOW RATE (NOTE 6)	F	FE	FT	FI	FR	FQI	FAH	FAHH	FAL	FALL	FAHL	FK	FC	FD	•	FV	FZ	FSH	FSHH	FSL	FSLL	FSHL	FG	FP	FY
FLOW RATIO	FF	FE	FT	FFI	FFR		FFSH		FFSL			FFK	FFC		•			FFSH	FFSHH	FFSL	FFSLL	FFSHL			
HAND (MANUAL)	H	•	•	•	•	•	•	•	•	•	•	HK	HC	HD	HCV	HV	HZ	•	•	•	•	HS	•	•	HY
CURRENT	I	IE	IT	II	IR	•	IAH	IAHH	IAL	IALL	IAHL	IK	IC	•	•	•	IZ	ISH	ISHH	ISL	ISLL	ISHL	•	•	IY
POWER	J	JE	JT	JI	JR	JQI	JAH	JAHH	JAL	JALL	JAHL	JK	JC	•	•	•	JZ	JSH	JSHH	JSL	JSLL	JSHL	•	•	JY
TIME	K	•	KT	KI	•	KQI	KAH	KAHH	KAL	KALL	KAHL	•	KC	•	•	•	KZ	KSH	KSHH	KSL	KSLL	KSHL	•	•	KY
LEVEL	L	LE	LT	LI	LR	•	LAH	LAHH	LAL	LALL	LAHL	LK	LC	•	LCV	LV	LZ	LSH	LSHH	LSL	LSLL	LSHL	LG	LP	LY
MOISTURE	M	ME	MT	MI	MR	•	MAH	MAHH	MAL	MALL	MAHL	MK	MC	MD	•	MV	MZ	MSH	MSHH	MSL	MSLL	MSHL	•	MP	MY
PRESSURE OR VACUUM	P	PE	PT	PI	PR	•	PAH	PAHH	PAL	PALL	PAHL	PK	PC	•	PCV	PV	PZ	PSH	PSHH	PSL	PSLL	PSHL	•	PP	PY
PRESSURE DIFFERENTIAL	PD	•	PDT	PDI	PDR	•	PDAH	PDAHH	PDAL	PDALL	•	PDK	PDC	•	PDCV	PDV	PDZ	PDSH	PDSHH	PDSL	PDSLL	PDSHL	•	PP	•
QUANTITY OR EVENT	Q	QE	QT	QI	QR	QQI	QAH	QAHH	QAL	QALL	QAHL	QK	QC	•	•	•	QZ	QSH	QSHH	QSL	QSLL	QSHL	•	•	QY
RADIOACTIVITY	R	RE	RT	RI	RR	RQI	RAH	RAHH	RAL	RALL	RAHL	RK	RC	•	•	RV	RZ	RSH	RSHH	RSL	RSLL	RSHL	•	•	RY
SPEED OR FREQUENCY	S	SE	ST	SI	SR	•	SAH	SAHH	SAL	SALL	SAHL	SK	SC	•	•	•	SZ	SSH	SSHH	SSL	SSLL	SSHL	•	•	SY
TEMPRATURE	T	TE	TT	TI	TR	•	TAH	TAHH	TAL	TALL	TAHL	TK	TC	TD	TCV	TV	TZ	TSH	TSHH	TSL	TSLL	TSHL	•	TP	TY
TEMPERATURE DIFFERENTIAL	TD	•	•	TDI	TDR	•	TDAH	TDAHH	TDAL	TDALL	•	•	TDC	•	TDCV	TDV	TDZ	TDSH	TDSHH	TDSL	TDSLL	TDSHL	•	•	•
MULTI-VARIABLE	U	•	•	UI	UR	•	UAH	UAHH	UAL	UALL	UAHL	•	UC	•	•	UV	UZ	USH	USHH	USL	USLL	USHL	•	•	UY
VIBRATION/MACH ANALYSIS	V	VE	VT	VI	VR	•	VAH	VAHH	VAL	VALL	VAHL	VK	VC	•	•	•	VZ	VSH	VSHH	VSL	VSLL	VSHL	•	VP	VY
WEIGHT, FORCE, TORQUE	W	WE	WT	WI	WR	WQI	WAH	WAHH	WAL	WALL	WAHL	WK	WC	•	•	•	WZ	WSH	WSHH	WSL	WSLL	WSHL	•	•	WY
USER DEFINED (NOTE 10)	X	XE	XT	XI	XR	XQI	XAH	XAHH	XAL	XALL	XAHL	XK	XC	XD	•	XV	XZ	XSH	XSHH	XSL	XSLL	XSHL	XG	XP	XY
EVENT/STATE OR PRESENCE (NOTE 15)	Y	YE	YT	YI	YR	•	•	•	•	•	•	•	YC	•	•	YV	YZ	YSH	YSHH	YSL	YSLL	YSHL	•	YP	YY
POSITION (NOTE 4)	Z	ZE	ZT	ZI (L)	ZR	•	ZAH	ZAHH	ZAL	ZALL	ZAHL	•	ZC	•	•	•	ZZ	ZSH	ZSHH	ZSL	ZSLL	ZSHL	•	•	ZY



NOTES:

1. THE INSTRUMENT LEGEND IS BASED ON ISA-S5.1-1984, INSTRUMENTATION SYMBOLS AND IDENTIFICATION STANDARD (ISA). EXCEPTIONS SPECIFIC TO RPP-WTP ARE NOTED IN THIS LEGEND. REFER TO THE ISA STANDARD FOR FURTHER DETAILS AND CLARIFICATION. THE COMPONENT FUNCTIONAL IDENTIFIER FOR AN INSTRUMENT CONSISTS OF LETTERS DERIVED FROM THE INSTRUMENT LEGEND SHEET AND THESE NOTES. THE FIRST LETTER IS SELECTED ACCORDING TO MEASURED OR INITIATION VARIABLE. SUCCEEDING LETTERS IDENTIFY FUNCTIONS PERFORMED. MODIFYING LETTER MAY BE USED TO MODIFY EITHER A FIRST LETTER OR SUCCEEDING LETTERS AS APPLICABLE.
2. PILOT OR INDICATOR LIGHTS ARE NORMALLY NOT SHOWN ON P&IDs, ESPECIALLY THOSE LIGHTS ASSOCIATED WITH HAND SWITCHES. HOWEVER, THE FOLLOWING EXCEPTIONS APPLY:
   - WHEN A PILOT LIGHT IS PART OF AN INSTALLED LOOP, IT SHOULD BE DESIGNATED BY A FIRST LETTER, FOLLOWED BY THE SUCCEEDING LETTER "L".
   - STATUS INDICATOR LIGHTS ASSOCIATED WITH VALVE STATUS SWITCHES USED IN FIRE SYSTEM, MAY USE THE DESIGNATION "ZL".
   - SPECIFIC CASES WHERE THE PILOT LIGHT IS ESSENTIAL FOR EXPLAINING SPECIAL FUNCTION OR LOCATION OF THE LIGHT. ALSO USED AS VALVE LIMIT SWITCH INDICATION IN PROGRAMMABLE ELECTRONIC SYSTEM (PES).
3. WHEN "A" IS USED FOR ANALYSIS VARIABLES NOT ASSIGNED FIRST LETTER DESIGNATORS, THE FOLLOWING TERMS MAY BE PLACED OUTSIDE THE INSTRUMENT CIRCLE TO DENOTE THE SPECIFIC MEASURED VARIABLES, FOR EXAMPLE:
   - H - DISSOLVED HYDROGEN
   - NO_x - NITROGEN OXIDE
   - H_2 - GASEOUS HYDROGEN
   - pH - pH
   - Na - SODIUM
   - TRB - TURBIDITY
4. MODIFYING LETTERS "H" HIGH AND "L" LOW SHALL HAVE THE FOLLOWING MEANING (EXAMPLES GIVEN WITH POSITION SWITCH, ZS):
   - ZSH - HIGH, UP, RAISED, OPEN, EXTENDED, ON, ENERGIZED, VERTICAL, INFLATED.
   - ZSL - LOW, DOWN, LOWERED, CLOSED, RETRACTED, OFF, HORIZONTAL, DEFLATED.
5. THE LETTER "Z" WHICH FOLLOWS A MEASURED VARIABLE REPRESENTS FINAL CONTROL ELEMENT, OTHER THAN CONTROL VALVES, SUCH AS HYDRAULIC COUPLING, ADJUSTABLE SPEED MOTOR/DEVICE ETC.
6. "FO" DESIGNATES FLOW RESTRICTION ORIFICE.
7. BURNER/COMBUSTION "B" SHALL BE USED FOR ALL FIRE PROTECTION AND BURNER/COMBUSTION APPLICATIONS.
8. A TEST POINT IS A PROCESS CONNECTION TO WHICH NO INSTRUMENT IS PERMANENTLY CONNECTED, BUT WHICH IS INTENDED FOR TEMPORARY, INTERMITTENT, OR FUTURE CONNECTION OF AN INSTRUMENT.
9. TRANSMITTERS WILL BE PROVIDED WITH INTEGRAL INDICATORS AS SPECIFIED ON THE APPLICABLE INSTRUMENT DATA SHEET.
10. EXAMPLES OF EQUIPMENT USING "X" INCLUDE BAR CODE OR OPTICAL CHARACTER RECOGNITION (OCR) SYSTEMS, TELEVISION SYSTEMS, PHOTOCELL, ETC.
11. DELETED
12. THE DESIGNATION "D" REPRESENTS HVAC CONTROL DAMPERS.
13. ANY FIRST LETTER, WHEN COMBINED WITH MODIFYING LETTER "F" (RATIO), "M" (MOMENTARY), "Q" (TOTALIZER) OR "K" (TIME RATE OF CHANGE), REPRESENTS A SINGLE MEASURED VARIABLE AND IS CONSIDERED THE SAME AS A FIRST LETTER ONLY VARIABLE.
14. USING "X" AS A MODIFIER DESIGNATES AN ACCESSORY PURCHASED WITH AN INSTRUMENT SYSTEM, SUCH AS A SAMPLE CONDITIONING SYSTEM.
15. USE OF "C" (FOR A SUCCEEDING LETTER) IS PERMITTED FOR DIGITAL ON/OFF CONTROL FOR A "YC" TAG. IN ALL OTHER CASES "C" SHOULD BE RESERVED FOR PROPORTIONAL, DERIVATIVE, INTEGRAL (PID) TYPE FUNCTION.
16. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
17. DELETED
18. VALVE BODY SYMBOL MAY BE SHOWN USING A GENERAL VALVE SYMBOL (GATE) IN ACCORDANCE WITH ISA S5.1, SECTION 6.4; OR THE VALVE BODY SYMBOL MAY BE SHOWN AS THE SPECIFIC PURCHASED TYPE (i.e. BALL, NEEDLE, ETC.)
19. REVISION 3 REVISED TO INCORPORATE 24590-WTP-MBN-50-00039, 00040, 00041 AND TO SHOW THE ENHANCED VERSION OF TYPICAL OPEN/CLOSE VALVE CONTROL, TYPICAL FAIL LAST ON-OFF VALVE AND TYPICAL ON/OFF VALVE WITH FOUNDATION FIELD BUS ACTUATOR. REVISED/ADDED NOTES AND MINOR EDITORIAL CHANGES.
20. FOR THOSE FACILITIES WHICH USE PSA IN LIEU OF ISA, SUBSTITUTE AIR SUPPLY AS ISA WITH PSA.
21. ISA ISOLATION VALVE MAY BE LOCATED AT THE BRANCH, NEAR THE SOLENOID VALVE/INSTRUMENT DEVICE, OR IN THE INSTRUMENT RACK.
22. REVISION 4: REVISED TO ADD REMOTE I/P POSITIONER THROTTLING VALVE CONTROL WITH SAFETY SOLENOID S/D, AIR HANDLING UNITS AND EXHAUST FANS WITH ADJUSTABLE SPEED DRIVE, TYPICAL CONTROL VALVE WITH ISA ISOLATION VALVE DETAILS, AND ANALYSIS DIFFERENTIAL IN INSTRUMENT CODE LETTER IDENTIFICATION TABLE. REVISED/ADDED/DELETED DETAILS 14, 15, 16, NOTES, ISOLATION VALVE, PARALLEL ROOT VALVE DETAIL. HIGH PRESSURE/TEMPERATURE THREE WAY ROOT VALVES AND BACKFLOW PREVENTER WERE MOVED TO SHEET 2 AND MINOR EDITORIAL CHANGES.

REVISION HISTORY

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
RICHLAND, WA

P&ID
SYMBOLS AND LEGEND
SHEET 4 OF 8

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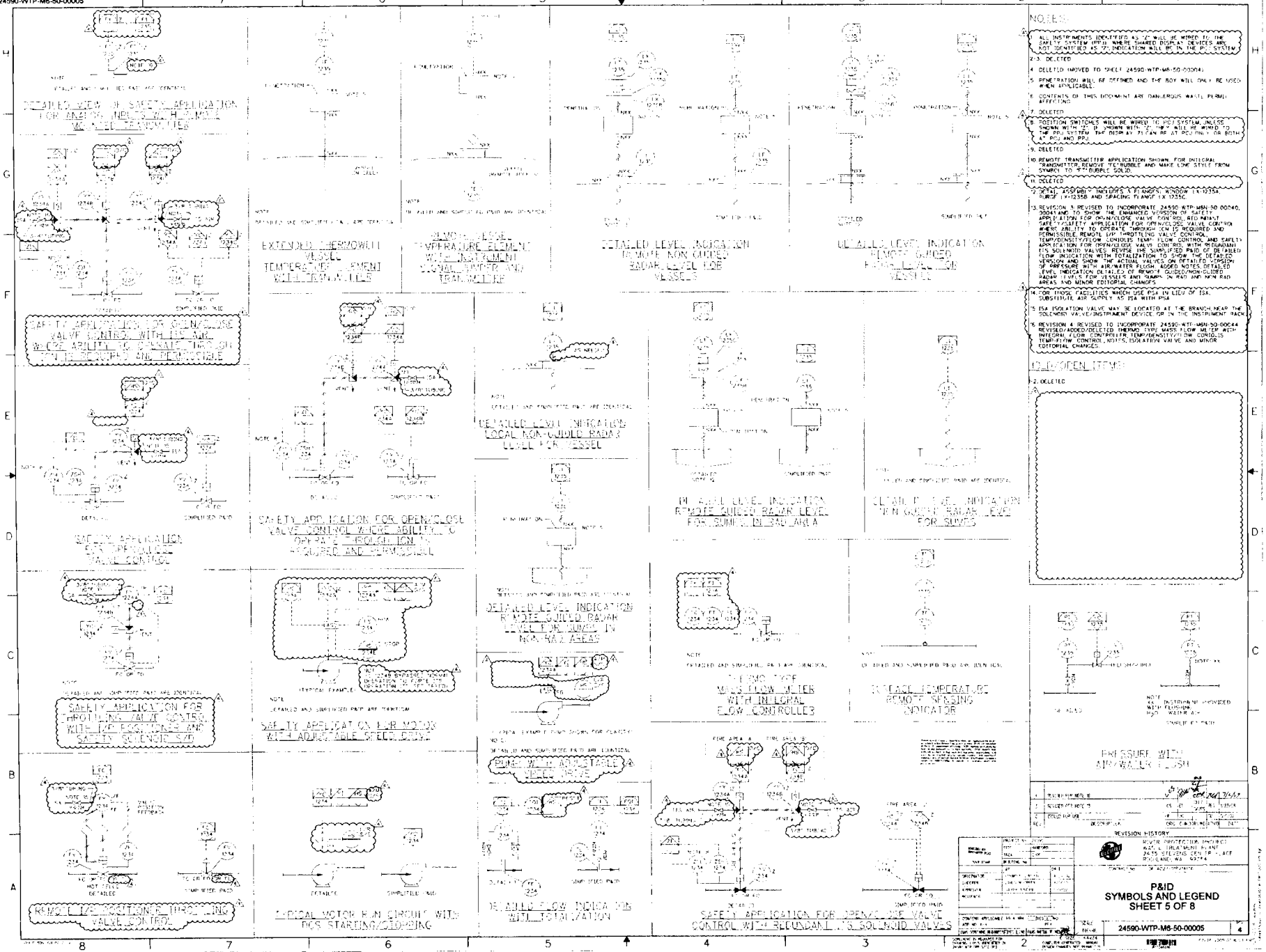
DETAILED VIEW OF SAFETY APPLICATION FOR OPEN/CLOSE VALVE CONTROL
EXTENDED THERMOWELL VESSEL TEMPERATURE ELEMENT WITH TRANSMITTER
VESSEL TEMPERATURE ELEMENT WITH INSTRUMENT SHOWN JUMPER AND TRANSMITTER
DETAILED LEVEL INDICATION REMOTE NON GUIDED RADAR LEVEL FOR VESSELS
DETAILED LEVEL INDICATION REMOTE GUIDED RADAR LEVEL FOR VESSELS
SAFETY APPLICATION FOR OPEN/CLOSE VALVE CONTROL WITH AIR WORK ABILITY TO OPERATE THROUGH CONTROL IS REQUIRED AND PERMISSIBLE
DETAILED LEVEL INDICATION LOCAL NON-GUIDED RADAR LEVEL FOR VESSEL
SAFETY APPLICATION FOR OPEN/CLOSE VALVE CONTROL WITH ABILITY TO OPERATE THROUGH CONTROL IS REQUIRED AND PERMISSIBLE
DETAILED LEVEL INDICATION REMOTE GUIDED RADAR LEVEL FOR SUMPS IN RAD AREA
DETAILED LEVEL INDICATION REMOTE GUIDED RADAR LEVEL FOR SUMPS
SAFETY APPLICATION FOR OPEN/CLOSE VALVE CONTROL
DETAILED LEVEL INDICATION REMOTE GUIDED RADAR LEVEL FOR SUMPS IN NON-RAD AREAS
THERMO TYPE MASS FLOW METER WITH INTEGRAL FLOW CONTROLLER
RELEASE TEMPERATURE REMOTE SENSING INDICATOR
SAFETY APPLICATION FOR THROTTLING VALVE CONTROL WITH DIFFERENTIAL PRESSURE AND SAFETY SOLENOID VALVE
SAFETY APPLICATION FOR MOTOR WITH ADJUSTABLE SPEED DRIVE
PUMP WITH ADJUSTABLE SPEED DRIVE
PRESSURE WITH AIR/WATER FLUSH
REMOTE VIEW POSITIONING THROTTLING VALVE CONTROL
TYPICAL MOTOR RUN CIRCUIT WITH PCS STARTING/STOPPING
DETAILED FLOW INDICATION WITH TOTALIZATION
SAFETY APPLICATION FOR OPEN/CLOSE VALVE CONTROL WITH REDUNDANT PCS SOLENOID VALVES
NOTES:
1. ALL INSTRUMENTS IDENTIFIED AS IZ WILL BE WIRED TO THE SAFETY SYSTEM (PPJ). WHERE SHARED DISPLAY DEVICES ARE NOT IDENTIFIED AS IV, INDICATION WILL BE IN THE PCJ SYSTEM.
2-3. DELETED
4. DELETED (MOVED TO SHEET 24590-WTP-M6-50-00004)
5. PENETRATION WILL BE DEFINED AND THE BOX WILL ONLY BE USED WHEN APPLICABLE.
6. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
7. DELETED
8. POSITION SWITCHES WILL BE WIRED TO PCJ SYSTEM UNLESS SHOWN WITH IZ. IF SHOWN WITH IZ, THEY WILL BE WIRED TO THE PPJ SYSTEM. THE DISPLAY MEAN BE AT PCJ ONLY OR BOTH AT PCJ AND PPJ.
9. DELETED
10. REMOTE TRANSMITTER APPLICATION SHOWN. FOR INTEGRAL TRANSMITTER, REMOVE TEE/BUBBLE AND MAKE LINE STYLE FROM SYMBOL TO TEE/BUBBLE SOLID.
11. DELETED
12. DETAIL VIEW NOTES 1. FLANGE, WINDOW (X-1235A), PURGE (X-1235B) AND SPACING FLANGE (X-1235C)
13. REVISION 3: REVISED TO INCORPORATE 24590-WTP-M6N-50-00040, 00041 AND 00 TO SHOW THE ENHANCED VERSION OF SAFETY APPLICATION FOR OPEN/CLOSE VALVE CONTROL REQUIRED WHERE SAFETY/SAFETY APPLICATION FOR OPEN/CLOSE VALVE CONTROL WHERE ABILITY TO OPERATE THROUGH CONTROL IS REQUIRED AND PERMISSIBLE, REMOTE I/P THROTTLING VALVE CONTROL, TEMP/DENSITY/FLOW CONDUCTS TEMP-FLOW CONTROL AND SAFETY APPLICATION FOR OPEN/CLOSE VALVE CONTROL WITH REDUNDANT PCS SOLENOID VALVES. REVISE THE SIMPLIFIED PAID OF DETAILED FLOW INDICATION WITH TOTALIZATION TO SHOW THE DETAILED VERSION AND SHOW THE ACTUAL VALVES ON DETAILED VERSION OF PRESSURE WITH AIR/WATER FLUSH. ADDED NOTES DETAILED LEVEL INDICATION DETAILED OF REMOTE GUIDED/NON-GUIDED RADAR LEVELS FOR VESSELS AND SUMPS IN RAD AND NON RAD AREAS AND MINOR EDITORIAL CHANGES.
14. FOR PROCESS FACILITIES WHICH USE PSA IN LIEU OF ISA, SUBSTITUTE AIR SUPPLY AS ISA WITH PSA.
15. ISA ISOLATION VALVE MAY BE LOCATED AT THE BRANCH NEAR THE SOLENOID VALVE/INSTRUMENT DEVICE OR IN THE INSTRUMENT RACK.
16. REVISION 4: REVISED TO INCORPORATE 24590-WTP-M6N-50-00044 REVISED/ADDED/DELETED THERMO TYPE MASS FLOW METER WITH INTERNAL FLOW CONTROLLER TEMP/DENSITY/FLOW CONDUCTS TEMP-FLOW CONTROL, NOTES, ISOLATION VALVE AND MINOR EDITORIAL CHANGES.
10 BROKEN ITEMS
2. DELETED
REVISION HISTORY
P&ID
SYMBOLS AND LEGEND
SHEET 5 OF 8
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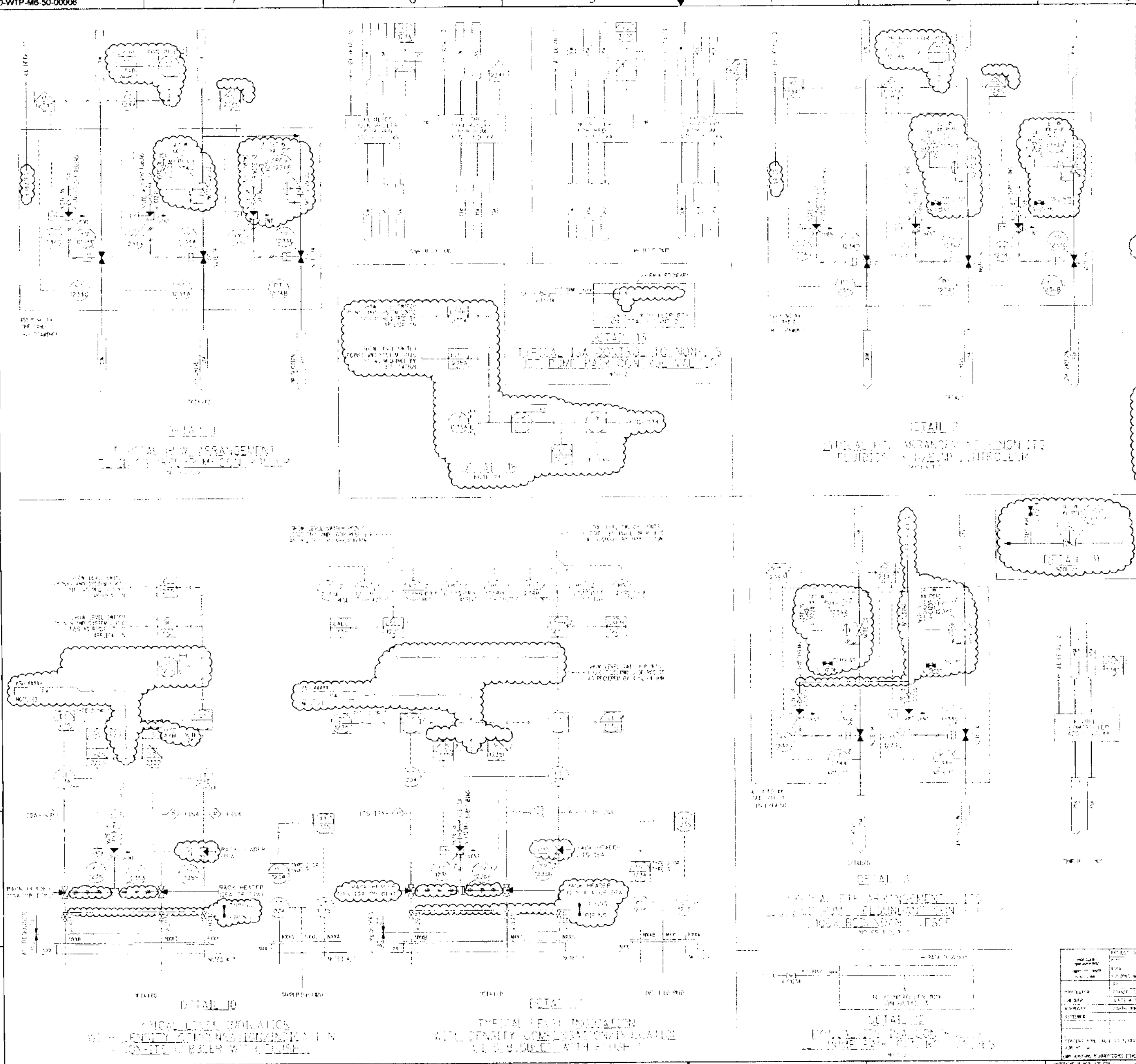
4

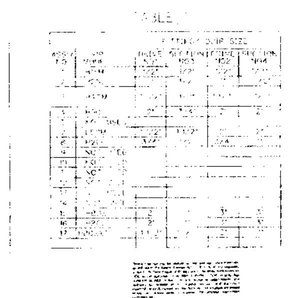


NOTES

1. JUMPERS WILL BE SHOWN ON P&ID IF REQUIRED.
2. ACTUAL SEQUENCE NUMBERS WILL BE SHOWN ON THE P&IDs
3. FOR USE WITH PJM, THEN NO "A" SUFFIX IS REQUIRED
4. SHORTEST LEG IS DEFINED AS THE [illegible]
5. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING
6. DELETED
7. TYPE 1 BUBBLERS ARE NOT NORMALLY FLUSHED AUTOMATICALLY AND EXCEPTIONS TO THIS ARE NOTED ON THE AFFECTED SYSTEM P&IDs. BUBBLER TYPES 2 OR 3 WILL BE FLUSHED AUTOMATICALLY. TYPICALLY, TYPE 2 ARE USED IN ROTATIONAL MIXED SLURRY VESSELS AND HAVE AN OUTER CASING AND TYPE 3 HAVE STIFFENERS WELDED TO THE DIP PIPES. REFER TO THE VESSEL DESIGN DOCUMENTATION FOR ACTUAL PHYSICALIZATION AND HARDWARE CONFIGURATION.
8. DELETED
9. INSTRUMENTATION AND VALVES ARE TAGGED WITH PROCESS SYSTEM IDENTIFIERS
10. FOR TYPICAL PTF PRIMARY CONTROLLER, SEE DETAIL 6 ON 24590-WTP-M6-50-00007
11. DETAIL 3 (REDUNDANT) AND DETAIL 6 (PRIMARY), SHOWN ON SHEET 7, CONTROLLERS ARE IN SEPARATE FIRE AREAS.
12. DELETED
13. DELETED
14. VALVE TYPE SHOWN IS A GENERAL SYMBOL. ANGLE SEAT VALVES ARE USED FOR RFD/PJM CONTROL APPLICATIONS.
15. REVISION 3 REVISED TO INCORPORATE 24590-WTP-MBN-50-00039 AND FURTHER REVISED. REVISED/ADDED NOTES, SIMPLIFIED AND DETAILED VERSION OF DETAILS 1, 2, 3, AND DETAILED LEVEL INDICATION WITH DENSITY COMPENSATION/INDICATION AND MINOR EDITORIAL CHANGES
16. FOR THOSE FACILITIES WHICH USE PSA IN LIEU OF ISA, SUBSTITUTE AIR SUPPLY AS ISA WITH PSA
17. SEE DETAIL 15 OR 16 ON DRAWING 24590-WTP-M6-50-00004 FOR STANDARD DETAILS OF "Z" TRANSMITTER
18. ISA ISOLATION VALVE MAY BE LOCATED AT THE BRANCH, NEAR THE SOLENOID VALVE/INSTRUMENT DEVICE, OR IN THE INSTRUMENT RACK
19. REVISION 4 REVISED TO ADD/DELETE NOTES, ISOLATION VALVE, CONTROLLERS, DETAILS 10, 11, 12, 13, AND MINOR EDITORIAL CHANGES
20. RECOMMENDED SENSING LINE 3 TO 5 FEET DOWNSTREAM OF PCV
21. DELETED
22. ALTERNATE CONFIGURATION IN DETAIL 19 WILL BE USED FOR FLUIDICS PFD CONTROLLER.
23. KSH SWITCH ACTUATED BY BUBBLER AUTO FLUSH/PURGE TIMER
24. ALTERNATE CONFIGURATION IN DETAIL 19 WILL BE USED FOR LEVEL INDICATION IN GALLONS
25. REVISION 5 REVISED TO INCORPORATE 24590-WTP-MBN-50-00002, 24590-WTP-MBN-50-00055, -00056, -00060. ADDED/DELETED/REVISED NOTES, DETAIL, AND PCV CONTROLLER

UNRESOLVED ITEMS

1. DELETED
2. DELETED
3. DELETED
4. DELETED



REVISION HISTORY

P&ID
SYMBOLS AND LEGEND
SHEET 6 OF 8

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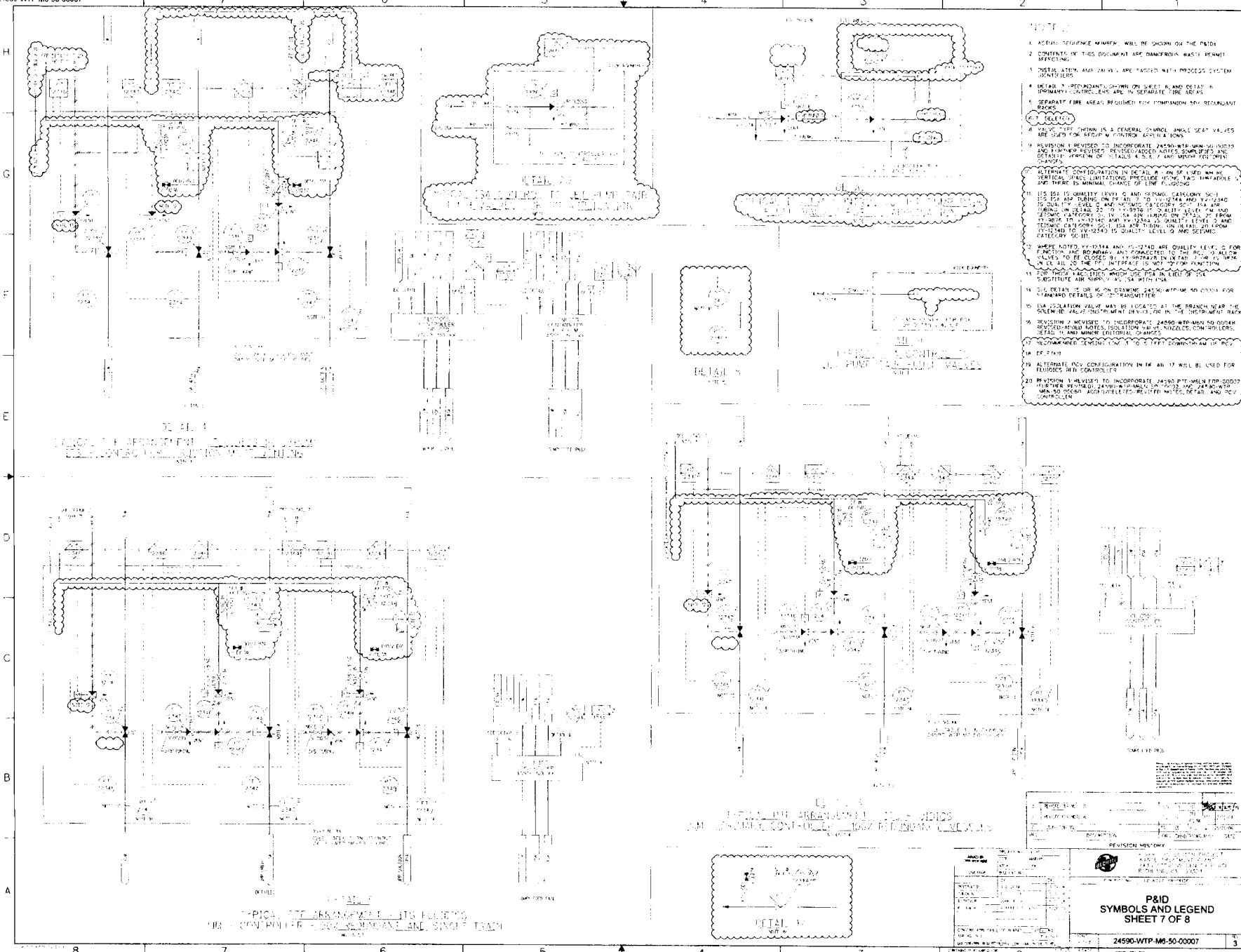
24590-WTP-M6-50-00007



NOTES:

1. ACTUAL SEQUENCE NUMBERS WILL BE SHOWN ON THE P&IDs
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING
3. INSTALLATION AND VALVES ARE TAGGED WITH PROCESS SYSTEM IDENTIFIERS
4. DETAIL 3 (REDUNDANT) SHOWN ON SHEET 6, AND DETAIL 6 (PRIMARY) CONTROLLERS ARE IN SEPARATE FIRE AREAS
5. SEPARATE FIRE AREAS REQUIRED FOR COMPANION 50Y REDUNDANT RACKS
6-7. DELETED
8. VALVE TYPE SHOWN IS A GENERAL SYMBOL. ANGLE SEAT VALVES ARE USED FOR BFDPM CONTROL APPLICATIONS
9. REVISION 1 REVISED TO INCORPORATE 24590-WTP-MBN-50-00030 AND FURTHER REVISED. REVISED/ADDED NOTES, SIMPLIFIED AND DETAILED VERSION OF DETAILS 4, 5, 6, 7 AND MINOR EDITORIAL CHANGES
10. ALTERNATE CONFIGURATION IN DETAIL 8 CAN BE USED WHERE VERTICAL SPACE LIMITATIONS PRECLUDE USING TWO THREADOLETS AND THERE IS MINIMAL CHANGE OF LINE PLUGGING
11. IFS ISA IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I. IFS ISA AIR TUBING ON DETAIL 2 TO YY-1234A AND YY-1234D IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I. ISA AIR TUBING ON DETAIL 20 TO YY-9876 IS QUALITY LEVEL QA AND SEISMIC CATEGORY SC-IV. ISA AIR TUBING ON DETAIL 20 FROM YY-9876 TO YY-1234D AND YY-1234A IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-I. ISA AIR TUBING ON DETAIL 20 FROM YY-1234D TO YY-1234D IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III.
12. WHERE NOTED, YY-1234A AND YY-1234D ARE QUALITY LEVEL Q FOR FUNCTION AND BOUNDARY AND CONNECTED TO THE PCV. IF ALLOW VALVES TO BE CLOSED BY YY-9876A/B IN DETAIL 7 FOR YY-9876 IN DETAIL 20 THE PCV INTERFACE IS NOT "Q" FOR FUNCTION
13. FOR THOSE FACILITIES WHICH USE PSA IN LIEU OF ISA SUBSTITUTE AIR SUPPLY AS ISA WITH PSA.
14. SEE DETAIL 15 OR 16 ON DRAWING 24590-WTP-M6-50-00004 FOR STANDARD DETAILS OF "Z" TRANSMITTER
15. ISA ISOLATION VALVE MAY BE LOCATED AT THE BRANCH NEAR THE SOLENOID VALVE/INSTRUMENT DEVICE, OR IN THE INSTRUMENT RACK
16. REVISION 2 REVISED TO INCORPORATE 24590-WTP-M6N-50-00044 REVISED/ADDED NOTES, ISOLATION VALVE, NOZZLES, CONTROLLERS, DETAIL 11, AND MINOR EDITORIAL CHANGES
17. RECOMMENDED SENSING LINE 3 TO 5 FEET DOWNSTREAM OF PCV
18. DELETED
19. ALTERNATE PCV CONFIGURATION IN DETAIL 17 WILL BE USED FOR FLUIDICS RED CONTROLLER
20. REVISION 3 REVISED TO INCORPORATE 24590-PTF-M6N-FDP-00007 (FURTHER REVISED), 24590-WTP-M6N-50-00002, AND 24590-WTP-M6N-50-00060. ADDED/DELETED/REVISED NOTES, DETAIL, AND PCV CONTROLLER

REVISION HISTORY

P&ID
SYMBOLS AND LEGEND
SHEET 7 OF 8

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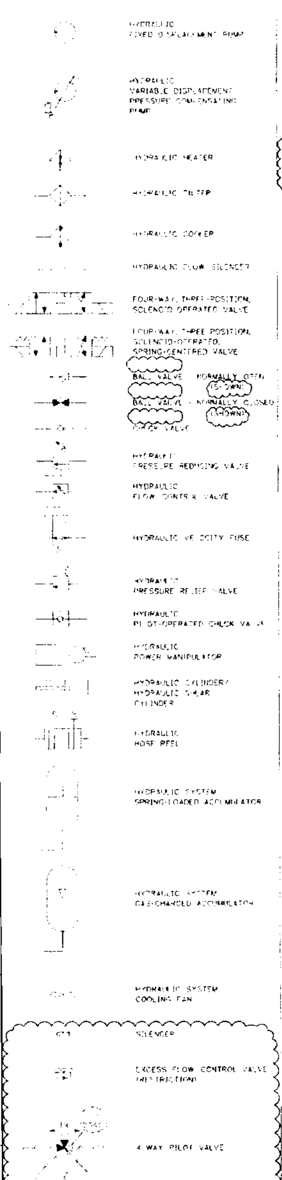
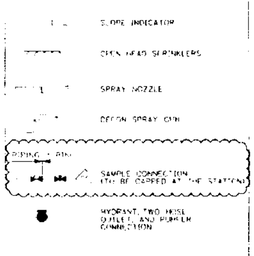
HYDRAULIC/PNEUMATIC SYMBOLS



MISCELLANEOUS SYMBOLS



POSITION U3 DESIGNATIONS (NOTE 3)	
AVG	AVERAGE
A/M	AUTO/MANUAL SELECTOR SWITCH ON OPERATOR DISPLAY FACEPLATE
D/S	DUTY/STANDBY
E-STOP	EMERGENCY STOP PUSHBUTTONS SWITCH ON MCC COMPARTMENT FACE OR NEAR FIELD EQUIPMENT
E/I	VOLTAGE TO CURRENT TRANSDUCER
H	HIGH ALARM
HH	HIGH HIGH ALARM
HHH	HIGH-HIGH-HIGH ALARM
HOA	HAND OFF AUTO SWITCH NEAR FIELD EQUIPMENT
I/I	CURRENT TO CURRENT TRANSDUCER
I/P	CURRENT TO PNEUMATIC TRANSDUCER
L	LOW ALARM
LL	LOW-LOW ALARM
LLL	LOW-LOW-LOW ALARM
L/L	LEAD/LAG
L/R	LOCAL/REMOTE SWITCH ON MCC COMPARTMENT FACE OR NEAR FIELD EQUIPMENT
O/C	OPEN/CLOSE PUSHBUTTONS ON OPERATOR DISPLAY FACEPLATE
P/H	PNEUMATIC TO HYDRAULIC TRANSDUCER
P/I	PNEUMATIC TO CURRENT TRANSDUCER
S/I	SPEED/FREQUENCY TO CURRENT TRANSDUCER
S/S	START/STOP PUSHBUTTONS ON OPERATOR DISPLAY FACEPLATE
START	START HAND SWITCH
STOP	STOP HAND SWITCH
√	SQUARE ROOT FUNCTION

SYSTEM LOCATOR/SYSTEM NAME

NOTE 1

AFR	ANTI FOAM REAGENT SYSTEM
AMR	REAGENT AMMONIA SYSTEM
ARL	ANALYTICAL RADIOLOGICAL LABORATORY SYSTEM
ARV	ATMOSPHERIC REFERENCE VENTILATION SYSTEM
ASJ	AUTOSAMPLING CONTROL SYSTEM
ASX	AUTOSAMPLING SYSTEM
BAG	BOTTLED ARGON GAS SYSTEM
BNG	BOTTLED NITROGEN GAS SYSTEM
BHG	BOTTLED HELIUM GAS SYSTEM
BSA	BREATHING SERVICE AIR SYSTEM
CDG	CARBON DIOXIDE GAS SYSTEM
CHW	CHILLED WATER SYSTEM
CME	COMMUNICATIONS ELECTRICAL SYSTEM
CNP	CESIUM NITRIC ACID RECOVERY PROCESS SYSTEM
CPE	CATHODIC PROTECTION ELECTRICAL SYSTEM
CRP	CESIUM RESIN ADDITION PROCESS SYSTEM
CXP	CESIUM ION EXCHANGE PROCESS SYSTEM
C1V	C1 VENTILATION SYSTEM
C2V	C2 VENTILATION SYSTEM
C3V	C3 VENTILATION SYSTEM
C5V	C5 VENTILATION SYSTEM
DCE	DC ELECTRICAL (125 V) SYSTEM
DFO	DIESEL FUEL OIL SYSTEM
DIW	DEMINERALIZED WATER SYSTEM
DOW	DOMESTIC (POTABLE) WATER SYSTEM
DAJ	PLANT DATA WAREHOUSING AND REPORTING SYSTEM
EDX	EMERGENCY DIESEL GENERATOR SYSTEM
EMJ	ENVIRONMENTAL MONITORING SYSTEM
FDE	FIRE DETECTION AND ALARM SYSTEM
FEP	WASTE FEED EVAPORATION PROCESS SYSTEM
FNJ	FACILITY NETWORK INFRASTRUCTURE SYSTEM
FPW	FIRE PROTECTION WATER SYSTEM
FRP	WASTE FEED RECEIPT PROCESS SYSTEM
FSW	FIRE SERVICE WATER STORAGE AND DISTRIBUTION SYSTEM
GFR	GLASS FORMERS REAGENT SYSTEM
GRE	GROUNDING AND LIGHTING PROTECTION ELECTRICAL SYSTEM
HCP	HLW CONCENTRATE RECEIPT PROCESS SYSTEM
HDH	HLW CANISTER DECONTAMINATION HANDLING SYSTEM
HEH	HLW CANISTER EXPORT HANDLING SYSTEM
HFH	HLW FILTER CAVE HANDLING SYSTEM
HFP	HLW MELTER FEED PROCESS SYSTEM
HLP	HLW LAG STORAGE AND BLENDING PROCESS SYSTEM
HMH	HLW MELTER HANDLING SYSTEM
HMP	HLW MELTER PROCESS SYSTEM
HOP	MELTER OFFGAS TREATMENT PROCESS SYSTEM
HPH	HLW CANISTER POUR HANDLING SYSTEM
HPS	HIGH PRESSURE STEAM SYSTEM
HRH	HLW CANISTER RECEIPT HANDLING SYSTEM
HSH	HLW MELTER CAVE SUPPORT HANDLING SYSTEM
HTE	HEAT TRACE ELECTRICAL SYSTEM
ISA	INSTRUMENT SERVICE AIR SYSTEM
LCP	LAW CONCENTRATE RECEIPT PROCESS SYSTEM
LEH	LAW CONTAINER EXPORT HANDLING SYSTEM
LFH	LAW CONTAINER FINISHING HANDLING SYSTEM
LFP	LAW MELTER FEED PROCESS SYSTEM
LIJ	LABORATORY INFORMATION MANAGEMENT SYSTEM
LMH	LAW MELTER HANDLING SYSTEM
LMP	LAW MELTER PROCESS SYSTEM
LOP	LAW PRIMARY OFFGAS PROCESS SYSTEM
LPH	LAW CONTAINER POUR HANDLING SYSTEM
LPS	LOW PRESSURE STEAM SYSTEM
LRH	LAW CONTAINER RECEIPT HANDLING SYSTEM
LSH	LAW MELTER EQUIPMENT SUPPORT HANDLING SYSTEM
LTE	LIGHTING ELECTRICAL SYSTEM
LVE	LOW VOLTAGE ELECTRICAL (480/208-120 V) SYSTEM
LVP	LAW SECONDARY OFFGAS/VESSEL VENT PROCESS SYSTEM
MHJ	MECHANICAL HANDLING CONTROL SYSTEM
MVE	MEDIUM VOLTAGE ELECTRICAL (13.8/4.16 KV) SYSTEM
MXG	MISCELLANEOUS GASES SYSTEM
MXR	MISCELLANEOUS REAGENTS SYSTEM
NAR	NITRIC ACID REAGENT SYSTEM
NLD	NON-RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM
PCJ	PROCESS CONTROL SYSTEM
PCW	PLANT COOLING WATER SYSTEM
PFH	PRETREATMENT FILTER CAVE HANDLING SYSTEM
PIH	PRETREATMENT IN CELL HANDLING SYSTEM
PJV	PULSE JET VENTILATION SYSTEM
PPJ	PROGRAMMABLE PROTECTION SYSTEM
PSA	PLANT SERVICE AIR SYSTEM
PSW	PROCESS SERVICE WATER SYSTEM
PTJ	PROCESS AND MECHANICAL HANDLING CCTV SYSTEM
PVA	PLANT VACUUM AIR SYSTEM
PVP	PRETREATMENT VESSEL VENT PROCESS SYSTEM
PVV	PROCESS VESSEL VENT EXHAUST SYSTEM
PWD	PLANT WASH AND DISPOSAL SYSTEM
RDP	SPENT RESIN COLLECTION AND DEWATERING PROCESS SYSTEM
RLD	RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM
RPL	RADIOLOGICAL PERSONNEL MONITORING SYSTEM
RWH	RADIOACTIVE SOLID WASTE HANDLING SYSTEM
RWW	RAW WATER SYSTEM
SCE	SECURITY ELECTRICAL SYSTEM
SCW	STEAM CONDENSATE WATER SYSTEM
SDJ	STACK DISCHARGE MONITORING (RAD AND NON-RAD) SYSTEM
SDX	STANDBY DIESEL GENERATOR SYSTEM
SHR	SODIUM HYDROXIDE REAGENT SYSTEM
SMX	SEISMIC MONITORING SYSTEM
SND	SANITARY DISPOSAL SYSTEM
SNR	SODIUM NITRITE REAGENT SYSTEM
SPR	SODIUM PERMANGANATE REAGENT SYSTEM
STR	STRONTIUM NITRITE REAGENT SYSTEM
SWD	STORM WATER DISPOSAL SYSTEM
TCP	TREATED LAW CONCENTRATE STORAGE PROCESS SYSTEM
TLP	TREATED LAW EVAPORATION PROCESS SYSTEM
TSJ	TRAINING SIMULATOR SYSTEM
UFP	ULTRAFILTRATION PROCESS SYSTEM
UPE	120 VAC UNINTERRUPTIBLE POWER ELECTRICAL SYSTEM
URR	UREA REAGENT SYSTEM
VHW	VENTILATION HOT WATER SYSTEM
WTJ	WASTE TRACKING AND INVENTORY SYSTEM

ABBREVIATIONS

PROJECT SUBDIVISION

- WTP - WASTE TREATMENT FACILITY
- BOF - BALANCE OF FACILITIES
- HLW - HIGH-LEVEL WASTE VITRIFICATION FACILITY
- LAB - ANALYTICAL LABORATORY FACILITIES
- LAW - LOW-ACTIVITY WASTE VITRIFICATION FACILITY
- PTF - PRETREATMENT FACILITY

MISCELLANEOUS

AG	ABOVE GROUND
ATM	ATMOSPHERE
BC	BLACK CELL
CIN	COMPONENT IDENTIFICATION NUMBER
CIS	COMPONENT INFORMATION SYSTEM
CO	CLEAN OUT
Cs	CESIUM
DR	DRAIN
ET	ELECTRIC TRACING
FBOX	FLOOR BOX
FO	FAIL OPEN, FLOW ORIFICE
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
HC	HOT CELL
HMI	HUMAN MACHINE INTERFACE
ICN	INTEGRATED CONTROL NETWORK
IF	INSULATING FLANGES
ITS	IMPORTANT TO SAFETY
MAWP	MAXIMUM ALLOWABLE WORKING PRESSURE
PCJ	PROGRAMMABLE CONTROL SYSTEM
PPJ	PROGRAMMABLE PROTECTION SYSTEM
RO	RESTRICTION ORIFICE
S/D	SHUT DOWN
UG	UNDERGROUND
V	VENT
WBOX	WALL BOX

VALVE POSITIONS

FC	FAIL CLOSED
FI	FAIL INDETERMINATE
FL	FAIL LAST POSITION
LC	LOCKED CLOSED
LO	LOCKED OPEN
LT	LOCKED THROTTLED
NC	NORMALLY CLOSED
NO	NORMALLY OPEN

RADIOLOGICAL AREA CLASSIFICATION (BASED ON DOSE RATE)

R1	RADIOLOGICAL CONTROLLED AREA
R2	RADIOLOGICAL BUFFER AREA
R3	AVERAGE RADIATION AREA
R4	MAXIMUM RADIATION AREA
R5	HIGH AND VERY HIGH RADIATION AREA

RADIOLOGICAL AREA CLASSIFICATION (BASED ON CONTAMINATION)

C1	RADIOLOGICAL CONTROLLED AREA
C2	RADIOLOGICAL BUFFER AREA
C3	CONTAMINATION AREA
C4	HIGH CONTAMINATION AREA
C5	AIRBORNE RADIOACTIVITY AREA

PIPING MATERIAL

CI	CAST IRON
CS	CARBON STEEL
Cu	COPPER
FRP	FIBERGLASS REINFORCED PLASTIC
GALV	GALVANIZED
PVC	POLYVINYL CHLORIDE
SS	STAINLESS STEEL

PIPING AND EQUIPMENT INSULATION

FOR HOT SERVICES

- HC - HEAT CONSERVATION
- HF - HOT AND FIRE PROTECTION
- PS - PROCESS STABILITY
- PP - PERSONNEL PROTECTION (INSULATION SYMBOL NORMALLY NOT VISIBLE IN THE DRAWING)
- PG - PERSONNEL PROTECTION GUARDS (INSULATION SYMBOL NORMALLY NOT VISIBLE IN THE DRAWING)

FOR COLD SERVICES

- AS - ANTI-SWEAT
- CC - COLD CONSERVATION
- PF - PREVENTION FROM FREEZING

TRACED INSULATION

- ET - ELECTRIC HEAT TRACED
- ST - STEAM HEAT TRACED

NO INSULATION

- NI - NO INSULATION

GENERAL NOTES

1. QUALITY LEVELS AND SEISMIC CATEGORIES SHOWN ARE THE MINIMUM REQUIREMENTS. DESIGN FABRICATION AND INSTALLATION MAY BE TO A HIGHER CLASSIFICATION.
2. ALL TUBING INSTALLED BY BNI WILL BE PROCURED QUALITY LEVEL Q IN ACCORDANCE WITH THE SPECIFICATION FOR INSTRUMENT PIPING MATERIAL 24590-WTP-3PS-PXE0-T0002. TUBING WILL BE USED FOR BOTH QUALITY LEVEL Q AND CM APPLICATIONS. BNI PROCURED TUBING ARE IDENTIFIED ON DRAWINGS AS JPSS FOR TUBING.
3. PHYSICAL DESIGN MODIFICATION NOT IN SCOPE OF P&ID CONTROLS ENHANCEMENT DESIGN EFFORTS.
4. THE PRESSURE BOUNDARY OF A SYSTEM IS DEFINED AS THE WETTED PORTION OF A PIPE OR COMPONENT THAT IS IN CONTACT WITH THE CONTAINED FLUID. THE PRESSURE INSIDE IS EXERTED EITHER POSITIVELY OR NEGATIVELY BY THE CONTAINED FLUID.
5. FOR DRAWINGS THAT ARE DANGEROUS WASTE PERMIT AFFECTING THAT WILL BE SUBMITTED OR ISSUED TO STATE OF WASHINGTON DEPARTMENT OF ECOLOGY AND/OR OFFICE OF RIVER PROTECTION (ORP), THE FOLLOWING DOE RADIOACTIVE MATERIALS DISCLAIMER STATEMENT TO BE INCLUDED IN EACH DRAWING.

> [illegible]

6. INSTRUMENT TYPICAL DETAILS MAY NOT SHOW ALL DEVICES ASSOCIATED WITH THE PRIMARY INSTRUMENT. FOR EXAMPLE, ISOLATION VALVES AND RELAYS ARE NOT SHOWN CONNECTED TO THE LEVEL INDICATORS FOR SUMP RADAR LEVEL CONTROL. THE INDIVIDUAL COMPLETED P&ID'S WILL SHOW THE FULL INSTRUMENT DETAILS.
7. ONE PUMP TO BE RUNNING AND ONE PUMP TO BE IN STANDBY MODE FOR PUMPS TAGGED WITH SUFFIX (A) AND (B) UNLESS OTHERWISE NOTED.
8. ISA/PSA TUBING SOLENOIDS ON ACTUATED VALVES WILL MAINTAIN SEISMIC CATEGORY AND QUALITY LEVEL BOUNDARY OF THE ISA/PSA HEADER, UNLESS OTHERWISE NOTED.

SLOPE REQUIREMENTS

GENERAL PIPE SLOPE REQUIREMENTS AND DEFINITIONS

1. PIPE SLOPES ARE TO CONFORM TO THE FOLLOWING REQUIREMENTS UNLESS OTHERWISE NOTED ON THE P&ID.
2. THE NUMERICAL SLOPE SHOWN ON A P&ID IS THE MINIMUM REQUIRED SLOPE. SLOPES WITH NO NUMERICAL VALUE INDICATE A MINIMUM SLOPE OR HORIZONTAL RUN OF PIPE WITH THE INTENT OF DRAINING LINES.
3. THE PIPE SLOPE IS TO HAVE A CONTINUOUS SLOPE BETWEEN VERTICAL SEGMENTS.
4. PROCESS LINES BETWEEN FACILITIES ARE TO HAVE THE MINIMUM SLOPE SPECIFIED TO MEET LEAK DETECTION REQUIREMENTS. DEVIATIONS DO NOT APPLY.
5. POCKETING IS NOT ALLOWED.
6. "POCKETING" IS DEFINED AS ANY CHANGE TO A HORIZONTAL PIPE RUN THAT CREATES A LOW POINT WITHOUT PROVISIONS FOR ADEQUATE DRAINING. (ADEQUATE DRAINING MAY BE SELF DRAINING OR BE A LOW POINT DRAIN).
7. "FREE DRAINING" IS DEFINED AS HAVING LOW POINT DRAINS WHERE NECESSARY TO DRAIN THE LINE.
8. "SELF-DRAINING" IS DEFINED AS HAVING A CONTINUOUS SLOPE OR HAVING HORIZONTAL LINES WITHOUT INTERMEDIATE LOW POINTS OR POCKETS.

ADDITIONAL REQUIREMENTS

9. FOR THE STEAM LINES DRIP LEGS AND STEAM TRAPS SHALL BE PROVIDED AT ANY NATURAL COLLECTION POINT, LOW POINT AT THE BOTTOM OF RISERS AND EXPANSION LOOPS. FOR LOCATIONS GREATER THAN 150 FEET APART, ADDITIONAL DRIP LEGS AND STEAM TRAPS TO BE PROVIDED SUCH THAT DISTANCE BETWEEN THEM DOES NOT EXCEED 150 FEET OR UNLESS OTHERWISE NOTED ON THE P&ID.
10. BLACK CELL PIPING TO BE ROUTED AS "SELF DRAINING" AND "DO NOT POCKET" WHERE NO SLOPE IS INDICATED, EXCEPT AS NOTED BELOW IN DEVIATIONS FROM PIPE SLOPE.
11. ALL NON-BLACK CELL PIPING TO BE FREE DRAINING, UNLESS OTHERWISE NOTED.
12. JUMPERS CONVEYING SOLIDS MAY BE HORIZONTAL BUT PROVISIONS MUST BE MADE FOR FLUSHING UPON SHUTDOWN AND PRIOR TO REMOVAL. JUMPERS FOR CONVEYING CLEAR LIQUIDS MAY BE HORIZONTAL AND DO NOT REQUIRE A FLUSH CONNECTION.

DEVIATIONS FROM PIPE SLOPE

13. SHORT SECTIONS OF A SELF DRAINING LINE THAT REQUIRES A SLOPE BETWEEN VERTICAL SEGMENTS (10% OR LESS OF THE PIPE RUN) MAY BE LESS THAN THE SPECIFIED SLOPE. THIS DOES NOT APPLY TO UNDERGROUND WASTE TRANSFER LINES BETWEEN FACILITIES.
14. PIPING PENETRATING WALLS AND THE IMMEDIATE ADJACENT AREAS MAY BE HORIZONTAL WITH THE FOLLOWING LIMITS:
    - I. WITH FLUSHING PROVISIONS FOR PUMPED OR PRESSURIZED SYSTEMS, HORIZONTAL RUNS ARE TO BE NO MORE THAN THE WIDTH OF THE WALL PLUS 8 FEET (BOTH SIDES COMBINED).
    - II. WITHOUT FLUSHING PROVISIONS FOR PUMPED OR PRESSURIZED SYSTEMS, HORIZONTAL RUNS ARE TO BE NO MORE THAN THE WIDTH OF THE WALL PLUS 2 FEET (BOTH SIDES COMBINED).
    - III. HORIZONTAL RUNS FOR GRAVITY DRAINS WITH NEWTONIAN FLUIDS ARE TO BE NO MORE THAN THE WIDTH OF THE WALL PLUS 2 FEET (BOTH SIDES COMBINED).
15. PIPING CONNECTIONS TO TANKS, VESSELS, EQUIPMENT, CABINETS, BULGES, AND JUMPERS MAY BE HORIZONTAL PRIOR TO THE CONNECTION AS REQUIRED, TO FACILITATE CONNECTING THE PIPING TO THE COMPONENT NOZZLE. THE REQUIRED PIPING SLOPE SHOULD BE ACHIEVED AS SOON AS PRACTICAL AT THE CONNECTION AND WITHIN FIVE PIPE DIAMETERS OR 2 FEET, WHICHEVER IS GREATER.
16. FOR TOP PENETRATIONS, PIPE ROUTING INTO TANKS, VESSELS, OR EQUIPMENT MAY HAVE A HIGH POINT AND SLOPE IN THE OPPOSITE DIRECTION FROM THE SLOPE SHOWN ON THE P&ID, PRIOR TO THE TANK, VESSEL, OR EQUIPMENT.
17. FOR FIELD RUN INSTRUMENT SENSING TUBING, REFER TO REFERENCE 3. WALL PENETRATIONS TO BE THE SAME AS 14(I) THROUGH 14(III) ABOVE.
18. STEAM TRAP MANIFOLDS AND CONTROL VALVE MANIFOLDS FOR DRIP LEGS FROM STEAM HEADERS ARE NOT REQUIRED TO BE SLOPED ON SHORT HORIZONTAL RUNS (10 FEET OR LESS).

NOTES

1. SYSTEM DESIGNATOR SHALL BE IN ACCORDANCE WITH SYSTEM AND AREA LOCATORS LIST AND DIVISION OF RESPONSIBILITY 24590-WTP-RPT-ENG-02-003.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. SEE NOTE 3 OF DRAWING 24590-WTP-M6-50-00003 FOR POSITION OF U3 DESIGNATIONS ON INSTRUMENT BUBBLE.
4. REVISION 1 REVISED TO INCORPORATE 24590-WTP-M6N-50-00033, 00040, 00041 AND FURTHER REVISED. REVISED/ADDED SYSTEM NAME, NOTES, PIPING MATERIALS, POSITION U3 DESIGNATIONS TABLES AND MINOR EDITORIAL CHANGES.
5. REVISION 2 REVISED TO INCORPORATE 24590-WTP-M6N-50-00045. REVISED/ADDED NOTES, PIPING MATERIALS, ABBREVIATIONS, HYDRANT AND SLOPE SYMBOLS, AND MINOR EDITORIAL CHANGES.
6. REVISION 3 REVISED TO INCORPORATE 24590-WTP-M6N-50-00002, 24500-WTP-M6N-50-00058, ADDED GENERAL NOTE 8, MOVED MISCELLANEOUS SYMBOLS COLUMN LOCATION TO COORDINATE H6/H7. MOVED POSITION U3 TABLE FROM ABBREVIATIONS COLUMN TO MISCELLANEOUS SYMBOLS COLUMN.

REFERENCES

1. DESIGN GUIDE - RECOMMENDED SLOPES FOR PIPING SYSTEMS 24590-WTP-GPG-M-027
2. DELETED
3. DRAWING - INSTRUMENT SENSING LINE SLOPE DESIGN REQUIREMENTS, 24590-WTP-J8-50-00012
4. PIPING ASSEMBLY DETAILS, 24590-WTP-3FB-P000-T0001
5. ISA STANDARD, ANSI/ISA S5.1 1984, R1992, "INSTRUMENTATION SYMBOLS AND IDENTIFICATION" AND STANDARD ISA S5.3 1983 "GRAPHIC SYMBOLS FOR DISTRIBUTED CONTROL/SHARED DISPLAY INSTRUMENTATION, LOGIC AND COMPUTER SYSTEMS".
6. DELETED
7. ISO 1219-1, FLUID POWER SYSTEMS AND COMPONENTS, GRAPHIC SYMBOLS AND CIRCUIT DIAGRAMS-PART 1: GRAPHIC SYMBOLS.
8. ISO 1219-2, FLUID POWER SYSTEMS AND COMPONENTS, GRAPHIC SYMBOLS AND CIRCUIT DIAGRAMS-PART 2: CIRCUIT DIAGRAMS.
9. 24590-WTP-3PS-PXE0-T0002, ENGINEERING SPECIFICATION FOR INSTRUMENT PIPING MATERIAL CLASS QUALITY LEVEL Q.

REVISION HISTORY

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Quarter Ending March 31, 2012 24590-WTP-PCN-ENV-11-006

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 Engineering Specification 24590-WTP-3PS-MWK0-T0001, *Activated Carbon Bed Adsorbers*, in Appendix 7.7.

Submitted by Co-Operator:

D. M. Busche 2/7/12 Date

Reviewed by ORP Program Office:

D. L. Noyes 2/24/12 Date

Quarter Ending March 31, 2012 24590-WTP-PCN-ENV-11-006

Hanford Facility RCRA Permit Modification Notification Form

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

Description of Modification:

The purpose of this Class 1 prime modification is to update Engineering Specification 24590-WTP-3PS-MWK0-T0001, *Activated Carbon Bed Adsorbers* in Appendix 7.7.

The following specification is submitted to replace the document currently in Appendix 7.7:

Appendix 7.7			
Replace:	24590-WTP-3PS-MWK0-T0001 Rev. 4	With:	24590-WTP-3PS-MWK0-T0001 Rev. 5

This modification requests Ecology approval and incorporation into the permit the specific changes to this engineering specification identified in Revision History of the specification. This revision primarily addresses changes to the division of responsibilities between Seller of HLW and LAW Activated Carbon Bed Adsorbers, BNI's Third Party Testing Subcontractor, and BNI to implement test methods, complete testing, review, and reporting for the Buyer Third Party Warranty and Permit Testing programs described in Appendices B and C. The change documents were submitted to Ecology in accordance with Condition III.10.C.9.h.

This specification has been revised to incorporate the following:

- Changes related to division of responsibility between Seller of HLW and LAW Activated Carbon Bed Adsorbers and BNI's Third Party Testing Subcontractor: Updated Table of Contents (TOC); updated Sections 1.3.13, 1.4 (Acronyms), 3.4.2.2, 3.4.3.2, 4.1.3, 4.1.4, 6.4.2, 6.4.3, and 6.4.4; and updated roles and responsibility to implement test methods, complete testing, review, and reporting for the Buyer Third Party Warranty and Permit Testing programs in Appendix B and Appendix C (24590-WTP-3PN-MWK0-00006)
- Changes to LAW and HLW Activated Carbon Bed Adsorbers – Buyer Third Party Warranty (Appendix B) and Permit (Appendix C) Testing: Updated Section 4.1.4, and provided further clarification of the roles and responsibilities to implement test methods, complete testing, review, and reporting for the Buyer Third Party Warranty and Permit Testing programs Appendix B, and Appendix C (24590-WTP-3PN-MWK0-00007)
- Addition of Section 3.1.16 and incorporation of LAW Structural Attachment Design Requirements as Figure 1 (TCN 24590-QL-MRA-MWK0-00001-T0001, presented as Figure 4 in TCN)
- Revision of Section 3.8.1 to make temperature consistent with MDSs (TCN 24590-QL-MRA-MWK0-00001-T0001)
- LAW/LVP Offgas System design changes in Sections 3.1.6 and 3.6.5, outlet valves changed from manual to actuated (i.e., pneumatic), changed room environment from harsh to mild, deleted Section 3.6.3 (TCN 24590-QL-MRA-MWK0-00001-T0003)
- Changes to Environmental Qualification for LAW: Updated TOC; updated Sections 1.6.2, 2.3.15, 3.6.5, 3.10.2, 3.16.1.1, and 3.16.2.8; added Appendices K and L; deleted Section 3.6.3 (TCN 24590-QL-MRA-MWK0-00001-T0004)
- Addition of Iodine/Acid Gas Removal requirements to HLW: Updated Section 3.2.2.1 and 3.4.2.1 (TCN 24590-QL-MRA-MWK0-00001-T0005)
- Change to scope for Q fasteners, Section 5 witness and hold point flowdown and sub supplier submittal requirements for GCD: Added Sections 1.3.15 and 5.4.10 (TCN 24590-QL-MRA-MWK0-00001-T0008)
- Although no change to the text of Section 5.2.1 was made, the supplier requested deviation from requirements of Section 5.2.1 for fit-up and welding of fixed beam weldment to bottom panel assembly. The deviation was incorporated by reference as documented by 24590-WTP-SDDR-MS-11-00087 (See Section 11.2)
- Section 11 - References updated

Quarter Ending March 31, 2012 24590-WTP-PCN-ENV-11-006

- Other minor editorial changes and corrections

This modification requests Ecology approval and incorporation of the following outstanding change document(s) into the permit. These change documents have been provided to Ecology in the weekly milk run. The CCN transmitting each document is provided after the number of the change document. Although not yet incorporated into the revised document included in this PCN, the listed outstanding change document(s) are intended to be incorporated into the permit:

24590-WTP-3PS-MWK0-T0001:

- 24590-WTP-SDDR-MS-11-00169 (CCN 233566)
- 24590-WTP-SDDR-MS-11-00173 (CCN 233566)
- 24590-QL-MRA-MWK0-00001-T0009 (CCN 233572)
- 24590-WTP-SDDR-MS-11-00187(CCN 233573)
- 24590-WTP-SDDR-MS-11-00199 (CCN 233571)
- 24590-WTP-SDDR-MS-11-00230(CCN 233571)
- 24590-WTP-SDDR-MS-11-00245 (CCN 233572)

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

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

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

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

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

Reason for denial:

Reviewed by Ecology:

Annette Carlson 4-10-12

A. Carlson Date

R11387307

RIVER PROTECTION PROJECT – WASTE TREATMENT PLANT

ENGINEERING SPECIFICATION

FOR

Activated Carbon Bed Adsorbers

ISSUED BY
RPP-WTP PDC

Content applicable to ALARA? ☒ Yes ☐ No

ADR No.
24590-WTP-ADR-M-04-0004

Rev
0

Specification changes retroactive? ☐ Yes ☒ No
☐ N/A (alpha revision or revision 0)

Quality Level
Q

DOE Contract No.
DE-AC27-01RV14136

NOTE: Contents of this document are Dangerous Waste Permit affecting.

REV	DATE	BY	CHECK	REVIEW	E&NS	EGS
5	7/21/11	D Rickettson	S Edwards	G Goolsby	D Krahn	D Wilsey
4	09/17/08	R Jablonski	N Whitcomb	G Goolsby	D Carlstrom	J Roth
3	04/08/08	R Jablonski	C Knauss	G Goolsby	M Rosenthal	J Julyk
2	05/18/05	D Pease	K Chin	C Morley	S Woolfolk/ T Allen	M Hoffmann
1	11/02/04	D Pease	S Ngakan	C Morley	S Woolfolk/ M Medsker	M Hoffmann
0	08/06/04	D Pease	S Ngakan	C Morley	B Spezialetti	M Hoffmann

SPECIFICATION No.
24590-WTP-3PS-MWK0-T0001

Rev
5

Revision History

Revision	Reason for Revision
0	Issued for purchase of HLW Adsorbers. LAW adsorbers are on hold pending approval of ABAR 24590-WTP-SE-ENS-03-1261 Rev 0.
1	Issued for purchase based on DTD number 24590-LAW-DTD-ENS-04-0002,with LAW adsorber ITS equipment for carbon bed fire mitigation on hold. This includes: Isolation valves, high temperature switch and interlock, and COx monitor and interlocks.
2	Incorporated SCN number 24590-WTP-3PN-MWK0-00001 and SDDR 24590-WTP-SDDR-PROC-04-01020, 24590-WTP-SDDR-PROC-04-01040, 24590-WTP-SDDR-PROC-05-00392, 24590-WTP-SDDR-PROC-05-00392, 24590-WTP-SDDR-PROC-05-00602, 24590-WTP-SDDR-PROC-05-00652, 24590-WTP-SDDR-PROC-05-00701, and 24590-WTP-SDDR-PROC-05-00018. Revised LAW instrumentation requirements for remote mounting of analyzers and transmitters. Revised Figures 1 and 2 to clarify instrumentation. Added appendix B and C to clarify testing requirements for carbon media. LAW adsorber ITS equipment for carbon bed fire mitigation is still on hold. This includes: Isolation valves, high temperature switch and interlock, and COx monitors and interlocks.
3	Incorporated SCN 24590-WTP-3PN-MWK0-00002 and SDDRs 24590-SDDR-WTP-SDDR-M-06-00286, 24590-WTP-SDDR-M-06-00287. and 24590-WTP-SDDR-M-07-00051. Revised Appendix B and C Testing requirements. Added WTP specific tailoring of codes (appendix D-J). Updated HLW ITS List. Updated Environmental Requirements based on EQ Room Data Sheets. Changed CO and COx analyzers from suppliers scope to buyer's. Added Hg Monitor probe connection detail (Fig 3).
4	Changed Appendix B&C testing scope from Seller to Buyer. Deleted Figure 1 and 2 (replaced with P&ID drawing reference). Renamed Table 1 and Table 2. Added information to Table 2. Added instruction for including WTP piping and supports into Supplier Analysis. Added Monorail and Hoist Carbon media loading requirements and necessary codes. Changed LAW instrumentation scope from supplier to WTP. Renamed Table 1 and 2. Added revisions to Tailored Codes in Appendix section
5	Incorporated SCN numbers 24590-WTP-3PN-MWK0-00006 and 24590-WTP-3PN-MWK0-00007. Incorporated TCN numbers, 24590-QL-MRA-MWK0-00001-T0001, 24590-QL-MRA-MWK0-00001-T0003, 24590-QL-MRA-MWK0-00001-T0004, 24590-QL-MRA-MWK0-00001-T0005 and 24590-QL-MRA-MWK0-00001-T0008. Incorporated SDDR number, 24590-WTP-SDDR-MS-11-00087 by Reference. Document was revised according to the approved change notices only, identification of revised items is not necessary.

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.

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1 Scope

1.1 Project Description and Location

The Hanford Tank Waste Treatment and Immobilization Plant (WTP) is a complex of waste treatment facilities where the US Department of Energy (DOE) Hanford Site tank waste will be pretreated and immobilized into stable glass form via vitrification. The WTP Contractor will design, build, and startup the WTP pretreatment and vitrification facilities for the DOE Office of River Protection (ORP). The waste treatment facilities will pretreat and immobilize the low activity waste (LAW) and high level waste (HLW) currently stored in underground storage tanks at the Hanford Site.

The Hanford Site occupies an area of about 560 square miles and is located along the Columbia River, north of Richland, WA in the U.S.A. The WTP Facility will be constructed at the east end of the 200 East Area of the Hanford Site. The counties of Benton, Franklin, and Grant surround the Hanford Site.

1.2 Equipment, Material, and Services Required

This specification provides the requirements for the design, analysis, fabrication, project management, quality assurance, inspection, testing, qualification, and labeling of the Activated Carbon Bed Adsorbers, associated filters, gaskets, insulation, piping, fasteners, shims, and special tools for use in the High Level Waste (HLW) and Low Activity Waste (LAW) facilities. This specification also provides the requirements for the conception, demonstration, design, fabrication, quality assurance, inspection, testing, qualification, and supply of activated carbon, testing equipment, testing apparatus, testing materials, manuals, instructions, and procedures.

The scope of work for the Seller includes all work specifically defined in this specification. Work shall include, but is not limited to, the following:

1.2.1 Provide fully detailed designs, drawings, supporting calculations, supporting analysis, supporting models, procedures, and all labor, materials, fasteners, tooling, equipment, apparatus, required instrumentation, shop drawings, and services necessary to manufacture, test, inspect, label, and package Activated Carbon Bed Adsorbers in accordance with this specification and the Mechanical Data Sheets in Section 2 of the purchasing documents.

1.2.2 Provide Buyer with a breakdown (by paragraph) of the following codes, industry standards, and referenced documents to be applied to each aspect of the Activated Carbon Bed Adsorbers detailed design, drawings, analysis, fabrication, quality assurance, inspection, testing, qualification, labeling, packaging, handling, and shipment for review prior to beginning detailed design:

- ASME AG-1-1997, including WTP specific tailoring
- ASME AG-1a-2000
- ASME N509-1989
- ASME B&PVC, Section VIII, Div 1

If an entire section or part of the above listed codes and standards applies, a breakdown by paragraph is not required. Only the part or section shall be listed.

1.2.3 Provide design calculations in accordance with this specification and applicable codes. Calculations shall include, but not be limited to:

- Code calculations
- Seismic calculations
- Support calculations (Include tabulated resultant reactions at support locations, by load case)
- Calculations associated with lifting and erection of the vessel
- Nozzle loads and movements per thermal and seismic calculations
- Thermal and discontinuity stresses as applicable
- Fatigue analysis as applicable for pressure vessels in fatigue services

1.2.4 Provide a three-dimensional (3-D) computational fluid dynamics (CFD) model and analysis of the Activated Carbon Bed Adsorbers. CFD model and analysis shall include necessary Buyer supplied inlet piping to model the velocity profile of the offgas air stream entering the adsorber.

1.2.5 Provide thermal calculations for the Activated Carbon Bed Adsorber units and support frames in accordance with the requirements of this specification and Mechanical Data Sheets (MDSs) in section 2 of the purchasing documents. Select insulation material (i.e. calcium silicate, mineral wool, etc.) to meet thermal requirements of this specification.

1.2.6 Provide an analysis of the Activated Carbon Bed Adsorber design to determine expected adsorber change out frequency.

1.2.7 Delete.

1.2.8 Provide connecting piping and actuated on/off control valves to configure two (2) Activated Carbon Bed Adsorber units in a single offgas stream to be operated in either series or parallel with the ability to isolate one unit for maintenance and still operate. Activated Carbon Bed Adsorber units shall be configured for automatic (remote) operation from Buyer's integrated control network.

1.2.9 Provide internal water deluge fire suppression system to allow flooding of the Activated Carbon Beds. Fire detection shall include a combination of carbon monoxide (CO/COx) monitors, temperature monitors, and isolation valves. CO/COx monitors shall be interlocked to isolation valves. Process water for carbon bed flooding is a backup to bed isolation. Provide liquid level interlocks operated from radar level indicators.

1.2.10 Provide fire detection and suppression system acceptance tests.

1.2.11 Provide control logic and I/O mapping for automatic configuration and fire suppression system.

1.2.12 In addition to the field testing requirements set forth in ASME AG-1, Section TA, and/or ASME N509, Section 9, conduct the following acceptance tests in the shop, on each Activated Carbon Bed Adsorber unit prior to shipment:

- Visual Inspection
- Structural Capability Test

- System Bypass Test
- Mechanical Test
- Differential Pressure Test
- Airflow Distribution Test
- Electrical Air Heater Performance Test (per design)

1.2.13 Provide challenge gas and challenge gas injection and sampling ports/manifolds.

1.2.14 Provide detailed bag-in/bag-out procedure for removal and replacement of adsorbent and any other filter(s) required.

1.2.15 Provide all personnel, equipment, apparatus, labor, personal protection equipment (PPE), materials, glove bags, bags, HEPA filters, etc. to simulate field conditions, demonstrate, and videotape the bag-in/bag-out procedure using fully assembled Activated Carbon Bed Adsorber equipment in shop.

1.2.16 Provide material certified test reports, welding procedures, insulation installation procedures, testing procedures, testing results, quality assurance procedures, quality assurance inspection results, and all other procedures and documentation required per this specification.

1.2.17 Provide transportation, storage, and installation instructions for the Activated Carbon Bed Adsorber units per the Seller's recommendations and the requirements of this specification.

1.2.18 Package and prepare the Activated Carbon Bed Adsorber units for shipment to the WTP site. Packaging shall be sufficient to allow outdoor storage for a period of up to one year at the WTP site, without Buyer action except routine inspection. Environmental conditions for storage are found in section 3.6 of this specification.

1.2.19 Provide all equipment, instrumentation, labor, and materials to perform a shop lifting test, demonstrating that the lifting lugs or attachment points are adequate to support the Activated Carbon Bed Adsorber units without distortion. Lifting lugs or attachment points shall be placed such that the equipment remains essentially level during the lift without tilting or swaying. Seller shall provide shop test report on lifting points provided on the Activated Carbon Bed Adsorber equipment.

1.2.20 Provide Material Safety Data Sheets (MSDSs) for loaded Activated Carbon Bed Adsorber and all other materials used in the construction of the Activated Carbon Bed Adsorber units.

1.2.21 Provide operation and maintenance manuals, with sequence of operations, and recommended spare parts list.

1.2.22 Provide a set of special tools for each Activated Carbon Bed Adsorber required for operation, bag-in/bag-out, sampling, and maintenance.

1.2.23 Provide design for structural attachment to the Buyer's provided embeds.

1.2.24 Delete.

1.3 Work by Others

Any item not specifically listed as being supplied by the Buyer shall be provided by the Seller. The Buyer shall supply the following:

1.3.1 Shipping to jobsite.

1.3.2 Unloading and storage of all materials and equipment at jobsite.

1.3.3 Activated Carbon Bed Adsorber installation labor at jobsite.

1.3.4 Foundation, embeds, and anchor bolts.

1.3.5 Electric power supply.

1.3.6 External wiring.

1.3.7 External connection to Buyer's instrumentation and controls.

1.3.8 Control system.

1.3.9 Piping external to the Activated Carbon Bed Adsorber unit package.

1.3.10 Pressure drop indicators for pressure drop piping connections.

1.3.11 Installation of insulation.

1.3.12 Instrument racks.

1.3.13 Appendix B (Buyer Third Party Warranty) & C (Buyer Third Party Permit) testing.

1.3.14 LAW instrumentation

1.3.15 Q (ITS) Fasteners

1.4 Acronyms

AGS	American Glove box Society
AISC	American Institute of Steel Construction
ASD	Adjustable Speed Drive
ASME	American Society of Mechanical Engineers
ASTM	International Society for Testing and Materials
AWS	American Welding Society
CFD	Computational Fluid Dynamics
CFR	Code of Federal Regulations
3-D	Three-Dimensional

3-D	Three-Dimensional
DBE	Design Basis Event
DF	Decontamination Factor
DOE	US Department of Energy
ESF	Engineered Safety Feature
ERDA	Energy Research and Development Administration
FMEA	Failure Mode and Effect Analysis
HEPA	High Efficiency Particulate Air
HCl	Hydrogen Chloride
HLW	High Level Waste
HF	Hydrogen Fluoride
HVAC	Heating, Ventilation, and Air-Conditioning
HOP	High Level Waste Secondary Offgas Treatment System
FFB	Foundation Field Bus
ICN	Integrated Control Network
IEEE	Institute of Electrical and Electronics Engineers
ISA	Instrument Service Air
ITS	Important to Safety
LAW	Low Activity Waste
LVP	Low Activity Waste Secondary Offgas System
MR	Material Requisition
MDS	Mechanical Data Sheet
MSDS	Material Safety Data Sheet
NDE	Nondestructive Evaluation/Examination
NRTL	Nationally Recognized Testing Laboratory
ORP	Office of River Protection
OSHA	Occupational Safety and Health Administration
P&ID	Piping and Instrumentation Diagram
PMI	Positive Material Identification
PPE	Personal Protection Equipment
ppm	Parts per million
psf	pounds per square foot (lb/ft^2)
PSV	Pressure Safety Valve
QA	Quality Assurance

QAP	Quality Assurance Program
QL	Quality Level
SC	Seismic Category
scfm	Standard Cubic Feet per Minute
SDDR	Supplier Deviation Disposition Request
SS	Stainless Steel
SS	Safety Significant
TBD	To Be Determined
UL	Underwriters Laboratories, Inc.
VSL	The Catholic University of America Vitreous State Laboratory
WAC	Washington Administrative Code
WTP	Hanford Tank Waste Treatment and Immobilization Plant

1.5 Definitions

Activated Carbon Bed Adsorber Unit: Refers to complete Carbon Bed equipment assembly. This includes two (2) full capacity Carbon Bed Adsorbers, connecting pipe work, valves, instrumentation, and support frame for Carbon Bed Adsorbers and piping.

Activated Carbon Bed Adsorber expert: One who has extensive knowledge regarding the characteristics and application of Activated Carbon Bed Adsorbers. Must have a minimum of five (5) years experience.

Adsorbent Media: A solid having the ability to concentrate and hold other substances.

Adsorber: A device or vessel containing adsorbent (e.g., an adsorber cell filled with adsorbent).

Bag-in/Bag-out: A method of introducing and removing items from a contaminated enclosure where a bag provides a physical barrier at all times during the operation that prevents the spread of contamination.

Buyer's Representative(s): The Buyer's designee(s), who shall witness onsite operations at the seller and sub-seller sites and perform onsite inspections and surveillance.

Bypass, Leakage: A pathway through which contaminated air can escape treatment by the installed HEPA and/or adsorber banks. Examples are leaks in filters and filter mounting frames, defective or inefficient isolation dampers that result in the uncontrolled flow through adjacent plenums, and unsealed penetrations for electrical conduits, pipes, floor drains, etc.

Challenge Gas: A gas of known characteristics, under specified conditions, used for the purpose of testing. For in-shop and in-place/field testing of adsorbers required by this specification. The challenge gas to be used shall depend on what is recommended by the

Activated Carbon Bed Adsorber manufacturer. Challenge gas shall be an environmentally safe non-ozone depleting substance, if possible.

Engineered Safety Feature (ESF): A nuclear air treatment system, HVAC system, gas processing system, or a component that serves to control and limit the consequences of releases of energy and radioactivity.

Glovebag: A temporary barrier to contain or prevent the spread of contamination generally during system maintenance or production. The area or component is surrounded by the portable glovebox boundary material, usually a flexible plastic film. Personnel perform work inside the glovebag through glovesleeves and gloves while remaining outside the containment area. Other access ports are provided to allow for equipment and service penetrations as necessary. Additional openings can be provided through the use of zippers, velcro closures, and bag-out ports.

HEPA Filter: A high efficiency particulate air filter having a fibrous medium with a particle removal efficiency of at least 99.97 % when tested with essentially monodispersed 0.3 μm test aerosol particles.

Mounting Frame: A structure against which adsorbers may be snugly mounted and supported in a position that permits the passage of air or gas and provides a surface to hold the sealing gasket, thereby avoiding a potential bypass or leakage path for the non-filtered air or gas.

Paragraph: When a paragraph of this specification, referenced documents, referenced codes, or referenced standards is referenced in this specification, the paragraph referenced <u>and</u> all subparagraphs and sub-subparagraphs of the paragraph referenced shall be considered inclusive.

Quality Level: The quality level identifies the quality requirements to be applied to the equipment. The identified quality levels are Q and CM (Commercial). Quality requirements are specifically defined on the associated mechanical data sheets (MDSs) and supplier quality assurance program (QAP) requirements data sheets.

Safety Significant (SS): The structures, systems, and components which are not designated as safety-class structures, systems, and components, but whose preventative or mitigative function is a major contributor to defense and/or worker safety as determined from safety analyses.

Seismic Category: Specific requirements for each seismic category are defined in reference documents listed in section 2.4 of this specification.

Special Tools: Any tooling required to perform maintenance on the Activated Carbon Bed Adsorber unit or for Activated Carbon Bed Adsorber and discharge filter removal and replacement. Includes tools that must be specially designed and fabricated and tools that are readily available in the commercial market.

1.6 Safety/Quality Classifications

1.6.1 Activated Carbon Bed Adsorber units for HLW shall meet the quality level requirements of Q as shown on the associated MDSs and supplier quality assurance program requirements data

sheet. Seismic category shall be SC-III as shown on the associated MDSs and defined in reference documents listed in section 2.4 of this specification. Safety classification is Safety Significant (SS).

1.6.2 Activated Carbon Bed Adsorber units for LAW shall meet the quality level requirements of Q as shown on the associated MDSs and supplier quality assurance program requirements data sheet. Seismic category shall be SC-III as shown on the associated MDSs and defined in reference documents listed in section 2.4 of this specification. Safety classification is Safety Significant (SS) solely for Chemical Toxicity.

2 Applicable Documents

2.1 General

2.1.1 Work shall be done in accordance with the referenced codes, standards, and documents listed below, which are an integral part of this specification.

2.1.2 When specific chapters, sections, parts, or paragraphs are listed following a code, industry standard, or reference document, only those chapters, sections, parts, or paragraphs of the document are applicable and shall be applied. For the codes and standards listed in section 2, the specific revision or effective date identified, as well as the specific revision or effective date of codes and standards that they incorporate by reference (daughter codes and standards), shall be followed. If a date or revision is not identified, the latest issue, including addenda, at the time of quotation, shall apply. The effective dates and revisions listed in section 2 shall apply to subsequent references to the codes and standards within this specification. When more than one code, standard, or referenced document covers the same topic, the requirements for all must be met with the most stringent governing. The use of any other edition, revision, or issue requires buyer's approval.

2.1.3 Unless specified otherwise, requirements apply to both HLW and LAW design, fabrication, testing, storage, and handling.

2.2 Codes

2.2.1 ASME AG-1-1997, Code on Nuclear Air and Gas Treatment, Sections AA, FE, FF, and TA. See Appendix D for WTP specific tailoring.

2.2.2 ASME AG-1a-2000, Addenda to ASME AG-1-1997 Code on Nuclear Air and Gas Treatment, Section HA.

2.2.3 ASME B31.3-1996, Process Piping. See Appendix E for WTP specific tailoring.

2.2.4 ASME Boiler and Pressure Vessel Code, Section VIII, Div. 1, Rules for Construction of Pressure Vessels.

2.2.5 DOE-RL-92-36, Hanford Site Hoisting and Rigging Manual.

2.2.6 AWS D1.6, Structural Welding Code-Stainless Steel.

2.2.7 Delete.

2.2.8 AISC (ASD), 9th Edition, American Institute of Steel Construction. See Appendix F for WTP specific tailoring.

2.2.9 29 CFR 1910, Occupational Safety and Health Standards (OSHA).

2.2.10 UBC-1997, *Uniform Building Code.*

2.2.11 ASME Boiler and Pressure Vessel Code, Section V, Nondestructive Examination.

2.3 Industry Standards

2.3.1 AGS-G001 ©1998, Guideline for Gloveboxes, Second Edition.

2.3.2 ASME N509-1989, Nuclear Power Plant Air-Cleaning Units and Components, Sections 1, 2, 3, 4 – (Paragraphs 4.3, 4.4, 4.6.1 through 4.6.7.2, 4.11, 4.12. 4.13(a)), 5 – (Paragraphs 5.5, 5.6.5.5 and 5.6.5.6), 7 – (Paragraph 7.2), 8 – (Paragraph 8.2), 9, Appendix C, and Appendix D.

2.3.3 ASME N510-1989, (Rev.1995), Testing of Nuclear Air Treatment Systems, Sections 1 through 8, 11, 13, 14, 15, and appendices.

2.3.4 ASME NQA-1-1989, Quality Assurance Program Requirements for Nuclear Facilities. See Appendix G for WTP specific tailoring.

2.3.5 ASME Y14.100, Engineering Drawing Practices.

2.3.6 ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.

2.3.7 ASTM F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

2.3.8 ASTM F594, Standard Specification for Stainless Steel Nuts.

2.3.9 ERDA 76-21, Nuclear Air Cleaning Handbook, Chapter 1 (All), Chapter 2 (Paragraphs 2.1 through 2.4.16), Chapter 3 (Paragraphs 3.1, 3.4.1, 3.4.2, 3.4.5, 3.4.6), Chapter 4 (Paragraphs 4.3 through 4.3.5, 4.5.9), Chapter 7 (All), Chapter 8 (All), Chapter 9 (Paragraph 9.4.1).

2.3.10 NACE Standard RP0198, The Control of Corrosion Under Thermal Insulation and Fireproofing Materials-A Systems Approach.

2.3.11 PIP INIH1000, Hot Insulation Installation Details.

2.3.12 RR-C-271D, Federal Specification for chains and attachments, welded and weldless.

2.3.13 NEMA 4, Enclosures for Electrical Equipment.

2.3.15 IEEE Std. 323, Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations. See Appendix I for WTP specific tailoring (HLW only).

2.3.16 IEEE Std. 344, Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations. See Appendix J for WTP specific tailoring.

2.3.17 ASME B320.20-1999, Below-The-Hook Lifting Devices.

2.3.18 ASME B30.11, Monorails and Underhung Cranes.

2.4 Reference Documents/Drawings

2.4.1 24590-WTP-3PS-G000-T0001, *General Specification for Supplier Quality Assurance Program Requirements*

2.4.2 24590-WTP-3PS-G000-T0002, *Engineering Specification for Positive Material Identification (PMI) for Shop Fabrication*

2.4.3 24590-WTP-3PS-G000-T0003, *Engineering Specification for Packaging, Handling, and Storage Requirements*

2.4.4 24590-WTP-3PS-NWP0-T0001, *Engineering Specification for General Welding and NDE Requirements for Supplier Fabricated Piping*

2.4.5 24590-WTP-3PS-MVB2-T0001, *Engineering Specification for Welding of Pressure Vessels, Heat Exchangers and Boilers*

2.4.6 24590-WTP-3PS-JQ07-T0001, *Engineering Specification for Instrumentation for Package Systems*

2.4.7 24590-WTP-3PS-SS00-T0001, *Engineering Specification for Welding of Carbon Structural Steel*

2.4.8 24590-WTP-3PS-SS00-T0002, *Engineering Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel*

2.4.9 24590-WTP-3PS-FB01-T0001, *Engineering Specification for Structural Design Loads for Seismic Category III and IV Equipment and Tanks*

2.4.10 24590-WTP-3PS-NN00-T0001, *Engineering Specification for Thermal Insulation for Mechanical Systems*

2.4.11 Deleted.

2.4.12 24590-WTP-3PB-P000-TS11V, *Piping Material Classification, Pipe Class S11V*

2.4.13 24590-WTP-3PB-P000-TS11N, *Piping Material Classification, Pipe Class S11N*

2.4.14 24590-WTP-3PS-PV00-T0001, *Engineering Specification for Technical Supply Conditions for Valves*

2.4.14 24590-WTP-3PS-PV00-T0001, *Engineering Specification for Technical Supply Conditions for Valves*

2.4.15 24590-WTP-3PS-JV15-T0001, *Engineering Specification for Actuators for On/Off Valves*

2.4.16 24590-WTP-3PS-EKP0-T0001, *Engineering Specification for Electrical Requirements for Packaged Equipment*

2.4.17 24590-WTP-3PS-MUMI-T0002, *Engineering Specification for Low Voltage Induction Motors*

2.4.18 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*

2.4.19 24590-WTP-3PS-MV00-T0001, *Engineering Specification for Pressure Vessel Design and Fabrication*

2.4.20 24590-WTP-3PS-JQ06-T0005, *Environmental Qualification of Control and Electrical Systems and Components*

2.4.21 24590-WTP-J8-50-00001, *Controls and Instrumentation Radar Installation Wave Guide Spool Joining Details.*

2.4.22 24590-WTP-MV-M59T-00016002, *Vessel Connections Standard Details Sheet 2 of 3*

2.4.23 24590-WTP-3PS-AFPS-T0001, *Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment*

2.4.24 24590-WTP-3PS-G000-T0015, *Engineering Specification for Environmental Qualification of Mechanical Equipment*

2.4.25 24590-WTP-3PS-G000-T0014, *Engineering Specification for Supplier Design Analyses*

2.4.26 24590-HLW-M6-HOP-00011, *P&ID - HLW Melter Offgas System Melter 1 Secondary Offgas Treatment Sheet 3 of 3.*

2.4.27 24590-HLW-M6-HOP-20011, *P&ID - HLW Melter Offgas System Melter 2 Secondary Offgas Treatment Sheet 3 of 3.*

2.4.28 24590-LAW-M6-LVP-00004, *P&ID - LAW Melters Secondary Offgas Vessel Vent Process System Mercury Mitigation Equipment.*

2.4.29 24590-WTP-LIST-CON-08-0001, *Restricted Materials List.*

3 Design Requirements

3.1 General Requirements

3.1.1 The Activated Carbon Bed Adsorbers and support frame shall be designed per this specification, the applicable documents listed in section 2 of this specification, and the MDSs in section 2 of the purchasing documents.

3.1.2 The detailed design of the Activated Carbon Bed Adsorbers shall be performed by personnel who have past experience in the design, fabrication, and testing of Activated Carbon Bed Adsorber banks or HEPA filter banks to meet the requirements set forth in ASME AG-1, ASME AG-1a, and NQA-1. Qualifications for personnel conducting the detailed design of the Activated Carbon Bed Adsorber shall be provided to the Buyer for review.

3.1.3 All calculations, modeling, analyses, drawings, and documentation shall be performed and/or completed using U.S. customary units.

3.1.4 The design of the Activated Carbon Bed Adsorber pressure boundary shall be per the requirements of ASME Boiler and Pressure Vessel Code, Section VIII, Div.1. (Code stamp is not required) Design pressure used shall be as specified on the MDSs. Design temperature shall be determined by Seller based on thermal analysis specified in section 3.13.5 for conditions generated during a carbon bed fire.

3.1.5 The design of the Activated Carbon Bed Adsorbers shall be per Seller and shall meet the performance requirements of this specification, appendices, and MDSs in section 2 of the purchasing documents.

3.1.6 Each Activated Carbon Bed Adsorber shall be equipped with a fire suppression system. Fire detection shall include a combination of CO monitors and carbon bed temperature monitors for fire detection. Refer to P&ID drawings in Section 2 of the MR for additional information related to CO/COx monitors and temperature monitors specific to each HLW and LAW Activated Carbon Bed Adsorber.

For HLW, each fire detection system shall allow the isolation of one carbon bed upon detection of a fire, such that one Activated Carbon Bed Adsorber will not affect the fire detection capability in the other unit. Refer to 24590-HLW-M6-HOP-00011 and 24590-HLW-M6-HOP-20011 for HLW CO monitor and isolation valve configuration requirements.

For LAW, COx monitors shall be located on the inlet and outlet of the Activated Carbon Bed Adsorber unit. LAW Activated Carbon Bed Adsorber unit shall be isolated with pneumatic valves on the inlet and outlet as shown on P&ID 24590-LAW-M6-LVP-00004.

3.1.7 The Activated Carbon Bed Adsorbers shall be designed for carbon bed isolation as the primary means of fire suppression. Seller shall also design a water flood fire suppression system in accordance with applicable requirements of ASME AG-1, subarticle FE-4620, and MDSs in section 2 of the purchasing documents. Pressure Relief shall be treated as an ITS function of the Carbon Bed Adsorbers. Seller shall account for increased pressure inside the carbon bed vessel caused by activation of the fire suppression system and flooding of the carbon bed with water by providing the proper sized PSV for each HLW housing and specifying the required size Rupture Disk for each LAW housing. Seller shall work closely with Buyer in determining required flow-rates for fire suppression water.

3.1.8 The Activated Carbon Bed Adsorber units and all permanently attached appurtenances (i.e. piping manifold, insulation, valves, and maintenance platforms) shall be designed to fit within the space envelope specified on the MDSs in section 2 of the purchasing documents.

3.1.9 Piping including supports shall be designed per the requirements of ASME B31.3 (Process Piping). Flanges used for connection to Buyer's piping shall be class 150 and meet the requirements of ASME B31.3.

3.1.10 The CFD model and analysis, thermal analysis, Activated Carbon Bed Adsorber analysis, and seismic analysis to be provided per this specification must verify that the final detailed design of the Activated Carbon Bed Adsorber and support frame meets the requirements set forth in this specification.

3.1.11 Each Activated Carbon Bed Adsorber Bed unit shall include all items listed or implied including, but not limited to, the following:

- Housing with inlet, outlet, support frame with anchorage provisions, platform supports, discharge filter receiver, piping connections and manifolds for testing and sampling, piping connections for pressure drop indication, insulation supports and hold-downs, lifting lugs, internal baffles, and mixing vanes (if mixing vanes required).
- Fire suppression system, inlet and drain piping, shall be piped to equipment edge with flange.
- Activated Carbon Bed Adsorbers, with pneumatic loading and gravity unloading of activated carbon.
- Platform with grating and guardrails
- (Optional) Monorail and Hoist system in lieu of activated carbon pneumatic loading.

3.1.12 All testing and sampling piping, connections, ports, and manifolds shall be permanently attached to the Activated Carbon Bed Adsorbers and easily accessible for shop and field testing. If required pipe length is not feasible within the space envelope or down stream of carbon bed isolation valves, the Seller shall supply mixing vanes/diffusers to adequately mix test gases in accordance with applicable code requirements. Refer to P&ID drawings in Section 2 of the MR for additional clarification on test port locations. The Seller shall work closely with the Buyer to determine best locations for testing and sampling piping, connections, ports, and manifolds.

3.1.13 The Activated Carbon Bed Adsorbers shall be designed for use with a bag-in/bag-out procedure to be developed by the Seller to facilitate adsorber removal and replacement operations. The Seller shall work closely with the Buyer on developing the bag-in/bag-out procedure.

3.1.14 The Activated Carbon Bed Adsorber shall be designed to attach insulation to the exterior of the pressure boundary. The design shall ensure the insulation is installed per the requirements of Buyer Specification 24590-WTP-3PS-NN00-T0001, *Thermal Insulation for Mechanical Systems* and section 4.3 of this specification.

3.1.15 Confinement of melter offgas is an ITS function of the activated carbon bed adsorber units for both HLW and LAW. Design of the pressure boundary and support frame shall ensure confinement of melter offgas during nominal, maximum, design conditions, and a carbon bed fire DBE. Pressure boundary must be maintained during and post an SC-III DBE.

[redacted] For LAW, Seller to provide design for structural attachment to Buyer supplied embeds. The design shall include a Seller supplied 16" x 16" x 1-1/2" steel plate welded to each embed. The support column shall be attached to the 1-1/2 inch Plate utilizing a bolted connection. Bolt location shall be within the flanges of the column. Buyer to drill and tap the steel plate per the Seller's specified bolt location and size. See Figure 1 for the LAW Structural Attachment Design Requirements.

3.2 Basic Function

3.2.1 General

3.2.1.1 Each offgas stream consists of two (2) Activated Carbon Bed Adsorbers that can be operated in either series or parallel with the ability to isolate one unit for maintenance during operation. During normal operation, the Activated Carbon Bed Adsorbers will operate in a lead/lag series arrangement.

3.2.1.2 The Activated Carbon Bed Adsorber units are located downstream of HEPA filter banks operating with a minimum particulate removal efficiency of 99%.

3.2.1.3 Each Activated Carbon Bed Adsorber unit shall consist of a vessel, connecting piping, air actuated on/off control valves, adsorber bed(s), insulation, water fire suppression system, and a discharge filter.

3.2.2 HLW Activated Carbon Bed Adsorber

3.2.2.1 HLW Activated Carbon Bed Adsorbers shall be used to remove mercury hydrogen chloride hydrogen fluoride, sulfur dioxide, and iodine from the HLW melter secondary offgas HOP system.

3.2.2.2 Each Activated Carbon Bed Adsorber vessel shall be designed with a Seller specified activated carbon media and number of beds to meet performance criteria specified in section 3.4 of this specification and the MDSs in section 2 of the purchasing documents.

3.2.3 LAW Activated Carbon Bed Adsorber

3.2.3.1 LAW Activated Carbon Bed Adsorber shall be used to remove mercury (Hg), iodine (I_2), HCl, and HF from the LAW melter secondary offgas LVP system.

3.2.3.2 Each Activated Carbon Bed Adsorber vessel shall be designed with a Seller specified activated carbon media and beds to meet performance criteria specified in section 3.4 of this specification and the MDSs in section 2 of the purchasing documents. The Seller may supply separate or mixed beds for acid gas removal.

3.3 Optional Electric Preheater

3.3.1 If determined necessary by Seller, to prevent condensate from forming in the activated carbon media during startup or after replacement, the Seller shall propose an electric preheater.

3.3.2 Electric preheater shall use an electric element and fan to preheat the carbon bed upon start-up or after media replacement.

3.3.3 The preheater shall be mounted on a 4 ft by 4 ft skid frame that must be located within the space envelope specified in the MDSs in section 2 of the purchasing documents.

3.3.4 Seller shall submit proposed control system and instrumentation for the preheater in accordance with Buyer specification 24590-WTP-3PS-JQ07-T0001 *Instrumentation for Package Systems*, and with the requirements of this specification.

3.4 Performance

3.4.1 General

3.4.1.1 The Activated Carbon Bed Adsorber units shall be designed for a minimum service life of 40 years. Where specific components cannot meet the specified service requirement, they shall be identified, and a mechanism for their replacement and/or maintenance shall be incorporated into the design. Refer to section 10.1.12 of this specification for additional component design reliability requirements.

3.4.1.2 The Activated Carbon Bed Adsorbers shall be designed for a minimum adsorbent life expectancy as required by the MDSs when operating 8,760 hours per year.

3.4.1.3 As applicable to design, the root mean square of the velocities in a traverse shall be within ± 20 % of the average velocity across the front face of the Activated Carbon Beds. If required, ports shall be provided on one foot intervals to confirm velocity distribution.

3.4.1.4 Instrumentation, valves, and related appurtenances shall meet the performance requirements of Buyer specification 24590-WTP-3PS-JQ07-T0001, *Instrumentation for Package Systems*.

3.4.1.5 Actuators for On/Off valves shall meet the performance requirements of Buyer specification 24590-WTP-3PS-JV15-T0001, *Actuators for On/Off Valves*.

3.4.2 HLW

3.4.2.1 Refer to MDSs in Section 2 of the purchasing documents for specified mercury hydrogen chloride, hydrogen fluoride, sulfur dioxide, and iodine decontamination factors (DF)/removal efficiencies and carbon media design life requirements.

3.4.2.2 Seller shall affirm activated carbon media performance utilizing Buyer Third Party Warranty and Permit Testing results in accordance with Appendix B and C of this specification.

3.4.3 LAW

3.4.3.1 Refer to MDS in Section 2 of the purchasing documents for specified mercury, iodine, HCl, and HF decontamination factors (DFs)/removal efficiencies and carbon media design life requirements.

3.4.3.2 Seller shall affirm activated carbon media performance utilizing Buyer Third Party Warranty and Permit Testing results in accordance with Appendix B and C of this specification.

3.5 Design Conditions

3.5.1 The Activated Carbon Bed Adsorber units shall be designed to meet design conditions specified in the MDSs in Section 2 of the purchasing documents.

3.5.2 The Activated Carbon Bed Adsorber units shall be considered non-ESF as defined in ASME AG-1, Article AA-1000.

3.5.3 The Activated Carbon Bed Adsorber units shall be designed to meet Level C service limits as defined in ASME AG-1, Paragraph AA-4214.

3.6 Environmental Conditions

3.6.1 The HLW and LAW Activated Carbon Bed Adsorber units will be installed indoors. See Equipment Environmental Qualification data, located in the MDSs, for additional room environmental conditions.

3.6.2 Prior to installation, the Activated Carbon Bed Adsorber units may be stored outdoors at ambient temperature extremes ranging from (-)35 °F dry-bulb to 118 °F dry-bulb and a relative humidity of 0 to 100%.

3.6.3 Deleted

3.6.4 Control and electrical equipment shall be exposed to the room environment conditions listed on the Equipment Environmental Qualification data, located in the MDSs.

3.6.5 Mechanical equipment/components required to meet credited safety functions of confinement of melter offgas (HLW and LAW) shall be designed and fabricated to meet environmental qualifications in accordance with engineering specification 24590-WTP-3PS-G000-T0015, *Engineering Specification for Environmental Qualification of Mechanical Equipment*, for a mild environment.

3.7 Mechanical Requirements

3.7.1 General

3.7.1.1 Sample ports shall be provided downstream of each bed for monitoring HCl and HF.

3.7.1.2 Each carbon bed shall be equipped with three (3) vertical and three (3) horizontal ports to obtain physical samples at three locations within the bed. The Seller shall provide special tools to physically retrieve samples. Seller may also propose the use of cylindrical media samples located external to the housing.

3.7.1.3 Valves and actuators shall meet the requirements of Buyer specification 24590-WTP-3PS-PV00-T0001, *Technical Supply Conditions for Valves*, and 24590-WTP-3PS-JV15-T0001, *Actuators for On/Off Valves*. Valve type, fail position, material, and flange requirements shall be as specified on the MDSs in section 2 of the purchasing documents. Refer to P&ID

24590-HLW-M6-HOP-00011 and 24590-HLW-M6-HOP-20011 for HLW and P&ID 24590-LAW-M6-LVP-00004 for LAW.

3.7.2 Loading System

3.7.2.1 Pneumatic loading shall lift activated carbon media to the fill chute. The carbon media shall be gravity loaded through the fill chute.

3.7.2.2 Pneumatic loading system shall be complete with hopper, piping, vacuum blower, mounting equipment, and air filters necessary to safely lift the activated carbon adsorbent media. If determined necessary by Seller, vibration equipment shall be designed and supplied for loading of the carbon media into the Activated Carbon Bed Adsorbers.

3.7.2.3 The loading equipment shall be transferable to other Activated Carbon Bed Adsorber units within that facility. Rate of loading shall be specified by the Seller to minimize possible damage or degradation of the Activated Carbon Media.

3.7.2.4 Transferable loading equipment may be located in maintenance aisle ways as shown in the MDSs in section 2 of the purchasing documents. Location shall be specified by the Seller. Seller shall work closely with the Buyer with respect to equipment size.

3.7.2.5 If permissible in the equipment space envelope required on the MDSs, Seller may propose an alternative loading system using a monorail and hoist to lift carbon media super sacks for bulk loading. Monorail and hoist system shall be designed and tested in accordance with the applicable requirements of ASME B30.11, Monorails and Underhung Cranes and DOE-RL-92-36, Hanford Site Hoisting and Rigging Manual. Testing shall include the following at a minimum:

- Operational Test
- Load Test

3.7.3 Unloading System

3.7.3.1 Spent carbon media shall be gravity unloaded directly into 55 gal drums for disposal. Seller shall allow for clearance of the 55 gal drum and bag-in/bag-out operations in accordance with applicable code requirements. If required to meet the space envelope specified in the MDSs, the Seller may propose the use an unloading system to elevate the carbon media into a 55 gal drum. Buyer prefers to use loading equipment for unloading.

3.7.3.2 If determined necessary by Seller, vibration equipment shall be designed and supplied for unloading of the carbon media.

3.7.3.3 Spent carbon is considered hazardous and potentially radioactive and must be contained during unloading through the use of a bag-out procedure as required in section 3.11 of this specification.

3.8 Discharge Filter Requirements

3.8.1 The discharge filters for the Activated Carbon Bed Adsorber units shall be rated at a minimum for the design temperature indicated on the MDS's, with an efficiency of 99% at 5 microns and have a minimum capacity of two (2) times the design flowrate. Each discharge filter shall also be equipped with a differential pressure gage to measure pressure drop across the filter.

3.9 Lifting Requirements

3.9.1 Lifting lugs shall be installed on each Activated Carbon Bed Adsorber unit for balanced lifting and handling. Seller shall identify the weight and center of gravity of each unit and submit a report for Buyer review.

3.9.2 All lifting points shall be designed and tested in accordance with the requirements of Buyer specification 24590-WTP-3PS-G000-T0003, *Packaging, Handling, and Storage Requirements*. The allowable design stress shall equal the applicable code allowable design stress at ambient temperature.

3.9.3 The lifting lugs shall be designed in accordance with ASME B30.20 - 1999 Below-The-Hook Lifting Devices, to permit lifting of the Activated Carbon Bed Adsorber units without distortion or damage to the components or lifting lugs.

3.9.4 Lifting lugs shall be accessible without removal of covers and guardrails.

3.9.5 The lifting lugs must accept standard lifting equipment. Chain blocks or braiding shall not be permitted. If applicable, the lifting lugs shall be designed to accept Crosby shackles or equivalent meeting Federal Specification RR-C-271D.

3.9.6 Sampling and testing connections and ports shall not be used for lifting.

3.9.7 Seller shall provide any special designed equipment that is required to handle the component and is not available from a commercial source. Such equipment may include but is not limited to rigging devices such as spreader beams, structural lifting devices, strongbacks, and yokes. Rigging devices shall be designed, tested, and tagged in accordance with the applicable requirements of DOE-RL-92-36, Hanford Site Hoisting and Rigging Manual.

3.9.8 All lifting points on the Activated Carbon Bed Adsorber units shall be proof tested in shop. Test and examination certificates shall be provided to the Buyer for review.

3.10 Loadings

3.10.1 The Activated Carbon Bed Adsorber and support frames shall be self-supporting, capable of carrying the static loads of components, thermal expansion loads (including Carbon bed fire), seismic loads, full flood fire suppression water loads, and capable of handling the stresses imposed during shipment, installation, and operation. Full flood fire suppression water loads are not required to be included in combination with the seismic loads.

3.10.2 Loads to be considered for the structural design of the Activated Carbon Bed Adsorbers and support frame shall be in accordance with applicable codes, standards, and reference

documents listed in section 2 of this specification. As a minimum, loadings and stresses to be imposed shall meet Level C service limits as described in ASME AG-1, Paragraph AA-4214 and be in accordance with Buyer specification 24590-WTP-3PS-FB01-T0001, *Engineering Specification for Structural Design Loads for Seismic Category III and IV Equipment and Tanks*. A component response factor of Rp = 3.0 shall be used for seismic analysis for the LAW activated carbon adsorbers.

3.10.3 Loads and stresses imposed for design of the vessel housings shall be in accordance with ASME Boiler and Pressure Vessel Code, Section VIII, Div. 1.

3.10.4 Nozzle design shall consider seismic, thermal, and combination loads. Loads shall be in accordance with the requirements of the MDSs in section 2 of the purchasing documents.

3.11 Bag-in/Bag-out Procedure Requirements

3.11.1 Seller shall provide a detailed bag-in/bag-out procedure using a pneumatic loading system and gravity unloading of the Activated Carbon Bed Adsorber media and discharge filters using PPE, bags, a glovebag (if required), and special tools. Procedure shall assume carbon bed is isolated and not in operation. If unloading system is used, Seller's bag-out procedure shall include this additional equipment.

3.11.2 Bag-in/bag-out procedure shall note the necessary steps needed to safely bag-out media after a water deluge (i.e. additional drying of media, vibration, etc.).

3.11.3 Procedure shall include proposed means of activated carbon adsorbent media delivery (i.e. 40 lb bags, 55 gal drums, etc.).

3.11.4 Seller shall work with Buyer to determine PPE requirements to be included in the procedure for personnel conducting adsorbent and filter removal and replacement.

3.11.5 If a glovebag is required to perform the bag-in/ bag-out procedure, it shall conform to AGS-G001, and ERDA 76-21, Paragraph 2.2.1 and Chapter 7. Seller shall work with Buyer to determine whether or not a glovebag will be necessary.

3.11.6 Drawings of bags and glovebag (if glovebag is required) to be used shall be included in the bag-in/bag-out procedure. Drawings shall show configuration with dimensions and identify any equipment, filters, either/or apparatus to be an integral part of the bags and glovebag. Drawings shall also identify material, manufacturer, either/or model numbers of all bag and glovebag components.

3.11.7 The bag-in/bag-out procedure shall be written to ensure that confinement is not broken at any time.

3.11.8 Personnel shall not need to break the plane of the pressure boundary or discharge filter access openings at any time to perform the bag-in/bag-out procedure.

3.12 CFD Model and Analysis Requirements

3.12.1 The 3-D CFD model, required per section 1 of this specification, shall demonstrate the effects of internal structures and components on offgas flow distribution through the Activated Carbon Bed Adsorbers.

3.12.2 The 3-D CFD model shall include the following components of the Activated Carbon Bed Adsorber units:

- Housing including inlet (with transition fittings and necessary inlet piping to model turbulent flow entering the unit), outlet, inlet plenum, outlet plenum, discharge filter, manifolds for testing and sampling, and any required internal baffles, mixing vanes, and/or cross-venting holes.
- Activated carbon bed(s).

3.12.3 The 3-D graphical results from the CFD model shall include:

- Analysis of changes to the Activated Carbon Bed Adsorber units to enhance offgas flow effectiveness.
- Analysis of the effect of including additional baffles, mixing vanes, and/or cross-venting holes as required to study local offgas flow effects to achieve uniform offgas flow distribution through the adsorbers.
- Analysis of changes to the Activated Carbon Bed Adsorber units to minimize the overall dimensions.

3.12.4 The 3-D graphical results from the CFD model shall demonstrate uniform offgas distribution through the adsorber beds at 75% of the design flowrate with ± 10 % variation in flowrate.

3.12.5 Provide pressure drop to velocity relationship per adsorber bed(s) as part of the CFD analysis based on carbon media testing.

3.12.6 The Seller shall provide the documented results from the 3-D CFD analysis in report form to the Buyer. The CFD report shall provide a complete offgas flow analysis and shall include 3-D graphical results of the model and any calculations performed. The reports shall, at minimum, include:

- Definition of analysis objective
- Identification of equipment for analysis
- General description of equipment supplemented by drawings and sketches
- Functional requirements per this specification
- Purpose of analysis
- Definition of design criteria and inputs with corresponding sources
- Results of literature searches and other applicable background data
- Applicable codes, standards, and reference documents per section 2 of this specification broken down by chapter, section, and paragraph, as applicable
- Analysis methodology
- Description of computer(s) used to conduct analysis

- Description of software/computer programs used for modeling and any calculations and limitations, justification for choice of program, and evidence and description of program validation method.
- Assumptions (indicate those that must be verified as the design proceeds)
- Analyses conducted with results
- Summary of analysis results
- Conclusions
- Location for Buyer review signatures

All assumptions shall be plainly identified and data present (including their uncertainty) with precise logic. Actual accomplishments of the work shall be clearly stated.

3.12.7 The final CFD report shall convey information to several disciplines, many of whom may be less familiar with the general subject than the authors. Care shall be taken to use simple statements and expressions and to make statements as concise as possible. If highly technical terms are necessary, they shall be adequately explained and defined.

3.13 Thermal Requirements

3.13.1 Refer to MDSs in section 2 of the purchasing documents for mechanical design data pertaining to thermal design information.

3.13.2 Thermal analyses shall include the effects of stresses resulting from potential variations in temperatures due to startup, normal operation, shutdowns, carbon bed fire, and thermal cycling of the Activated Carbon Bed Adsorber units. Analyses shall determine nozzle deflections in all directions per thermal expansion or other approved method. The calculations shall consider that the maintenance platforms shall be connected together with mechanical fasteners during normal operation.

3.13.3 Thermal analyses shall confirm the insulation temperature of Seller selected insulation and all exterior uninsulated portions of the Activated Carbon Bed Adsorber units with potential for personnel exposure, do not exceed 140 °F at maximum design temperature, in accordance with the requirements of Buyer specification 24590-WTP-3PS-NN00-T0001, *Thermal Insulation for Mechanical Systems*. Thermal calculations shall also confirm heat loss to the room is within the requirements of the MDSs. Refer to section 4.3 of this specification for addition insulation requirements.

3.13.4 The thermal analyses shall confirm the thickness and extent of insulation required on the bottom of the Activated Carbon Bed Adsorber units so that the average temperature of the Buyer's concrete foundation directly under and within three feet of the skid boundary does not exceed 100 °F.

3.13.5 Seller shall perform a thermal analysis to determine and define the thermal conditions generated during a carbon bed fire. This analysis shall define the maximum and design temperatures for the carbon bed pressure boundary and isolation valves. Seller shall determine equilibrium design temperature for a carbon bed fire based on Seller specified CO/COx analyzer set points and the carbon bed being isolated. This equilibrium design temperature shall be used in ASME Boiler and Pressure Vessel Code, Section VIII, Div.1 calculations for design of the Activated Carbon Bed Adsorber pressure boundary. If determined necessary, based on Seller operating procedures, operators shall have the option of

activating the water deluge fire suppression system. Seller shall assume a minimum response time of one hour or any operator action. Design temperature determined by this thermal analysis shall confirm valve selection (valve material, seat material, leak tightness, etc.) for pressure boundary valves and process isolation valves.

3.14 Activated Carbon Bed Adsorber Design Analysis Requirements

3.14.1 The Seller shall conduct and submit separate Activated Carbon Bed Adsorber design analyses for LAW and HLW facilities. The design analysis of the Activated Carbon Bed Adsorber units shall be conducted by an Activated Carbon Bed Adsorber expert to determine the expected adsorbent changeout frequency for the final Activated Carbon Bed Adsorber design. Seller shall provide personnel qualifications to the Buyer for review prior to beginning adsorber design.

3.14.2 Analysis shall be conducted considering operation of the Activated Carbon Bed Adsorber units at design conditions outlined in this specification and MDSs.

3.14.3 Analysis shall determine expected adsorbent changeout frequency based on the gas composition and load information specified in the MDSs in Section 2 of the purchasing documents.

3.14.4 Assume that the offgas flow through the Activated Carbon Bed Adsorbers may vary as much as ± 10 % from the design flowrate specified in the MDSs in section 2 of the purchasing documents.

3.14.5 Seller shall provide the documented results of the Activated Carbon Bed Adsorber analysis with any graphical results, as applicable, in report form to the Buyer prior to fabrication. Refer to section 3.12.6 and 3.12.7 for the minimum requirements of the report.

3.14.6 The final Activated Carbon Bed Adsorber design analysis report shall convey information to several disciplines, many of whom may be less familiar with the general subject than the authors. Care shall be taken to use simple statements and expressions and to make statements as concise as possible. If highly technical terms are necessary, they shall be adequately explained and defined.

3.14.7 LAW analysis shall include Buyer designed and installed Radar Guide Tube piping and supports as required per this specification and the MDS's.

3.15 Electrical Requirements

3.15.1 Electrical equipment necessary to meet the requirements of this specification and appendices shall be designed, fabricated, and tested in accordance with Buyer specification 24590-WTP-3PS-EKP0-T0001, *Electrical Requirements for Packaged Equipment*.

3.15.2 The Buyer will provide a single feed for each HLW Activated Carbon Bed Adsorber unit. The Seller shall be responsible for determining electrical load and for the distribution of power within the HLW Activated Carbon Bed Adsorber unit. The Seller shall provide a disconnect switch at the connection point for the Buyer's power feed for each Activated Carbon Bed Adsorber.

3.15.3 Delete

3.15.4 Motors shall operate continuously under running conditions at rated load and meet the requirements of Engineering Specification 24590-WTP-3PS-MUMI-T0002, *Low Voltage Induction Motors*.

3.15.5 The Buyer will provide a single feed for each LAW Activated Carbon Bed Adsorber unit to Buyer supplied electrical disconnect. The Buyer will be responsible for determining the electrical load and for the distribution of power within the LAW Activated Carbon Bed Adsorber unit.

3.16 Instrumentation and Control Requirements

3.16.1 General

3.16.1.1 Instrumentation included in the Seller's scope of work shall meet the requirements of Buyer specification 24590-WTP-3PS-JQ07-T0001, *Instrumentation for Package Systems*. For general instrumentation scope refer to P&ID 24590-HLW-M6-HOP-00011 and 24590-HLW-M6-HOP-20011 for HLW and P&ID 24590-LAW-M6-LVP-00004 for LAW.

For the HLW Activated Carbon Bed Adsorber Unit, the Buyer shall provide the appropriate ABB control system components (i.e. I/O modules, power supplies) to the Seller for fabrication into the Seller's control panel. Seller shall provide non-ABB manufactured equipment (fiber optic converters, fiber optic patch cables and plates, terminals, circuit breaker, wiring, etc.), and panel fabrication. Seller shall design their control panel to utilize the ABB control system equipment and provide a General Arrangement drawing with a Bill of Materials identifying all parts to be provided by the Buyer. Seller shall provide I/O list for all instruments. Seller shall provide control narrative, logic drawings, and related items as specified in 24590-WTP-3PS-JQ07-T0001, *Instrumentation for Package Systems*. Buyer shall provide programming according to Seller's specification of the monitoring and control requirements. Buyer shall provide controller, software, and attend and support the factory test of the equipment at the Seller's facility.

3.16.1.2 Delete.

3.16.2 Activated Carbon Bed Adsorber

3.16.2.1 The following instruments shall be included with the HLW Activated Carbon Bed Adsorber Units as a minimum, refer to section 1.6 of this specification for additional QA with subsequent testing requirements for these instruments:

- Inlet temperature elements, thermowell, and indicating transmitter on inlet to each Activated Carbon Bed.
- Inlet CO analyzer sample collection tap and return for Buyer supplied ITS CO analyzer.

- Differential pressure indicating transmitter on each Activated Carbon Bed Adsorber vessel.
- Carbon Bed temperature elements, thermowells, and indicating transmitter. (two for each guard media and two for each primary media).
- Radar level indicator for each Activated Carbon Bed Adsorber vessel.
- Differential pressure indicating transmitter on each discharge filter.
- Outlet CO analyzer sample collection tap and return for Buyer supplied ITS CO analyzer.
- Delete.
- Mercury monitor sample tap from each Activated Carbon Bed Adsorber with common return for Buyer supplied mercury analyzer. See Figure 3 for Mercury monitor sample tap requirements.

See P&ID 24590-HLW-M6-HOP-00011 and 24590-HLW-M6-HOP-20011 for additional Seller and Buyer instrumentation and control scope.

3.16.2.2 The following instruments shall be included with the LAW Activated Carbon Bed Adsorber Units as a minimum, refer to section 1.6 of this specification for additional QA with subsequent testing requirements for these instruments:

- Two (2) Thermowells for Buyer supplied inlet temperature elements (ITS) and indicating transmitters on inlet piping.
- Two (2) inlet COx analyzer sample collection taps and returns for Buyer supplied ITS COx analyzer.
- Tap and return for Buyer supplied differential pressure indicating transmitter on each Activated Carbon Bed Adsorber vessel.
- Thermowell for Buyer supplied Carbon Bed temperature elements and transmitters. (4 total for each housing - two for guard media, two for primary media).
- Taps for two (2) Buyer supplied radar level indicators for each Activated Carbon Bed Adsorber vessel (ITS).
- Tap and return for Buyer supplied differential pressure instrument on each discharge filter (with ISA purges on each pressure leg).
- Thermowell for One (1) Buyer supplied outlet temperature element and indicator.
- Two (2) outlet COx analyzer sample collection taps and returns for Buyer supplied ITS COx analyzer.
- Mercury monitor sample tap from each Activated Carbon Bed Adsorber with common return for Buyer supplied mercury analyzer. See Figure 3 for Mercury monitor sample tap requirements.
- HF/HCl monitor sample tap and return tap for Buyer supplied HF/HCl analyzer.

See P&ID 24590-LAW-M6-LVP-00004 for additional Seller and Buyer instrumentation and control scope.

3.16.2.3 Deleted.

3.16.2.4 As listed in 3.16.2.1 and 3.16.2.2, each Activated Carbon Bed shall have at least four (4) temperature instruments and transmitters. Temperature elements shall be provided with thermowells that meet the inspection and testing requirements per the specified Q quality

level and the requirements of Buyer specification 24590-WTP-3PS-JQ07-T0001, *Instrumentation for Package Systems*. Seller shall work closely with the Buyer in determining the location of the temperature instruments.

3.16.2.5 As listed in 3.16.2.1 and 3.16.2.2, each Activated Carbon Bed vessel shall have radar level indicator(s). Radar level indicators shall be Ohmart-Vega meeting Appendix B requirements of Buyer specification 24590-WTP-3PS-JQ07-T0001, *Instrumentation for Package Systems*. Seller proposed substitutions shall be well documented as to the relative technical advantages and exclude commercial considerations.

3.16.2.6 Seller shall provide control logic required to operate the Activated Carbon Bed Adsorber Units including the fire suppression system in accordance with the performance requirements of this specification and MDSs.

3.16.2.7 The HLW Activated Carbon Bed Adsorber Unit shall be designed with a single instrumentation tie-in point for connection to Buyer's Integrated Control Network (ICN) in accordance with the requirements of Buyer specification 24590-WTP-3PS-JQ07-T0001, *Instrumentation for Package Systems*. Design drawings shall show the location of instrumentation tie-in point. Instrumentation specified ITS shall have a separate tie-in point for connection to Buyer's Programmable Protection System (PPJ) in accordance with section 3.4.4 of Buyer specification 24590-WTP-3PS-JQ07-T0001, *Instrumentation for Package Systems*, and the requirements of IEEE Std. 384.

3.16.2.8 The following instrumentation for HLW are specified ITS and shall have isolated hardwires to Buyer's programmable protection system (PPJ) in accordance with the requirements of section 3.4.4 of Buyer specification 24590-WTP-3PS-JQ07-T0001, *Instrumentation for Package Systems for ITS instrumentation*, and the requirements of IEEE Std. 384.

- Control and electrical components related to HLW Activated Carbon Bed Adsorber pneumatic isolation valves. (Instrument air supply shall have two solenoid valves in series, one solenoid valve is independently hardwired for connection to Buyer's PPJ, the second solenoid valve is wired to the non-ITS control panel. All isolation valves are fail closed. (Refer to P&ID 24590-HLW-M6-HOP-00011 and 24590-HLW-M6-HOP-20011.
- Buyer supplied inlet and outlet CO analyzers for HLW.

3.16.2.9 The following instrumentation shall meet the requirements of Buyer specification 24590-WTP-3PS-JQ06-T0005, *Environmental Qualification of Control and Electrical Systems and Components*.

- Inlet temperature elements for LAW Activated Carbon Bed Adsorbers
- Radar level indicators for LAW Activated Carbon Bed Adsorbers
- Control and electrical components related to HLW and LAW Activated Carbon Bed Adsorber pneumatic isolation valves
- Rupture Disks for LAW Activated Carbon Bed Adsorbers

3.16.2.10 LAW instrumentation shall be remote mounted in adjacent rooms.

3.16.2.11 Delete.

3.16.3 Optional Preheater

3.16.3.1 Seller shall propose control system for electric pre-heater with over heat protection in accordance with section 3.3 of this specification.

3.16.3.2 Proposed control system shall be in accordance with the requirements of Buyer specification 24590-WTP-3PS-JQ07-T0001, *Engineering Specification for Instrumentation for Package Systems*.

3.17 Accessibility and Maintenance

3.17.1 General

3.17.1.1 Accessibility and maintenance requirements shall be per this specification.

3.17.1.2 Seller's recommended accessibility and maintenance requirements for each piece of equipment shall be included in the Seller's applicable submittals.

3.17.1.3 Frequency of inspection and maintenance intervals shall be in accordance with Seller's recommendations.

3.17.1.4 All valves shall be accessible for maintenance and operation. Maintenance and replacement of valves shall be outlined in Seller's operation and maintenance procedures.

3.17.1.5 Seller shall design and supply any special tools required to perform maintenance activities and describe its use in applicable procedures.

3.17.1.6 If the equipment weight (i.e. valves, actuators, loading/unloading equipment, etc.) is in excess of 50 pounds the Seller shall design and supply jib cranes, lifting beams, or rigs in accordance with the requirements of DOE-RL-92-36.

3.17.2 Platform Requirements

3.17.2.1 Equipment, instrumentation, and electrical components that are 6 feet and over from ground level shall be provided with permanent work platforms with fixed ladders/stairs to perform maintenance.

3.17.2.2 The Activated Carbon Bed Adsorber unit maintenance platforms and ladders shall be designed to meet the requirements set forth in 29 CFR 1910, Occupational Safety and Health Standards (OSHA), Subpart D, Walking-Working Surfaces, and AISC 9th Edition.

3.17.2.3 The Activated Carbon Bed Adsorber unit maintenance platforms shall include guardrails. The guardrails shall be made out of piping.

3.17.2.4 The guardrails shall be designed per 29 CFR 1910.23.

3.17.2.5 The minimum live load for the column platforms shall be 100 psf. If platforms are to be used for laydown during maintenance, use a minimum live load of 250 psf.

3.17.2.6 The fixed ladder to be installed on the maintenance platforms shall meet the requirements set forth in 29 CFR 1910.27.

3.17.2.7 The maintenance platforms must be able to be attached to the Activated Carbon Bed Adsorber units without welding after the adsorbers are placed in the HLW and LAW facilities.

3.17.2.8 All openings in guardrails of each Activated Carbon Bed Adsorber unit maintenance platform shall have a safety gate or chain designed per the requirements of 29 CFR 1910.23.

4 Materials

4.1 General

4.1.1 Material used for the pressure boundary including control instrumentation shall comply with Buyer specification 24590-WTP-3PS-G000-T0002, *Positive Material Identification* (PMI) *for Shop Fabrication*. In accordance with the requirements of the PMI specification the Cr, Ni, Mo, content of the pressure boundary materials including weld consumables must be verified before and after fabrication.

4.1.2 Seller shall submit manufacturer cut sheets and MSDSs for all gaskets used for the pressure boundary. All gaskets, seal pads, caulks, and adhesives used must be certified for contact with austenitic stainless steel.

4.1.3 Seller's Activated Carbon Bed Media (the carbon portion of the primary and guard beds) shall have ash content limits established based on materials used in Appendix B and C testing. Seller shall provide a certificate of analysis (COA), which establishes limits for future purchase of replacement Activated Carbon Media.

4.1.4 Performance of the Activated Carbon Bed for removal of HCl, HF, and radioactive iodine (I^{129}) associated with the LAW and HLW offgas system is required. The performance requirements of the HLW Activated Carbon Bed also includes the removal efficiency requirements for SO_2. Calculation of guard bed media design life shall include other acid gases also present in LAW melter offgas (SO_2, HNO_2 and HNO_3).

4.1.5 The Activated Carbon Bed Media shall meet applicable ASTM methods for particle size distribution.

4.2 Construction

4.2.1 Materials used in the construction of the Activated Carbon Bed Adsorber units shall conform to the requirements of ASME AG-1, Article AA-3000, ASME AG-1a, Article HA-3000, this specification, and the MDSs in section 2 of the purchasing documents. Material property and performance data for any materials not covered in ASME AG-1, ASME AG-1a or this specification shall be submitted to the Buyer for review prior to incorporation into the design of the Activated Carbon Bed Adsorber units. All materials in contact with the adsorber and

process piping shall be 300 series stainless steel. Performance data shall indicate that material is acceptable for environmental and specific service conditions.

4.2.2 All materials used in the construction of the Activated Carbon Bed Adsorber units shall be resistant to radiation levels indicated in subsection 3.6 of this specification and be able to operate under environmental and design conditions described in ASME N509 (paragraph 4.4) and MDSs in section 2 of the purchasing documents.

4.2.3 Seller shall maintain a record of ASME or ASTM numbers, material test reports, and manufacturer material certifications for all materials used for construction of the Activated Carbon Bed Adsorber units. Seller shall provide copies to the Buyer.

4.2.4 All materials used in the manufacture of the Activated Carbon Bed Adsorber units, support frames, and shims shall be new and unused. Where specific criteria are not provided, material selection shall be determined by the Seller and have properties and composition suitable for the specific service conditions and consistent with this specification.

4.2.5 Dissimilar metal couples shall be avoided due to corrosion potential.

4.2.6 Activated Carbon Bed Adsorber housing material shall be in accordance with the requirement of the MDSs. Discharge filter covers shall be constructed of 316 L stainless steel.

4.2.7 The Activated Carbon Bed Adsorber support frames, pipe supports, and maintenance platforms shall be made of Carbon Steel. Special attention shall be placed on securing the stainless steel carbon bed adsorbers and piping to the carbon steel support structure to prevent galvanic corrosion.

4.2.8 The discharge filter frame shall be composed entirely of 316 L stainless steel.

4.2.9 Deleted.

4.3 Insulation

4.3.1 The Seller shall provide detailed insulation installation procedures complete with sketches showing methods and details for applying and securing external insulation, metal jacketing, etc., to the Activated Carbon Bed Adsorber Units and necessary piping. The insulation procedures shall be in accordance with PIP INIH 1000 and NACE Standard RP0198, Buyer specification 24590-WTP-3PS-NN00-T0001 *Thermal Insulation for Mechanical Systems*, and this specification.

4.3.2 Procedures for insulation thicknesses greater than three (3) inches shall be applied in multiple layers with staggered joints. Each layer of multiple layer and double insulation shall be held in place separately.

4.3.3 Procedures for insulation installation shall include jacketing the insulation with 304 L stainless steel following the requirements of Buyer specification 24590-WTP-3PS-NN00-T0001 *Thermal Insulation for Mechanical Systems*, and this specification. The stainless steel jacketing shall be 0.024 inches thick flat and smooth sheet. The jacketing shall be furnished in the annealed or soft condition with a regular 2B mill finish and have a factory applied moisture barrier.

4.3.4 Seller shall recommend cements, mastics, and adhesives that will be suitable for the maximum design temperature of the Activated Carbon Bed Adsorber units. The mixing of cements, mastics, etc., shall be done with deionized water. All recommended cements, mastics, adhesives must by certified for contact with austenitic stainless steel.

4.3.5 Procedures shall include cleaning instructions for surfaces to be insulated. Procedures should note that surfaces to be insulated must be dry and free of loose scale, dirt, and oil before the insulation is applied.

4.3.6 The design shall provide for removable/replaceable insulation on flanges, manholes, doors, and access openings.

4.3.7 All recommended insulation components, including facings, mastic, and adhesives, shall meet ASTM E84 fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed. Ratings used are determined by Underwriters Laboratories, Inc. (UL).

4.4 Piping

4.4.1 All applicable materials used for piping and related appurtenances shall be in accordance with the requirements of the MDSs and Buyer specification 24590-WTP-3PB-P000-TS11V *Piping Material Classification Pipe Class S11V*, for HLW, and Buyer specification 24590-WTP-3PB-P000-TS11N *Piping Material Classification Pipe Class S11N*, for LAW.

4.4.2 Special attention shall be placed on securing stainless steel piping to the carbon steel support structure to prevent galvanic corrosion.

4.5 Prohibited Materials

4.5.1 Mercury and other low melting point metals, their alloys, or materials containing such metals as their basic constituents shall not be used in the construction of the Activated Carbon Bed Adsorber units and shims.

4.5.2 Molybdenum and halides shall not be used in direct contact with stainless steel.

4.5.3 Asbestos shall not be included in any component of the Activated Carbon Bed Adsorber units.

4.5.4 Halide containing materials shall not be used in any component of the Activated Carbon Bed Adsorber units, unless otherwise noted in this specification.

4.5.5 Certain materials are restricted from use at WTP. Refer to 24590-WTP-LIST-CON-08-0001, *Restricted Materials List*, for the complete list of restricted materials. The use of any restricted materials requires authorization from WTP Safety Assurance.

4.6 Storage of Special Materials (e.g., stainless steel) prior to work

4.6.1 Stainless steel is susceptible to corrosion caused by the contact and interaction with incompatible materials. All stainless steel material shall be stored in separate areas away from other materials.

4.6.2 Storage of activated carbon and testing media shall be per the manufacturer's instructions to prevent contamination and degradation. Activated carbon and testing media storage requirements and instructions shall be provided by the Seller to the Buyer for review prior to purchase.

5 Fabrication

5.1 General Requirements

5.1.1 The Activated Carbon Bed Adsorber units shall be fabricated per this specification and the applicable documents listed in section 2 of this specification.

5.1.2 ASME Boiler and Pressure Vessel Code, Section VIII, Div. 1 shall only be applied to the fabrication of the housing pressure boundary of the Activated Carbon Bed Adsorber units. The housing pressure boundary shall be fabricated in accordance with ASME Boiler and Pressure Vessel Code, Section VIII, Div. 1. **U-stamp and National Board Registration for the Activated Carbon Bed Adsorbers are not required.**

5.1.3 Identification of fabrication methods shall be included in the detailed design of the Activated Carbon Bed Adsorber units.

5.1.4 All fabrication shall be performed by personnel qualified in accordance with this specification and applicable documents in section 2 of this specification.

5.1.5 Piping shall be fabricated in accordance with the requirements of ASME B31.3 and Buyer specification 24590-WTP-3PS-PS02-T0001, *Shop Fabrication of Piping*.

5.2 Assembly

5.2.1 Flatness of the completed Activated Carbon Bed Adsorbers and support frames shall be 1/8 inch per foot minimum, with no greater than 3/16 inch over the entire length, except for areas around cutouts. Areas around cutouts shall be flat within 1/16 inch per foot.

5.2.2 Cutout locations shall be within ± 1/8 inch and cutout size shall be within ± 1/16 inch.

5.2.3 The Activated Carbon Bed Adsorber units and shims shall have edges that are both smooth and not sharp to the touch.

5.2.4 The method of fabrication shall minimize the number and amount of seams, overlaps, or other discontinuities, which could trap radioactive contamination.

5.3 Tolerances

All tolerances, surface flatness, and finish requirements for assembly and fabrication shall be determined and specified by the Seller when completing the detailed design to meet performance requirements set forth in this specification. At a minimum, all tolerances, surface flatness, and finish requirements shall be per all applicable codes, standards, and reference documents in section 2 of this specification.

5.4 Welding

5.4.1 Seller shall develop detailed welding, weld inspection, NDE, and weld repair procedures for fabrication of the Activated Carbon Bed Adsorber units and submit them to the Buyer for review prior to fabrication. Procedures shall include acceptance criteria. The procedures shall conform to the following, as applicable:

- Buyer Specification 24590-WTP-3PS-SS00-T0001
- Buyer Specification 24590-WTP-3PS-SS00-T0002
- Buyer Specification 24590-WTP-3PS-NWP0-T0001
- Buyer Specification 24590-WTP-3PS-MVB2-T0001 (Pressure Boundary Only)
- ASME AG-1a, Article HA-6000
- ASME AG-1, Articles FE-6000
- ASME Boiler and Pressure Vessel Code, Section VIII, Div. 1 (Pressure Boundary Only)
- ASME B31.3
- AWS D1.6

5.4.2 Activated Carbon Bed Adsorber welding, weld inspection, NDE, and weld repair shall be carried out in accordance with the applicable procedures developed per the previous paragraph.

5.4.3 Activated Carbon Bed Adsorber welder qualifications shall be performed in accordance with requirements of the referenced specifications and codes listed in section 5.4.1 of this specification.

5.4.4 Welding or material manipulation shall be carried out indoors and only when the ambient, piping, or plate temperature is above 41°F, or higher where elevated temperatures are called for by a process.

5.4.5 Personnel performing Activated Carbon Bed Adsorber weld inspections shall be qualified in accordance with ASME AG-1, Paragraph AA-6335, ASME Boiler and Pressure Vessel Code, Section VIII, Div. 1, Buyer specification 24590-WTP-3PS-SS00-T0002, *Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel* and 24590-WTP-3PS-SS00-T0001, *Specification for Welding of Structural Carbon Steel.*

5.4.6 Repairs required as a result of weld rejection by either the Seller's or Buyer's inspection shall be fully documented in accordance with Seller's Quality Assurance Program (QAP). Activated Carbon Bed Adsorber weld repairs shall be performed in accordance with ASME AG-1, subsubarticle AA-6330 and ASME Boiler and Pressure Vessel Code, Section VIII (housing pressure boundary only). Weld repair records shall be included with Seller's quality verification document package to be submitted to Buyer.

5.4.7 Joints and seams shall be fabricated in accordance with ASME AG-1a, subsubarticle HA-4330 and ASME Boiler and Pressure Vessel Code, Section VIII (housing pressure boundary only).

5.4.8 Welding procedures and welder qualification records shall be submitted to Buyer for review and permission to proceed prior to start of fabrication. Each procedure shall be prepared and

qualified in accordance with the requirements of the listed standards in section 5.4.1 of this specification.

5.4.9 Seller shall submit a weld verification report including a weld map which identifies the specific weld procedure and NDE procedure utilized for each weld joint.

5.4.10 If the vendor opts to perform CGD on the 18" bellows, thermowells, and /or 18-inch welded elbows and tees in accordance with BNI accepted CGD plans then the requirements of sections 5.4.1, 5.4.8 and 5.4.9 do not apply to these items.

5.5 Coating

5.5.1 Seller shall provide coating for carbon steel surfaces in accordance with 24590-WTP-3PS-AFPS-T0001, *Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment*, Appendix D, Item # 8.20. System code D applies.

5.5.2 Coating finish color shall be in accordance with 24590-WTP-3PS-AFPS-T0001, *Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment,* Appendix E, ANSI 70 Gray.

5.5.3 All carbon steel to stainless steel weld areas shall remain free of any zinc filled coatings, such as the P02 primer contained in system code D. Surfaces that were previously coated with zinc filled material, and subsequently ground off, are considered to be contaminated with zinc. Stainless steel shall not be welded to these surfaces.

5.5.4 Zinc filled coatings shall be held back from the carbon steel to stainless steel welds by 3 to 4 inches for shop welds and 4 to 5 inches for field welds. Coating hold back requirements are further defined in 24590-WTP-3PS-AFPS-T0001, *Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment*, section 2.2.1.

5.5.5 The following coating materials may be applied directly to stainless steel surfaces:

- Sherwin Williams Macropoxy 646
- Carboline Carbogard 890

5.5.6 Insulated surfaces (applicable only to carbon steel in contact with stainless steel) with an operating temperature no greater than 200 °F shall be coated with system code H (see 24590-WTP-3PS-AFPS-T0001, *Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment*, Appendix C, Table 2, limited to the coating materials listed in section 5.5.5 above). The coating shall be applied to all carbon steel surfaces overlapping 1 inch on to the stainless steel. Insulated surfaces (applicable only to carbon steel in contact with stainless steel) with an operating temperature from 200 °F to 300 °F shall be coated with system code G (see 24590-WTP-3PS-AFPS-T0001, *Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment*, Appendix C, Table 2). The coating material specified for use in system code G is not acceptable for direct application over stainless steel surfaces or stainless steel to carbon steel welds. Coat carbon steel surfaces with system code G to within 1-2 inches of the carbon steel-stainless steel weld. Do not overlap coating onto weld area or onto stainless steel material. Zinc primers without top-coating and hot dip galvanizing are not acceptable on surfaces that will be insulated.

5.5.7 Carbon steel components of gratings, platform assemblies, ladder assemblies, crane rail, and supports shall be hot dip galvanized in accordance with 24590-WTP-3PS-AFPS-T0001, *Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment,* Appendix D, Note 15.

5.5.8 Components that are coated to manufacturer's standard shall be in accordance with 24590-WTP-3PS-AFPS-T0001, *Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment,* section 6.2.1.2.

6 Tests and Inspections

6.1 General Requirements

6.1.1 The Activated Carbon Bed Adsorber units shall be tested and inspected per this specification, applicable documents listed in section 2 of this specification, and all appendices, addenda, and attachments. Seller shall submit shop and field test plans for Buyer review.

6.1.2 Seller shall conduct and be responsible for all testing and inspections required per this specification, applicable codes, applicable standards, and reference documents.

6.1.3 Seller shall submit a detailed test and inspection plan identifying all the inspections and tests planned, including recommended witness and hold points. Buyer's inspector will advise the Seller of witness and hold points and identify the shop tests that the Buyer intends to witness.

6.1.4 Seller shall develop and submit to Buyer detailed test procedures for conducting all shop and field acceptance testing required per this specification, applicable codes, standards, and reference documents for review by the Buyer prior to Activated Carbon Bed Adsorber fabrication. Procedures shall include acceptance criteria and detailed drawings of the shop and field testing configurations. Seller shall identify on drawings location of taps, ports, piping connections, and/or manifolds made on housing and ductwork in order to take measurements during shop and field tests. These taps, ports, piping connections, and/or manifolds shall be temporarily capped for use in the field during acceptance testing. Seller shall provide instructions on permanently sealing these taps after field acceptance testing. Drawings shall be scalable and shall include plan and elevation views of the following:

- Activated Carbon Bed Adsorber
- Any Seller furnished materials, fittings, and ductwork required to perform the tests
- Seller furnished discharge filter(s)
- All Seller furnished equipment, apparatus, and instrumentation

6.1.5 Seller shall develop and submit to Buyer detailed testing and inspection procedures for conducting all testing and inspections required per this specification, applicable codes, standards, and reference documents for review by the Buyer prior to Activated Carbon Bed Adsorber fabrication.

6.1.6 Seller shall complete reports of all testing and inspections and submit them to Buyer. Reports shall identify the component tested, date performed, applicable test procedure, acceptance

criteria, person performing the test or inspection, test results, and conclusions. Drawings of test setups shall be included. All testing and inspection results shall be certified.

6.1.7 Control and calibration of measuring and test equipment shall be in accordance with ASME AG-1, subarticle AA-5130.

6.1.8 All shop testing and inspection instruments used to conduct testing on the Activated Carbon Bed Adsorber units shall meet the requirements set forth in ASME AG-1, Article TA-3000. All testing and inspection instruments shall be in calibration and traceable to the appropriate national standard.

6.1.9 Any non-conforming work, in accordance with Seller's acceptance criteria, shall be redone by the Seller at Seller's cost.

6.2 Weld Testing and Inspection

6.2.1 Activated Carbon Bed Adsorber welds shall be inspected, examined, and tested in accordance with ASME AG-1, subarticle AA-6330, ASME Boiler and Pressure Vessel Code, Section VIII, Div. 1 (housing pressure boundary only), and Buyer specification 24590-WTP-3PS-MV00-T0001, *Pressure Vessel Design and Fabrication*.

6.2.2 Activated Carbon Bed Adsorber support frame welds shall be inspected, examined, and tested in accordance with Buyer specification 24590-WTP-3PS-SS00-T0002, *Engineering Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel* and 24590-WTP-3PS-SS00-T0001, *Engineering Specification for Welding of Carbon Structural Steel.*

6.2.3 Piping shall be inspected, examined, and tested in accordance with ASME B31.3, Buyer specification 24590-WTP-3PS-PS02-T0001, *Shop Fabrication of Piping*, and Buyer specification 24590-WTP-3PS-NWP0-T0001, *General Welding and NDE Requirements for Supplier Fabricated Piping.*

6.2.4 As applicable, per code requirements, Seller shall submit Radiographic, Liquid Penetrant, and Ultrasonic Examination procedures for review, prior to fabrication.

6.2.5 Exposed radiograph film must be submitted along with technique and reader sheets. Film must be packaged in such a manner as to preclude moisture and handling damage.

6.3 Personnel Qualifications

6.3.1 All inspection and testing shall be performed by personnel qualified per the requirements set forth in this specification and all applicable documents in section 2 of this specification.

6.3.2 Seller shall submit personnel qualification documents, including years of experience for Seller's inspection and test personnel, for Buyer review.

6.4 Laboratory Tests

6.4.1 Seller shall conduct and be responsible for laboratory testing of Activated Carbon Media in accordance with appendix A of this specification. The laboratory test shall be conducted in accordance with the applicable sections of NQA-1. The test plan shall include a matrix cross-referencing the QA requirements to implementing procedures for the work and justifying elements that are not applicable.

6.4.2 Seller shall submit laboratory test plan and procedures for Buyer review prior to the start of testing in accordance with the requirements of the G-321-E in section 3 of the purchasing documents and Appendix A of this specification.

6.4.3 A final report shall be submitted for Buyer review in accordance with the requirements of section 10.7 and Appendix A of this engineering specification. The final report shall support the engineering design of the Activated Carbon Bed Adsorber Units. Any effects related to the design of the Activated Carbon Bed Adsorber Units shall be identified in the final report.

6.4.4 The Buyer will be responsible for performing Third Party Testing, and preparation of the Third Party Test Plans and Reports (required by section 10.7) of Activated Carbon Media performance in accordance with Appendix B & C of this specification. The Seller shall be responsible for the performance of the Activated Carbon Media in accordance with this specification and associated mechanical data sheet requirements. Seller shall review the Buyer Third Party Test Plans and Test Reports and sign as a mandatory reviewer on these documents. Seller shall also be responsible for review of Buyer Third Party preliminary data summary reports furnished after completion of each test segment (includes summary of primary observations, graphs of key process variables, copies of the log book entries and electronic data). For Appendix B & C testing, the Seller shall be responsible for participating in conference calls and meetings associated with testing progress reports and resolution of technical issues encountered during the test. Seller shall be available for an on site inspection and sign on mandatory witness and hold points pertaining to Activated Carbon Media conditioning and steady state operating conditions for Appendix B and C of this specification. The Seller shall provide separate reports for HLW and LAW, utilizing Appendix B & C the Buyer Third Party Test results, demonstrating that the Activated Carbon Bed Adsorbers and Activated Carbon Media performance requirements delineated in this specification and associated mechanical data sheets, are met. Seller's final report shall identify any effects related to the design of the Activated Carbon Bed Adsorber Units.

6.5 Shop Tests

6.5.1 Seller shall provide all materials, labor, tools, equipment, apparatus, instrumentation, testing media, and challenge gas to conduct all shop testing on the Activated Carbon Bed Adsorber units.

6.5.2 All shop tests requiring that adsorbent media be installed in the Activated Carbon Bed Adsorber units shall be conducted using activated carbon. The Seller shall ensure that the Activated Carbon Bed Adsorber does not become contaminated or degraded at any time before, during, or after completion of shop testing.

6.5.3 Testing media shall be loaded into adsorber cells and tested per applicable sections of ASME AG-1, Article FE-5000. Seller shall issue manufacturer's information for testing media to the Buyer for review prior to purchase.

6.5.4 Electrical and instrumentation tests shall be conducted in accordance with the requirements of Buyer specification 24590-WTP-3PS-EKP0-T0001, *Electrical Requirements for Packaged Equipment*, and 24590-WTP-3PS-JQ07-T0001, *Instrumentation for Package Systems*. Electrical and instrumentation test reports shall be submitted for Buyer review.

6.5.5 Seller shall conduct the following acceptance tests in the shop on each unit using air at ambient temperature, prior to shipment:

- Visual Inspection
- Structural Capability Test
- System Bypass Test
- Mechanical Test
- Differential Pressure Test
- Airflow Distribution Test
- Electrical Air Heater Performance Test (per design)

All Activated Carbon Bed Adsorber shop acceptance testing procedures shall conform to ASME AG-1 (Section TA), N509 (Section 9), N510, and ERDA 76-21 (Chapter 8).

6.5.6 Deleted.

6.5.7 The Activated Carbon Bed Adsorber pressure boundary shall be Bubble Tested per ASME Boiler and Pressure Vessel Code, Section V, Nondestructive Examination, Appendix I - Direct Pressure Technique. Sensitivity of the test shall not be less than 10-3 atm-ml/sec under test conditions.

6.5.8 Structural Capability Test: Conduct at pressure and conditions specified in the MDSs.

6.5.9 System Bypass Test: At ± 10 % of design flowrate through the Activated Carbon Bed Adsorber, challenge gas leakage rate shall not exceed 0.1 % at 99.9 % efficiency.

6.5.10 All test results shall be documented, certified, and submitted to the Buyer for review.

6.6 Site Tests

All Activated Carbon Bed Adsorber field acceptance testing procedures shall conform to ASME AG-1 (Section TA), N509 (Section 9), N510, and ERDA 76-21 (Chapter 8).

6.7 Bag-in/Bag-out Procedure Demonstration

6.7.1 Demonstration shall be conducted in Seller's shop on one (1) of the fully assembled Activated Carbon Bed Adsorber units and witnessed by Buyer's Representatives. The Activated Carbon Bed Adsorber to be used for the demonstration shall be chosen by the Buyer.

6.7.2 Demonstration shall include removal and replacement of one (1) activated carbon adsorber bed adsorbent and the discharge filter(s) for one (1) Activated Carbon Bed Adsorber unit for each HLW and LAW facility. Actual adsorber bed adsorbent to be removed shall be chosen by the Buyer.

6.7.3 When conducting the demonstration, Seller personnel shall be wearing all PPE required per the final bag-in/bag-out procedure.

6.7.4 Field conditions shall be simulated in the shop when performing the bag-in/bag-out procedure demonstration, which will include pulling a vacuum on the Activated Carbon Bed Adsorber, room clearance, and lifting constraints.

7 Preparation for Shipment

7.1 General Requirements

7.1.1 The Activated Carbon Bed Adsorber units shall be packaged/prepared for shipment, handled, and stored in accordance with Buyer specification 24590-WTP-3PS-G000-T0003 *Engineering Specification for Packaging, Handling, and Storage Requirements*, and ASME AG-1a, Article HA-7000, (Level C).

7.1.2 The activated carbon media shall be packaged/prepared for shipment, handled, and stored in accordance with Buyer specification 24590-WTP-3PS-G000-T0003 *Engineering Specification for Packaging, Shipping, Handling and Storage Requirements*, ASME AG-1, Article FE-7000 and FF-7000, (Level B).

7.1.3 The Activated Carbon Bed Adsorber units, activated carbon media, and shims shall not be packaged for shipping until all shop tests and inspections have been performed and the Buyer's Representative reviews the results.

7.2 Cleanliness

7.2.1 Cleanliness shall be per the applicable documents in Paragraphs 7.1.1 and 7.1.2 of this specification.

7.2.2 Solvents and cleaning solutions used on stainless steel shall have a halogen content of less than 200 ppm.

7.3 Tagging

7.3.1 Tagging of the Activated Carbon Bed Adsorber units shall be as specified in ASME AG-1, Article FE-9000 and ASME AG-1a, Article HA-9000. Tagged information shall also include associated plant item number specified in the data sheets that are in Section 2 of the purchasing documents.

7.3.2 A stainless steel nameplate shall be rigidly attached to the Activated Carbon Bed Adsorber units in a prominent position for ease of visibility and include:

- manufacturer's name
- shop location
- date of manufacture
- serial number
- equipment ratings (pressure, flow, temperature)
- plant item number
- weight of assembly
- purchase order number

7.3.3 Nameplates shall be visible after the insulation is installed, or a duplicate nameplate shall be provided on the top of the insulation. Nameplate shall be located for easy access and reading.

7.3.4 All field testing materials and filters shall be tagged as required for field testing.

7.3.5 Seller shall use Buyer supplied tag numbers for valves, instrumentation, junction boxes, racks, and panels.

7.4 Documentation

7.4.1 Seller shall ensure that appropriate documentation is prepared and, if required, signed by the appropriate person(s). The shipping documentation shall accurately reflect specific traceability to the items being shipped.

7.4.2 Seller shall ensure that appropriate documentation is prepared for the Activated Carbon Bed Adsorber units, activated carbon, and shims. At a minimum, documentation shall include the following information, as applicable:

- Manufacturer name, model number, and serial number
- Plant Item Number

7.5 Shipment Preparation Instructions

7.5.1 Shipment of items shall be conducted in accordance with ASME AG-1a, Article HA-7300, Buyer specification 24590-WTP-3PS-G000-T0003 *Engineering Specification for Packaging, Handling, and Storage Requirements*.

7.5.2 The Activated Carbon Bed Adsorber units shall be shipped completely assembled except for activated carbon. Activated carbon shall be shipped separately.

7.5.3 Weatherproof shipping lists (two per packaged item) shall be prepared and submitted, and shall clearly identify the contents of each package sent to the Buyer. All submittals and shipping boxes shall be identified with the Buyer's purchase order number.

7.5.4 Seller shall provide a complete identification and location of temporary material contained within the equipment for shipment, handling, or storage that must be removed prior to commissioning (e.g., shipping blocks, desiccant bags, components shipped inside larger sections, etc.). In addition, the Seller shall provide instructions for removal of temporary materials, as required.

7.5.5 The Activated Carbon Bed Adsorber units and shims shall be mounted on skids, in crates, or in boxes as suited for the intended method of transport. Lifting weight and center of gravity shall be clearly marked on both the equipment and its shipping documents.

8 Quality Assurance

8.1 General Requirements

8.1.1 The Seller's QAP Requirements are included in Buyer specification 24590-WTP-3PS-G000-T0001, *General Specification for Supplier Quality Assurance Program Requirements.*

8.1.2 Seller's QAP Manual shall be submitted to Buyer for review in accordance with Buyer specification 24590-WTP-3PS-G000-T0001, *General Specification for Supplier Quality Assurance Program Requirements.*

8.1.3 Seller's QAP, as a minimum, shall contain the requirements detailed in the Supplier Quality Assurance Program Requirements Data Sheets listed in Section 2 of the purchasing documents.

8.2 Quality (Q) Related Components

8.2.1 Seller shall have in place a QAP meeting the requirements of ASME-NQA-1, marked as applicable in Supplier Quality Assurance Program Requirements Data Sheet attached to the purchasing documents, and Buyer specification 24590-WTP-3PS-G000-T0001, *General Specification for Supplier Quality Assurance Program Requirements.*

8.2.2 The successful bidder must pass a pre-award survey by the Buyer. Seller shall demonstrate that its quality program is in compliance with the procurement quality requirements listed in the Supplier Quality Assurance Program Requirements Data Sheet. The Seller shall allow the Buyer, its agent, and DOE access to their facility and records pertaining to this purchase order for the purpose of Quality Assurance (QA) Audits and Surveillance at mutually agreed times.

8.2.3 All items shall be manufactured in accordance with the Seller's QAP that meets the requirements of ASME NQA-1, and has been previously evaluated and accepted by the WTP Quality Organization.

8.2.4 Seller shall submit their QAP and work plan to Buyer for review prior to commencement of work. The plan shall include documents and procedures to implement the work and include a matrix of essential QA elements cross referenced with the documents/procedures.

8.3 Supplier Deviation

8.3.1 Each Supplier shall be required to identify and promptly document all deviations from the requirements of the procuring documents. In addition, the supplier shall be required to describe the recommended disposition based on appropriate analysis. Submittals of request for deviations from lower-tier suppliers shall be through the prime supplier to RPP-WTP.

Supplier-proposed deviations from procurement documents shall be initiated by use of Supplier Deviation Disposition Request (SDDR) form in section 2 of the purchasing documents.

9 Configuration Management

Equipment and or components covered by this specification are identified with Plant Item numbers shown in the MDSs. Each item shall be identified in accordance with Tagging in section 7 of this specification.

10 Documentation and Submittals

10.1 General

10.1.1 Seller shall submit to Buyer all detailed designs, documentation, procedures, instructions, calculations, analyses, laboratory results, models, manufacturer data, inspection plans and reports, test plans and reports, certifications, certificates, qualification records, manuals, MSDSs, video tapes, and drawings required per this specification, the applicable codes, standards, and reference documents in section 2 of this specification, and the purchasing documents.

10.1.2 All detailed designs, drawings, shop drawings, supporting calculations, supporting analyses, support models, procedures, instructions, manufacturer data, operation manuals, and maintenance manuals shall be issued to the Buyer for review prior to manufacture of the Activated Carbon Bed Adsorber units, special tools, and/or the purchase of special tools, filters, and gaskets.

10.1.3 Seller shall submit storage requirements and instructions for Buyer's review.

10.1.4 Seller shall submit to Buyer Engineering and Quality Verification documents in the forms and quantities shown in Form G-321-E, Engineering Document Requirements, and Form G-321-V, Quality Verification Document Requirements attached to the purchasing documents.

10.1.5 Seller shall submit a report identifying any deviations and/or conflicts per Section 2 of the purchasing documents to the Buyer for review.

10.1.6 Each documentation transmittal package shall have a documentation inventory sheet attached listing all documents and the number of pages each.

10.1.7 MDSs in Section 2 of the purchasing documents and motor data sheets shall be marked-up by the Seller and submitted to the Buyer for review with the detailed design. Seller shall fill in all information that is marked with an asterisk (*) and mark-up actual overall Activated Carbon Bed Adsorber dimensions based on the detailed design.

10.1.8 Seller shall provide all operation manuals (include media changeout operations and any media conditioning requirements), maintenance manuals, initial setup and startup instructions, special tools, and spare parts lists for Activated Carbon Bed Adsorber components, as applicable.

10.1.9 Provide nominal and maximum inlet and outlet nozzle loadings, deflections, and moments in all directions for Activated Carbon Bed Adsorber units per thermal and seismic analysis results.

10.1.10 Provide Activated Carbon Bed Adsorber unit support and anchorage design load analyses including seismic, thermal, and combination loads.

10.1.11 Provide MSDS for Seller's recommended challenge gas.

10.1.12 The Seller shall provide equipment reliability figures for all major components and sub-components of the Carbon Bed Adsorber system. The definition of components and sub-components is at the vendor's discretion. The reliability figures shall include, as a minimum, the following:

- Failure rate, or mean time between failure (whichever is available)
- Estimated modes of failure (example, Drive gear failure, motor burnout, brake failure, etc.). This may be delineated in a FMEA. The method used to perform the FMEA (example, MIL-STD-1629) and the year shall be specified. In addition, all assumptions used to perform the FMEA shall be stated.
- Recommended maintenance and frequency, as applicable
- Estimated time to perform the recommended maintenance, as applicable

The data above shall be based on the physical and environmental conditions delineated in this specification. Where possible, the seller shall compare the figures for the equipment in this specification to similar equipment sold and serviced by the vendor. The source for all estimates and any underlying assumptions shall be stated. If software is used to perform the FMEA, the seller shall specify the software used and the version (example software, Relex, Isogen, Reliasoft, etc.)

10.1.13 Provide installation manual per the requirements of engineering specification 24590-WTP-3PS-G000-T0003, *Packaging, Handling, and Storage Requirements.*

10.1.14 Provide site handling and storage instructions per the requirements of section 3.9 and engineering specification 24590-WTP-3PS-G000-T0003, *Packaging, Handling, and Storage Requirements.*

10.1.15 All analyses shall be submitted in accordance with the requirements of 24590-WTP-3PS-G000-T0014, *Engineering Specification for Supplier Design Analyses.*

10.2 Drawings

10.2.1 Seller shall provide all drawings required per this specification and the applicable documents in section 2 of this specification.

10.2.2 All drawings shall be produced per the drawing practices set forth in ASME Y14.100, Engineering Drawing Practices.

10.2.3 Seller shall submit drawings and diagrams for Buyer's review prior to fabrication, and/or purchase of appurtenance equipment. Drawing and diagram submittals shall include as a minimum, but are not limited to, the following:

- Outline drawings showing dimensions, services, insulation, and foundation and mounting details.
- Outline drawing showing electrical and instrumentation tie-in points.
- Outline drawing showing locations of piping connections with nozzle schedule, including sizes of piping connections with nominal and maximum nozzle loadings, deflections, and moments in all directions.
- Insulation detail drawing(s) mapping installation
- Overall piping and instrumentation diagram (P&ID) for the Activated Carbon Bed Adsorber Units using Buyers supplied instrumentation and equipment tag numbers.
- Interconnection diagram showing details of all internal connections and Buyer external connections, including required location and sizes of wiring connections (including other connections to Buyer's control system).
- Overall single line diagram (wiring diagram) showing all electrical equipment and wiring in the Activated Carbon Bed Adsorber Unit.
- Control logic diagrams showing input signal paths required to accomplish a response.
- Assembly drawings with sufficient information and detail to facilitate assembly of the component parts of an equipment item.
- Shop detail drawings that provide information and detail to facilitate fabrication, manufacture, or installation.

10.3 30% Design Review

10.3.1 Seller shall conduct a 30 % design review with the Buyer. Seller shall submit all drawings, procedures, calculations, laboratory testing results, analyses, and information necessary to conduct the 30 % design review to the Buyer for review.

10.3.2 Finalized outline dimensions of the Activated Carbon Bed Adsorber units shall be included in the 30 % design review. Finalized dimensions shall, at a minimum, include the following:

- Overall dimensions and size for Activated Carbon Bed Adsorber units
- P&IDs
- Control logic diagrams
- Activated Carbon Bed Adsorber unit inlet and outlet nozzle locations
- Discharge filter location and size
- Testing port and manifold locations and size
- Adsorber cell overall dimensions
- Mounting details (anchor size, location, layout, etc.)
- Preliminary bag-in/bag-out plan
- Fire water inlet and drain locations and sizes

10.4 90% Design Review

Seller shall conduct a 90 % design review with the Buyer. Seller shall submit all drawings, procedures, calculations, analyses, and information necessary to conduct the 90 % design review to the Buyer for review.

10.5 Calculations

All calculations to be provided shall be orderly, complete, and sufficiently clear to permit verification. The body of the calculations shall include:

- A concise statement of the purpose of the calculation
- Input data, applicable criteria, and stated assumptions
- A list of references used, including drawings, codes, standards, and computer programs (indicate the version or issue date)
- A discussion of rationale used for design assumption basis
- Equations used for all computations
- Numerical calculations including identification of units used
- A concise statement addressing the calculation results and/or recommendations
- A table of contents for complex calculations

10.6 Schedules

10.6.1 A detailed schedule of laboratory testing, engineering, document submittals, material purchases, fabrication, shop tests, and shipment shall be submitted.

10.6.2 All procedures and instructions shall be completed and submitted to the Buyer a minimum of eight (8) weeks prior to Activated Carbon Bed Adsorber shipment.

10.7 Reporting Appendix A Test Results

A test plan and supporting documentation (operating procedures, materials and testing equipment control lists, analytical procedures) must provide a full record of the testing requirements, testing equipment configuration, operating conditions, assumptions, and any other relevant information. In addition to, or consistent with, the test plan content required by the Quality Assurance Project Plan for RPP-WTP, current revision, the test plan shall include directly or by reference (as appropriate) the following information:

- **Document Number** – Test plan number in the document header.
- **Document Hierarchy** – Statement in the test plan text referencing the governing test specification.
- **Background** – Summary level discussion of past results and current data needs that provide context and relevancy of the testing to the WTP Project.
- **Test Prerequisites** – Definition and/or reference of laboratory testing, engineering analyses, small-scale testing needed to support testing.
- **Test Conditions** – Test variables and operating conditions (e.g., duration of operations at steady state conditions, range of equipment operating conditions, process flows, pressures, temperatures, differential pressures, etc.) identified in tables or other efficient formats.
- **Sample Data Requirements** – A table listing the sample type, location, frequency, number of replicates, and planned analyses to be performed. Minimum data accuracy requirements shall be addressed.
- **Test Modifications** – Test Plan shall contain a statement defining how changes or modifications in operations or testing will be documented in the "desk copy" or

similar controlling documentation during the test and who has the authority to authorize changes or modifications depending on the significance of the change.

- **Equipment Configuration Record** – The equipment configuration for the test or document reference where the configuration can be found. Statement defining where any changes or modifications to the baseline equipment will be recorded, e.g., laboratory record book.
- **M&TE** – A list identifying measuring and test equipment (M&TE) used to collect data to meet Test Specification requirements, data reported to the project in the summary report or other data reporting formats, and M&TE relied upon for control or modeling purposes. Accuracy and sensitivity achievable for each instrument.
- **Supporting Procedures** – A list of applicable technical and operating procedures or a referenced document that contains the list of documents required for operating the test equipment and associated support systems, sample preparation and analytical procedures, etc.
- **Unique Sample Identification** – Description of or document reference defining method to label, store and maintain samples.
- **Reporting and Analyses Requirements** – Process data that will be obtained and reported, Rate versus time, average temperature versus time, and analyses are required to satisfy each test objective. Planned data analyses, e.g., comparison to theoretical or published predictions, empirical fitting, etc., required to meet objectives.
- **Personnel Qualification** – List of any special training needs.
- **Quality Assurance** – Statement identifying applicable quality assurance requirements. Any exceptions to the approved quality assurance plan shall be described.

A final report shall be submitted within 60 days of completing testing and sample analyses. Test report content shall include (compatible with the individual test objectives):

- Approval sheet signed by the principal investigator, data validation peer reviewer, and project manager,
- Summarize the tests performed, including the date of the tests, and applicable test specification and test plan,
- Provide a clear description of the purpose of the test and state how the completed test met that purpose,
- Describe the unit operations in which the tests were performed and contrast test conditions with planned operating conditions of the RPP-WTP, as appropriate,
- Present and discuss test results and compare against the "success" criteria. Discuss whether or not the findings of the test performed are consistent with previous test reports, whether the expected WTP design or operational conditions are appropriate for the system, or have implications for safety, permitting, or operability,
- Data collected and its acceptability,
- Actions taken in connection with any nonconformances noted,
- Identification of the measuring and test equipment used during the test,
- Describe deviations from the approved test plan, or expected configuration conditions, that occurred during the conduct of the test,
- Comprehensive list of all samples providing the date/time of sampling, sample type, and sample label,

- Data tables listing monitored parameter values.
- A discussion of how the test results validate equipment sizing and performance.

11 References

11.1 Incorporated Design Changes

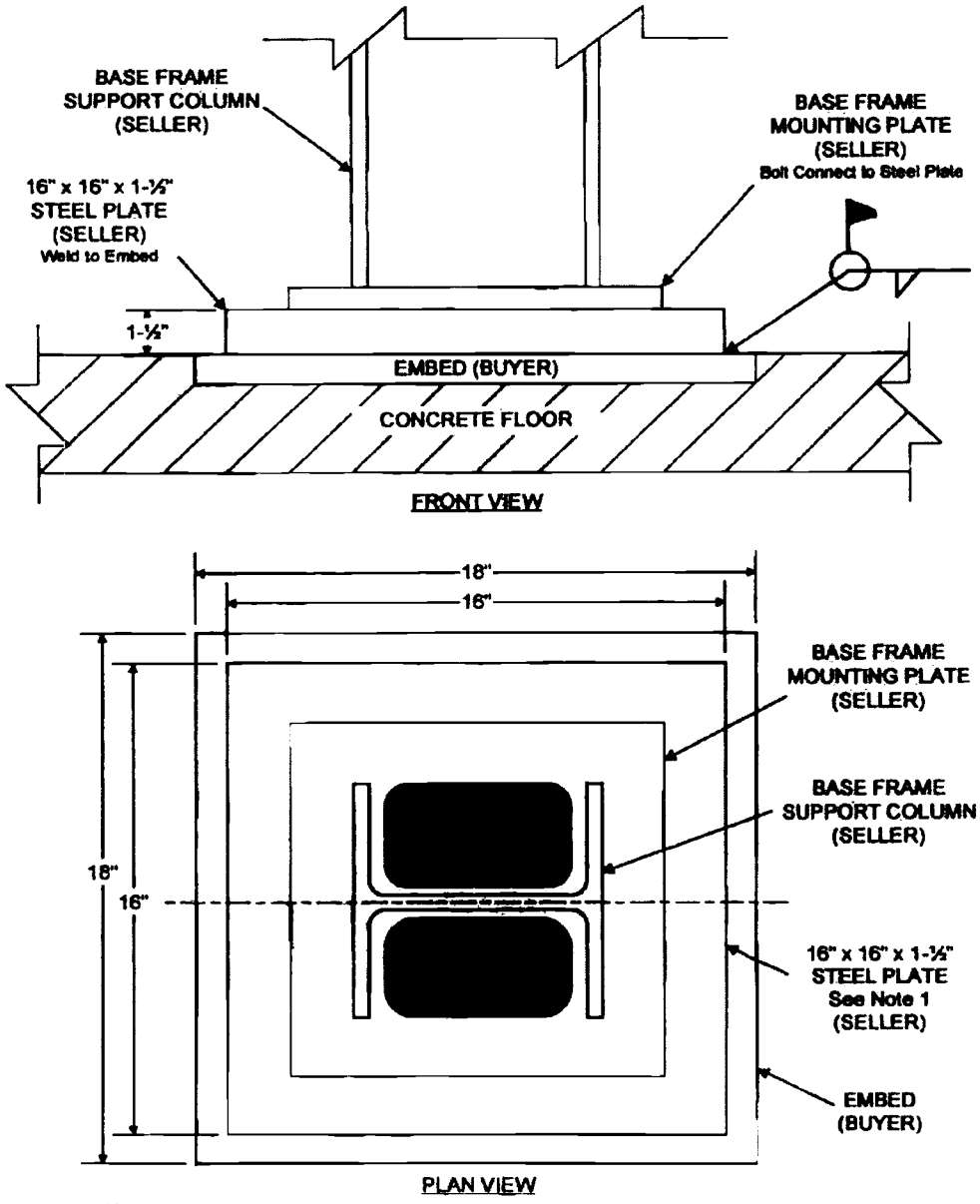
- 24590-WTP-3PN-MWK0-00001
- 24590-WTP-3PN-MWK0-00002
- 24590-WTP-SDDR-PROC-04-01020
- 24590-WTP-SDDR-PROC-04-01040
- 24590-WTP-SDDR-PROC-05-00392
- 24590-WTP-SDDR-PROC-05-00602
- 24590-WTP-SDDR-PROC-05-00652
- 24590-WTP-SDDR-PROC-05-00701
- 24590-WTP-SDDR-M-05-00018
- 24590-WTP-SDDR-MS-07-00051

11.2 Design Changes Incorporated by Reference

- 24590-WTP-SDDR-M-06-00286
- 24590-WTP-SDDR-M-06-00287
- ~~24590-WTP-SDDR-MS-08-00040~~ DJR 8/1/11 DW 8/1/11
- ~~24590-WTP-SDDR-MS-08-00042~~ DJR 8/1/11 DW 8/1/11
- 24590-WTP-SDDR-MS-11-00087

Figure 1 LAW Structural Attachment Design Requirements

Note: Figure 4 from TCN, 24590-QL-MRA-MWK0-00001-T0001, incorporated as Figure 1



Notes:
1. Buyer to drill and tap 16"x16"x1-½" steel plate per Seller's specified bolt location and size.

Figure 2 **Deleted**

Deleted.

Figure 3 Mercury Gas Monitor Probe Flange Connection

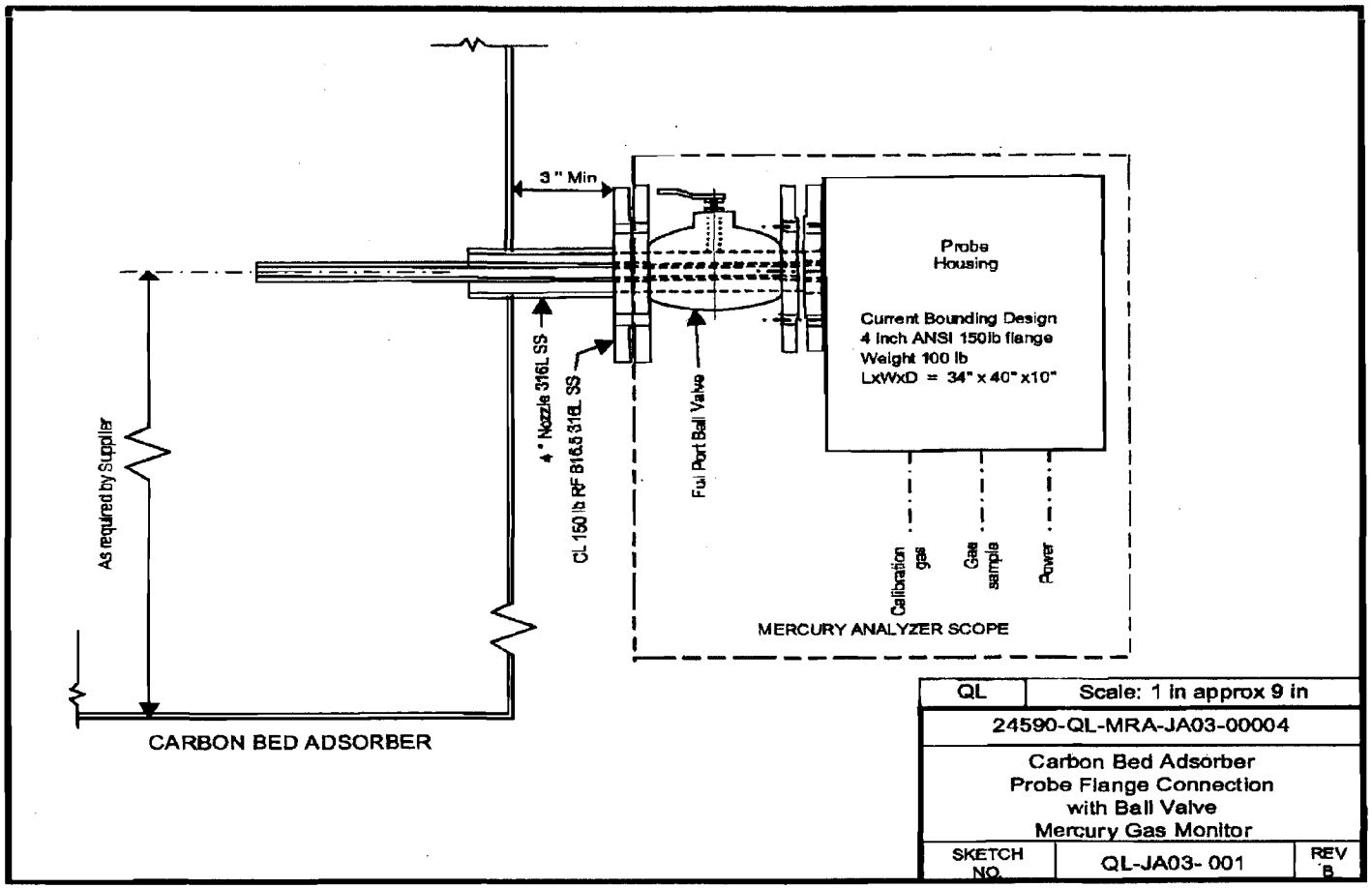


Table 1 Quality Level List (HLW)

QUALITY LEVEL

COMPONENT TAG NO.:
24590-HLW-MV-HOP-ADBR-00001A/B
24590-HLW-MV-HOP-ADBR-00002A/B

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
D8169	D8169-1	Air Slot with Sample Holes	D8169-1	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
Inlet Air Slot	D8169-2	Air Slot without Sample Holes	D8169-2	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8169-3	Vertical Channel LH	12GA SHT 316L SS	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8169-4	Vertical Channel RH	12GA SHT 316L SS	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8169-5	Horizontal Channel	12GA SHT 316L SS	20	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8169-6	Lower Channel	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8169-7	Upper Channel	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8169-8	Vertical Flat Bar (118)	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8169-9	Vertical Flat Bar (123.53)	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8169-10	Backing Washer	12GA SHT 316L SS	3	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8169-11	Perforated Sheet (22.38)	20GA SHT 316L SS	10	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8169-12	Perforated Sheet (10.44)	20GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
D8170	D8170-1	Vertical Channel	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
Outlet Air Slot	D8170-2	Horizontal Channel	12GA SHT 316L SS	10	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8170-3	Lower Channel	12GA SHT 316L SS	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8170-4	Upper Channel	12GA SHT 316L SS	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8170-5	Vertical Flat Bar	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8170-6	Perforated Sheet (22.38)	20GA SHT 316L SS	10	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8170-7	Perforated Sheet (10.44)	20GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
D8171	D8171-1	Air Slot with Sample Holes	D8169-1	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
Bed Air Slot	D8171-2	Air Slot without Sample Holes	D8169-2	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8171-3	Vertical Channel	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8171-4	Horizontal Channel	12GA SHT 316L SS	20	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8171-5	Lower Channel	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8171-6	Upper Channel	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8317-5	Sling (11200#)	McMaster - Carr	4	CM	No	Does not function to contain meter offgas. External to the pressure boundary and is considered a none permiate piece of plant equipment. Used only for handling the equipment during transportation and installation.
	D8317-6	Name Plate (4.00 X 7.00)	11GA SHT 304L SS	2	CM	No	Does not function to contain meter offgas. External to the pressure boundary and is considered a none permiate piece of plant equipment. Used only for handling the equipment during transportation and installation.
D8574 Inlet Pipe Support Assy	D8574-1	I-Beam	8 X 12.5# HRS ASTM A-36	1	QL	Yes	
	D8574-2	Angle (34.62)	2 X 2 X 1/4 ANGLE ASTM A-36	1	QL	Yes	
	D8574-3	Plate (22.38)	1/4 PL 316L SS	1	QL	Yes	
	D8574-4	Plate (21.38)	1/4 PL 316L SS	1	QL	Yes	
	D8574-5	Plate (4.00)	1/4 PL 316L SS	4	QL	Yes	
	D8574-6	Plate (7.00)	1/4 PL 316L SS	2	QL	Yes	
	D8574-7	Plate (2.75)	1/4 PL 316L SS	2	QL	Yes	
	D8574-8	Hex HD Bolt (2.0)	1/2-13UNC 316 SS	4	QL	Yes	
	D8574-9	Lock Washer	1/2 I.D. 316 SS	4	QL	Yes	
	D8574-10	Hex Nut	1/2-13UNC 316 SS	4	QL	Yes	
C9992 VA-3000 CO ANALYZER	3	Drain Separator	Glass	6	QL	Yes	
	4	Mist Catcher		6	QL	Yes	
	5	Selector Valve	PVC	6	QL	Yes	
	6	Filter	304 SS	12	QL	Yes	
	7	Filter		6	QL	Yes	
	8	Pump		12	QL	Yes	
	9	Thermo-Electric Dehumidifier		6	QL	Yes	
	10	Needle Valve	PVC	12	QL	Yes	
	11	Flow Meter	Glass	12	QL	Yes	
	12	CO Analyzer Unit		6	QL	Yes	
	13	Capillary		6	QL	Yes	
	14	Filter		6	QL	Yes	
	15	Pump		6	QL	Yes	
	16	Solenoid Valve (2-way)		12	QL	Yes	
	17	Rotameter W / Valve		6	QL	Yes	
	18	Solenoid Valve (3-Way)		6	QL	Yes	
	19	Ball Valve (2-Way)		18	QL	Yes	
	20	Bulkhead Fitting (3/8 x 3/8)		20	QL	Yes	
	21	Needle Valve		6	QL	Yes	
	22	Flow Meter		6	QL	Yes	
	23	Bulkhead Fitting (1/4 x 1/4)		4	QL	Yes	
	24	3/8 inch Tee		6	QL	Yes	
	25	1/4 inch Tee		20	QL	Yes	
	26	Vacuum Switch		6	QL	Yes	
	27	VS-3001 Sample Sample System		6	QL	Yes	
	28	VA-3000 Analyzer		6	QL	Yes	
	29	1/2 inch Piping	PVC	A/R	QL	Yes	
	30	3/8 inch PTFE Teflon Tubing	PTFE	A/R	QL	Yes	
	31	1/4 inch PTFE Teflon Tubing	PTFE	A/R	QL	Yes	

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8183-19	Reinforcement Plate 8"	D8188-20	12	QL	Yes	
	D8183-20	Cylinder 16" I.D.	D8188-21	2	QL	Yes	
	D8183-21	Discharge Filter MTG Plate	D8196	1	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D8183-22	Slide Gate Assembly	D8215-2	8	QL	Yes	
	D8183-23	Lifting Lug	B8216	4	CM	No	Does not function to contain melter offgas. Lifting lugs do not form part of the pressure boundary and are only used to handle the housings for transportation and installation.
	D8183-24	Plate (126.62)	1/4 PL 316L SS	8	QL	Yes	
	D8183-25	Plate (120)	1/4 PL 316L SS	6	QL	Yes	
	D8183-26	Plate (84)	1/4 PL 316L SS	2	QL	Yes	
	D8183-27	Plate (6.25)	3/8 PL 316L SS	8	QL	Yes	
	D8183-28	Plate (5.62)	3/8 PL 316L SS	20	QL	Yes	
	D8183-29	I-Beam (131.88)	6 X 12.5 # HRS	8	QL	Yes	
	D8183-30	I-Beam (120)	6 X 12.5 # HRS	6	QL	Yes	
	D8183-31	I-Beam (84.5)	6 X 12.5 # HRS	2	QL	Yes	
	D8183-32	Pipe T.O.E. (4.5)	1/2 SCH 40 316L SS	1	QL	Yes	
	D8183-33	Pipe T.O.E. (12)	2 SCH 40 316L SS	1	QL	Yes	
	D8183-34	Pipe (23.62)	2 SCH 40 316L SS	1	QL	Yes	
	D8183-35	Pipe (18.00)	2 SCH 40 316L SS	1	QL	Yes	
	D8183-36	Pipe (3.00)	2 SCH 40 316L SS	1	QL	Yes	
	D8183-37	Pipe (8.88)	8 SCH 40 316L SS	12	QL	Yes	
	D8183-38	Pipe (6.38)	8 SCH 40 316L SS	8	QL	Yes	
	D8183-39	Pipe (6.38)	14 SCH 40 316L SS	1	QL	Yes	
	D8183-40	Weld Neck Flange	2 X 150# 316L SS	2	QL	Yes	
	D8183-41	Slip-on Flange	8 X 150# 316L SS	12	QL	Yes	
	D8183-42	Weld Neck Flange	14 X 150# 316L SS	4	QL	Yes	
	D8183-43	90° Elbow	2 SCH 40 316L SS	2	QL	Yes	
	D8183-44	Hex HD Bolt	HEX HD BOLT (1.75)	24	QL	Yes	
	D8183-45	Bag-out Flange	D8188-22	2	QL	Yes	
	D8183-46	Door Flange	D8188-23	2	QL	Yes	
	D8183-47	He-Bar Flange	D8188-24	2	QL	Yes	
	D8183-48	Round Bar	1/4 DIA ROUND BAR 316L SS	A/R	CM	No	Does not function to contain melter offgas. This round bar is used to help hold a bag in place during a discharge filter bag-in/bag-out operation.
	D8183-49	Pipe Support Assy	D8229-1	1	QL	Yes	
	D8183-50	Pipe Support Assy	D8229-2	2	QL	Yes	
	D8183-51	Reinforcement PL (17.0 OD)	3/8 PL 316L SS	3	QL	Yes	
	D8183-52	Reinforcement PL (15.5 OD)	3/8 PL 316L SS	1	QL	Yes	
	D8183-53	Reinforcement PL (16 OD)	3/8 PL 316L SS	2	QL	Yes	
	D8183-54	Reinforcement PL (4.00 OD)	3/8 PL 316L SS	3	QL	Yes	
	D8183-55	Pipe Support Assy	D8574	1	QL	Yes	
	D8183-56	Plug	3/8 PL 316L SS	1	QL	Yes	
D8188 Housing WLDMT Details	D8188-1	Back Panel	3/8 PL 316L SS	1	QL	Yes	
	D8188-2	Front Panel	3/8 PL 316L SS	1	QL	Yes	
	D8188-3	Front Panel	3/8 PL 316L SS	2	QL	Yes	
	D8188-4	Bottom Panel	3/8 PL 316L SS	1	QL	Yes	
	D8188-5	Top Panel	3/8 PL 316L SS	1	QL	Yes	
	D8188-6	Top Panel w/ Hole	3/8 PL 316L SS	1	QL	Yes	
	D8188-7	Top Panel	3/8 PL 316L SS	1	QL	Yes	
	D8188-8	Top End Panel	3/8 PL 316L SS	2	QL	Yes	
	D8188-9	Inlet End Panel	3/8 PL 316L SS	1	QL	Yes	
	D8188-10	Outlet End Panel	3/8 PL 316L SS	1	QL	Yes	
	D8188-11	Hopper Side Main Bed	3/8 PL 316L SS	8	QL	Yes	
	D8188-12	Hopper Side Guard Bed Panel	3/8 PL 316L SS	8	QL	Yes	
	D8188-13	Hopper End Main Bed Panel	3/8 PL 316L SS	8	QL	Yes	
	D8188-14	Hopper End Guard Bed Panel	3/8 PL 316L SS	8	QL	Yes	

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D6188-15	Hopper Bottom Panel	3/8 PL 316L SS	8	QL	Yes	
	D6188-16	Manway Flange	3/4 PL 316L SS	2	QL	Yes	
	D6188-17	Manway Cover	1/2 PL 316L SS	2	QL	Yes	
	D6188-18	Reinforcement Plate 16"	3/4 X 1 RECT BAR 316L SS	2	QL	Yes	
	D6188-19	Reinforcement Plate 14"	3/4 X 1 RECT BAR 316L SS	1	QL	Yes	
	D6188-20	Reinforcement Plate 8"	3/8 X 1 RECT BAR 316L SS	12	QL	Yes	
	D6188-21	Cylinder 16" I.D.	3/16 PL 316L SS	2	QL	Yes	
	D6188-22	Bag-out Flange	3/16 PL 316L SS	2	QL	Yes	
	D6188-23	Door Flange	3/4 X 3 RECT BAR 316L SS	2	QL	Yes	
	D6188-24	Re-Bar Flange	1 X 3 RECT BAR 316L SS	2	QL	Yes	
D6196	D6196-1	Plate (32.88)	1/4 PL 316L SS	1	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
Discharge Filter MTG	D6196-2	Plate (33.38)	1/4 PL 316L SS	1	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
Plate	D6196-3	Plate (23.75)	1/4 PL 316L SS	1	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D6196-4	Plate (21.75)	1/4 PL 316L SS	4	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D6196-5	Z-Bar (6.19)	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D6196-6	Z-Bar (8.69)	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D6196-7	Strip	20GA SHT 316L SS	4	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D6196-8	Pull Rod	16GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This is used to help remove the discharge filters during the bag-in/bag-out operation.
D6215	D6215-1	Pipe	8 SCH 40 316L SS	1	QL	Yes	
Slide Gate Assembly	D6215-2	Flange	1 PLATE 316L SS	1	QL	Yes	
	D6215-3	Flange	1 PLATE 316L SS	1	QL	Yes	
	D6215-4	Slide	7GA SHT 316L SS	1	QL	Yes	
	D6215-5	O-Ring	1/4 DIA SOLID NEOPRENE	1	QL	Yes	
	D6215-6	Hex HD Bolt	3/4-10UNC 316 SS	8	QL	Yes	
	D6215-7	Hex Nut	3/4-10UNC 316 SS	8	QL	Yes	
	D6215-8	Lock Washer	3/4 I.D. 316 SS	8	QL	Yes	
D6217	D6217-1	Adsorber Assembly	D6179	1	QL	Yes *	The pipe coupling called out as part of this assembly functions to contain melter offgas, therefore, the whole assembly is designated ITS. * For Item# D6217-1 should refer to drawing D6179 for the safety / quality designation and CGD requirements.
Housing Weldment	D6217-2	Back Panel	D6188-1	1	QL	Yes	
	D6217-3	Front Panel	D6188-2	1	QL	Yes	
	D6217-4	Bottom Panel	D6188-4	1	QL	Yes	
	D6217-5	Top Panel	D6188-5	1	QL	Yes	
	D6217-6	Top Panel W/Holes	D6188-6	1	QL	Yes	
	D6217-7	Top Panel	D6188-7	1	QL	Yes	
	D6217-8	Top End Panel	D6188-8	2	QL	Yes	
	D6217-9	Inlet End Panel	D6188-9	1	QL	Yes	
	D6217-10	Outlet End Panel	D6188-10	1	QL	Yes	
	D6217-11	Hopper Side Main Bed	D6188-11	8	QL	Yes	
	D6217-12	Hopper Side Guard Bed Panel	D6188-12	8	QL	Yes	
	D6217-13	Hopper End Main Bed Panel	D6188-13	8	QL	Yes	
	D6217-14	Hopper End Guard Bed Panel	D6188-14	8	QL	Yes	
	D6217-15	Hopper Bottom Panel	D6188-15	8	QL	Yes	
	D6217-16	Manway Flange	D6188-16	2	QL	Yes	
	D6217-17	Reinforcement Plate 16"	D6188-18	2	QL	Yes	
	D6217-18	Reinforcement Plate 14"	D6188-19	4	QL	Yes	

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8217-19	Reinforcement Plate 8"	D8188-20	12	QL	Yes	
	D8217-20	Cylinder 16" I.D.	D8188-21	2	QL	Yes	
	D8217-21	Discharge Filter MTG Plate	D8196	1	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D8217-22	Slide Gate Assembly	D8215-2	8	QL	Yes	
	D8217-23	Lifting Lug	B8216	4	CM	No	Does not function to contain melter offgas. Lifting lugs do not form part of the pressure boundary and are only used to handle the housings for transportation and installation.
	D8217-24	Plate (126.62)	1/4 PL 316L SS	8	QL	Yes	
	D8217-25	Plate (120)	1/4 PL 316L SS	6	QL	Yes	
	D8217-26	Plate (84)	1/4 PL 316L SS	2	QL	Yes	
	D8217-27	Plate (6.25)	3/8 PL 316L SS	8	QL	Yes	
	D8217-28	Plate (5.62)	3/8 PL 316L SS	20	QL	Yes	
	D8217-29	I-Beam (131.88)	6 X 12.5 # HRS	8	QL	Yes	
	D8217-30	I-Beam (120)	6 X 12.5 # HRS	6	QL	Yes	
	D8217-31	I-Beam (84.5)	6 X 12.5 # HRS	2	QL	Yes	
	D8217-32	Pipe T.O.E. (4.5)	1/2 SCH 40 316L SS	1	QL	Yes	
	D8217-33	Pipe T.O.E. (12)	2 SCH 40 316L SS	1	QL	Yes	
	D8217-34	Pipe (23.62)	2 SCH 40 316L SS	1	QL	Yes	
	D8217-35	Pipe (18.00)	2 SCH 40 316L SS	1	QL	Yes	
	D8217-36	Pipe (3.00)	2 SCH 40 316L SS	1	QL	Yes	
	D8217-37	Pipe (8.88)	8 SCH 40 316L SS	12	QL	Yes	
	D8217-38	Pipe (6.38)	8 SCH 40 316L SS	8	QL	Yes	
	D8217-39	Pipe (6.38)	14 SCH 40 316L SS	1	QL	Yes	
	D8217-40	Weld Neck Flange	2 X 150# 316L SS	2	QL	Yes	
	D8217-41	Slip-on Flange	8 X 150# 316L SS	12	QL	Yes	
	D8217-42	Weld Neck Flange	14 X 150# 316L SS	4	QL	Yes	
	D8217-43	90° Elbow	2 SCH 40 316L SS	2	QL	Yes	
	D8217-44	Hex HD Bolt	HEX HD BOLT (1.75)	24	QL	Yes	
	D8217-45	Bag-out Flange	D8188-22	2	QL	Yes	
	D8217-46	Door Flange	D8188-23	2	QL	Yes	
	D8217-47	Re-Bar Flange	D8188-24	2	QL	Yes	
	D8217-48	Round Bar	1/4 DIA ROUND BAR 316L SS	A/R	CM	No	Does not function to contain melter offgas. This round bar is used to help hold a bag in place during a discharge filter bag-in/bag-out operation.
	D8217-49	Pipe Support Assy	D8229-1	1	QL	Yes	
	D8217-50	Pipe Support Assy	D8229-2	2	QL	Yes	
	D8217-51	Reinforcement PL (17.0 OD)	3/8 PL 316L SS	3	QL	Yes	
	D8217-52	Reinforcement PL (15.5 OD)	3/8 PL 316L SS	1	QL	Yes	
	D8217-53	Reinforcement PL (18 OD)	3/8 PL 316L SS	2	QL	Yes	
	D8217-54	Reinforcement PL (4.00 OD)	3/8 PL 316L SS	3	QL	Yes	
	D8217-55	Plug	3/8 PL 316L SS	1	QL	Yes	
D8218	D8218-1	W-Beam (278.50)	8 X 31# HRS ASTM A-36	2	QL	Yes	
Base Frame Assembly	D8218-2	W-Beam (88.96)	9 X 31# HRS ASTM A-36	4	QL	Yes	
	D8218-3	W-Beam (46.50)	10 X 31# HRS ASTM A-36	6	QL	Yes	
	D8218-4	Plate	1.0 PL HRS ASTM A-36	6	QL	Yes	
	D8218-5	Channel (7.12)	4 X 5.4# HRS ASTM A-36	2	QL	Yes	
	D8218-6	Channel (81.25)	4 X 5.4# HRS ASTM A-36	1	QL	Yes	
D8220	D8220-1	Flat Bar (191.5)	1/2 X 2 1/2 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Ladder and all associated parts are external to the pressure boundary and form part of the maintenance platform.
Ladder Assembly	D8220-2	Flat Bar (35.5)	1/2 X 2 1/2 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Ladder and all associated parts are external to the pressure boundary and form part of the maintenance platform.
	D8220-3	Flat Bar (5.5)	1/2 X 2 1/2 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Ladder and all associated parts are external to the pressure boundary and form part of the maintenance platform.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8220-4	Flat Bar (10.25)	1/4 X 2 FL HRS ASTM A-39	2	CM	No	Does not function to contain melter offgas. Ladder and all associated parts are external to the pressure boundary and form part of the maintenance platform.
	D8220-5	Pipe	3/4 BAR CS	18	CM	No	Does not function to contain melter offgas. Ladder and all associated parts are external to the pressure boundary and form part of the maintenance platform.
	D8220-6	Flat Bar (13.06)	1/4 X 2 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Ladder and all associated parts are external to the pressure boundary and form part of the maintenance platform.
	D8220-7	Flat Bar (8.00)	1/4 X 2 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Ladder and all associated parts are external to the pressure boundary and form part of the maintenance platform.
D8222 Housing Assembly	D8222-1	Housing Weldment Unit A	D8183	1	QL	Yes	
	D8222-2	Manway Cover	D8188-17	2	QL	Yes	
	D8222-3	Slide Gate Assembly	D8215	8	QL	Yes	
	D8222-4	Access Door Discharge Filter	D8224	2	QL	Yes	
	D8222-5	Carbon Sample Plug Assembly	B8264	3	QL	Yes	
	D8222-6	Electrical Enclosure/gauge panel assy Unit A	D8285	1	QL	Yes *	PDITs contain a small amount of melter offgas making the pressure boundary function of the PDITs an ITS function. This makes the assembly ITS * For Item# D8222-6 should refer to drawing D8285 for the safety / quality designation and CGD requirements.
	D8222-7	Blind Flange Modified	8 X 150# 316L SS	3	QL	Yes	
	D8222-8	Blind Flange	8 X 150# 316L SS	9	QL	Yes	
	D8222-9	Pipe Plug	1 1/4 X 150# 316L SS	3	QL	Yes	
	D8222-10	Pipe Coupling	1 1/4 X 3000# 316L SS	3	QL	Yes	
	D8222-11	Pipe Coupling	1 1/2 X 3000# 316L SS	1	QL	Yes	
	D8222-12	Pipe T.O.E. (8.38)	1/2 SCH 40 316L SS	6	QL	Yes	
	D8222-13	Pipe T.O.E. (19.38)	1/2 SCH 40 316L SS	2	QL	Yes	
	D8222-14	Thermowell (27")	B8309-2	1	QL	Yes	
	D8222-15	Thermowell (46")	B8309-3	4	QL	Yes	
	D8222-16	Thermowell (86")	B8309-4	4	QL	Yes	
	D8222-17	Temperature Element (27")	2904100-015	1	CM	No	Additional Protection Class (APC), may be purchased as commercial component.
	D8222-18	Temperature Element (46")	2904100-015	4	CM	No	Additional Protection Class (APC), may be purchased as commercial component.
	D8222-19	Temperature Element (86")	2904100-015	1	CM	No	Additional Protection Class (APC), may be purchased as commercial component.
	D8222-20	Radar Level Detector	2904100-017	1	QL	Yes	
	D8222-21	Manual Valve 1/2"	2904100-019	8	QL	Yes	
	D8222-22	Ball Valve 2"	2904100-020	1	QL	Yes	
	D8222-23	Gasket B/O Door 3/8THK x 1WD	Silicone Closed Cell Sponge	12ft	QL	Yes	
	D8222-24	Gasket 8" Flange		12	QL	Yes	
	D8222-25	Gasket Manway 3/8THK x 1WD		2	QL	Yes	
	D8222-26	Hex Nut	1/2-13UNC 316 SS	24	QL	Yes	
	D8222-27	Hex Nut	3/4-10UNC 316 SS	224	QL	Yes	
	D8222-28	Hex HD Bolt (2.5)	3/4-10UNC 316 SS	32	QL	Yes	
	D8222-29	Hex HD Bolt (3.5)	3/4-10UNC 316 SS	192	QL	Yes	
	D8222-30	Flat Washer	1/2 I.D. 316 SS	24	QL	Yes	
	D8222-31	Flat Washer	3/4 I.D. 316 SS	224	QL	Yes	
	D8222-32	DELETED					
	D8222-33	Solenoid Valve 1/2"	2904100-022	1	QL	Yes	
D8223 Housing Assembly	D8223-1	Housing Weldment Unit B	D8217	1	QL	Yes	
	D8223-2	Manway Cover	D8188-17	2	QL	Yes	
	D8223-3	Slide Gate Assembly	D8215	8	QL	Yes	
	D8223-4	Access Door Discharge Filter	D8224	2	QL	Yes	
	D8223-5	Carbon Sample Plug Assembly	B8264	3	QL	Yes	

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D6223-6	Electrical Enclosure/gauge panel assy Unit A	D6286	1	QL	Yes *	PDITs contain a small amount of melter offgas making the pressure boundary function of the PDITs an ITS function. This makes the assembly ITS. * For item# D6223-6 should refer to drawing D6286 for the safety / quality designation and CGD requirements.
	D6223-7	Blind Flange Modified	8 X 150# 316L SS	3	QL	Yes	
	D6223-8	Blind Flange	8 X 150# 316L SS	9	QL	Yes	
	D6223-9	Pipe Plug	1 1/4 X 150# 316L SS	3	QL	Yes	
	D6223-10	Pipe Coupling	1 1/4 X 3000# 316L SS	3	QL	Yes	
	D6223-11	Pipe Coupling	1 1/2 X 3000# 316L SS	1	QL	Yes	
	D6223-12	Pipe T.O.E. (8.38)	1/2 SCH 40 316L SS	5	QL	Yes	
	D6223-13	Pipe T.O.E. (19.38)	1/2 SCH 40 316L SS	2	QL	Yes	
	D6223-14	Thermowell (27")	98309-2	1	QL	Yes	
	D6223-15	Thermowell (46")	98309-3	4	QL	Yes	
	D6223-16	Thermowell (86")	98309-4	4	QL	Yes	
	D6223-17	Temperature Element (27")	2904100-015	1	CM	No	Additional Protection Class (APC), may be purchased as commercial component.
	D6223-18	Temperature Element (46")	2904100-015	4	CM	No	Additional Protection Class (APC), may be purchased as commercial component.
	D6223-19	Temperature Element (86")	2904100-015	1	CM	No	Additional Protection Class (APC), may be purchased as commercial component.
	D6223-20	Radar Level Detector	2904100-017	1	QL	Yes	
	D6223-21	Manual Valve 1/2"	2904100-019	8	QL	Yes	
	D6223-22	Ball Valve 2"	2904100-020	1	QL	Yes	
	D6223-23	Gasket B/O Door 3/8TI-IK x 1WD	Silicone Closed Cell Sponge	12ft	QL	Yes	
	D6223-24	Gasket 8" Flange		12	QL	Yes	
	D6223-25	Gasket Manway 3/8THK x 1WD		2	QL	Yes	
	D6223-26	Hex Nut	1/2-13UNC 316 SS	24	QL	Yes	
	D6223-27	Hex Nut	3/4-10UNC 316 SS	224	QL	Yes	
	D6223-28	Hex HD Bolt (2.5)	3/4-10UNC 316 SS	32	QL	Yes	
	D6223-29	Hex HD Bolt (3.5)	3/4-10UNC 316 SS	192	QL	Yes	
	D6223-30	Flat Washer	1/2 I.D. 316 SS	24	QL	Yes	
	D6223-31	Flat Washer	3/4 I.D. 316 SS	224	QL	Yes	
	D6223-32	DELETED					
	D6223-33	Solenoid Valve 1/2"	2904100-022	1	QL	Yes	
D6224 Access Door Discharge Filter	D6224-1	Plate-1	3/16 PL 316L SS	1	QL	Yes	
	D6224-2	Plate-2	3/16 PL 316L SS	2	QL	Yes	
	D6224-3	Plate-3	3/16 PL 316L SS	2	QL	Yes	
	D6224-4	Flat bar-1	3/4 X 2 RECT BAR 316L SS	2	QL	Yes	
	D6224-5	Flat bar-2	3/4 X 2 RECT BAR 316L SS	2	QL	Yes	
	D6224-6	Flat bar-3	1/4 X 2 RECT BAR 316L SS	1	CM	No	Does not function to contain melter offgas. This bar is used to make a lifting lug for the access door.
D6226	D6226-1	I-Beam (25')	4 X 7.7# HRS ASTM A-36	1	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
Crane Trolley Assembly	D6226-2	Square Tube (91.25)	4 X 4 X 1/4 WT HRS	4	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D6226-3	Square Tube (113.75)	4 X 4 X 1/4 WT HRS	8	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8226-4	Angle (6.00)	2 X 2 X 1/4 WT HRS	7	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D8226-5	Angle (3.00)	2 X 2 X 1/4 WT HRS	2	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D8226-6	Angle (3.00)	2 X 2 X 1/4 WT HRS	2	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D8226-7	Flat Bar (6.00)	1/4 X 2 FL HRS ASTM A-36	1	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D8226-8	Flat Bar (67.58)	1/4 X 2 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D8226-9	Plate (3.00 X 4.00)	1/4 PL HRS ASTM A-36	1	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D8226-10	Plate (6.00 X 8.00)	1/4 PL HRS ASTM A-36	3	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D8226-11	Plate (6.00 X 6.00)	1/4 PL HRS ASTM A-36	1	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D8226-12	Plate (7.00 X 7.00)	1/4 PL HRS ASTM A-36	8	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D8226-13	Hex HD Bolt (2.00)	1/2-13UNC GR 8 PL	20	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D8226-14	Hex Nut	1/2-13UNC GR 8 PL	20	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D8226-15	Lock Washer	1/2 NOM ID GR 8 PL	20	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D8226-16	Electric Hoist	McMaster - Carr	1	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
D8229 Pipe Support Assembly	D8229-1	Pipe Support with Gusset	D8229-1	1	QL	Yes	
	D8229-2	Pipe Support without Gusset	D8229-2	1	QL	Yes	
	D8229-3	I-Beam	6 X 12.5# HRS ASTM A-36	2	QL	Yes	
	D8229-4	Angle	2 X 2 X 1/4 WT HRS ASTM A-36	1	QL	Yes	
	D8229-5	Plate (1.50 X 7.00)	1/4 PL 316L SS	2	QL	Yes	
	D8229-6	Plate (0.50 X 1.50)	1/4 PL 316L SS	4	QL	Yes	

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8229-7	Sheet	12GA SHT 316L SS	2	QL	Yes	
	D8229-8	Stud	1/2-13UNC X 3.0 LG, 316L SS	4	QL	Yes	
	D8229-9	SQ Beveled Washer	18-8 SS	4	QL	Yes	
	D8229-10	Hex Nut	1/2-13UNC 316 SS	4	QL	Yes	
D8250	D8250-1	Channel (23.26 X 126.00)	3/16 PL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
Platform Assembly	D8250-2	Channel (11.4 X 272.50)	3/16 PL HRS ASTM A-36	3	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-3	Channel (9.9 X 91.25)	3/16 PL HRS ASTM A-36	3	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-4	Channel (9.9 X 28.58)	3/16 PL HRS ASTM A-36	10	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-5	Channel (11.4 X 6.00)	3/16 PL HRS ASTM A-36	6	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-6	Pipe (278.40)	1 1/2 SCH 40 CS	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-7	Pipe (30.40)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-8	Pipe (19.40)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-9	Pipe (71.85)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-10	Pipe (48.15)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-11	Pipe (40.50)	1 1/2 SCH 40 CS	6	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-12	Pipe (40.50)	1 1/2 SCH 40 CS	4	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-13	Pipe (41.98)	1 1/2 SCH 40 CS	4	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.

Drawing Number	Item No.	Description	Material or Vendor	QTY	OL/CM	CGD	COMMENTS
	D6250-14	Pipe (68.73)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6250-15	Pipe (68.10)	1 1/2 SCH 40 CS	8	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6250-16	Pipe (59.23)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6250-17	Pipe (45.23)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6250-18	Pipe (27.48)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6250-19	Pipe (18.48)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6250-20	Angle (6.00 X 7.70)	3/16 PL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6250-21	Plate (7.00 X 7.00)	1/4 PL HRS ASTM A-36	8	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6250-22	Plate (6.50 X 7.00)	1/4 PL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6250-23	Plate (3.5 X 7.00)	1/4 PL HRS ASTM A-36	6	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6250-24	Hook (3.00)	1/4 DIA BAR HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6250-25	Bracket (2.25)	1/4 X 2 FL HRS ASTM A-36	4	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6250-26	Plate (2.81 X 17.50)	3/16 PL HRS ASTM A-36	8	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6250-27	Plate (2.81 X 5.62)	3/16 PL HRS ASTM A-36	9	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8250-28	Flat Bar (276.50)	1/4 X 4 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-29	Flat Bar (124.00)	1/4 X 4 FL HRS ASTM A-36	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-30	Flat Bar (69.75)	1/4 X 4 FL HRS ASTM A-36	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-31	Flat Bar (28.50)	1/4 X 4 FL HRS ASTM A-36	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-32	Chain (28.00)	3/16 304L SS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-33	Chain (82.50)	3/16 304L SS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-34	Grating (25.12 WD X 99.0 LG)	1 1/2 X 3/16 BEARING BAR	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-35	Grating (25.12 WD X 75.0 LG)	1 1/2 X 3/16 BEARING BAR	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-36	Grating (29.88 WD X 75.0 LG)	1 1/2 X 3/16 BEARING BAR	3	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-37	Grating (29.88 WD X 26.5 LG)	1 1/2 X 3/16 BEARING BAR	6	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-38	Angle (28.56)	1 1/2 X 1 1/2 X 3/16 ASTM A-36	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-39	Angle (93.26)	1 1/2 X 1 1/2 X 3/16 ASTM A-36	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-40	Angle (91.25)	1 1/2 X 1 1/2 X 3/16 ASTM A-36	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8250-41	Channel (9.90 X 83.25)	3/16 PL HRS ASTM A-36	3	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CSD	COMMENTS
	D8250-42	Grating Retainer Plate (3.00 X 4.00)	3/16 PL HRS ASTM A-36	12	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
D8251	D8251-1	Channel (23.28 X 126.00)	3/16 PL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
Platform Assembly	D8251-2	Channel (11.4 X 272.50)	3/16 PL HRS ASTM A-36	3	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-3	Channel (9.9 X 91.25)	3/16 PL HRS ASTM A-36	3	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-4	Channel (9.9 X 28.56)	3/16 PL HRS ASTM A-36	10	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-5	Channel (11.4 X 6.00)	3/16 PL HRS ASTM A-36	6	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-6	Pipe (278.40)	1 1/2 SCH 40 CS	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-7	Pipe (30.40)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-8	Pipe (19.40)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-9	Pipe (71.65)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-10	Pipe (48.15)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-11	Pipe (40.50)	1 1/2 SCH 40 CS	6	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-12	Pipe (40.50)	1 1/2 SCH 40 CS	4	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-13	Pipe (41.96)	1 1/2 SCH 40 CS	4	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D6251-14	Pipe (68.73)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6251-15	Pipe (68.10)	1 1/2 SCH 40 CS	8	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6251-16	Pipe (59.23)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6251-17	Pipe (45.23)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6251-18	Pipe (27.48)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6251-19	Pipe (18.48)	1 1/2 SCH 40 CS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6251-20	Angle (6.00 X 7.70)	3/16 PL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6251-21	Plate (7.00 X 7.00)	1/4 PL HRS ASTM A-36	8	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6251-22	Plate (5.50 X 7.00)	1/4 PL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6251-23	Plate (3.5 X 7.00)	1/4 PL HRS ASTM A-36	6	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6251-24	Hook (3.00)	1/4 DIA BAR HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6251-25	Bracket (2.25)	1/4 X 2 FL HRS ASTM A-36	4	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6251-26	Plate (2.81 X 17.50)	3/16 PL HRS ASTM A-36	8	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D6251-27	Plate (2.81 X 5.62)	3/16 PL HRS ASTM A-36	9	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8251-28	Flat Bar (276.50)	1/4 X 4 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-29	Flat Bar (124.00)	1/4 X 4 FL HRS ASTM A-36	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-30	Flat Bar (69.75)	1/4 X 4 FL HRS ASTM A-36	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-31	Flat Bar (26.50)	1/4 X 4 FL HRS ASTM A-36	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-32	Chain (26.00)	3/16 304L SS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-33	Chain (62.50)	3/16 304L SS	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-34	Grating (25.12 WD X 99.0 LG)	1 1/2 X 3/16 BEARING BAR	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-35	Grating (25.12 WD X 75.0 LG)	1 1/2 X 3/16 BEARING BAR	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-36	Grating (29.88 WD X 75.0 LG)	1 1/2 X 3/16 BEARING BAR	3	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-37	Grating (29.88 WD X 26.5 LG)	1 1/2 X 3/16 BEARING BAR	6	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-38	Angle (28.56)	1 1/2 X 1 1/2 X 3/16 ASTM A-36	2	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-39	Angle (83.25)	1 1/2 X 1 1/2 X 3/16 ASTM A-36	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-40	Angle (91.25)	1 1/2 X 1 1/2 X 3/16 ASTM A-36	1	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
	D8251-41	Channel (9.90 X 83.25)	3/16 PL HRS ASTM A-36	3	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D6251-42	Grating Retainer Plate (3.00 X 4.00)	3/16 PL HR8 ASTM A-36	12	CM	No	Does not function to contain melter offgas. Platform assembly and all associated parts are external to the pressure boundary and are used for maintenance operations.
D6282 Piping Assembly 14"	D6282-1	Inlet Pipe Assembly	D6282-1	1	QL	Yes	
	D6282-2	Crossover Pipe Assembly	D6282-2	1	QL	Yes	
	D6282-3	Outlet Pipe Assembly	D6282-3	1	QL	Yes	
	D6282-4	Crossover Pipe Assembly	D6282-4	1	QL	Yes	
	D6282-5	Butterfly Valve W/ Operator	2904100-009 W/ 2904100-011	6	QL	Yes	
	D6282-6	Weld Neck Flange	14 X 150# 316L SS	18	QL	Yes	
	D6282-7	Weld Neck Flange	2 X 150# 316L SS	1	QL	Yes	
	D6282-8	90° Elbow LR	14 SCH 40 316L SS	5	QL	Yes	
	D6282-9	Straight Tee	14 SCH 40 316L SS	2	QL	Yes	
	D6282-10	Pipe (Cut at Assembly)	14 SCH 10 316L SS	496 in	QL	Yes	
	D6282-11	Pipe (8.19)	2 SCH 40 316L SS	1	QL	Yes	
	D6282-12	Pipe T.O.E. (10.00)	1/2 SCH 40 316L SS	1	QL	Yes	
	D6282-13	Pipe T.O.E. (3.19)	1/2 SCH 40 316L SS	11	QL	Yes	
	D6282-14	DELETED					
	D6282-15	Manual Valve 1/2"	2904100-019	12	QL	Yes	
	D6282-16	Thermowell	88309-1	1	QL	Yes	
	D6282-17	Hex HD Bolt	1-8UNC 316 SS	120	QL	Yes	
	D6282-18	Flat Washer	316 SS	120	QL	Yes	
	D6282-19	Bellows Assy	2904100-021	4	QL	Yes	
	D6282-20	90° Elbow SR	14 SCH 40 316L SS	1	QL	Yes	
D6285	D6285-1	Panel (12.00 X 62.50)	12GA SHT 316L SS	1	QL	Yes	Panel is used for mounting of the PDITs which have an ITS pressure boundary function.
Electrical Enclosure	D6285-2	Z-Bar 50"	7GA SHT 316L SS	1	QL	Yes	Used to mount the electrical enclosures with PDITs to the carbon bed adsorber units. PDITs have an ITS pressure boundary function.
	D6285-3	Enclosure	Hoffman	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation
	D6285-4	Sub-Panel	Hoffman	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D6285-5	Temp. Transmitter	2904100-008	9	CM	No	Additional Protection Class (APC), may be purchased as commercial component.
	D6285-6	Diff. Press. X-Mitter	2904100-016	2	QL	Yes	
	D6285-7	5 Valve Manifold	Swagelok	2	QL	Yes	
	D6285-8	Mounting Channel	Allen Bradley	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D6285-9	End Plate	Allen Bradley	10	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D6285-10	End Clamp	Allen Bradley	5	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D6285-11	Marker Card	Allen Bradley	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D6285-12	Terminal	Allen Bradley	106	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8285-13	Circuit Breaker	Allen Bradley	3	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-14	Spur Block J-Box	Pepperl - Fuche	2	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-15	Profibus DP Station	2904100-043	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-16	Fiber Optic Repeater	2904100-041	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-17	Fiber Optic Housing	2904100-042	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-18	Power Supply	Phoenix	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-19	External GFCI Recpt.	Grace	2	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-20	Wire Duct	Panduit	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-21	Duct Cover	Panduit	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-22	Wire Duct	Panduit	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-23	Duct Cover	Panduit	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-24	Duct Cover	Panduit	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-25	Wire Duct	Panduit	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-26	Hex Nut	3/8-16UNC 316 SS	12	QL	Yes	
	D8285-27	Hex HD Bolt 1.00 LG	3/8-16UNC 316 SS	8	QL	Yes	
	D8285-28	Hex HD Bolt 2.00 LG	3/8-16UNC 316 SS	4	QL	Yes	
	D8285-29	Lock Washer	3/8-16UNC 316 SS	12	QL	Yes	
	D8285-30	TVSS	Ferraz Shawmut	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-31	Enclosure	Hoffman	2	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8285-32	Circuit Breaker	Allen Bradley	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
D8286	D8286-1	Panel (12.00 X 62.50)	12GA SHT 316L SS	1	QL	Yes	Panel is used for mounting of the PDITs which have an ITS pressure boundary function.
Electrical Enclosure	D8286-2	7-Par 50"	7GA SHT 316L SS	1	QL	Yes	Used to mount the electrical enclosures with PDITs to the carbon bed adsorber units. PDITs have an ITS pressure boundary function.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8286-3	Enclosure	Hoffman	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-4	Sub-Panel	Hoffman	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-5	Temp. Transmitter	2904100-006	9	CM	No	Additional Protection Class (APC), may be purchased as commercial component.
	D8286-6	Diff. Press. X-Mitter	2904100-016	2	QL	Yes	
	D8286-7	5 Valve Manifold	Swagelok	2	QL	Yes	
	D8286-8	Mounting Channel	Allen Bradley	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-9	End Plate	Allen Bradley	10	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-10	End Clamp	Allen Bradley	5	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-11	Marker Card	Allen Bradley	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-12	Terminal	Allen Bradley	106	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-13	Circuit Breaker	Allen Bradley	3	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-14	Spur Block J-Box	Pepperl - Fuchs	2	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-15	Profibus DP Station	2904100-043	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-16	Fiber Optic Repeater	2904100-041	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-17	Fiber Optic Housing	2904100-042	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-18	Power Supply	Phoenix	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-19	External GFCI Recpt.	Grace	2	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-20	Wire Duct	Panduit	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-21	Duct Cover	Panduit	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-22	Wire Duct	Panduit	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-23	Duct Cover	Panduit	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8286-24	Duct Cover	Panduit	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-25	Wire Duct	Panduit	A/R	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-26	Hex Nut	3/8-16UNC 316 SS	12	QL	Yes	
	D8286-27	Hex HD Bolt 1.00 LG	3/8-16UNC 316 SS	8	QL	Yes	
	D8286-28	Hex HD Bolt 2.00 LG	3/8-16UNC 316 SS	4	QL	Yes	
	D8286-29	Lock Washer	3/8-16UNC 316 SS	12	QL	Yes	
	D8286-30	TVSS	Ferraz Shawmut	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-31	Enclosure	Hoffman	2	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
	D8286-32	Circuit Breaker	Allen Bradley	1	CM	No	Does not function to contain melter offgas. Electrical enclosure internal component used for commercial instrumentation.
D8287 Piping Assembly 2"	D8287-1	Pipe (Cut at Assembly)	2 SCH 40 316L SS	30ft	QL	Yes	
	D8287-2	Weld Neck Flange	2 X 150# 316L SS	7	QL	Yes	
	D8287-3	90o Elbow	2 SCH 40 316L SS	9	QL	Yes	
	D8287-4	Tee	2 SCH 40 316L SS	1	QL	Yes	
	D8287-5	Gasket		7	QL	Yes	
	D8287-6	Rupture Disc		2	QL	Yes	
	D8287-7	Hex HD Bolt (2.5)	5/8-11UNC 316 SS	12	QL	Yes	
	D8287-8	Hex HD Bolt (3.00)	5/8-11UNC 316 SS	8	QL	Yes	
	D8287-9	Hex Nut	5/8-11UNC 316 SS	20	QL	Yes	
D8304 Final Assembly	D8304-1	Base Frame Assembly (1A/B)	D8218	1	QL	Yes	
	D8304-2	Base Frame Assembly (2A/B)	D8218	1	QL	Yes	
	D8304-3	Housing Assembly (1A)	D8222	1	QL	Yes	
	D8304-4	Housing Assembly (2A)	D8222	1	QL	Yes	
	D8304-5	Housing Assembly (1B)	D8223	1	QL	Yes	
	D8304-6	Housing Assembly (2B)	D8223	1	QL	Yes	
	D8304-7	Platform Assembly (1A/B)	D8250	1	QL	Yes	
	D8304-8	Platform Assembly (2A/B)	D8251	1	QL	Yes	
	D8304-9	Ladder Assembly (1A/B)	D8220	1	CM	No	Does not function to contain melter offgas. Ladder and all associated parts are external to the pressure boundary and form part of the maintenance platform.
	D8304-10	Ladder Assembly (2A/B)	D8220	1	CM	No	Does not function to contain melter offgas. Ladder and all associated parts are external to the pressure boundary and form part of the maintenance platform.
	D8304-11	Crane Trolley Assembly (1A/B)	D8226	1	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D8304-12	Crane Trolley Assembly (2A/B)	D8226	1	CM	No	Does not function to contain melter offgas. Crane trolley and all associated parts are external to the pressure boundary and are used as part of the carbon media loading operation.
	D8304-13	Inlet Pipe Assembly (1A/B)	D8282-1	1	QL	Yes	
	D8304-14	Crossover Pipe Assembly (1A/B)	D8282-2	1	QL	Yes	
	D8304-15	Outlet Pipe Assembly (1A/B)	D8282-3	1	QL	Yes	
	D8304-16	Crossover Pipe Assembly (1A/B)	D8282-4	1	QL	Yes	
	D8304-17	Inlet Pipe Assembly (2A/B)	D8282-1	1	QL	Yes	
	D8304-18	Crossover Pipe Assembly (2A/B)	D8282-2	1	QL	Yes	
	D8304-19	Outlet Pipe Assembly (2A/B)	D8282-3	1	QL	Yes	
	D8304-20	Crossover Pipe Assembly (2A/B)	D8282-4	1	QL	Yes	

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8304-21	Pipe Assembly 2" (1A/B)	D8287	1	QL	Yes	
	D8304-22	Pipe Assembly 2" (2A/B)	D8287	1	QL	Yes	
	D8304-23	Spacer (1/4 THK 4.0 X 4.0)	Alumina Silicate Ceramic	100	QL	Yes	
	D8304-24	Gasket 2"		10	QL	Yes	
	D8304-25	Gasket 14"		20	QL	Yes	
	D8304-26	Hex HD Bolt (1.50)	1/2-13UNC 316 SS	76	QL	Yes	
	D8304-27	Hex HD Bolt (2.00)	1/2-13UNC 316 SS	200	QL	Yes	
	D8304-28	Hex Nut	1/2-13UNC 316 SS	276	QL	Yes	
	D8304-29	Lock Washer	1/2 I.D. 316 SS	276	QL	Yes	
	D8304-30	Hex HD Bolt (2.50)	5/8-11UNC 316 SS	8	QL	Yes	
	D8304-31	Hex HD Bolt (3.00)	5/8-11UNC 316 SS	16	QL	Yes	
	D8304-32	Hex Nut	5/8-11UNC 316 SS	24	QL	Yes	
	D8304-33	Hex HD Bolt (4.50)	1-8UNC 316 SS	144	QL	Yes	
	D8304-34	Hex HD Bolt (2.50)	1-8UNC 316 SS	144	QL	Yes	
	D8304-35	Hex Nut	1-8UNC 316 SS	144	QL	Yes	
	D8304-36	Insulation	Calcium-Silicate	2400 ft^3	CM	No	Does not function to contain melter offgas. Insulation is not provided by IONEX.
	D8304-37	High Temperature Adhesive	Calbond R Gold	A/R	CM	No	Does not function to contain melter offgas. Insulation bonding material is not provided by IONEX.
	D8304-38	Sealing Caulk	PERMATEX HI-TEMP RED RTV	A/R	CM	No	Does not function to contain melter offgas. RTV is recommended for sealing the joints of the cladding and is not provided by IONEX.
	D8304-39	Flat Washer	1/2 ID X 1.25 OD 316 SS	552	QL	Yes	
	D8304-40	Name Plate (S/Ns 01 THRU 06)	B8221	1	CM	No	Does not function to contain melter offgas. Nameplate is external to the pressure boundary and is only used to identify the equipment.
	D8304-41	3-Way Solenoid Valve	Valcor	12	QL	No	Valcor solenoid valves have been procured from a qualified supplier. No CGD necessary.
	D8304-42	3-Way Solenoid Valve	ASCO	12	CM	No	Does not function to contain melter offgas. This 3-way solenoid valve is used during normal operation to activate the 14 inch butterfly valves to either isolate the units for maintenance or adjust the flow of offgas.
D8317	D8317-1	I-Beam	6 X 12.5# HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. External to the pressure boundary and is considered a none permanate piece of plant equipment. Used only for handling the equipment during transportation and installation.
Spreader bar	D8317-2	Plate	1.0 PLATE ASTM A-36	4	CM	No	Does not function to contain melter offgas. External to the pressure boundary and is considered a none permanate piece of plant equipment. Used only for handling the equipment during transportation and installation.
	D8317-3	Plate	1.0 PLATE ASTM A-36	4	CM	No	Does not function to contain melter offgas. External to the pressure boundary and is considered a none permanate piece of plant equipment. Used only for handling the equipment during transportation and installation.
	D8317-4	Anchor Shackle (25000#)	McMaster - Carr	12	CM	No	Does not function to contain melter offgas. External to the pressure boundary and is considered a none permanate piece of plant equipment. Used only for handling the equipment during transportation and installation.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D6171-7	Backing Washer	12GA SHT 316L SS	6	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D6171-8	Perforated Sheet (22.38)	20GA SHT 316L SS	20	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D6171-9	Perforated Sheet (10.44)	20GA SHT 316L SS	4	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D6171-10	Vertical Channel W/Holes	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
D6179	D6179-1	Inlet Air Slot with Sample Holes	D6169-1	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
Adsorber Assembly	D6179-2	Inlet Air Slot without Sample Holes	D6169-2	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D6179-3	Outlet Air Slot	D6170	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D6179-4	Bed Air Slot with Sample Holes	D6171-1	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D6179-5	Bed Air Slots without Sample Holes	D6171-2	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D6179-6	Tubing	1 1/2 OD x 0.120 WT, 316L SS	3	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen, used to fill the hole spaced used for the grain theft sample.
	D6179-7	Pipe Coupling	1 1/4 x 3000#, 316L SS	3	QL	Yes	
	D6179-8	Inlet Plate	12GA SHT 316L SS	1	CM	No	Does not function to contain melter offgas. Plate is used to channel air into the air slots and through the carbon media.
	D6179-9	Outlet Plate	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. Plate is used to channel air into the air slots and through the carbon media.
	D6179-10	Divider Plate	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. Plate is used in the top plenum of the carbon media beds to separate the different medias and aid in carbon media loading.
	D6179-11	Cover Plate	12GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. Plate is used to channel air into the air slots and through the carbon media.
D6183	D6183-1	Adsorber Assembly	D6179	1	QL	Yes *	The pipe coupling called out as part of this assembly functions to contain melter offgas, therefore, the whole assembly is designated ITS. * For Item# D6183-1 should refer to drawing D6179 for the safety / quality designation and CGD requirements.
Housing Weldment	D6183-2	Back Panel	D6188-1	1	QL	Yes	
	D6183-3	Front Panel	D6188-2	1	QL	Yes	
	D6183-4	Bottom Panel	D6188-4	1	QL	Yes	
	D6183-5	Top Panel	D6188-5	1	QL	Yes	
	D6183-6	Top Panel W/Holes	D6188-6	1	QL	Yes	
	D6183-7	Top Panel	D6188-7	1	QL	Yes	
	D6183-8	Top End Panel	D6188-8	2	QL	Yes	
	D6183-9	Inlet End Panel	D6188-9	1	QL	Yes	
	D6183-10	Outlet End Panel	D6188-10	1	QL	Yes	
	D6183-11	Hopper Size Main Bed	D6188-11	8	QL	Yes	
	D6183-12	Hopper Side Guard Bed Panel	D6188-12	8	QL	Yes	
	D6183-13	Hopper End Main Bed Panel	D6188-13	8	QL	Yes	
	D6183-14	Hopper End Guard Bed Panel	D6188-14	8	QL	Yes	
	D6183-15	Hopper Bottom Panel	D6188-15	8	QL	Yes	
	D6183-16	Manway Flange	D6188-16	2	QL	Yes	
	D6183-17	Reinforcement Plate 16"	D6188-18	2	QL	Yes	
	D6183-18	Reinforcement Plate 14"	D6188-19	4	QL	Yes	

Table 2 Quality Level List (LAW)

COMPONENT TAG NO.:
24590-LAW-MV-LVP-ADBR-00001A/B

QUALITY LEVEL

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
B8597	B8597-1	Pipe Plug Hex Threaded	1 1/4 x 150# 316L SS	1	QL	Yes	
Carbon Sample Plug	B8597-2	Tubing	1.0 OD x .120 WT 316L SS ASTM A-269	1	CM	No	Does not function to contain melter offgas. Forms part of the Carbon Sample Plug Assembly. Used to plug hole in the adsorber perforated sheet needed to take carbon samples.
	B8597-3	Round Bar 1.00 LG	1 1/4 DIA BAR 316L SS ASTM A-276 or ASTM A-479	1	CM	No	Does not function to contain melter offgas. Forms part of the Carbon Sample Plug Assembly. Used to plug hole in the adsorber perforated sheet needed to take carbon samples.
B8598	B8598-1	Piping Coupling Threaded	1/2 x 3000# 316L SS	1	QL	Yes	
Thermowell Assy	B8598-2	Tubing LG as Req'd	.50 OD x .120 WT 316L SS ASTM A-269	1	QL	Yes	
	B8598-3	Plug (See Detail)	1/4 DIA RD BAR 316L SS ASTM A-276 or ASTM A-479	1	QL	Yes	
D8224	D8224-1	Plate - 1	3/16 PL 316L SS ASTM A-240	1	QL	Yes	
Access Door Discharge Filter	D8224-2	Plate - 2	3/16 PL 316L SS ASTM A-240	2	QL	Yes	
	D8224-3	Plate - 3	3/16 PL 316L SS ASTM A-240	2	QL	Yes	
	D8224-4	Flat Bar - 1	3/4 x 2 RECT BAR 316L SS ASTM A-276 or A-479	2	QL	Yes	
	D8224-5	Flat Bar - 2	3/4 x 2 RECT BAR 316L SS ASTM A-276 or A-479	2	QL	Yes	
	D8224-6	Flat Bar - 3	1/4 x 2 RECT BAR 316L SS ASTM A-276 or A-479	1	CM	No	Does not function to contain melter offgas. This bar is used to make a lifting lug for the access door.
D8473	D8473-1	Vertical Channel 9.64 x 89.29	12 GA SHT 316L SS	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
End Air Slot	D8473-2	Horizontal Channel 8.89 x 75.00	12 GA SHT 316L SS	7	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8473-3	Lower Channel 9.64 x 77.00	12 GA SHT 316L SS	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8473-4	Upper Channel 15.14 x 77.00	12 GA SHT 316L SS	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8473-5	Vertical Flat Bar 1.00 x 82.00	12 GA SHT 316L SS	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8473-6	Vertical Flat Bar 1.00 x 87.50	12 GA SHT 316L SS	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8473-7	Perforated Sheet 22.38 x 76.75	C8476	3	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8473-8	Perforated Sheet 18.27 x 76.75	A9399	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
D8474	D8474-1	Vertical Channel 5.52 x 89.29	12 GA SHT 316L SS	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
Center Air Slot	D8474-2	Horizontal Channel 4.779 x 75.00	12 GA SHT 316L SS	7	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8474-3	Lower Channel 5.52 x 77.00	12 GA SHT 316L SS	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8474-4	Upper Channel 16.52 x 77.00	12 GA SHT 316L SS	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8474-5	Vertical Flat Bar 1.00 x 82.00	12 GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8474-6	Perforated Sheet 22.38 x 76.75	C8476	6	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8474-7	Perforated Sheet 18.27 x 76.75	A9399	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
D8475	D8475-1	Horizontal Channel 8.69 x 75.00	12 GA SHT 316L S.S.	7	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
End Air Slot	D8475-2	Lower Channel 9.64 x 77.00	12 GA SHT 316L S.S.	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8475-3	Upper Channel 15.14 x 77.00	12 GA SHT 316L S.S.	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8475-4	Vertical Flat Bar 1.00 x 82.00	12 GA SHT 316L S.S.	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8475-5	Vertical Flat Bar 1.00 x 87.50	12 GA SHT 316L S.S.	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8475-6	Perforated Sheet 22.38 x 76.75	C8476	3	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8475-7	Perforated Sheet 18.27 x 76.75	A9399	1	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
D8524	D8524-1	End Air Slot	D8473	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
Adsorber Assy	D8524-2	Center Air Slot	D8474	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8524-3	End Air Slot	D8475	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8524-4	Backing Washer 3.50 OD x 2.25 ID	12 GA SHT 316L SS	3	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8524-5	Tubing 8.19 LG	1 1/2 OD x .120 WT 316L SS ASTM A-269	3	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8524-6	Pipe Coupling Threaded	1 1/4 x 3000# 316L SS	3	QL	Yes	
	D8524-7	Closure Plate 31.55 x 84.00	12 GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8524-8	Closure Plate 39.55 x 84.00	12 GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8524-9	Cover Plate 3.50 x 84.00	12 GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
D8525	D8525-1	End Air Slot	D8473	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
Adsorber Assy	D8525-2	Center Air Slot	D8474	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8525-3	End Air Slot	D8475	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8525-4	Backing Washer 3.50 OD x 2.25 ID	12 GA SHT 316L SS	3	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8525-5	Tubing 8.19 LG	1 1/2 OD x .120 WT 316L SS ASTM A-269	3	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8525-6	Pipe Coupling Threaded	1 1/4 x 3000# 316L SS	3	QL	Yes	
	D8525-7	Closure Plate 31.55 x 84.00	12 GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8525-8	Closure Plate 39.55 x 84.00	12 GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
	D8525-9	Cover Plate 3.50 x 84.00	12 GA SHT 316L SS	2	CM	No	Does not function to contain melter offgas. This part forms part of the carbon media screen
D8526	D8526-1	Adsorber Assy LAW Unit B	D8524	1	QL	Yes	
Housing Wldmt	D8526-2	Front Panel Assy LAW Unit B	D8529	1	QL	Yes	
	D8526-3	Back Panel Assy LAW Unit B	D8530	1	QL	Yes	
	D8526-4	Top Panel Assy LAW Unit B	D8531	1	QL	Yes	
	D8526-5	Bottom Panel Assy LAW Unit A/B	D8532	1	QL	Yes	
	D8526-6	Outlet End Panel Assy LAW Unit B	D8533	1	QL	Yes	
	D8526-7	Inlet End Panel Assy LAW Unit A/B	D8534	1	QL	Yes	
	D8526-8						
	D8526-9						

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8526-10	Thermowell Assy 69"	B8598-1	2	QL	Yes	
	D8526-11	Thermowell Assy 27"	B8598-2	2	QL	Yes	
	D8526-12	Filter Rack Assy	D8581	1	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D8526-13	Lifting Lug	B8216	4	CM	No	Does not function to contain melter offgas. Lifting lugs do not form part of the pressure boundary and are only used to handle the housings for transportation and installation.
	D8526-14	Bracket .62 x 3.00	12 GA SHT 316L SS ASTM A-240	A/R	CM	No	Does not function to contain melter offgas. Used to help support the carbon media thermowells.
	D8526-15	Pipe 10.75 LG TOE	1/2 SCH 40 316L SS ASTM A-312	5	QL	Yes	
	D8526-16	Pipe 10.50 LG TOE	2 SCH 40 316L SS ASTM A-312	2	QL	Yes	
	D8526-17						
	D8526-18	Pipe 20.81 LG	2 SCH 40 316L SS ASTM A-312	1	QL	Yes	
	D8526-19						
	D8526-20	90 DEG Elbow LR BW	2 SCH 40 316L SS ASTM A-403	1	QL	Yes	
	D8526-21	Slip-On Flange	1-1/2 x 150# 316L SS ASTM A-182	2	QL	Yes	
	D8526-22	Weld Neck Flange	2 x 150# 316L SS ASTM-182	1	QL	Yes	
	D8526-23	Pipe 24.81 LG	3 SCH 40 316L SS ASTM A-312	1	QL	Yes	
	D8526-24						
	D8526-25	Weld Neck Flange	3 x 150# 316L SS ASTM A-182	1	QL	Yes	
	D8526-26	Washer 3.9 OD x 1.9 ID	1/2 PL 316L SS ASTM A-240	2	QL	Yes	
	D8526-27	Pipe 10.70 LG TOE	1-1/2 SCH 40 316L SS ASTM A-312	2	QL	Yes	
D8527 Housing Widmt	D8527-1	Adsorber Assy LAW Unit A	D8524	1	QL	Yes	
	D8527-2	Front Panel Assy LAW Unit A	D8529	1	QL	Yes	
	D8527-3	Back Panel Assy LAW Unit A	D8530	1	QL	Yes	
	D8527-4	Top Panel Assy LAW Unit A	D8531	1	QL	Yes	
	D8527-5	Bottom Panel Assy LAW Unit A/B	D8532	1	QL	Yes	
	D8527-6	Outlet End Panel Assy LAW Unit A	D8533	1	QL	Yes	
	D8527-7	Inlet End Panel Assy LAW Unit A/B	D8534	1	QL	Yes	
	D8527-8						
	D8527-9						
	D8527-10	Thermowell Assy 69"	B8598-1	2	QL	Yes	
	D8527-11	Thermowell Assy 27"	B8598-2	2	QL	Yes	
	D8527-12	Filter Rack Assy	D8581	1	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D8527-13	Lifting Lug	B8216	4	CM	No	Does not function to contain melter offgas. Lifting lugs do not form part of the pressure boundary and are only used to handle the housings for transportation and installation.
	D8527-14	Bracket .62 x 3.00	12 GA SHT 316L SS ASTM A-240	A/R	CM	No	Does not function to contain melter offgas. Used to help support the carbon media thermowells.
	D8527-15	Pipe 10.75 LG TOE	1/2 SCH 40 316L SS ASTM A-312	5	QL	Yes	
	D8527-16	Pipe 10.50 LG TOE	2 SCH 40 316L SS ASTM A-312	2	QL	Yes	
	D8527-17						
	D8527-18	Pipe 20.81 LG	2 SCH 40 316L SS ASTM A-312	1	QL	Yes	
	D8527-19						
	D8527-20	90 DEG Elbow LR BW	2 SCH 40 316L SS ASTM A-403	1	QL	Yes	
	D8527-21	Slip-On Flange	1-1/2 x 150# 316L SS ASTM A-182	2	QL	Yes	
	D8527-22	Weld Neck Flange	2 x 150# 316L SS ASTM-182	1	QL	Yes	
	D8527-23	Pipe 24.81 LG	3 SCH 40 316L SS ASTM A-312	1	QL	Yes	
	D8527-24			1			
	D8527-25	Weld Neck Flange	3 x 150# 316L SS ASTM A-182	1	QL	Yes	
	D8527-26	Washer 3.9 OD x 1.9 ID	1/2 PL 316L SS ASTM A-240	2	QL	Yes	
	D8527-27	Pipe 10.75 LG TOE	1-1/2 SCH 40 316L SS ASTM A-312	2	QL	Yes	
D8529 Front Panel Assy	D8529-1	Plate 36.5 x 90.75	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8529-2	Plate 96.00 x 117.75	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8529-3	Plate 5.00 x 111.50	1/4 PL 316L SS ASTM A-240	2	QL	Yes	

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8529-4	Plate 5.00 x 90.00	1/4 PL 316L SS ASTM A-240	8	QL	Yes	
	D8529-5	Plate 5.00 x 40.62	1/4 PL 316L SS ASTM A-240	2	QL	Yes	
	D8529-6	Plate 5.00 x 33.50	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
	D8529-7	S-Beam 120.50 LG	S8 x 18.4# CS ASTM A-36	2	QL	Yes	
	D8529-8	S-Beam 97.75 LG	S8 x 18.4# CS ASTM A-36	8	QL	Yes	
	D8529-9	S-Beam 32.81 LG	S8 x 18.4# CS ASTM A-36	1	QL	Yes	
	D8529-10	S-Beam 24.25 LG	S8 x 18.4# CS ASTM A-36	2	QL	Yes	
	D8529-11	Pipe 10.12 LG	18 SCH 10 316L SS ASTM A-312	1	QL	Yes	
	D8529-12	Re-Bar 18"	D8538-17 (A9357)	4	QL	Yes	
	D8529-13	Gusset	D8538-5 (A9358)	4	QL	Yes	
	D8529-14	Gusset	D8538-7 (A9359)	1	QL	Yes	
	D8529-15	Gusset	D8538-9 (A9360)	1	QL	Yes	
	D8529-16	Pad w/ Holes	D8538-3 (A9361)	3	QL	Yes	
	D8529-17	Pad	D8538-4 (A9362)	5	QL	Yes	
	D8529-18	Weld Neck Flange	18 x 150# 316L SS ASTM A-182	4	QL	Yes	
	D8529-19	Plate 48.0 x 90.75	1/2 PL 316L SS ASTM A-240	2	QL	Yes	
	D8529-20	Pad w/ Holes	D8538-1 (A9384)	5	QL	Yes	
	D8529-21	Pad	D8538-2 (A9383)	4	QL	Yes	
	D8529-22	Plate 5.0 x 4.81	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
D8530 Back Panel Assy	D8530-1	Plate 90.75 x 228.50	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
	D8530-2	Plate 27.00 x 46.75	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
	D8530-3	Plate 5.00 x 111.50	1/4 PL 316L SS ASTM A-240	2	QL	Yes	
	D8530-4	Plate 5.00 x 90.00	1/4 PL 316L SS ASTM A-240	8	QL	Yes	
	D8530-5	Plate 5.00 x 90.31	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
	D8530-6	Plate 5.00 x 63.31	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
	D8530-7	Plate 5.00 x 1.31	1/4 PL 316L SS ASTM A-240	2	QL	Yes	
	D8530-8	Plate 5.00 x 8.50	1/4 PL 316L SS ASTM A-240	4	QL	Yes	
	D8530-9	S-Beam 120.50 LG	S8 x 18.4# CS ASTM A-36	2	QL	Yes	
	D8530-10	S-Beam 97.75 LG	S8 x 18.4# CS ASTM A-36	8	QL	Yes	
	D8530-11	S-Beam 99.50 LG	S8 x 18.4# CS ASTM A-36	1	QL	Yes	
	D8530-12	S-Beam 72.50 LG	S8 x 18.4# CS ASTM A-36	1	QL	Yes	
	D8530-13	S-Beam 4.50 LG	S8 x 18.4# CS ASTM A-36	2	QL	Yes	
	D8530-14	Cylinder 16" ID	D8538-15 (A9381)	2	QL	Yes	
	D8530-15	Re-Bar 18"	D8538-16 (A9382)	2	QL	Yes	
	D8530-16	Pad w/ Holes	D8538-3 (A9362)	3	QL	Yes	
	D8530-17	Pad	D8538-4 (A9361)	5	QL	Yes	
	D8530-18	Flange	D8538-13 (A9385)	2	QL	Yes	
	D8530-19	Pad w/ Holes	D8538-1 (A9384)	5	QL	Yes	
	D8530-20	Pad	D8538-2 (A9383)	4	QL	Yes	
D8531 Top Panel Assy	D8531-1	Plate 80.00 x 154.00	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8531-2	Plate 48.75 x 80.00	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8531-3	Plate 24.75 x 80.00	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8531-4	Plate 6.75 x 80.00	1/2 PL 316L SS ASTM A-240	2	QL	Yes	
	D8531-5	Plate 5.00 x 78.50	1/4 PL 316L SS ASTM A-240	10	QL	Yes	
	D8531-6	Plate 5.00 x 20.88	1/4 PL 316L SS ASTM A-240	2	QL	Yes	
	D8531-7	Plate 5.00 x 15.75	1/4 PL 316L SS ASTM A-240	4	QL	Yes	
	D8531-8	Plate 5.00 x 8.50	1/4 PL 316L SS ASTM A-240	8	QL	Yes	
	D8531-9	S-Beam 81.50 LG	S8 x 18.4# CS ASTM A-36	9	QL	Yes	
	D8531-10	S-Beam 80.75 LG	S8 x 18.4# CS ASTM A-36	1	QL	Yes	
	D8531-11	S-Beam 20.88 LG	S8 x 18.4# CS ASTM A-36	2	QL	Yes	
	D8531-12	S-Beam 15.75 LG	S8 x 18.4# CS ASTM A-36	4	QL	Yes	
	D8531-13	Pipe 12.50 LG	8 SCH 10 316L SS ASTM A-312	10	QL	Yes	
	D8531-14	Re-Bar 8"	D8538-18 (A9620)	10	QL	Yes	
	D8531-15	Slip-On Flange	8 x 150# 316L SS ASTM A-182	10	QL	Yes	
D8532 Bottom Panel Assy	D8532-1	Plate 25.25 82.50	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8532-2	Plate 9.25 154.00	1/2 PL 316L SS ASTM A-240	4	QL	Yes	
	D8532-3	Plate 3.88 x 154.00	1/2 PL 316L SS ASTM A-240	2	QL	Yes	
	D8532-4	Plate 50.00 x 82.50	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8532-5	Plate 21.19 x 50.62	1/2 PL 316L SS ASTM A-240	12	QL	Yes	
	D8532-6	Plate 27.65 x 30.06	1/2 PL 316L SS ASTM A-240	12	QL	Yes	

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8532-7	Plate 9.50 x 9.50	1/2 PL 316L SS ASTM A-240	8	QL	Yes	
	D8532-8	Plate 27.00 x 82.50	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8532-9	Plate 5.00 x 82.50	1/4 PL 316L SS ASTM A-240	3	QL	Yes	
	D8532-10	S-Beam 97.50 LG	S8 x 18.4# CS ASTM A-36	2	QL	Yes	
	D8532-11	S-Beam 82.50 LG	S8 x 18.4# CS ASTM A-36	1	QL	Yes	
	D8532-12	Slide Gate Assy	D8563	8	QL	Yes	
D8533 Outlet End Panel Assy	D8533-1	Plate 80.00 x 111.00	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8533-2	Plate 5.00 x 109.50	1/4 PL 316L SS ASTM A-240	4	QL	Yes	
	D8533-3	S-Beam 111.00 LG	S8 x 18.4# CS ASTM A-36	4	QL	Yes	
	D8533-4	Bag-Out Flange	D8538-10	8	QL	Yes	
	D8533-5	Door Flange	D8538-11	8	QL	Yes	
	D8533-6	Re-Bar Flange	D8538-12	6	QL	Yes	
	D8533-7	Round Bar cut to length at assy	1/4 DIA RD BAR 316L SS ASTM A-276 or ASTM A-479	12	QL	Yes	
	D8533-8	Hex HD Bolt 1.75 LG	1/2-13UNC 316 SS ASTM A-193	36	QL	Yes	
	D8533-9	Pad w/ Holes	D8538-1 (A9384)	2	QL	Yes	
	D8533-10	Pad	D8538-2 (A9383)	6	QL	Yes	
D8534 Inlet End Panel Assy	D8534-1	Plate 80.00 x 84.00	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8534-2	Plate 5.00 x 82.50	1/4 PL 316L SS ASTM A-240	4	QL	Yes	
	D8534-3	S-Beam 84.00 LG	S8 x 18.4# CS ASTM A-36	4	QL	Yes	
	D8534-4	Pad w/ Holes	D8538-1 (A9384)	2	QL	Yes	
	D8534-5	Pad	D8538-2 (A9383)	6	QL	Yes	
D8535 Front Panel Assy	D8535-1	Plate 98.00 x 117.75	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8535-2	Plate 48.00 x 90.75	1/2 PL 316L SS ASTM A-240	2	QL	Yes	
	D8535-3	Plate 5.00 x 111.50	1/4 PL 316L SS ASTM A-240	2	QL	Yes	
	D8535-4	Plate 5.00 x 90.00	1/4 PL 316L SS ASTM A-240	8	QL	Yes	
	D8535-5	Plate 5.00 x 60.50	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
	D8535-6	Plate 5.00 x 33.50	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
	D8535-7	Plate 5.00 x 11.62	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
	D8535-8	S-Beam 120.50 LG	S8 x 18.4# CS ASTM A-36	2	QL	Yes	
	D8535-9	S-Beam 97.75 LG	S8 x 18.4# CS ASTM A-36	8	QL	Yes	
	D8535-10	S-Beam 61.88 LG	S8 x 18.4# CS ASTM A-36	1	QL	Yes	
	D8535-11	S-Beam 28.12 LG	S8 x 18.4# CS ASTM A-36	1	QL	Yes	
	D8535-12	Pipe 10.12 LG	18 SCH 10 316L SS ASTM A-312	1	QL	Yes	
	D8535-13	Re-Bar 18"	D8538-17 (A9357)	4	QL	Yes	
	D8535-14	Gusset	D8538-8 (A9576)	2	QL	Yes	
	D8535-15	Gusset	D8538-5 (A9358)	1	QL	Yes	
	D8535-16	Gusset	D8538-6 (A9577)	1	QL	Yes	
	D8535-17	Pad w/ Holes	D8538-3 (A9362)	3	QL	Yes	
	D8535-18	Pad	D8538-4 (A9361)	5	QL	Yes	
	D8535-19	Weld Neck Flange	18 x 150# 316L SS ASTM A-182	4	QL	Yes	
	D8535-20	Plate 36.50 x 90.75	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8535-21	Pad w/ Holes	D8538-1 (A9384)	5	QL	Yes	
	D8535-22	Pad	D8538-2 (A9383)	4	QL	Yes	
	D8535-23	Plate 5.00 x 7.45	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
D8536 Back Panel Assy	D8536-1	Plate 98.00 x 117.75	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8536-2	Plate 48.00 x 90.75	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8536-3	Plate 5.00 x 111.50	1/4 PL 316L SS ASTM A-240	2	QL	Yes	
	D8536-4	Plate 5.00 x 90.31	1/4 PL 316L SS ASTM A-240	8	QL	Yes	
	D8536-5	Plate 5.00 x 90.00	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
	D8536-6	Plate 5.00 x 83.31	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
	D8536-7	Plate 5.00 x 1.31	1/4 PL 316L SS ASTM A-240	2	QL	Yes	
	D8536-8	Plate 5.00 x 8.50	1/4 PL 316L SS ASTM A-240	4	QL	Yes	
	D8536-9	S-Beam 120.50 LG	S8 x 18.4# CS ASTM A-36	2	QL	Yes	
	D8536-10	S-Beam 97.75 LG	S8 x 18.4# CS ASTM A-36	8	QL	Yes	
	D8536-11	S-Beam 99.50 LG	S8 x 18.4# CS ASTM A-36	1	QL	Yes	
	D8536-12	S-Beam 72.50 LG	S8 x 18.4# CS ASTM A-36	1	QL	Yes	
	D8536-13	S-Beam 4.50 LG	S8 x 18.4# CS ASTM A-36	2	QL	Yes	
	D8536-14	Cylinder 16" ID	D8538-15 (A9381)	2	QL	Yes	
	D8536-15	Re-Bar 18"	D8538-16 (A9382)	2	QL	Yes	

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8538-16	Pad w/ Holes	D8538-3 (A9382)	3	QL	Yes	
	D8538-17	Pad	D8538-4 (A9381)	5	QL	Yes	
	D8538-18	Flange	D8538-13 (A9385)	2	QL	Yes	
	D8538-19	Plate 48.00 x 90.75	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8538-20	Plate 36.50 x 90.75	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8538-21	Pad w/ Holes	D8538-1 (A9384)	5	QL	Yes	
	D8538-22	Pad	D8538-2 (A9383)	4	QL	Yes	
D8537 Top Panel Assy	D8537-1	Plate 80.00 x 154.00	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8537-2	Plate 48.75 x 80.00	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8537-3	Plate 24.75 x 80.00	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8537-4	Plate 6.75 x 80.00	1/2 PL 316L SS ASTM A-240	2	QL	Yes	
	D8537-5	Plate 5.00 x 78.50	1/4 PL 316L SS ASTM A-240	10	QL	Yes	
	D8537-6	Plate 5.00 x 20.88	1/4 PL 316L SS ASTM A-240	2	QL	Yes	
	D8537-7	Plate 5.00 x 15.75	1/4 PL 316L SS ASTM A-240	4	QL	Yes	
	D8537-8	Plate 5.00 x 8.25	1/4 PL 316L SS ASTM A-240	8	QL	Yes	
	D8537-9	S-Beam 81.50 LG	S8 x 18.4# CS ASTM A-36	9	QL	Yes	
	D8537-10	S-Beam 80.75 LG	S8 x 18.4# CS ASTM A-36	1	QL	Yes	
	D8537-11	S-Beam 20.88 LG	S8 x 18.4# CS ASTM A-36	2	QL	Yes	
	D8537-12	S-Beam 15.75 LG	S8 x 18.4# CS ASTM A-36	4	QL	Yes	
	D8537-13	Pipe 12.50 LG	8 SCH 10 316L SS ASTM A-312	10	QL	Yes	
	D8537-14	Re-Bar 8"	D8538-18 (A9620)	10	QL	Yes	
	D8537-15	Slip-On Flange	8 x 150# 316L SS ASTM A-182	10	QL	Yes	
D8538 Miscellaneous Details	D8538-1	Pad w/ Holes 5.00 x 7.50	1/2 PL HRS AST A-36	28	QL	Yes	
	D8538-2	Pad w/o Holes 5.00 x 7.50	1/2 PL HRS AST A-36	40	QL	Yes	
	D8538-3	Pad w/ Holes 5.00 x 8.00	1/2 PL HRS AST A-36	12	QL	Yes	
	D8538-4	Pad w/o Holes 5.00 x 8.00	1/2 PL HRS AST A-36	20	QL	Yes	
	D8538-5	Gusset 7.58 x 7.82	1/2 PL 316L SS ASTM A-240	5	QL	Yes	
	D8538-6	Gusset 8.00 x 10.93	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8538-7	Gusset 4.94 x 5.00	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8538-8	Gusset 3.19 x 10.86	1/2 PL 316L SS ASTM A-240	2	QL	Yes	
	D8538-9	Gusset 7.89 x 8.00	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8538-10	Bag-Out Flange 12.75 x 57.85	3/16 PL 316L SS ASTM A-240	6	QL	Yes	
	D8538-11	Door Flange 74.00 LG	3/4 x 3 RECT BAR 316L SS ASTM A-276 or A-479	6	QL	Yes	
	D8538-12	Re-Bar Flange 74.00 LG	1.25 x 3 RECT BAR 316L SS ASTM A-276 or A-479	6	QL	Yes	
	D8538-13	Manway Flange 21.50 OD x x16.50 ID	3/4 PL 316L SS ASTM A-240	4	QL	Yes	
	D8538-14	Manway Cover 21.50 DIA	1/2 PL 316L SS ASTM A-240	4	QL	Yes	
	D8538-15	Cylinder 16" ID 14.00 x 50.85	3/16 PL 316L SS ASTM A-240	4	QL	Yes	
	D8538-16	Re-Bar 16" 72.00 LG	1 x 2 RECT BAR 316L SS ASTM A-276 or A-479	4	QL	Yes	
	D8538-17	Re-Bar 18" 68.00 LG	1 1/2 x 2 RECT BAR 316L SS ASTM A-276 or A-479	8	QL	Yes	
	D8538-18	Re-Plate 8" 11.00 OD x 8.75 ID	1/2 PL 316L SS ASTM A-240	20	QL	Yes	
D8562 Outlet End Panel Assy	D8562-1	Plate 80.00 x 111.00	1/2 PL 316L SS ASTM A-240	1	QL	Yes	
	D8562-2	Plate 5.00 x 109.50	1/4 PL 316L SS ASTM A-240	4	QL	Yes	
	D8562-3	S-Beam 111.00 LG	S8 x 18.4# CS ASTM A-36	4	QL	Yes	
	D8562-4	Bag-Out Flange	D8538-10 (A9625)	6	QL	Yes	
	D8562-5	Door Flange	D8538-11	6	QL	Yes	
	D8562-6	Re-Bar Flange	D8538-12	6	QL	Yes	
	D8562-7	Round Bar cut to length at assy	1/4 DIA RD BAR 316L SS ASTM A-276 or ASTM A-479	12	QL	Yes	
	D8562-8	Hex HD Bolt 1.75 LG	1/2-13UNC 316 SS ASTM A-193	38	QL	Yes	
	D8562-9	Pad w/ Holes	D8538-1 (A9384)	2	QL	Yes	
	D8562-10	Pad	D8538-2 (A9383)	6	QL	Yes	
D8563 Slide Gate Assy	D8563-1	Pipe 5.75 LG	8 SCH 10 316L SS ASTM A-312	1	QL	Yes	
	D8563-2	Flange 14.00 x 16.00	1 PL 316L SS ASTM A-240	1	QL	Yes	
	D8563-3	Flange 14.00 x 16.00	1 PL 316L SS ASTM A-240	1	QL	Yes	
	D8563-4	Slide 10.50 x 18.75	7 GA SHT 316L SS ASTM A-240	1	QL	Yes	

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8583-5	O-Ring 9.25 ID	1/4 DIA SOLID NEOPRENE SHORE A DUROMETER McMASTER-CARR	1	QL	Yes	
	D8583-6	Hex HD Bolt 3.00 LG	3/4-10UNC 316 SS ASTM A-193	8	QL	Yes	
	D8583-7	Hex Nut	3/4-10UNC 316 SS ASTM A-194	8	QL	Yes	
	D8583-8	Lock Washer	3/4 ID 316 SS	8	QL	Yes	
D8581	D8581-1	Plate 19.31 x 47.85	1/4 PL 316L SS ASTM A-240	1	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
Filter Rack Assy	D8581-2	Plate 10.00 x 47.88	1/4 PL 316L SS ASTM A-240	2	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D8581-3	Plate 5.69 x 47.88	1/4 PL 316L SS ASTM A-240	1	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D8581-4	Plate 2.00 x 22.00	1/4 PL 316L SS ASTM A-240	3	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D8581-5	Plate notch as shown 1.38 x 22.00	1/4 PL 316L SS ASTM A-240	1	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D8581-6	Plate 1.38 x 22.00	1/4 PL 316L SS ASTM A-240	2	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D8581-7	Plate 1.00 x 22.00	1/4 PL 316L SS ASTM A-240	3	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D8581-8	Z-Bar 6.19 x 47.50	12 GA SHT 316L SS ASTM A-240	1	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D8581-9	Z-Bar 6.19 x 47.88	12 GA SHT 316L SS ASTM A-240	2	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D8581-10	Z-Bar 6.69 x 47.88	12 GA SHT 316L SS ASTM A-240	3	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
	D8581-11	Strip 1.00 x 23.75	20 GA SHT 316L SS ASTM A-240	12	CM	No	Does not function to contain melter offgas. This is the internal rack used to hold the discharge filters.
D8582	D8582-1	W-Beam-1 203.25 LG	W8 X 31# HRS ASTM A-36	2	QL	Yes	
Base Frame Assy	D8582-2	W-Beam-2 165.25 LG	W8 X 31# HRS ASTM A-36	2	QL	Yes	
	D8582-3	W-Beam-3 51.75 LG	W8 X 31# HRS ASTM A-36	10	QL	Yes	
	D8582-4	I-Beam-1 97.50 LG	S8 x 18.4# CS ASTM A-36	4	QL	Yes	
	D8582-5	I-Beam-2 81.50 LG	S8 x 18.4# CS ASTM A-36	4	QL	Yes	
	D8582-6	S-Beam 174.75 LG	S8 X 1.73# HRS ASTM A-36	2	QL	Yes	
	D8582-7	Plate-1 12.00 x 12.00	1.0 PL HRS ASTM A-36	10	QL	Yes	
	D8582-8	Plate-2 8.00 x 8.00	3/4 PL HRS ASTM A-36	4	QL	Yes	
	D8582-9	Plate-3 2.00 x 174.75	1/2 PL 316L SS ASTM A-240	2	QL	Yes	
	D8582-10	Hex HD Bolt 2.50 LG	3/4-10UNC 316 SS ASTM A-193	8	QL	Yes	
	D8582-11	Hex Nut	3/4-10UNC 316 SS ASTM A-194	8	QL	Yes	
	D8582-12	Lock Washer	3/4 ID 316 SS	8	QL	Yes	
D8583	D8583-1	Channel 19.75 x 97.50	3/16 PL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
Platform Assy	D8583-2	Channel 18.25 x 97.50	3/16 PL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-3	Channel 6.00 x 250.31	3/16 PL HRS ASTM A-36	4	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-4	Pipe 169.03 LG	1 1/2 SCH 40 CS ASTM A-53	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8583-5	Pipe 19.53 LG	1 1/2 SCH 40 CS ASTM A-53	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-6	Pipe 60.03 LG	1 1/2 SCH 40 CS ASTM A-53	1	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-7	Pipe 252.90 LG	1 1/2 SCH 40 CS ASTM A-53	1	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-8	Pipe 19.53 LG	1 1/2 SCH 40 CS ASTM A-53	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-9	Pipe 60.03 LG	1 1/2 SCH 40 CS ASTM A-53	1	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-10	Pipe 252.90 LG	1 1/2 SCH 40 CS ASTM A-53	1	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-11	Pipe 40.50 LG	1 1/2 SCH 40 CS ASTM A-53	10	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-12	Pipe 40.50 LG	1 1/2 SCH 40 CS ASTM A-53	4	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-13	Pipe 41.96 LG	1 1/2 SCH 40 CS ASTM A-53	12	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-14	Pipe 16.60 LG	1 1/2 SCH 40 CS ASTM A-53	4	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-15	Pipe 40.60 LG	1 1/2 SCH 40 CS ASTM A-53	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-16	Pipe 57.10 LG	1 1/2 SCH 40 CS ASTM A-53	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8583-17	Pipe 61.72 LG	1 1/2 SCH 40 CS ASTM A-53	12	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-18	Square Tube 91.50 LG	3 x 3 x 3/16 WT HRS ASTM A-500 GR 8	6	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-19	Square Tube 134.00 LG	3 x 3 x 3/16 WT HRS ASTM A-500 GR 8	8	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-20	Angle 91.50 LG	1 1/2 x 1 1/2 x 3/16 ANGLE HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-21	Angle 134.00 LG	1 1/2 x 1 1/2 x 3/16 ANGLE HRS ASTM A-36	4	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-22	Plate 2.81 x 19.38	3/16 PL 316L SS ASTM A-36	8	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-23	Plate 2.81 x 5.62	3/16 PL 316L SS ASTM A-36	12	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-24	Plate 3.00 x 6.00	1/4 PL HRS ASTM A-36	4	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-25	Chain 28.00 LG	3/16 304L SS McMASTER-CARR	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-26	Chain 62.50 LG	3/16 304L SS McMASTER-CARR	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-27	Hook 3.00 LG	1/4 DIA BAR HRS ASTM A-36	4	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-28	Flat Bar 11.50 LG	3/16 X 2 FL HRS ASTM A-36	8	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QU/CM	CGD	COMMENTS
	D8583-29	Flat Bar 120.00 LG	3/16 X 2 FL HRS ASTM A-36	8	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-30	Bracket 2.25 LG	1/4 x 4 FL HRS ASTM A-36	4	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-31	Flat Bar 251.00 LG	1/4 x 4 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-32	Flat Bar 167.12 LG	1/4 x 4 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-33	Flat Bar 58.12 LG	1/4 x 4 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-34	Flat Bar 17.62 LG	1/4 x 4 FL HRS ASTM A-36	4	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-35	Grating 29.88 WD x 83.3 LG	1 1/2 x 3/16 BEARING BAR 19-W-4 MIL-G 18014	8	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-36	Grating 29.88 WD x 105.0 LG	1 1/2 x 3/16 BEARING BAR 19-W-4 MIL-G 18014	3	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-37	Grating 32.25 WD x 20.5 LG	1 1/2 x 3/16 BEARING BAR 19-W-4 MIL-G 18014	16	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-38	Grating 32.25 WD x 18.0 LG	1 1/2 x 3/16 BEARING BAR 19-W-4 MIL-G 18014	8	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-39	Hex HD Bolt 1.50 LG	1/2-13UNC 316 SS ASTM A-194	4	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8583-40	Hex Nut	1/2-13UNC 316 SS ASTM A-193	4	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8583-41	Lock Washer	1/2 ID 316 SS	4	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing
D8585 Piping Assy 18"	D8585-1	Weld Neck Flange	18 x 150# 316L SS ASTM A-182	20	QL	Yes	
	D8585-2	Bellows Assy 18 OD x OAL BW Ends	2904100-053	4	QL	Yes	
	D8585-3	Butterfly Valve w/ Pneumatic Actuator	2904100-036 2904100-037	2	QL	Yes	
	D8585-4	Straight Tee BW	18 SCH 10 316L SS ASTM A-312	2	QL	Yes	
	D8585-5	Pipe 5.75 LG TOE	1/2 SCH 40 316L SS ASTM A-312	8	QL	Yes	
	D8585-6	Pipe 14.75 LG TOE	1/2 SCH 40 316L SS ASTM A-312	5	QL	Yes	
	D8585-7	90 DEG Elbow SR BW	18 SCH 10 316L SS ASTM A-312	1	QL	Yes	
	D8585-8	18 SCH 10 Pipe	18 SCH 10 316L SS ASTM A-312	1	QL	Yes	
	D8585-9	18 SCH 10 Pipe	18 SCH 10 316L SS ASTM A-312	1	QL	Yes	
	D8585-10	18 SCH 10 Pipe	18 SCH 10 316L SS ASTM A-312	1	QL	Yes	
	D8585-11	Solenoid Valve 1/2"	2904100-023	10	QL	No	
	D8585-12	Temperature Element	2904100-032	3	QL	No	
	D8585-13	Ball Valve	1/2" 316 SS W/ TEFLON SEAL PROTECH	2	QL	Yes	
	D8585-14	Hex Head Bolt 3.0 LG	1 1/8-7UNC 316 SS ASTM A-193	160	QL	Yes	
	D8585-15	Flat washer 1 1/8 ID	316 SS	192	QL	Yes	
	D8585-16	Thermowell Assy	B8598-3	3	QL	Yes	
	D8585-17	90 DEG Elbow LR BW	18 SCH 10 316L SS ASTM A-312	8	QL	Yes	
	D8585-18	Butterfly Valve w/ Manual Actuator	2904100-036 2904100-037	4	QL	Yes	
	D8585-19	18 SCH 10 Pipe	18 SCH 10 316L SS ASTM A-312	2	QL	Yes	
	D8585-20	Pipe 8.19 LG	2 SCH 40 316L SS ASTM A-312	1	QL	Yes	
	D8585-21	Weld Neck Flange	2 x 150# 316L SS ASTM-182	1	QL	Yes	
	D8585-22	18 SCH 10 Pipe	18 SCH 10 316L SS ASTM A-312	1	QL	Yes	
	D8585-23	18 SCH 10 Pipe	18 SCH 10 316L SS ASTM A-312	1	QL	Yes	
	D8585-24	18 SCH 10 Pipe	18 SCH 10 316L SS ASTM A-312	1	QL	Yes	
	D8585-25	18 SCH 10 Pipe	18 SCH 10 316L SS ASTM A-312	1	QL	Yes	
	D8585-26	Hex Head Bolt 5.0 LG	1 1/8-7UNC 316 SS ASTM A-193	18	QL	Yes	
	D8585-27	Hex Head Nut	1 1/8-7UNC 316 SS ASTM A-193	16	QL	Yes	
	D8585-28	Solenoid Valve 1/2"	2904100-023	1	QL	No	
D8586 Piping Assy 2"	D8586-1	Pipe cut at assy	2 SCH 40 316L SS ASTM A-312	80 ft	QL	Yes	
	D8586-2	Weld Neck Flange	2 x 150# 316L SS ASTM-182	7	QL	Yes	
	D8586-3	90 DEG Elbow	2 SCH 40 316L SS ASTM A-182	7	QL	Yes	
	D8586-4	Tee BW	2 SCH 40 316L SS ASTM A-182	1	QL	Yes	
	D8586-5	Gasket 2.12 ID x 3.62 OD	1/8 THK COMMERCIAL GRADE VITON RUBBER	7	QL	Yes	
	D8586-6	Rupture Disc 2" Pipe Size 15 PSI	McMASTER-CARR	2	QL	Yes	
	D8586-7	Hex HD Bolt 2.50 LG	5/8-11UNC 316 SS ASTM A-193	12	QL	Yes	
	D8586-8	Hex HD Bolt 3.00 LG	5/8-11UNC 316 SS ASTM A-193	8	QL	Yes	
	D8586-9	Hex Nut	5/8-11UNC 316 SS ASTM A-194	20	QL	Yes	
D8588	D8588-1	Flat Bar 159.3 LG	1/2 x 2 1/2 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance ladder are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
Ladder Assy	D8588-2	Flat Bar 35.5 LG	1/2 x 2 1/2 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance ladder are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8588-3	Flat Bar 5.5 LG	1/2 x 2 1/2 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance ladder are external to the pressure boundary and are not used to support the carbon bed adsorber housing.

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8588-4	Flat Bar 10.25 LG	1/4 x 2 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance ladder are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8588-5	Ladder Rung 17.00 LG	3/4 RD BAR ASTM A-36	14	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance ladder are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8588-6	Flat Bar 13.06 LG	1/4 x 2 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance ladder are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8588-7	Flat Bar 8.00 LG	1/4 x 2 FL HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance ladder are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8588-8	Antislip Tape 2 WD x 15 LG	McMASTER-CARR	14	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance ladder are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
D8589 Housing Assy	D8589-1	Housing Widmt Unit A	D8527	1	QL	Yes	
	D8589-2	Manway Cover	D8538-14	2	QL	Yes	
	D8589-3	Slide Gate Assy	D8563	6	QL	Yes	
	D8589-4	Access Door Discharge Filter	D8224	3	QL	Yes	
	D8589-5	Carbon Sample Plug Assy	B8597	3	QL	Yes	
	Deleted						
	D8589-7	Blind Flange Modified	8 x 150# 316L SS ASTM A-182	3	QL	Yes	
	D8589-8	Blind Flange	8 x 150# 316L SS ASTM A-182	7	QL	Yes	
	D8589-9	Pipe Plug Hex Threaded	1 1/4 x 3000# 316L SS	3	QL	Yes	
	D8589-10	Pipe Coupling Threaded	1 1/4 x 3000# 316L SS	3	QL	Yes	
	D8589-11	Temperature Element 27"	2904100-048	2	CM	No	Only the two inlet temperature elements and transmitter have been specifed ITS. Mid bed temperature elements and transmitters are commercial.
	D8589-12	Temperature Element 69"	2904100-048	2	CM	No	Only the two inlet temperature elements and transmitter have been specifed ITS. Mid bed temperature elements and transmitters are commercial.
	D8589-13	Blind Flange	1 1/2 x 150# 316L SS ASTM A-182	2	QL	Yes	
	D8589-14	Solenoid Valve 1/2"	2904100-023	1	QL	No	
	D8589-15	Manual Valve 1/2"	2904100-019	4	QL	Yes	
	D8589-16	Ball Valve 2"	1/2" 316 SS W/ TEFLON SEAL PROTECH	2	QL	Yes	
	D8589-17	Gasket B/O Door 4.75 x 25.00 ID Vulcanized Corners	1/2 THK x 1 WD COMMERCIAL GRADE VITON RUBBER	12 ft	QL	Yes	
	D8589-18	Gasket 8" Flange 8.62 ID x 10.62 OD	1/8 THK COMMERCIAL GRADE VITON RUBBER	10	QL	Yes	
	D8589-19	Gasket Manway 16.5 ID x 18.5 OD	1/8 THK COMMERCIAL GRADE VITON RUBBER	2	QL	Yes	
	D8589-20	Hex Nut	1/2-13UNC 316 SS ASTM A-194	36	QL	Yes	
	D8589-21	Hex Nut	3/4-10UNC 316 SS ASTM A-194	112	QL	Yes	
	D8589-22	Hex HD Bolt 2.50 LG	3/4-10UNC 316 SS ASTM A-193	32	QL	Yes	
	D8589-23	Hex HD Bolt 3.50 LG	3/4-10UNC 316 SS ASTM A-193	80	QL	Yes	
	D8589-24	Flat Washer	1/2 ID 316 SS	36	QL	Yes	
	D8589-25	Flat Washer	3/4 ID 316 SS	112	QL	Yes	
	D8589-27	Inlit Pipe Support	D8660	1	QL	Yes	
	D8589-28	Pipe Support	D8661	2	QL	Yes	
D8590 Housing Assy	D8590-1	Housing Widmt Unit B	D8526	1	QL	Yes	
	D8590-2	Manway Cover	D8538-14	2	QL	Yes	
	D8590-3	Slide Gate Assy	D8563	6	QL	Yes	

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8590-4	Access Door Discharge Filter	D8224		QL	Yes	
	D8590-5	Carbon Sample Plug Assy	B8597	3	QL	Yes	
	Deleted						
	D8590-7	Blind Flange Modified	8 x 150# 316L SS ASTM A-182	3	QL	Yes	
	D8590-8	Blind Flange	8 x 150# 316L SS ASTM A-182	7	QL	Yes	
	D8590-9	Pipe Plug Hex Threaded	1 1/4 x 150# 316L SS	3	QL	Yes	
	D8590-10	Pipe Coupling Threaded	1 1/4 x 3000# 316L SS	3	QL	Yes	
	D8590-11	Tempature Element 27"	2904100-046	2	CM	No	Only the two inlet temperature elements and transmitter have been specified ITS. Mid bed temperature elements and transmitters are commercial.
	D8590-12	Tempature Element 69"	2904100-046	2	CM	No	Only the two inlet temperature elements and transmitter have been specified ITS. Mid bed temperature elements and transmitters are commercial.
	D8590-13	Blind Flange	1 1/2 x 150# 316L SS ASTM A-182	2	QL	Yes	
	D8590-14	Solenoid Valve 1/2"	2904100-023	1	QL	No	
	D8590-15	Manual Valve 1/2"	2904100-019	4	QL	Yes	
	D8590-16	Ball Valve 2"	1/2" 316 SS W/ TEFLON SEAL PROTECH	2	QL	Yes	
	D8590-17	Gasket B/O Door	VITON	12 ft	QL	Yes	
	D8590-18	Gasket 8" Flange	SPIRAL WOUND GRAPHIC, 316 SS	10	QL	Yes	
	D8590-19	Gasket Manway	VITON	2	QL	Yes	
	D8590-20	Hex Nut	1/2-13UNC 316 SS ASTM A-194	36	QL	Yes	
	D8590-21	Hex Nut	3/4-10UNC 316 SS ASTM A-194	112	QL	Yes	
	D8590-22	Hex HD Bolt 2.50 LG	3/4-10UNC 316 SS ASTM A-193	32	QL	Yes	
	D8590-23	Hex HD Bolt 3.50 LG	3/4-10UNC 316 SS ASTM A-193	80	QL	Yes	
	D8590-24	flat Washer	1/2 ID 316 SS	36	QL	Yes	
	D8590-25	Flat Washer	3/4 ID 316 SS	112	QL	Yes	
	Deleted						
	D8590-27	Pipe Support	D8661	3	QL	Yes	
D8594 Final Assy	D8594-1	Base Frame Assy LVP-ADBR-00001 Unit A/B	D8582	1	QL	Yes	
	D8594-2	Housing Assy LVP-ADBR-00001 Unit A/B	D8589	1	QL	Yes	
	D8594-3	Housing Assy LVP-ADBR-00001 Unit B	D8590	1	QL	Yes	
	D8594-4	Platform Assy LVP-ADBR-00001 Unit A/B	D8583	1	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance platform are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8594-5	Ladder Assy LVP-ADBR-00001 Unit A/B	D8588	1	CM	No	Does not function to contain melter offgas. Parts and components associated with the maintenance ladder are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8594-6	Crane Trolley Assy LVP-ADBR-00001 Unit A/B	D8601	1	CM	No	Does not function to contain melter offgas. Parts and components associated with the crane trolley are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8594-7	Inlet Pipe Assy LVP-ADBR-00001 Unit A/B	D8585-1	1	QL	Yes	
	D8594-8	Crossover Pipe Assy LVP-ADBR-00001 Unit A/B	D8585-2	1	QL	Yes	
	D8594-9	Outlet Pipe Assy LVP-ADBR-00001 Unit A/B	D8585-3	1	QL	Yes	
	D8594-10	Crossover Pipe Assy LVP-ADBR-00001 Unit A/B	D8585-4	1	QL	Yes	
	D8594-11	Pipe Assy LVP-ADBR-00001 Unit A/B	D8586	1	QL	Yes	
	D8594-12	Spacer 1/4 THK 6.0 x 6.0	ALUMINA SILICATE CERAMIC McMASTER-CARR	20	QL	Yes	
	D8594-13	Spacer 1/4 THK 3.0 x 6.0	ALUMINA SILICATE CERAMIC McMASTER-CARR	20	QL	Yes	
	D8594-14	Gasket 2"	SPIRAL WOUND GRAPHIC, 316 SS	10	QL	Yes	
	D8594-15	Gasket 18"	SPIRAL WOUND GRAPHIC, 316 SS	20	QL	Yes	

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
Inlet Pipe Support Assy	D8660-2	Angle 34.62 LG	2 x 2 x 1/4 ANGLE HRS ASTM A-36	1	QL	Yes	
	D8660-3	Plate 4.00 x 28.87	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
	D8660-4	Plate 4.00 x 27.87	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
	D8660-5	Plate 1.75 x 4.00	1/4 PL 316L SS ASTM A-240	7	QL	Yes	
	D8660-6	Plate 6.00 x 7.00	1/4 PL 316L SS ASTM A-240	2	QL	Yes	
	D8660-7	Plate 2.75 x 2.75	1/4 PL 316L SS ASTM A-240	2	QL	Yes	
	D8660-8	Hex HD Bolt 2.0 LG	1/2-13UNC 316 SS ASTM A-193	4	QL	Yes	
	D8660-9	Lock Washer	1/2 ID 316 SS	4	QL	Yes	
	D8660-10	Hex Nut	1/2-13UNC 316 SS ASTM A-194	4	QL	Yes	
D8661	D8661-1	S-Beam 40.50 LG	S8 x 12.5# HRS ASTM A-36	1	QL	Yes	
Pipe Support Assy	D8661-2	Angle 34.62 LG	2 x 2 x 1/4 ANGLE HRS ASTM A-36	1	QL	Yes	
	D8661-3	Plate 2.00 x 12.00	1/4 PL 316L SS ASTM A-240	1	QL	Yes	
	D8661-4	Plate 1.25 x 2.00	1/4 PL 316L SS ASTM A-240	2	QL	Yes	
	D8661-5	Sheet 2.00 x 45.00	7 GA SHT 316L SS ASTM A-240	1	QL	Yes	
	D8661-6	Stud 4.00 LG Threaded 1/2-13UNC x 3.0 LG	1/2 DIA ROUND BAR 316L SS ASTM A-276 or A-479	2	QL	Yes	
	D8661-7	SQ Beveled Washer .50 NOM ID	18-8 SS	2	QL	Yes	
	D8661-8	Hex Nut	1/2-13UNC 316 SS ASTM A-194	2	QL	Yes	
D8234	D8234-16	GFI		1	CM	No	
N.I.T.S Rack Assembly	D8234-15	TEMP. TRANSMITTER (2904100-008)		9	CM	No	
	D8234-14	SPUR BLOCK		2	CM	No	
	D8234-13	SOLENOID (2904100-022)		2	CM	No	
	D8234-12	PDIT (2904100-018)		4	QL	Yes	
	D8234-11	CONTROL PANEL	PALMER	1	CM	No	
	D8234-10	LOCK WASHER 1/4 NOM ID	18-8 SS	12	QL	Yes	
	D8234-9	LOCK WASHER 3/8 NOM ID	18-8 SS	30	QL	Yes	
	D8234-8	HEX HEAD BOLT 3/8-16 X 1.00 LG	18-8 SS	30	QL	Yes	
	D8234-7	HEX HEAD BOLT 1/4-20 X 1.00 LG	18-8 SS	12	QL	Yes	
	D8234-6	CHANNEL NUT W/SPRING 1/4-20 UNC	UNISTRUT O/E P1006-1420	12	QL	Yes	
	D8234-5	CHANNEL NUT W/SPRING 3/8-16 UNC	UNISTRUT O/E P1006	30	QL	Yes	
	D8234-4	UNISTRUT 56.75 LG	UNISTRUT O/E P1000T	8	QL	Yes	
	D8234-3	UNISTRUT 68.00 LG	UNISTRUT O/E P1000T	4	QL	Yes	
	D8234-2	UNISTRUT 11.75 LG	UNISTRUT O/E P1000T	4	QL	Yes	
	D8234-1	BASE PLATE 6.00 X 4.00 X .25	304L SS ASTM A-240	4	QL	Yes	
D8235	D8235-15	SOLENOID (294100-018)		2	QL	No	
I.T.S Rack Assembly	D8235-14	GFI		1	CM	No	
	D8235-13	TEMP. TRANSMITTER (2904100-028)		2	QL	No	
	D8235-12	RADAR LEVEL TRANSMITTER (2904100-054)		4	QL	No	
	D8235-11	CONTROL PANEL	PALMER	1	CM	No	
	D8235-10	LOCK WASHER 1/4 NOM ID	18-8 SS	8	QL	Yes	
	D8235-9	LOCK WASHER 3/8 NOM ID	18-8 SS	12	QL	No	
	D8235-8	HEX HEAD BOLT 3/8-16 X 1.00 LG	18-8 SS	12	QL	Yes	
	D8235-7	HEX HEAD BOLT 1/4-20 X 1.00 LG	18-8 SS	8	QL	No	
	D8235-6	CHANNEL NUT W/SPRING 1/4-20 UNC	UNISTRUT O/E P1006-1420	8	QL	Yes	
	D8235-5	CHANNEL NUT W/SPRING 3/8-16 UNC	UNISTRUT O/E P1006	12	QL	No	
	D8235-4	UNISTRUT 41.75 LG	UNISTRUT O/E P1000T	8	QL	Yes	
	D8235-3	UNISTRUT 48.25 LG	UNISTRUT O/E P1000T	4	QL	No	
	D8235-2	UNISTRUT 11.75 LG	UNISTRUT O/E P1000T	8	QL	Yes	
	D8235-1	BASE PLATE 6.00 X 4.00 X .25	304L SS ASTM A-240	4	QL	No	

Drawing Number	Item No.	Description	Material or Vendor	QTY	QL/CM	CGD	COMMENTS
	D8594-16	Hex HD Bolt 5.00 LG	1 1/8-7UNC 316 SS ASTM A-193	96	QL	Yes	
	D8594-17	Hex HD Bolt 3.00 LG	1 1/8-7UNC 316 SS ASTM A-193	32	QL	Yes	
	D8594-18	Hex Nut	1 1/8-7UNC 316 SS ASTM A-193	96	QL	Yes	
	D8594-19	Hex HD Bolt 2.50 LG	5/8-11UNC 316 SS ASTM A-193	4	QL	Yes	
	D8594-20	Hex HD Bolt 3.00 LG	5/8-11UNC 316 SS ASTM A-193	8	QL	Yes	
	D8594-21	Hex Nut	5/8-11UNC 316 SS ASTM A-194	12	QL	Yes	
	D8594-22	Hex HD Bolt 1.50 LG	3/4-10UNC 316 SS ASTM A-193	16	QL	Yes	
	D8594-23	Hex HD Bolt 2.00 LG	3/4-10UNC 316 SS ASTM A-193	80	QL	Yes	
	D8594-24	Hex Nut	3/4-10UNC 316 SS ASTM A-194	96	QL	Yes	
	D8594-25	Lock Washer	1/2 ID 316 SS	96	QL	Yes	
	D8594-26	Flat Washer	1/2 ID x 1.25 OD 316 SS	160	QL	Yes	
	D8594-27	Insulation	CALCIUM-SILICATE THERMO-12 R GOLD INDUSTRIAL INSULATION GROUP / JOHNS MANVILLE	1200 cuft	N/A	N/A	Supplied by others
	D8594-28	High Temperature Ashesive	CALBOND R GOLD HIGH TEMP ADHESIVE INDUSTRIAL INSULATION GROUP / JOHNS MANVILLE	A/R	N/A	N/A	Supplied by others
	D8594-29	Sealing Caulk	PERMATEX I-TEMP RED RTV	A/R	N/A	N/A	Supplied by others
	D8594-30	Hex HD Bolt 2.50 LG	3/4-10UNC 316 SS ASTM A-193	8	QL	Yes	
	D8594-31	Hex Nut	3/4-10UNC 316 SS ASTM A-194	8	QL	Yes	
	D8594-32	Lock Washer	3/4 ID 316 SS	8	QL	Yes	
D8601	D8601-1	I-Beam 25'-0" LG	8 x 18.4# HRS ASTM A-36	1	CM	No	Does not function to contain melter offgas. Parts and components associated with the crane trolley are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
Crane Trolley Assy	D8601-2	I-Beam 23'-6" LG	8 x 18.4# HRS ASTM A-36	1	CM	No	Does not function to contain melter offgas. Parts and components associated with the crane trolley are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8601-3	Angle 4.00 LG	2 x 2 x 1/4 ANGLE HRS ASTM A-36	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the crane trolley are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8601-4				CM	No	Does not function to contain melter offgas. Parts and components associated with the crane trolley are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8601-5	Plate 4.00 x 8.00	1/4 PL HRS ASTM A-36	1	CM	No	Does not function to contain melter offgas. Parts and components associated with the crane trolley are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8601-6	Hex HD Bolt 2.00 LG	1/2-13UNC GR 8 PL STL	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the crane trolley are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8601-7	Hex Nut	1/2-13UNC GR 8 PL STL	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the crane trolley are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8601-8	Lock Washer	1/2 NOM ID GR 8 PL STL	2	CM	No	Does not function to contain melter offgas. Parts and components associated with the crane trolley are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
	D8601-9	Electric Hoist 2000# Cap 25ft Lift @ 16ft/MIN Push Trolley Mounted	McMASTER-CARR	1	CM	No	Does not function to contain melter offgas. Parts and components associated with the crane trolley are external to the pressure boundary and are not used to support the carbon bed adsorber housing.
D8660	D8660-1	S-Beam 40.50 LG	S6 x 12.5# HRS ASTM A-36	1	QL	Yes	

Appendix A

Mandatory Ammonium Nitrate Test Requirements for LAW Carbon Bed Adsorbers

Appendix A
Mandatory Ammonium Nitrate Test Requirements for LAW Carbon Bed Adsorbers

1.0 Purpose

The purpose of appendix A testing is to determine if sufficient amounts of ammonium nitrate can form in the LAW offgas pipeline, in the guard bed, and in the activated carbon bed adsorber media to increase the propagation rate of a bed fire.

2.0 Overview

The potential for ammonia and nitrous oxides to form ammonium nitrate within the LAW carbon bed adsorber media is unknown. A significant accumulation of ammonium nitrate within the bed media has been raised as a fire safety concern. It is postulated that ammonium nitrate may increase the rate a bed fire propagates, potentially modifying the current bed-fire mitigation strategy. It should be noted that VSL carbon bed testing has shown large temperature exotherms resulting from NOx. It may be necessary to condition the carbon media before testing with large NOx concentrations.

3.0 Objectives

1. Test 1 - Determine formation of NH_4NO_3 in the proposed LAW activated carbon adsorber media(s) configuration if the inlet gas contains NO_X and NH_3.
2. Test 2 - Assess the hazards associated with NH_4NO_3 adsorbed in the proposed LAW activated carbon adsorber media(s), (i.e. fire propagation).

4.0 Quality Assurance

Tests shall be performed in accordance with the applicable sections of NQA-1. The Test Plan will include a matrix cross-referencing the QA requirements to implementing procedures for the work, and justifying elements that are not applicable.

5.0 Test Conditions

Each of the tests in the following sections have been formulated to address the test objectives from Section 3.

The activated carbon beds proposed for the LAW off gas systems will operate under the conditions defined in mechanical data sheets. The appropriate media for each test will be selected and described in the Vendor Test Plan. The Test Plan will detail the test conditions and data collection for each test based on the media and operating conditions.

Testing will be done with a bench scale apparatus using air and water for humidity as the bulk gas.

Carbon test beds shall be insulated such that the temperature drop across the beds does not exceed 1.0 °C with dry hot air passing through the test beds at the test temperature.

5.1 Test 1 - Determine NH_4NO_3 formation in the proposed LAW activated carbon adsorption system(s).

a. Test conditions
   - Sorbent - By vendor
   - Bed residence time – By vendor
   - Superficial gas velocity – by vendor
   - Inlet HEPA temperature – 50 °C (bounding case in exception with mechanical data sheets)
   - Relative humidity – 50 % (bounding case in exception with mechanical data sheets)
   - Gas composition:
     a. Bulk gas – Air and water vapor
     b. Other constituents –
        i. Inlet NH_3 concentration - 10 ppm
        ii. Inlet CO concentration - 170 ppm
        iii. Inlet NO concentration - 4000 ppm
        iv. Inlet NO_2 concentration - 4000 ppm
   - Inlet gas HEPA filtered to remove particulate ammonium nitrate formed prior to the carbon bed with two AG-1 certified HEPA filters operating in series.
   - Eight (8) seconds gas residence time to simulate ammonium nitrate formation, prior to HEPA filtration.
   - Residence time from the HEPA filters to the carbon bed is specified as 2.8 seconds.

b. Test duration
   - By vendor

c. Data to be obtained
   - Inlet and outlet NO, NO_2, NH_3 concentrations.
   - Quantity of NH_4NO_3 - accumulated in the pipeline, HEPAs, and bed media at the end of test.
   - Temperature profile of bed during loading.

5.2 Test 2 - Perform standard calorimeter test (i.e., ASTM E 1623-04 or equivalent) to measure exotherm of new bed media compared to bed media containing two years of accumulated ammonium nitrate.

5.3 Test 3 - If a substantial quantity of ammonium nitrate or a substantial exotherm is determined, re-run Test 1 and Test 2 with the addition of offgas pre-heat to 70 °C just prior to HEPA filtration.

5.4 Test 4 - If a substantial (>140 °F) temperature change is measured in the bed, re-run Test 1 with 50% of the NO and NO_2 concentrations.

6.0 Success Criteria

1. Quantization of ammonium nitrate formed in-situ on bed media, extrapolated to a two-year bed life.
2. Calorimeter test data of new bed media compared to bed media containing ammonium nitrate accumulated in two-years of bed life.
3. If Test 1 does not yield detectable levels of ammonium nitrate on the bed media, detection level shall be assumed and extrapolated to a two-year bed life. If Test 3 does not yield detectable levels of ammonium nitrate on the bed media, Test results shall take special note of this observation with no extrapolation to a two-year bed life.

Appendix B

Buyer Third Party Warranty Testing

Appendix B
Buyer Third Party Warranty Testing

1.0 Purpose

The purpose of the Appendix B Buyer Third Party Warranty Testing is to validate performance guarantees related to removal efficiencies and design life for the Activated Carbon Media in simulated LAW and HLW offgas. Seller shall use Buyer Third Party Warranty Test results to perform calculations that verify Activated Carbon Bed Adsorber performance and success criteria are met.

2.0 Overview

Mercury is present in many of the DOE's mixed wastes including the high-level tank wastes, which will be processed in the WTP. When this waste is processed in the WTP Low-Activity Waste (LAW) and High-Level Waste (HLW) melter systems, principal components in the resulting offgas will include mercury (Hg), water vapor, NOx, organics and halogens. Sulfur-activated carbon (S-AC) has been successfully used to remove mercury from offgas. However, it has generally been used with elemental mercury and under conditions that are not representative of WTP melter offgas. Concerns related to the adsorption behavior of elemental and oxidized forms of mercury, such as mercuric chloride, have been raised regarding mercury removal efficiency and breakthrough capacity, which could have a direct impact on sizing of the adsorption system and the frequency at which S-AC must be changed. Test apparatus will include two adsorbent columns (lead and lag adsorbers), each with guard and primary activated carbon media, and discharge filters as described in the mechanical data sheets (Refer to MDSs in Section 2 of the purchasing documents for specified mercury, HCl, HF and iodine decontamination factors (DFs) /removal efficiencies and carbon media design life requirements). Note that the HLW MDSs also include removal efficiency requirements for SO_2).

The WTP project has previously conducted offgas system testing at The Catholic University of America Vitreous State Laboratory (VSL). VSL testing demonstrated that an activated carbon media temperature rise occurred when water vapor was first introduced to virgin Kombisorb BAT37. The temperature increase rapidly progressed (as a reaction front) through the VSL test bed, with media temperatures quickly returning to normal as the bed became acclimated to the water content in the offgas. Introduction of NOx to the Kombisorb BAT37 resulted in an initial temperature rise followed by a more gradual temperature decrease as the media became acclimated to the NOx. Because virgin activated carbon media had a much greater sensitivity to the high NOx content in LAW offgas, it was necessary for VSL to establish a procedure for ramping feed of NOx to a test bed with virgin media (a process referred to as conditioning). Conditioning of the VSL test bed to the introduction of organics was also found to be very important, however acetonitrile (to be used in Appendix B testing) did not show much of a temperature effect. Nonetheless, the Appendix B Test Plan will include separate conditioning periods for NOx and organics.

VSL testing only evaluated the primary bed material, Kombisorb BAT37. Because it may be possible that other important temperature effects may exist within the guard bed material, Iosorbent-50, the Buyer Third Party Testing will also address the effects that the simulant offgas stream composition may have on the guard bed media temperature.

VSL testing identified the need to account for the introduction of NOx and organic into virgin Kombisorb BAT37. The Buyer Third Party Test Plan will address conditioning of virgin activated carbon media, based on review of the following VSL steps:

- As NOx and organic ramping is initiated, actions will be taken to either stop ramps or reduce rates at a temperature threshold of 120°C.
- As NOx and organic approach full rates and during steady state operations, temperatures up to 130°C are permissible.
- Organic feed will be stopped if activated carbon media temperature exceeds 130°C.
- If at any time the carbon media temperature reaches 140°C, both NOx and organic feed will be stopped.

Buyer Third Party Testing will not start (Phase 2 hold point) until conditioning of the test beds is complete and operating conditions have been maintained at steady-state for a minimum of 8-hours as determined by lead and lag bed media temperatures being less than an hourly average variation of 1°C and lead bed inlet NOx and acetonitrile composition being less than an hourly average variation of 5% of the lag bed outlet offgas composition. Once steady-state media temperatures and offgas outlet concentrations are satisfied, introduction of mercury challenge gas into the test apparatus will be initiated. Conditioning of the Activated Carbon Media for the addition of mercury will be verified (e.g., verify monitoring parameters remain within limits for steady state). A minimum period of 24-hours will be used to establish that Activated Carbon Media is conditioned for mercury.

Buyer Third Party Test apparatus will consist of two adsorbent columns (each with guard and primary activated carbon media) as described in mechanical data sheets (Refer to MDSs in Section 2 of the purchasing documents for mercury/ HCl/ HF/ Iodine DFs/ removal efficiencies and carbon media design life requirements). Note that the HLW MDSs also includes removal efficiency requirements for SO_2).

3.0 Objectives

1. HLW Test 1 - Determine removal efficiency and loading of mercury, hydrogen chloride, hydrogen fluoride, sulfur dioxide, and iodine on the guard and primary beds for the lead and lag adsorbers with simulated offgas. Confirm compliance with removal efficiency requirements and 12 month design life for the lead adsorber for mercury and lead and lag adsorbers for hydrogen chloride, hydrogen fluoride, sulfur dioxide and iodine. Confirm that the maximum media operating temperatures in the lead and lag adsorbers are below 130°C. Determine compatibility of the guard and primary bed media to the specified offgas composition and operating conditions (e.g., resistance of media to degradation).

2. LAW Test 2 - Determine removal efficiency and loading of mercury, hydrogen chloride, hydrogen fluoride, and iodine on the guard and primary beds for the lead and lag adsorber with simulated offgas. Confirm compliance with removal efficiency requirements and 24 month design life for lead adsorber for mercury and the lead and lag adsorbers for hydrogen chloride, hydrogen fluoride and iodine. Confirm that the maximum media operating temperatures in the lead and lag adsorbers are below 130°C. Determine compatibility of the guard and primary bed media to the specified offgas composition and operating conditions (e.g., resistance of media to degradation).

4.0 Quality Assurance

Buyer Third Party Warranty Testing will be performed in accordance with applicable sections of the United States Environmental Protection Agency (US EPA) Test Methods for Evaluating Solid Waste,

Physical/Chemical Methods (SW-846) and use National Institute of Standards and Technology (NIST) traceable calibration procedures. The Buyer Third Party Warranty Test Plan will include a matrix cross-referencing the QA requirements to implementing procedures for the work, and justifying elements that are not applicable. Seller shall provide a certificate of analysis (COA) for the activated carbon media used in the laboratory testing in accordance with AG-1, N509, N510 and associated ASTM test methods. Seller shall submit the COA prior to the start of Buyer Third Party Testing.

5.0 Test Conditions

Each of the Buyer Third Party Test Conditions in the following sections have been formulated to address the test objectives from Section 3.

The activated carbon beds proposed for the HLW and LAW off gas systems will operate under the conditions defined in this section of Appendix B (Refer to MDSs in Section 2 of the purchasing documents for specified mercury/ HCl/ HF/ Iodine DFs/ removal efficiencies and carbon media design life requirements). Note that the HLW MDSs also includes removal efficiency requirements for SO_2). The Test Plan will detail the test conditions and data collection for each test based on the media and operating conditions, including steps for conditioning of virgin activated carbon media and to reach steady state operating conditions.

Buyer Third Party Testing will be performed in a bench scale apparatus using air and water for humidity as the bulk gas. Laboratory bench scale apparatus will be conducted in a minimum 1½-inch diameter column using offgas velocities and residence times in accordance with MDSs.

Buyer Third Party Test apparatus design will incorporate salient features from the WTP adsorber design (Refer to Section 2 of the purchasing documents for the drawings and MDSs showing the adsorber configuration and thickness of insulation). Because heating within the test apparatus is an important success criteria (see Section 6.0), the thermal efficiency for the test apparatus will be comparable to the worst-case (e.g., test apparatus design to account for the most insulated location within the beds) thermal efficiency associated with the WTP carbon bed adsorbers.

5.1 HLW Test 1 - Measure removal efficiencies and loading for mercury, hydrogen chloride, hydrogen fluoride sulfur dioxide, and iodine through the adsorbent beds using a simulated offgas that includes acetonitrile.

A. Test conditions (Buyer Third Party Test):
- Activated Carbon Media - Donau Kombisorb BAT37 and Iosorbent-50 (Test Materials Supplied by Seller)
- Residence time – to match mechanical data sheet
- Superficial gas velocity – to match mechanical data sheet
- Inlet temperature – 110°C ± 0.5°C (maximum case)
- Mercury concentration – 52,600 μg/dscm ± 100 μg/dscm (maximum case)
    - i. Elemental mercury 85wt% ± 1 wt% Hg^0
    - ii. Oxidized mercury 15wt% ± 1 wt% Hg^{+2} ($HgCl_2$)
- Relative humidity – 10.7%
- Gas composition (actual composition):
    - a. Bulk gas – Air and Water (15.5 Volume% ± 0.5 Volume%) vapor (maximum case)
    - b. Concentration of organic:

i. acetonitrile – 4.0 ppm ± 0.1 ppm (10-times bounding case for significance)

c. Other components

i. CO_2 – 0.40 Volume% ± 0.05 Volume% (maximum case)
ii. CO – 5.2 ppm ± 0.2 ppm (maximum case)
iii. NO – 480 ppm ± 10 ppm (bounding case)
iv. NO_2 – 380 ppm ± 10 ppm (bounding case)
v. HF – 1.7 ppm ± 0.2 ppm (maximum case)
vi. HCl – 1.6 ppm ± 0.2 ppm (maximum case)
vii. Iodine - 1.0 ppm ± 0.2 ppm (25-times the maximum case for measurement)
viii. SO_2 – 0.9 ppm ± 0.2 ppm (maximum case)
ix. HNO_2 – 7 ppm ± 1 ppm (maximum case) HNO_3 – 4 ppm ± 0.5 ppm (maximum case) (Note that NOx and water react to form HNO_2 and HNO_3 -separate addition of these acids is not required)

B. Test Phases (Buyer Third Party Test):

- Phase 1: Initial period (24-7 operation) to condition the virgin Activated Carbon Media with the test gases and to reach steady-state operations.
- Phase 2: Media Performance Testing, 100 hours (24-7 operation) or until breakthrough of mercury.

C. Buyer Third Party Testing will obtain the following data:

- Analysis of activated carbon media for each sample submitted for Buyer Third Party Testing according to parameters and methods identified in Seller's COA.
- Measure Total Hydrocarbons at the inlet and outlet of the lead and lag adsorbers
- Measure inlet and outlet offgas composition (CO, CO_2, SO_2, NO, NO_2, HNO_3, HNO_2, HCl, HF and iodine) for the lead and lag adsorbers.
- Measure inlet and outlet mercury concentrations for the lead and lag adsorbers.
- Measure mercury profile in the lead and lag adsorbers (guard and primary beds) at end of test.
- Measure chloride profile in the lead and lag adsorber media.
- Measure fluoride profile in the lead and lag adsorber media.
- Measure iodine profile in the lead and lag adsorber media.
- Measure sulfur dioxide profile in the lead and lag adsorber media.
- Measure organic profile of the lead and lag adsorber media.
- Measure inlet and outlet offgas temperatures of lead and lag adsorbers.
- Measure sulfur content of three representative samples of virgin primary media and three representative samples of primary media taken after completion of testing from the location where maximum bed temperature was reached.
- Media temperature at two equally spaced locations along the centerline of the guard bed and primary bed for both the lead and lag adsorbers (total of 4 per adsorber).
- Time at which breakthrough occurs (if realized) for any adsorbed constituents for the lead and lag adsorbers. Breakthrough is defined as the concentration at which the time average emission reaches 100% of the specified removal efficiency. For example, breakthrough for mercury would be 52.6 μg/dscm using the DF of 1000

and maximum mercury loading of 52,600 μg/dscm shown in the mechanical data sheets.

- Report limits established for step changes to NOx concentrations (and any other limiting gas stream components determined by testing).
- Measure pressure drop of the guard bed and primary bed for both the lead and lag adsorbers.
- Analyze the guard and primary beds to determine if hydrated reaction products are formed and the extent of formation.
- Measure particulate downstream of the lead and lag adsorbers and collected on the discharge filter.
- Measure pressure drop of the lead and lag discharge filters.

D. Seller shall perform the following calculations:

- Removal efficiency and loading for mercury, hydrogen chloride, hydrogen fluoride sulfur dioxide and iodine the lead and lag adsorbers.
- Estimated time for breakthrough of mercury, hydrogen chloride, hydrogen fluoride sulfur dioxide and iodine the lead and lag test adsorbers and for the WTP lead and lag adsorbers.
- Correlation of lead and lag adsorber guard and primary bed temperatures and offgas constituents.
- Analysis of the impact of key gas components on guard and primary bed temperatures during conditioning and operational phases.
- Determine compatibility of media to offgas composition and operating conditions.

E. Seller shall demonstrate the Activated Carbon Media meets the following performance:

- Activated carbon media meets the COA acceptance limits.
- Mercury DF ≥1000.
- Hydrogen fluoride and hydrogen chloride removal efficiency ≥90%.
- Sulfur Dioxide removal efficiency ≥90%.
- Iodine removal efficiency ≥90%.
- Carbon media temperature maintained below maximum operating temperature (130°C).
- Guard bed design life - 12 months (combined lead and lag adsorbers).
- Primary bed design life - 12 months (lead adsorber).
- Primary and guard bed media compatible with offgas composition and operating conditions.

5.2 LAW Test 2 - Measure removal efficiencies and loading for mercury, hydrogen chloride, hydrogen fluoride and iodine through the adsorbent beds and organic removal using a simulated offgas that also includes acetonitrile.

A. Test conditions (Buyer Third Party Test):

- Activated Carbon Media – Donau Kombisorb BAT37 and Iosorbent-50 (Test Materials Supplied by Seller)
- Residence time – to match mechanical data sheet
- Superficial gas velocity – to match mechanical data sheet
- Inlet temperature – 72 °C± 0.5 °C (maximum case)
- Mercury concentration - 24,000 μg/dscm ± 100 μg/dscm (maximum case)
    i. Elemental mercury 85 Weight% ± 1 Weight% Hg^0

ii. Oxidized mercury 15 Weight% ± 1 Weight% Hg^{+2} ($HgCl_2$)

- Relative humidity – 25.4%
- Gas composition (actual composition):
  a. Bulk gas – Air and Water (11.5 Volume% ± 0.5 Volume%) vapor (maximum case)
  b. Concentration of organic:
     i. acetonitrile – 50 ppm ± 1.5 ppm
  c. Hydrogen chloride (HCl) - 18 ppm ± 0.5 ppm (maximum case)
  d. Hydrogen fluoride (HF) - 1 ppm ± 0.2 ppm (maximum case)
  e. Iodine (I_2) - 1.0 ppm ± 0.1 ppm (10-times the maximum case for measurement)
  f. Other components:
     i. CO_2 - 1.2 Volume% ± 0.5 Volume% (maximum case)
     ii. CO - 350 ppm ± 10 ppm (maximum case)
     iii. NO - 3800 ppm ± 50 ppm (bounding case)
     iv. NO_2 - 5600 ppm ± 50 ppm (bounding case)
     v. SO_2 - 4.6 ppm ± 0.2 ppm (maximum case)
     vi. HNO_2 – 30 ppm ± 2 ppm (maximum case) HNO_3 – 20 ppm ± 2 ppm (maximum case) (Note that NOx and water react to form HNO_2 and HNO_3 -separate addition of these acids is not required)

B. Test Phases (Buyer Third Party Test):
- Phase 1: Initial period (24-7 operation) to condition the virgin Activated Carbon Media with the test gases and to reach steady-state operations.
- Phase 2: Media Performance Testing, 100 hours (24-7 operation) or until breakthrough of mercury.

C. Buyer Third Party Testing will obtain the following data:
- Analysis of activated carbon media for each sample submitted for Buyer Third Party Testing according to parameters and methods identified in Seller's COA.
- Measure Total Hydrocarbons at the inlet and outlet of the lead and lag adsorbers
- Measure inlet and outlet offgas component concentrations (CO, CO_2, NO, NO_2, HNO_3, HNO_2, SO_2, HCl, HF and iodine) for the lead and lag adsorbers.
- Measure inlet and outlet mercury concentrations for the lead and lag adsorbers.
- Measure mercury profile in the lead and lag adsorbers (guard and primary beds) at end of test.
- Measure chloride profile in the lead and lag adsorber media.
- Measure fluoride profile in the lead and lag adsorber media.
- Measure iodine profile in the lead and lag adsorber media.
- Measure organic profile of the lead and lag adsorber media.
- Measure inlet and outlet offgas temperatures of the lead and lag adsorbers.
- Measure sulfur content of three representative samples of virgin primary media and three representative samples of primary media taken after completion of testing from locations where maximum bed temperature was reached.
- Media temperature at two equally spaced locations along the centerline of the guard bed and primary bed for both the lead and lag adsorbers (total of 4 per adsorber).
- Time at which breakthrough occurs (if realized) for any adsorbed constituents for the lead and lag adsorbers. Breakthrough is defined as the concentration at which the average emission reaches 100% of the specified removal efficiency. For

example, breakthrough for mercury would be 53.3 μg/dscm using the DF of 450 and maximum mercury loading of 24,000 μg/dscm shown in the mechanical data sheets.

- Report limits established for step changes to NOx concentrations (and any other limiting gas stream components determined by testing).
- Measure pressure drop of the guard bed and primary bed for both the lead and lag adsorbers.
- Analyze the guard and primary beds to determine if hydrated reaction products are formed and the extent of formation.
- Measure particulate downstream of the lead and lag adsorbers and collected on the discharge filter.
- Measure pressure drop of the lead and lag discharge filters.

D. Seller shall perform the following calculations:
- Removal efficiency and loading for mercury, hydrogen chloride, hydrogen fluoride and iodine in the lead and lag adsorbers.
- Estimated time for breakthrough of mercury, hydrogen chloride, hydrogen fluoride and iodine in the lead and lag test adsorbers and for the WTP lead and lag adsorbers.
- Correlation of lead and lag adsorber guard and primary bed temperatures and offgas constituents.
- Analysis of the impact of key gas components on guard and primary bed temperatures during conditioning and operational phases.
- Determine compatibility of media to offgas composition and operating conditions.

E. Seller shall demonstrate the Activated Carbon Media meets the following performance:
- Activated carbon media meets the COA acceptance limits.
- Mercury DF ≥450.
- Hydrogen chloride removal efficiency ≥97%.
- Hydrogen fluoride removal efficiency ≥97%.
- Iodine removal efficiency ≥99%.
- Carbon media temperature maintained below maximum operating temperature (130°C).
- Primary bed design life - 24 months (lead adsorber).
- Guard bed design life - 24 months (combined lead and lag adsorbers).
- Primary and guard bed media compatible with offgas composition and operating conditions.

6.0 Success Criteria (by Seller):

1. Seller shall verify activated carbon media meets COA acceptance limits.
2. Seller shall verify that specified DFs/ removal efficiencies for required offgas constituents are achieved.
3. Seller shall verify load profiles for required offgas constituents and verification of WTP bed life.
4. Seller shall verify carbon media conditioning procedure is sufficient to maintain carbon media temperature below its maximum steady state operating limit of 130°C.
5. Seller shall verify the primary and guard bed media is compatible with offgas composition and operating conditions.

Appendix C

Buyer Third Party Permit Testing

Appendix C
Buyer Third Party Permit Testing

1.0 Purpose

The purpose of the Appendix C Buyer Third Party Permit Testing is to determine removal efficiencies and design life for the Activated Carbon Media with the addition of allyl alcohol and naphthalene to simulated HLW and LAW melter offgas. The purpose of the testing also includes determination of removal efficiency and loading of spiked organics for WTP offgas permit testing. Seller shall use Buyer Third Party Permit Test results to perform calculations that establish Activated Carbon Bed Adsorber performance and verify success criteria are met.

2.0 Overview

Permit requirements for the WTP melter offgas systems specify compliance with Maximum Achievable Control Technology (MACT) incinerator standards for control of mercury emissions and organic destruction and removal efficiency (DRE). The WTP project has conducted melter and offgas system tests at VSL to determine if the systems, as designed, will meet the MACT DRE requirements. However, mercury was not included in the VSL testing and the VSL test bed did not include the guard bed material. VSL testing also showed large temperature exotherms exist, resulting from NOx and presence of the MACT organics (allyl alcohol and naphthalene) in the offgas. Although iodine is not a MACT requirement, the Buyer Third Party Permit Testing includes demonstration whether DFs/ removal efficiencies and loadings are impacted by addition of the MACT organics.

VSL testing only evaluated the primary bed material, Kombisorb BAT37. Because it may be possible that other important temperature effects may exist within the guard bed, Iosorbent-50, the Buyer Third Party Testing will also address the effects the simulant offgas stream composition may have on guard bed media temperature.

VSL testing identified the need to condition virgin Kombisorb BAT37 to water, NOx, and organics. The Buyer Third Party Test Plan will address conditioning of virgin activated carbon media, based on review of the following VSL steps:

- As NOx and organic ramping is initiated, actions will be taken to either stop ramps or reduce rates at a temperature threshold of 120°C.
- As NOx and organic approach full rates and during steady state operations, temperatures up to 130°C are permissible.
- Organic feed will be stopped if activated carbon media temperature exceeds 130°C.
- If at any time the carbon media temperature reaches 140°C, both NOx and organic feed will be stopped.

Buyer Third Party Testing will not start (Phase 2 hold point) until conditioning of the test beds is complete and operating conditions have been maintained at steady-state for a minimum of 8-hours as determined by lead and lag bed media temperatures being less than an hourly average variation of 1°C and lead bed inlet NOx and organic composition being less than an hourly average variation of 5% of the lag bed outlet offgas composition. Once steady-state media temperatures and offgas outlet concentrations are satisfied, introduction of mercury to the test apparatus will be initiated. Conditioning of the Activated Carbon Media for the addition of mercury will be verified (e.g., verify monitoring parameters

remain within limits for steady state). A minimum period of 24-hours will be used to establish that Activated Carbon Media is conditioned for mercury.

Buyer Third Party Test apparatus will consist of two adsorbent columns (each with guard and primary activated carbon media) as described in mechanical data sheets (Refer to MDSs in Section 2 of the purchasing documents for specified mercury/ HCl/ HF/ Iodine DFs/ removal efficiencies and carbon media design life requirements. Note that the HLW MDSs also includes removal efficiency requirements for SO_2).

3.0 Objectives

1. HLW Test 1 - Determine removal efficiency and loading of mercury, hydrogen chloride, sulfur dioxide, iodine, allyl alcohol, and naphthalene on the guard and primary test beds for the lead and lag adsorbers with simulated offgas. Measure media temperatures and establish maximum allowable changes in NOx and allyl alcohol concentrations required to maintain control of bed temperatures due to adsorption and exothermic reactions. Confirm that the maximum media operating temperatures in the lead and lag adsorbers are below 130°C.

2. LAW Test 2 - Determine removal efficiency and loading of mercury, hydrogen chloride, iodine, allyl alcohol, and naphthalene on the guard and primary test beds for both lead and lag adsorbers with simulated offgas. Measure media temperatures and establish maximum allowable changes in NOx and allyl alcohol concentrations required to maintain control of bed temperatures due to adsorption and exothermic reactions. Confirm that the maximum media operating temperatures for the lead and lag adsorbers are below 130°C.

4.0 Quality Assurance

Buyer Third Party Permit Testing will be performed in accordance with applicable sections of the United States Environmental Protection Agency (US EPA) Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) and use National Institute of Standards and Technology (NIST) traceable calibration procedures. The Buyer Third Party Permit Test Plan will include a matrix cross-referencing the QA requirements to implementing procedures for the work, and justifying elements that are not applicable. Seller shall provide a COA for the activated carbon media used in the laboratory testing in accordance with AG-1, N509, N510 and associated ASTM test methods. Seller shall submit the COA prior to start of Buyer Third Party Testing.

5.0 Test Conditions

Each of the Buyer Third Party Test Conditions in the following sections have been formulated to address the test objectives from Section 3.

The activated carbon beds proposed for the HLW and LAW off gas systems will operate under the conditions defined in this section of Appendix C (Refer to MDSs in Section 2 of the purchasing documents for specified mercury/ HCl/ HF/ Iodine DFs/ removal efficiencies and carbon media design life requirements. Note that the HLW MDSs also includes removal efficiency requirements for SO_2). Test media will be consistent with that proposed for the WTP carbon bed adsorbers. The Buyer Third Party Test Plan will detail the test conditions and data collection for each test based on the media and operating conditions, including steps for conditioning of virgin activated carbon media.

Buyer Third Party Testing will be performed in a bench scale apparatus using air and water for humidity as the bulk gas. Laboratory bench scale apparatus will be conducted in a minimum 1½-inch diameter column using offgas velocities and residence times in accordance with MDSs.

Buyer Third Party Test apparatus design will be designed to incorporate salient features from the WTP adsorber design (Refer to Section 2 of the purchasing documents for the drawings and MDSs showing the adsorber configuration and thickness of insulation). Because heating within the Buyer test apparatus is an important success criteria (see Section 6.0), thermal efficiency for the test apparatus will be comparable to the worst-case (e.g., test apparatus design to account for the most insulated location within the beds) thermal efficiency for the WTP carbon bed adsorber.

5.1 HLW Test 1 - Measure removal efficiencies and loading for mercury, hydrogen chloride, sulfur dioxide, iodine, allyl alcohol and naphthalene using a simulated offgas.

A. Test conditions (Buyer Third Party Test):
- Activated Carbon Media - Donau Kombisorb BAT37 and Iosorbent-50 (Test Materials Supplied by Seller)
- Residence time – to match mechanical data sheet
- Superficial gas velocity – to match mechanical data sheet
- Inlet temperature – 110°C ± 0.5°C (maximum case)
- Mercury concentration – 52,600 μg/dscm ± 50 μg/dscm (maximum case)
    - i. Elemental mercury 85wt% ± 1 wt% Hg^0
    - ii. Oxidized mercury 15wt% ± 1 wt% Hg^{+2} ($HgCl_2$)
- Relative humidity – 10.7%
- Gas composition:
    - a. Bulk gas – Air and Water (15.5 Volume% ± 0.5 Volume%) vapor (bounding case)
    - b. Concentrations of organics:
        - i. Allyl alcohol – 1400 ppm ± 20 ppm (dry). Increases to be made in 4 steps (25%, 50%, 75% & 100%).
        - ii. Naphthalene – 35 ppm ± 1 ppm (dry)
    - c. Other components (actual composition):
        - i. CO_2 – 0.91 Volume% ± 0.1 Volume% (bounding case)
        - ii. CO – 50 ppm ± 1 ppm (bounding case)
        - iii. NO – 580 ppm ± 10 ppm (bounding case)
        - iv. NO_2 – 440 ppm ± 10 ppm (bounding case)
        - v. HCl – 10 ppm ± 0.2 ppm (represents the total of HCl plus HF for the bounding case)
        - vi. SO_2 – 2.4 ppm ± 0.2 ppm (bounding case)
        - vii. Iodine (I_2) - 1.0 ppm ± 0.1 ppm (25-times the bounding case for measurement)
        - viii. HNO_2 – 10 ppm ± 1 ppm (bounding case) HNO_3 – 5 ppm ± 0.5 ppm (bounding case) (Note that NOx and water react to form HNO_2 and HNO_3 -separate addition of these acids is not required)

B. Test Phases (Buyer Third Party Test):
- Phase 1: Initial period (24-7 operation) to condition the virgin Activated Carbon Media with the test gases and to reach steady-state operations.

- Phase 2: Media Performance Testing, 100 hours (24-7 operation) or until breakthrough of mercury.

C. Buyer Third Party Testing will obtain the following data:
- Analysis of activated carbon media for each sample submitted for Buyer Third Party Testing according to parameters and methods identified in Seller's COA.
- Measure Total Hydrocarbons at the inlet and outlet of the lead and lag adsorbers
- Measure inlet and outlet offgas composition (CO, CO_2, NO, NO_2, HNO_3, HNO_2, SO_2, HCl and iodine) for the lead and lag adsorbers.
- Measure inlet and outlet mercury concentrations for the lead and lag adsorbers.
- Measure mercury profile in the lead and lag adsorbers (guard and primary beds) at end of test.
- Measure chloride profile in the lead and lag adsorber media.
- Measure iodine profile in the lead and lag adsorber media.
- Measure SO_2 profile in the lead and lag adsorber media.
- Measure allyl alcohol and naphthalene profile in the lead and lag adsorber media.
- Measure allyl alcohol and naphthalene offgas concentrations at the outlet of the lead and lag adsorbers.
- Measure inlet and outlet offgas temperatures for the lead and lag adsorbers.
- Measure sulfur content of three representative samples of virgin primary media and three representative samples of primary media taken after completion of testing from the location where maximum bed temperature was reached.
- Media temperature at two equally spaced locations along the centerline of the guard bed and primary bed for both the lead and lag adsorbers (total of 4 per adsorber).
- Time at which breakthrough occurs (if realized) for any adsorbed constituents for the lead and lag adsorbers. Breakthrough is defined as the concentration at which the time average emission reaches 100% of the specified removal efficiency. For example, breakthrough for mercury would be 52.6 μg/dscm using the DF of 1000 and maximum mercury loading of 52,600 μg/dscm shown in the mechanical data sheets.
- Report limits established (if any) for step changes to NOx and allyl alcohol concentrations (and any other limiting gas stream components determined by testing).
- Measure pressure drop of the guard bed and primary bed for both the lead and lag adsorbers.
- Analyze the guard and primary beds to determine if hydrated reaction products are formed and the extent of formation.
- Measure particulate downstream of the lead and lag adsorbers and the discharge filter.
- Measure pressure drop of the lead and lag discharge filters.

D. Seller shall perform the following calculations:
- Removal efficiency and loading for mercury, sulfur dioxide, hydrogen chloride and iodine in the lead and lag adsorbers.
- Estimated time for breakthrough of mercury, sulfur dioxide, hydrogen chloride and iodine in the lead and lag test adsorbers and for the WTP lead and lag adsorbers.
- Allyl alcohol and naphthalene removal efficiency and loading for the lead and lag adsorbers.

- Estimated time for breakthrough of allyl alcohol and naphthalene for the lead and lag adsorbers.
- Correlation of guard and primary bed temperatures and offgas constituents for the lead and lag adsorber.
- Analysis of the impact of key gas components on guard and primary bed temperatures during conditioning and operational phases.
- Determine compatibility of media to offgas composition and operating conditions.

E. Seller shall demonstrate the Activated Carbon Media meets the following performance:
- Activated carbon media meets the COA acceptance limits.
- Mercury DF $\geq$ 1,000
- HCl removal efficiency $\geq$ 90%.
- Iodine removal efficiency $\geq$ 90%.
- SO_2 removal efficiency $\geq$ 90%.
- Carbon media temperature maintained below maximum allowable operating temperature for the media (130°C)
- Primary and guard bed media compatible with offgas composition and operating conditions.

5.2 LAW Test 2 - Measure removal efficiencies and loading for mercury, hydrogen chloride, iodine, allyl alcohol, and naphthalene using a simulated offgas.

A. Test (Buyer Third Party Test):
- Activated Carbon Media – Donau Kombisorb BAT37 and Iosorbent-50 (Test Materials Supplied by Seller)
- Residence time – to match mechanical data sheet
- Superficial gas velocity – to match mechanical data sheet
- Inlet temperature – 72°C ± 0.5°C (maximum case)
- Mercury concentration - 24,000 μg/dscm ± 50 μg/dscm (maximum case)
  - i. Elemental mercury 85 Weight% ± 1 Weight% Hg^0
  - ii. Oxidized mercury 15 Weight% ± 1 Weight% Hg^{+2} ($HgCl_2$)
- Relative humidity – 25.4%
- Gas composition:
  - a. Bulk gas – Air and Water (11.5 Volume% ± 0.5 Volume%) vapor (bounding case)
  - b. Concentrations of organics:
    - i. Allyl alcohol – 80 ppm ± 3 ppm (dry). Increases to be made in 4 steps (25%, 50%, 75% & 100%)
    - ii. Naphthalene – 35 ppm ± 1 ppm (dry)
  - c. Other components (actual composition):
    - i. CO_2 - 2 Volume% ± 0.5 Volume% (bounding case)
    - ii. CO - 610 ppm ± 10 ppm (bounding case)
    - iii. NO - 4900 ppm ± 50 ppm (bounding case)
    - iv. NO_2 - 7300 ppm ± 50 ppm (bounding case)
    - v. HCl - 50 ppm ± 1.5 ppm (represents the total of HCl plus HF for the bounding case)
    - vi. SO_2 - 5.0 ppm ± 0.1 ppm (bounding case)
    - vii. Iodine (I_2) - 1.0 ppm ± 0.1 ppm (10-times the bounding case for measurement)

viii. HNO_2 – 40 ppm ± 2 ppm (bounding case) HNO_3 – 30 ppm ± 2 ppm (bounding case) (Note that NOx and water react to form HNO_2 and HNO_3 -separate addition of these acids is not required)

B. Test Phases (Buyer Third Party Test):
- Phase 1: Initial period (24-7 operation) to condition the virgin Activated Carbon Media with the test gases and to reach steady-state operations.
- Phase 2: Media Performance Testing, 100 hours (24-7 operation) or until breakthrough of mercury.

C. Buyer Third Party Testing will obtain the following data:
- Analysis of activated carbon media for each sample submitted for Buyer Third Party Testing according to parameters and methods identified in Seller's COA.
- Measure Total Hydrocarbons at the inlet and outlet of the lead and lag adsorbers
- Measure inlet and outlet offgas component concentrations (CO, CO_2, NO, NO_2, HNO_3, HNO_2, SO_2, HCl and iodine) for the lead and lag adsorbers.
- Measure inlet and outlet mercury concentrations for the lead and lag adsorbers.
- Measure mercury profile in the lead adsorber (guard and primary beds) at end of test.
- Measure chloride profile of the lead and lag adsorber media.
- Measure iodine profile of the lead and lag adsorber media.
- Measure allyl alcohol and naphthalene profile in the lead and lag adsorber media.
- Measure allyl alcohol and naphthalene offgas concentrations at the outlet of the lead and lag adsorbers.
- Measure inlet and outlet offgas temperatures of lead and lag adsorbers.
- Measure sulfur content of three representative samples of virgin primary media and three representative samples of primary media taken after completion of testing from locations where maximum bed temperature was reached.
- Media temperatures at two equally spaced locations along the centerline of the guard bed and primary bed for both the lead and lag adsorbers (total of 4 per adsorber).
- Time at which breakthrough occurs (if realized) for any adsorbed constituents for the lead and lag adsorbers. Breakthrough is defined as the concentration at which the average emission reaches 100% of the specified removal efficiency. For example, breakthrough for mercury would be 53.3 μg/dscm using the DF of 450 and maximum mercury loading of 24,000 μg/dscm shown in the mechanical data sheets.
- Report limits established for step changes to NOx and allyl alcohol concentrations (and any other limiting gas stream components determined by testing).
- Measure pressure drop of the guard bed and primary bed for both the lead and lag adsorbers.
- Analyze the guard and primary beds to determine if hydrated reaction products are formed and the extent of formation.
- Measure particulate downstream of the lead and lag adsorbers and collection on the discharge filter.
- Measure pressure drop of the lead and lag discharge filters.

D. Seller shall perform the following calculations:

- Removal efficiency and loading for mercury, hydrogen chloride and iodine in the lead and lag adsorbers.
- Estimated time for breakthrough of mercury, hydrogen chloride and iodine in the lead and lag test adsorbers and for the WTP lead and lag adsorbers.
- Allyl alcohol and naphthalene removal efficiency and loading for the lead and lag adsorbers.
- Estimated time for breakthrough of allyl alcohol and naphthalene for the lead and lag adsorbers.
- Correlation of guard and primary bed temperatures and offgas constituents for the lead and lag adsorbers.
- Analysis of the impact of key gas components on guard and primary bed temperatures during conditioning and operational phases.
- Determine compatibility of media to offgas composition and operating conditions.

E. Seller shall demonstrate the Activated Carbon Media meets the following performance:
- Activated carbon media meets the COA acceptance limits.
- Mercury DF ≥ 450
- HCl removal efficiency $> 97\%$
- Iodine removal efficiency $> 99\%$
- Carbon media temperature maintained below maximum allowable operating temperature for the media (130°C)
- Primary and guard bed media compatible with offgas composition and operating conditions.

6.0 Success Criteria (by Seller):

1. Seller shall verify activated carbon media meets COA acceptance limits.
2. Seller shall verify DFs/ removal efficiencies for offgas constituents.
3. Seller shall verify load profiles for required offgas constituents and determination of WTP bed life.
4. Seller shall verify carbon media conditioning procedure is sufficient to maintain carbon media temperature below its maximum steady state operating limit of 130°C.
5. Seller shall verify the primary and guard bed media is compatible with offgas composition and operating conditions.

Note that it is possible that the specified test conditions may result in activated carbon media temperatures that do not satisfy the success criteria. In that event, the Buyer Third Party Testing will continue at the reduced allyl alcohol rate that is required to satisfy the success criteria.

Appendix D

WTP Specific Tailoring of ASME AG-1-1997

Appendix D
WTP Specific Tailoring of ASME AG-1-1997

35.0 ASME AG-1, Code on Nuclear Air and Gas Treatment

Revision: 1997 (R2000)
Sponsoring Organization: The American Society of Mechanical Engineers

WTP Specific Tailoring

The following tailoring of ASME AG-1 is required for use by the RPP-WTP project as an implementing standard for the use of Important-to-Safety (ITS) radial HEPA filter systems and the use of ITS axial flow HEPA filters as inbleed units in the Laboratory C5V Exhaust System. Where not specifically identified herein, the remainder of the code requirements are invoked.

Section FK is added as an addendum to ASME AG-1-1997 with the ASME AG-1a-2000 Addenda AG-1 edition invoked on the project.

In addition to the above tailoring for HEPA filter systems, ASME AG-1 is tailored to add ISO 1940-1:2003, Mechanical Vibration - Balance Quality Requirements For Rotors in A Constant (Rigid) State - Part 1: Specification And Verification Of Balance Tolerances, for balancing multi-stage blowers.

Page 228.9; Article HA-2000 Reference Documents

Revise Article HA-2000 as follows:

Change the code edition of ASME N509 as applied as a referenced (daughter) standard to AG-1 from 1989, reaffirmed December 6, 1996 to 2002.

Justification: The version of the ASME N509 Standard currently referenced as a daughter by AG-1 was issued in 1989 and Reaffirmed in 1996. At the time the N509-1989 (R1996) code was selected to be a daughter of AG-1, the ASME AG-1 code did not include requirements for HEPA filter housings. These requirements were later added in the 2000 Addenda to the AG-1 code. The ASME N509-2002 edition does not provide component requirements for HEPA filter housings and HEPA filters but instead refers the user to AG-1 for this information. Therefore, by making this change it will reduce potential redundancies and conflicts.

Page 228.16; Subsubarticle HA-4420 Access Doors and Panels

Revise Subsubarticle HA-4420 as follows for remote change housings:

Not applicable. The requirements of this article are not applicable to Remote Change Radial HEPA Filter Housings; the access doors and panels shall satisfy HA-4500, Pressure Boundary Leakage, and HA-5300, Pressure Boundary Leakage Testing.

Justification: Remote housings are not designed to "incorporate a means for adjusting compression forces, gasket compression..." There are not hinges or latches in the design and they are not designed for manual operation. Therefore, the requirements described in this code article are not applicable.

The remote housing design requires remote access, using a grapple to manipulate doors in a cave environment that may become subject to contamination and high radiation fields. The design incorporates low maintenance features not subject to failure (i.e., vertical housings and heavy doors). The housing doors seal by virtue of their weight alone. Door guides are included. A bar placed across the tops of the doors (and pinned in position) is used to ensure the doors remain in place during seismic events.

Page 228.18; Paragraph HA-4443 Clamping Mechanism

Revise Paragraph HA-4443 as follows for remote change and safe change radial HEPA housings:

Replace the text with: The requirements of this article are not applicable to Safe Change and Remote Change Radial HEPA Filter Housings. For Safe Change and Remote Change Radial HEPA filter housings, the design shall ensure that the housing knife-edge is embedded into the pliable filter sealant and will provide a seal for the complete perimeter of each filter.

Justification: The remote change housings are not side access housings and are not designed for manual operation. There are no clamping mechanisms or filter indexing mechanisms. The weight of the remote filter and differential pressure across the filter is relied upon to ensure that the knife-edge is embedded into the fluid seal.

The safe change housings are front access and are not walk-in style. The filter is not accessed from its side. Therefore, filter retrieval features and filter indexing mechanisms do not apply. A clamping mechanism that is capable of moving the filter (e.g., for side access housings) is not required. The safe change housings are designed to allow a person to insert and remove each filter.

Subarticle FK-4100 General Design

Revise second paragraph of Subarticle FK-4100 as follows for remote change and safe change radial HEPA filter designs:

Replace the text with: For Remote Change and Safe Change Radial HEPA Filters, the total media area provided within the filter pack shall be such that maximum media velocity is 6.5 ft/min (2.0 m/min) at the rated flow.

Justification: The RPP-WTP radial filter design is based upon a UK Atomic Energy Standard Specification AESS 30/95100. This Standard contains an equivalent requirement to that found in AG-1. It states: "The effective area of filter medium used for each insert shall be not less than 3.0 sq m for every 100 l/s rated airflow." The Project proposes to meet this criterion. Converting these metric units for a UK 950 l/s (~2,000 cfm) rated filter equates to approximately 6.5 ft/min media velocity or a minimum of 308 sq. ft of media.

The DOE Nuclear Air Cleaning Handbook (Reference DOE-HDBK-1169-2003 Chapter 2.3.7 and Figure 2.8(a)) illustrates the importance and intent behind this code requirement. AG-1 Subsubarticle FK-1130 states that a HEPA filter shall have *"a minimum efficiency of 99.97% (that is, a maximum particle penetration of 0.03%)for 0.3 micrometer diameter test aerosol particles."* This defines the minimum performance of a HEPA type filter. The curves depicted in Figure 2.8(a) of the Handbook show that at 10.5 ft/min air velocity, the 0.30-micron particle size can be expected to penetrate a HEPA filter such that the AG-1 FK-1130 performance requirement would not be met.

Numerous aerosol penetration tests have been performed on the proposed filter design both inside prototype housings and on individual prototype radial filters designed with a media area of 236 sq. ft., or approximately 8.5 ft/min media velocity. Each test demonstrated that a filter design with media velocities of this magnitude would meet the qualification performance requirements as stated in AG-1 (e.g., 99.97% efficiency or better for penetration of 0.3-micron particles).

The proposed RPP-WTP design uses a filter with approximately 325 sq. ft. of effective media area, or a media velocity of approximately 6.1 ft/min. This represents a small improvement on the UK design and therefore continues to meet the UK Standard requirement.

Further addition of filter media to meet the more restrictive AG-1 Section FK requirement would possibly result in other undesirable design and performance characteristics (e.g., increased DP, reduced pleat spacing). The filter geometry is also limited by many other design restrictions including: available building space, personnel filter handling limitations, and waste disposal package limitations.

Table FK-4000-1

Revise Table FK-4000-1 rating information for the 2,000 acfm filter as follows for remote change and safe change HEPA radial filter designs:

TABLE FK-4000-1 (TAILORED)
TYPE 1 RADIAL FLOW HEPA FILTER – NOMINAL RATINGS

Maximum Rated Air Flow		Maximum Resistance	
(acfm)	(m^3/hr)	Inches WC	Pa
40	68	1.3	325

Maximum Rated Air Flow		Maximum Resistance	
(acfm)	(m^3/hr)	Inches WC	Pa
100	170	1.3	325
250	425	1.3	325
500	850	1.3	325
1000	1700	1.3	325
1500	2550	1.3	325
2000	3400	1.6	400

Justification: A new filter design is being developed with the intent of qualifying it in accordance with the AG-1 code. The RPP-WTP radial flow HEPA filter design originated from UK Atomic Energy Standard Specification AESS 30/95100. The radial flow HEPA filters will be designed for a maximum initial pressure drop of approximately 1.55 inches WC at a rated flow of 2,000 cfm. This is just slightly greater than (~ delta of 0.15 inches WC) the acceptance criterion stated in UK Atomic Energy Standard Specification AESS 30/95100. This increase in observed pressure drop is primarily due to small design differences between the UK design and the design proposed for use in the RPP-WTP. These differences include increases in filter pack depth, increases in faceguard to media pack gaps (used to enhance protection of the media), and space to accommodate the filters gel seal channel. The UK filter pack depth is approximately 68mm or ~2.7 inches. The RPP-WTP filters are available in 1-inch increment pack depths with a 3-inch pack depth proposed for use on the RPP-WTP. The slightly deeper RPP-WTP media pack design will increase the filter media area and increase the removal efficiency for small particles. The benefits gained in the RPP-WTP radial filter design are viewed to outweigh the negligible increase in airflow resistance (~ 3 to 5% of typical filter loading at change-out of filter element).

Paragraph FK-6211 **Flatness and Squareness**

Revise Paragraph FK-6211 (a) as follows for remote change and safe change radial HEPA filter designs:

Type 1 filter flange and end cap tolerances shall meet the following criteria: parallel within $\frac{1}{8}$ in., flat within $\frac{1}{16}$ in.

Justification: TAILORING OF PARALLELISM TOLERANCE: The tailoring presented above changes the code requirement for flange to end cap parallelism from 1/16 in. to 1/8 in. For the Remote Change Filter, the inlet flange, which includes the gel channel with a nominal width of 3/4 in., creates the seal and supports the filter inside the housing. The outlet end cap is fully suspended inside the housing by the opposite inlet flange (i.e., outlet end cap does not touch the housing and is not used to form the seal).

Parallelism to within 1/8 in. will ensure that an adequate housing-to-filter seal is created. For the Safe Change Filter, as with the remote filter, the seal is formed by insertion of a housing knife-edge into a filter gel filled channel with a nominal width of 3/4 in. The gel channel is located on the filter inlet flange. Parallelism to within 1/8 in. will ensure an adequate housing-to-filter seal is created.

TAILORING OF SQUARENESS TOLERANCE: The "squareness" tolerance from FK-6211 is being addressed with a tolerance for circular runout as stated in tailoring for FK-6212. Circular runout controls the cumulative variations that may be present in the positional relationship between the inlet flange and outlet end cap. Inspection for circular runout is equivalent to and meets the code requirement to maintain the squareness characteristic while taking into account the entire length of the filter. Maintaining radial filter circular runout to within the 3/32" tolerance will ensure the filter forms an adequate seal within the filter housing.

Paragraph FK-6212 **Overall Dimensions**

Replace Paragraph FK-6212 as follows for the remote change and safe change radial HEPA filter design: Type 1 filter length shall be (+0 / -1/8 in.), circular runout of filter flange with respect to the filter end cap shall be within 3/32 in., all other dimensions ±1/16 in.

Justification: "Seal ring" and "seal face" are terms specific to Section FK radial filters with gaskets and therefore dimensions and tolerances associated with these terms are not applicable to the Type 1 gel seal radial filters to be used at the RPP-WTP.

TAILORING OF CONCENTRICITY: Concentricity is the condition in which the axes of all cross-sectional elements of a surface of revolution are common to the axis of a datum feature. Concentricity is being replaced with a tolerance for circular runout as a more practical method to verify roundness. Runout refers to the result of rotating a part about its central axis while measuring with a dial indicator its surface deviation from perfect roundness. With circular runout, the dial indicator is not moved along the direction of the axis of the part (as with "total runout"). Circular runout is therefore applied independently at each single circular element along the length of the part as the part is rotated through 360 degrees. The tolerance for circular runout provided in the tailored text controls the cumulative variations that may be present in the positional relationship between the inlet flange and outlet end cap.
The 3/32 in. tolerance provided for circular runout will ensure the filter forms an adequate seal within the filter housing.

TAILORING OF GENERAL DESIGN TOLERANCE OF +/- 1/16 IN.: REPLACE: "all other dimensions +/- 1/16 in. " WITH: "all other dimensions +/- 1/16 in. with exception that design filter media to faceguard gap shall be +/- 1/8 in. (i.e., to maintain a minimum media to faceguard gap of 1/8").

Justification: The proposed design is verified to be safe through code required filter qualification testing as described in Section FK-5100.

Section FG **Mounting Frames**

Not Applicable.

Justification: The ASME Committee on Nuclear Air and Gas Treatment (CONAGT) has stated that Section FG only applies to walk in housings. None of the filter housings (i.e., radial or axial filter designs) to be installed on the RPP-WTP Project is a "walk in" design. Reference ASME Technical Interpretation File # 05-990, RPP-WTP CCN # 107935).

Page 607; Paragraph TA-4632 Airflow Distribution Test (AD)

Revise Paragraph TA-4632 as follows for remote change and safe change radial HEPA housings:

Replace "downstream" with "upstream". Add for clarity: "For Remote Change and Safe Change Radial HEPA filter banks, flow measurement location is upstream vs. code required downstream."

Justification: The requirement for flow measurements to be taken downstream of each HEPA filter in a bank is in order to verify equal flow distribution between filters in a bank. In traditional axial flow systems, a measurement location downstream is preferred due to the improvements in the flow conditions (i.e., flow straightening) inside the housing created by the filter itself. However, due to the difference in configuration created by the radial filter, the flow profile both entering and exiting the filter is extremely complex (i.e., not uniform over the filter face). Testing and analysis (computational fluid dynamic models) performed on prototype units to date have determined that taking the flow measurement upstream and inside the filter (inlet) using a hot wire anemometer provides the most repeatable measurement. Accuracy of the measurement is still hindered by flow conditions and anemometer placement; however, increased precision is obtained by taking an average of multiple measurements at multiple locations within each filter inlet. Predicted results from CFD modeling have agreed with actual field measurements using this technique. The project intends to design (based on the prototype tests) and use an anemometer instrument developed specifically for the radial filter design and place it at the inlet (i.e., upstream) side of the filter. Verification, in the field, of acceptable air distribution between filters in a bank can then be accomplished, as the code requires.

Page 607; Paragraph TA-4633 Air-Aerosol Mixing Test (AA)

Revise Paragraph TA-4633 as follows for axial housings used as LAB C5V Inbleeds:

This article is not applicable to LAB C5V inbleed axial filter housings.

Justification: The intent of this test is to verify that the test aerosol is uniformly mixed in the air stream when it reaches the filter in order to verify that each filter in a filter bank is being challenged. This test is concerned primarily with designs and layouts where a single point injection of aerosol in close proximity to the filter bank may result in non-uniform distribution of the test agent.

The Laboratory Facility C5V Inbleed housing is designed such that each filter is assigned its own aerosol injection manifold. The manifold design and its proximity to the filters have been qualified to meet the aerosol mixing test criteria presented in AG-1. The housing is not designed to accommodate the air-aerosol mixing field-commissioning test per TA-4633. However, the housing design is not being

modified for RPP-WTP use and aerosol mixing, by virtue of the manufacturer test sections, will not be impacted by the installation in the RPP-WTP Laboratory Facility.

Page 111; Section BA-4162 Vibration, Centrifugal Fans

Supplement Section BA-4162 as follows for balancing multi-stage blowers:

Since Section BA-4162 of ASME AG-1 is not applicable for multi-stage blowers used in ventilation/offgas systems, multi-stage blowers shall be balanced to Quality Grade 2.5 of ISO 1940-1:2003, Mechanical Vibration - Balance Quality Requirements For Rotors in A Constant (Rigid) State - Part 1: Specification And Verification Of Balance Tolerances.

Justification: ASME AG-1 is not applicable for multi-stage blowers. ASME AG-1 Section GC is applicable to multi-stage blowers. However, Section GC is in the course of preparation and is not available for use at this time.

Appendix E

WTP Specific Tailoring of ASME B31.3-1996

Appendix E
WTP Specific Tailoring of ASME B31.3-1996

26.0 ASME B31.3-1996, Process Piping

Revision: 1996
Sponsoring Organization: ASME

WTP Specific Tailoring

The following tailoring of ASME B31.3, *Process Piping*, is required for use by the WTP contractor as an Implementing Standard for: (1) the fabrication and installation of those portions of the C5V ductwork that are being embedded in concrete, (2) the use of ASME B16.9 welding tees in accordance with ASME B31.3-2002, (3) use of vacuum box leak testing, and (4) the ASME B31.3-1998, paragraph 345.2.3(c), allowance for not leak testing closure welds outside of inaccessible areas.

- The tailored sections of ASME B31.3 applicable to embedded ductwork will only be utilized to the extent that it will cover the fabrication, installation, and inspection (and associated testing) of Category D fluid service piping being used as C5 ductwork. Air testing requirements for this ductwork will be compliant with ASME AG-1. Below is a description of those portions of ASME B31.3 that apply to fabrication, installation, and inspection of Category D fluid service piping and the sections of the SRD that they will apply to.
- The tailored sections of ASME B31.3 applicable to welding tees will only be used for ASME B16.9 welding tees. As long as the stress intensification factors from ASME B31.3-2002 are used in the stress analysis for the welding tees, welding tees fabricated to either the 1996 or the 2002 edition of ASME B31.3 can be used. Below is a description of those portions of ASME B31.3, Appendix D, Table D300, that apply to welding tees and the section of the SRD to which they will apply.
- The tailored paragraphs of ASME B31.3 applicable to vacuum box leak testing, in lieu of hydrostatic or pneumatic leak testing, will only be used to leak test full penetration circumferential piping field butt welds inside an inaccessible area (as defined in Appendix H, Section 6.0) out to the first isolation component outside the inaccessible area. Further, if the 100 % volumetric inspection using ultrasonic examination per ASME B31.3 paragraph 344.6, is conducted for welds to be vacuum box tested, then the ultrasonic examination shall be conducted using a method that creates and maintains a reproducible computerized image(s) of the entire weld in the axial and radial direction.
- The tailored paragraphs of ASME B31.3 adopting the provisions of ASME B31.3 (c) - 1998 Addendum paragraph 345.2.3(c) are applicable to all ASME B31.3 piping in all facilities except for closure welds in inaccessible areas.

Piping providing a confinement function in accordance with SRD 4.4-3 will comply with the following sections of ASME B31.3-1996, *Process Piping*. These sections of ASME B31.3 are applicable for embedded ductwork.

Chapter 3, Materials

Chapter 5, Fabrication

Table 341.3.2, Visual acceptance criteria for Category D fluid service piping

Justification: Due to wall thickness requirements of duct embedded in concrete, piping materials are required. ASME B31.3 will apply to materials, fabrication, and inspection standards as appropriate. Testing requirements for nuclear air treatment systems will be consistent with ASME AG-1.

Piping providing a confinement function in accordance with SRD 5.1-2 will comply with the following sections of ASME B31.3-1996, *Process Piping*. These sections of ASME B31.3 are applicable for embedded ductwork.

Chapter 3, Materials

Chapter 5, Fabrication

Table 341.3.2, Visual acceptance criteria for Category D fluid service piping

Justification: Due to wall thickness requirements of duct embedded in concrete, piping materials are required. ASME B31.3 will apply to materials, fabrication, and inspection standards as appropriate. Testing requirements for nuclear air treatment systems will be consistent with ASME AG-1.

Piping providing a confinement function in accordance with SRD 4.2-2 will comply with ASME B31.3-1996, *Process Piping*, with the following modification:

In Table D300, the description of welding tee per ASME B16.9 shall be revised so it is consistent with that shown in Table D300 of ASME B31.3-2002:

		Stress Intensification Factor [Notes (2), (3)]			
Description	**Flexibility Factor k**	**Out-of-Plane, i_o**	**In-Plane i_i**	**Flexibility Characteristic, h**	**Sketch**
Welded tee per ASME B16.9 [Notes (2), (4), (6), (11), (13)]	1	$\frac{0.9}{h^{2/3}}$	$3/4\ i_o + 1/4$	$3.1\frac{\overline{T}}{r_2}$	Same as ASME B31.3-1996

This means that for welding tees per ASME B16.9, note 11 in Table D300 is also changed to:

(11) If $r_x \geq 1/8D_b$ and $T_c \geq 1.5\overline{T}$, a flexibility characteristic of $4.4\,\overline{T}/r_2$ may be used.

Justification: The use of a lower flexibility characteristic for welding tees per ASME B.16.9 in accordance with ASME B31.3-2002 will increase both the out-of-plane and in-plane stress intensification factors. The increased stress intensification factors will reduce the allowable out-of-plane and in-plane moments that can be applied to the welding tee and keep the calculated stress below the stresses allowable by ASME B31.3-1996.

Important to Safety piping within the scope of SRD 4.2-2 shall comply with ASME B31.3-1996, Chapter V, Paragraph 345, using the following approach for vacuum box leak testing. Vacuum box leak testing, in lieu of hydrostatic or pneumatic leak testing, may be used to leak test full penetration circumferential piping, field butt welds inside an inaccessible area (as defined in Appendix H, Section 6.0) out to the first isolation component outside the inaccessible area, only under the following conditions:

Vacuum Box Leak Test Method - The vacuum box leak test shall be in accordance with a Bubble Test - Vacuum Box Technique method specified in ASME BPV Code, Section V, Article 10, Appendix II, subject to the requirements listed below:

(a) Sensitivity of the test shall be demonstrated to be not less than 1E-3 atm-ml/sec at 15 psig.

(b) The test pressure shall be a partial vacuum of at least 7 psi below atmosphere, applied to the outside of the weld.

(c) The required partial vacuum shall be maintained for at least 20 sec examination time.

In addition, the following limitations and restrictions shall apply to the application of vacuum box leak testing in lieu of a hydrostatic or a pneumatic leak test:

- Vacuum box leak testing will only be used to leak test circumferential piping field welds inside an inaccessible area (as defined in Appendix H, Section 6.0). This includes any welds in extensions of piping systems contained or originating in accessible areas between the inaccessible area boundary and the first isolation valve or device beyond the inaccessible area boundary;
- It shall only be used for piping field welds where required to avoid damage to components, ensure the safety to construction workers, perform leak tests of field welds where physical limitations prevent hydrostatic or pneumatic leak testing as prescribed in ASME B31.3-1996 paragraph 345.4 and paragraph 345.5 respectively;
- Pipe welds that are to be vacuum box leak tested will be assessed for suitability. The number of welds to be vacuum box leak tested shall be limited to a maximum of three welds between termination points (two termination or closure welds and one intermediate weld) on a given pipe system except where physical limitations prevent examination by hydrostatic or pneumatic leak testing. DOE will be informed of such exceptions, and may at its discretion and within 48 hours of being informed, respond to BNI on the suitability of the use of vacuum box leak testing for such instances. Termination points may be tanks, vessels, valves, etc. (Specifically excluded from the definition of termination points are junctions where the piping changes design class). This could be either the last two closure welds in an inaccessible area or the last closure weld in the inaccessible area and the last closure weld outside the

inaccessible area. In addition, vacuum box leak testing would be permitted for the connection welds between construction modules if this is limited to one module-to-module weld per piping run within the cells. This is in addition to termination welds on the piping run. A module is defined as a pre-leak-tested subassembly containing multiple pipe spools;

- Vacuum box leak testing shall be limited to full penetration girth butt welds, on straight pipe or between straight pipe and pipe components of the same nominal pipe size and same wall thickness on both sides of the weld at the weld location. The following configurations are candidates for vacuum box testing:

  (a) Straight pipe to straight pipe connection butt welds

  (b) Straight pipe to 90° elbow connection butt welds

  (c) Straight pipe to 45° elbow connection butt welds

  (d) Straight pipe to concentric reducer connection butt welds

  (e) Straight pipe to eccentric reducer connection butt welds

  (f) Straight pipe to butt welding tee connection butt welds

  (g) Straight pipe to butt welding reduced outlet tee connection butt welds

  (h) Straight pipe to valve nozzle connection butt welds

  (i) Straight pipe to tank or vessel nozzle connection welds

  (j) Straight pipe to safe-end of a weldolet connection butt welds - full penetration butt welded connection only

  (k) Straight pipe to pipe cap connection butt welds

  Prior to the application of vacuum box testing using any of the candidate configurations on piping butt welds at the WTP, the Contractor must successfully demonstrate to the DOE, for the candidate configuration, that (1) all portions of the weld to be inspected are visible and can be inspected in accordance with the ASME Boiler and Pressure and Vessel Code, Section V, Article 10, Appendix II - 1995; (2) the vacuum box can adequately maintain a partial vacuum of 7 psid; and (3) vacuum box leak testing can be accomplished in the time limits and other requirements established by this procedure. The DOE shall be advised at least 7 days in advance of any demonstration to qualify a new weld configuration so that they can witness the demonstration. The Contractor shall document any demonstration relied upon to justify the use of vacuum box leak testing on a new configuration. Further, vacuum box leak testing shall be conducted with a vacuum box that completely encapsulates the weld, at the test location;

- All welds shall be 100 % volumetrically inspected in accordance with ASME B31.3-1996, paragraphs 344.5 or 344.6. If the 100 % volumetric inspection is conducted using ultrasonic examination per ASME B31.3-1996 paragraph 344.6, then the ultrasonic examination shall be conducted using a method that creates and maintains a reproducible computerized image(s) of the entire weld in the axial and radial direction;

- It shall be limited to welds made using the Orbital welding machines. The only exception is that vacuum leak box testing may be used on manual welds if the 100 % volumetric inspection was conducted by radiography per ASME B31.3-1996 paragraph 344.5;

- The piping systems and or components on both sides of the weld to be vacuum box leak tested shall have been subjected to a hydrostatic leak test in accordance with ASME B31.3-1996

paragraph 345.4, a pneumatic test in accordance with ASME B31.3-1996 paragraph 345.5, a combination pneumatic-hydrostatic leak test in accordance with ASME B31.3-1996 paragraph 345.6, or in the case of components, leak tested in accordance with the Code or Standard applicable to the design of the component;

- At a minimum, a flexibility analysis in accordance with ASME B31.3-1996 paragraphs 319.4.2 (a) and (b) shall be required on any piping systems that contain welds that are to be vacuum leak box tested. In addition, a comprehensive flexibility analysis in accordance with ASME B31.3-1996 paragraphs 319.4.2 (c) and (d) shall be performed on any piping systems that contain welds that are to be vacuum box leak tested when the piping systems have a design temperature greater than or equal to 150 °F;
- For manual welds, the requirements of ASME B31.3-1996 paragraph 344.7.1 (a) through (g) shall be invoked on any weld to be vacuum box leak tested with the exception that the requirement of subparagraph 344.7.1 (e) "... aided by liquid penetrant or magnetic particle examination when specified in the engineering design" shall not be required. For welds made using Orbital welding machines, the requirements of ASME B31.3-1996 paragraph 344.7.1 (a), (b), (c), (d), and (g) shall be invoked. The requirements of 344.7.1 (e) and (f) shall not be required. The implementation of these requirements shall be documented in the weld inspection report;
- Pipe welds and the associated line numbers that are to be vacuum leak box tested shall be identified in advance of the testing. This identification shall be documented in the controlled document Weld List, which must include this information prior to the initiation of any vacuum box leak testing associated with those welds and line numbers. It is understood that the controlled document Weld List may need to be revised and updated periodically through the construction phase of the WTP Project; and
- The following special requirements shall be placed on the training programs used to certify the technicians that will be conducting the vacuum box leak tests:
  1. The BNI Construction Manager shall pre-approve the technician qualifying examination(s) for vacuum box leak testing;
  2. The BNI Construction Manager shall pre-approve the qualifications of each Level III technician preparing or giving the examinations for vacuum box leak testing;
  3. DOE ORP at their discretion shall reserve the right to observe any and/or all practical leak test examinations and review of the results of any and/or all written vacuum box leak test examinations;
  4. The minimum topical content of each Level II examination shall be specified by BNI, and approved by DOE;
  5. The 80 % correct criteria for passing the examination shall apply to each part of the three part examinations that are to be given;
  6. BNI shall provide reasonable assurance that they will take adequate measures to assure the integrity of written examination is maintained; and
  7. There shall be several versions of each examination in use to assure Level II knowledge and ability concerning vacuum box leak testing is confirmed.

Justification: The requirement for the vacuum box leak test sensitivity is consistent with the ASME B31.3 requirement for a sensitive leak test as given in ASME B31.3-1996 paragraph 345.8 and for at least 7 psi vacuum and an examination time of at least 20 seconds. The limitations in using vacuum box leak testing better define when this method can be used. DOE ORP may further change the definition and application of these special vacuum box leak testing criteria based on the Contractor's experience with their use, or the Contractor's request for a change.

Piping system closure welds outside of inaccessible areas (as defined in SRD Appendix H, Section 6.0) shall comply with the requirements of ASME B31.3-1998, subparagraph 345.2.3(c). When ASME B31.3-1998, subparagraph 345.2.3(c) is invoked the following restrictions shall apply:

- It shall not be invoked on any closure welds on piping systems in inaccessible areas as defined in Section 6.0 of Appendix H of the SRD. This includes any welds in extensions of piping systems contained or originating in inaccessible areas, between the inaccessible area boundary and the first isolation valve, or device beyond the inaccessible area boundary;
- It shall only be invoked on full penetration butt welds in straight pipe, full penetration butt welds at the safe-end of an equipment nozzle, or full penetration butt welds at the safe-end of branch connections. [The safe-end is defined as the piping to equipment nozzle connecting weld or the branch connection to branch piping connecting welds.];
- The requirements of ASME B31.3(c) - 1998, subparagraph 345.2.3 (c) shall be met;
- The piping systems and or components on both sides of the closure weld shall have been subjected to a hydrostatic leak test in accordance with ASME B31.3-1996 paragraph 345.4, a pneumatic leak test in accordance with ASME B31.3-1996 paragraph 345.5, a combination pneumatic-hydrostatic leak test in accordance with ASME B31.3-1996 paragraph 345.6, or in the case of components leak tested in accordance with the Code or Standard applicable to the design of the component;
- For manual welds, the requirements of ASME B31.3-1996 paragraph 344.7.1 (a) through (g) shall be invoked with the exception that the requirement of subparagraph 344.7.1 (e) "...aided by liquid penetrant or magnetic particle examination when specified in the engineering design" shall not be required. For welds made using the Orbital welding machines, the requirements of ASME B31.3 -1996 paragraph 344.7.1 (a), (b), (c), (d), and (g) shall be invoked. The implementation of these requirements shall be documented in the weld inspection report;
- Piping welds and the associated line numbers for which the closure weld classification is invoked shall be documented in a controlled document Weld List;
- Piping components may include mechanical elements other than piping; and
- In addition, BNI shall incorporate these requirements into the appropriate specification. DOE-ORP may further change the definition and application on the use of closure welds based on the Contractor's experience with their use or the Contractor's request for a change.

Justification: This change does not change the safety function of any pressure boundary components. The requirement to leak test pressure boundary field welds is primarily to ensure the reliability of the welds in addition to the reliability provided by the other required examinations. The exception allowed by ASME B31.3-1998, paragraph 345.2.3 that the final weld connecting piping systems or components which have been successfully tested in accordance with

paragraph 345 need not be leak tested provided the weld is examined in-process in accordance with paragraph 344.7 (a), (b), (c), (d), and (g) and passes with 100 % radiographic examination in accordance with paragraph 344.5 or 100 % ultrasonic examination in accordance with paragraph 344.6 provides adequate assurance that the weld is reliable and leak tight. The change continues to provide adequate safety since it requires that all piping closure welds that are not leak tested are in-process examined and 100 % volumetrically examined which exceeds the requirements of ASME B31.3-1996 for closure welds that are leak tested. The inability to hydrostatically or pneumatically leak test these closure welds does not affect the soundness of the welds.

Appendix F

WTP Specific Tailoring of AISC (ASD)

Appendix F

WTP Specific Tailoring of AISC (ASD)

9.0 AISC M016, Manual of Steel Construction, Allowable Stress Design (ASD)

Revision: 9th Edition
Sponsoring Organization: American Institute of Steel Construction

WTP Specific Tailoring

The following tailoring of M016 is required for use by the WTP contractor as an implementing standard for design of structural steel for Seismic Category III SSCs.

No specific section

Load combinations for design of structural steel members utilize those identified in UBC 97, Section 1612.3.

Justification: These load combinations represent the commercial requirements for allowable stress design of structural steel. Use of these load combinations will ensure compliance with the commercial design in accordance with the UBC.

No specific section

Seismic detailing requirements shall be in accordance with UBC 97, Chapter 22, Division V, Section 2214, for moderate seismic risk structures.

Justification: The requirements contained in this section contain accepted industry practice for design of important commercial steel structures. Use of this section will ensure compliance with the commercial design in accordance with the UBC.

Appendix G
WTP Specific Tailoring of ASME NQA-1-1989

Appendix G
WTP Specific Tailoring of ASME NQA-1-1989

C.37 ASME NQA-1-1989, Quality Assurance Program Requirements for Nuclear Facilities

Revision: 1989

Sponsoring Organization: The American Society of Mechanical Engineers

WTP Specific Tailoring

The following tailoring of ASME NQA-1-1989 is required for use by the WTP project as an implementing standard to perform Commercial Grade Dedication activities using ASME NQA-1-2004.

NQA-1-1989, Supplement S-1 **Terms and Definitions**

Replace the Commercial Grade Item definition with definition from NQA-1-2004, Part I, Section 400:

Commercial Grade Item: a safety class/safety significant structure, system, or component (SSC), or part thereof, that affects its safety function, that was not designed and manufactured in accordance with the requirements of this Standard.

Justification: By tailoring NQA-1-1989 to incorporate elements of NQA-1-2004, the Commercial Grade Item definition is broadened to reflect current industry practices related to Commercial Grade Dedication. Currently there are gaps among NQA-1 qualified suppliers and utilization of NQA-1-2004 will enable WTP to employ technically acceptable suppliers not available under the provision of NQA-1-1989. The NQA-1-1989 standard was established primarily to provide for the purchase of replacement parts for nuclear-related facilities and is not sufficient to support the purchase of commodities and equipment needed for a new facility.

Commercial Grade Items may be either off the shelf/catalog items or "engineered items", i.e., items for which some custom design effort is required by the supplier to meet purchaser requirements. If the critical characteristics of an "engineered item" cannot be verified solely based on material or performance attributes, verification of critical design characteristics should be based on NQA-1-2004, Section 704 (e.g., by design verification methods) or by application of alternate standards for qualification of suppliers of Safety Class/Safety Significant items.

NQA-1-1989, Supplement S-1 **Terms and Definitions**

Add to the reference section ASME NQA-1-1989, Supplement S-1, the following definitions from NQA-1-2004, Part I, Section 400:

Commercial Grade Service: a service that was not provided in accordance with the requirements of this standard.

Critical Characteristics: important design, material, and performance characteristics of a commercial grade item or service that, once verified, will provide reasonable assurance that the item or service will perform its intended safety function.

Dedication: an acceptance process performed in accordance with this Standard to provide reasonable assurance that a commercial grade item or service will successfully perform its intended safety function and, in this respect, is deemed equivalent to an item or services provided under the requirements of this Standard.

Dedicating Entity: the organization that performs the dedication process.

Justification: The tailoring of the NQA-1-1989, by adding definitions of Commercial Grade Service, Critical Characteristic, Dedication, Dedicating Entity, and Safety Function to NQA-1-2004, allows for the use of the Commercial Grade Dedication process to procure equipment requiring design services by the supplier. This incorporates definitions consistent with NQA-1-2004 text.

NQA-1-1989, Supplement 7S-1 Supplementary Requirements for Control of Purchased Items and Services

Replace NQA-1-1989 supplement 7S-1 Section 10, Titled Commercial Grade Items in its entirety with NQA-1-2004, Requirement 7, Section 700.

Justification: NQA-1-2004 provides greater flexibility for implementing the Commercial Grade Dedication process while assuring that equipment acquired under these processes will support their safety functions.

Modify new Section 701 General as follows:

701 General

When Commercial Grade Items or Services are utilized, the dedicating entity can utilize the requirements of this section for procurement and acceptance of items or services as an acceptable alternative to Sections 2 through 9 of this Supplement, except that Supplier evaluation and selection, where determined necessary by the Purchaser, shall be in accordance with Section 3.1 of this Supplement. The applicable requirements of this Standard shall apply to dedication activities for acceptance.

When a Commercial Grade Item has been delivered or installed, prior to the decision to dedicate, the dedicating entity can utilize the requirements of this section for acceptance of the item when the critical characteristics can be verified solely by inspections, tests, or analyses.

Justification: Corrects the section numbers to correspond to the appropriate section of NQA-1-1989 and provides for use of Commercial Grade Dedication for delivered and/or installed SSCs whose safety classification is subsequently upgraded.

Modify (referenced section number only) new Section 704.2 Source Verification as follows:

704.2 Source Verification

Source verification is only applicable to the actual item(s) or service(s) that are verified at the Supplier's facility or other applicable location. Source verification shall be performed in accordance with Section 8.2.2 of this Supplement, including a checklist or plan with the documented evidence of the source verification furnished to the dedicating entity and shall include or address the following:

(a) identification of the item(s) or service(s) included within the scope of the source verification

(b) identification of the critical characteristics, including acceptance criteria, to be controlled by the Supplier

(c) verification of the Supplier's processes and controls are effectively implemented for the identified critical characteristics

(d) identification of the activities witnessed during the source verification and the results obtained

(e) documentation of the adequacy of the Supplier's processes and controls.

Justification: Corrects the paragraph number to correspond to the appropriate section of NQA-1-1989.

Appendix H

WTP Specific Tailoring of IEEE Std. 384

Appendix H
WTP Specific Tailoring of IEEE Std. 384

19.0 IEEE-384, IEEE Standard Criteria for Independence of Class 1E Equipment and Circuits

Revision: 1992
Sponsoring Organization: The Institute of Electrical and Electronics Engineers, Inc.

RPP-WTP Specific Tailoring

The following tailoring of IEEE-384 is required for use by the RPP-WTP project as an implementing standard for SDC, SC, SDS, or SS electrical equipment and circuit design.

All Sections Clarification of Nuclear Power Generating Station Terminology

The term "Standby Generator" in the Standard is synonymous with "Emergency Generator" in the RPP-WTP.

Justification: As determined by the ISM review process, the Standby Generators on the RPP-WTP are not classified as SDC or SC while the Emergency Generators are classified as SDC or SC.

Section 2.0 Purpose

Replace with the following:

This standard establishes the criteria for implementation of the independence requirements of IEEE 603-1998 (as tailored in C.33) and IEEE 308-1991 (as tailored in C.18).

Justification: This section was revised to clarify that SRD implementing standards IEEE 603-1998 and IEEE 308-1991 are tailored in Appendix C.

Section 3.0 References

The following reference standards, do not apply for the RPP-WTP.

- [1] ANSI/ANS-58.2-1988, Design Basis for Protection of Light Water Nuclear Power Plants Against the Effects of Postulated Pipe Rupture.

Justification: This document is applicable to the high pressure steam lines found in nuclear power generating stations and doesn't apply for the RPP-WTP.

- [4] ANSI/NFPA 803-1988, Fire Protection for Light Water Nuclear Power Plants.

Justification: This document specifically addresses nuclear power generating stations. Per Section 4.5 of volume II of the SRD, the RPP-WTP will use NFPA 801-2003 as an implementing standard for fire protection.

- [11] IEEE Std 494-1974 (reaff 1990), IEEE Standard Method for Identification of Documents Related to Class 1E Equipment and Systems for Nuclear Power Generating Stations.

Justification: This standard has been withdrawn by the IEEE standards committee and no replacement standard has been recommended. This standard is not called out as an implementing standard in the SRD. Procedures for identification of documents related to SDC, SC, SDS, or SS equipment will be developed internally for the RPP-WTP project.

Replace the 1991 version of IEEE 603 with the following version.

IEEE Std 603-1998, *IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations.*

Justification: SRD Safety Criterion 4.4-4 lists the 1998 version of IEEE 603 as an implementing standard for SDC and SC electrical power systems. The 1998 revision of IEEE 603 shall be used in place of the 1991 revision called out as a reference in the body of IEEE 384-1992 for SDC and SC electrical power systems only.

The following reference Standards shall be included:

- [16] DOE/RL-96-0006, Revision 1, *Top-level Radiological, Nuclear, and Process Safety Standards and Principles for TWRS Privatization Contractors.*

Justification: Called out as a regulatory basis in the SRD.

- [17] ANSI/ISA-S84.01-1996, *Application of Safety Instrumented Systems for the Process Industries.*

Justification: Replaces IEEE-603 for Control and Instrumentation Systems at the WTP, per 24590-WTP-ABCN-ESH-01-027.

- [18] NFPA 801-2003, *Standard for Fire Protection for Facilities Handling Radioactive Materials.*

Justification: Called out as an implementing standard under safety criteria 4.5-1 through 4.5-4.

Section 4.0 Definitions

- The definition of **design basis events** shall be replaced with the following:

"Postulated events providing bounding conditions for establishing the performance requirements of structures, systems, and components that are necessary to: 1) ensure the integrity of the safety boundaries protecting the worker; 2) place and maintain the facility in a safe state indefinitely; or 3) prevent or mitigate the event consequences so that the radiological exposures to the general public or the workers would not exceed appropriate limits. The Design-Basis Events also establish the performance requirements of the structures, systems and components whose failure under Design-Basis Event conditions could adversely affect any of the above functions."

Justification: This definition is from DOE/RL-96-0006.

Section 5.3, Equipment and Circuits Requiring Independence

Replace with the following sentence:

Equipment and circuits requiring independence shall be determined during the ISM review cycle and shall be identified on documents and drawings in a distinctive manner.

Justification: The reference to IEEE-494 is not applicable since this standard has been withdrawn by the IEEE standards committee and no replacement standard has been recommended. This standard is not called out as an implementing standard in the SRD. The ISM process will provide reliability requirements for each control strategy. These reliability requirements determine when control strategies require independence, redundancy, and seismic qualifications.

Section 6.1.3.2, Area Boundaries

Replace the reference to NFPA 803-1998[4] with NFPA 801-2003 [18].

Justification: Standard NFPA 803-1998 is not applicable for the RPP-WTP. Per Section 4.5 of the SRD, NFPA 801-2003 shall be used for the RPP-WTP.

Section 6.5, Containment Electrical Penetrations

Not applicable for the RPP-WTP.

Justification: Containment electrical penetration assemblies are unique to the containment structure of Nuclear Power Generating Stations and have no equivalent in the RPP-WTP project.

Appendix I

WTP Specific Tailoring of IEEE Std. 323 (HLW only)

Appendix I
WTP Specific Tailoring of IEEE Std. 323 (HLW only)

23.0 IEEE-323, Qualifying Class 1E Equipment for Nuclear Power Generating Stations

Revision: 1983
Sponsoring Organization: The Institute of Electrical and Electronics Engineers, Inc.

RPP-WTP Specific Tailoring

The following tailoring of IEEE-323 is required for use by the RPP-WTP project as an implementing standard for ITS electrical and instrument system design.

Section 1.1, Scope

- This Standard applies to SSCs designated as SDC, SC, SDS, or SS (where the SS SSCs is required to perform a credited safety function in a harsh environment).

Justification: SS SSCs, which are required to perform a safety function in a harsh environment, have been included within the scope of this standard.

Section 2, References

The following reference Standard shall be included:

- [9] DOE/RL-96-0006, Revision 3, Top-level Radiological, Nuclear, and Process Safety Standards and Principles for the RPP Waste Treatment Plant Contractor.

Justification: The added references are applicable for the RPP-WTP project.

Section 3, Definitions

- Modify the definition of **harsh environment** to be: An environment expected as the result of the postulated service condition appropriate for the design basis event of the RPP-WTP. It is an environment that exceeds the conditions of a mild environment. Equipment that do not experience an environment beyond a mild environment during a design basis event can be considered to be in a mild environment.

Justification: A **harsh environment**, as defined by this standard, applies to a Nuclear Power Generating Station and are the result of a loss of cooling accident (LOCA)/high energy line brake (HELB) inside the containment and post-LOCA or HELB outside containment. The modified definition applies to RPP-WTP.

This modified definition is further supported by 10 CFR 50.49, Environmental qualification of electric equipment important to safety for nuclear power plants, which states, in Section C: " Requirements for (1) dynamic and seismic qualification of electric equipment important to safety, (2) protection of electric equipment important to safety against other natural phenomena and external events, and (3) environmental qualification of electric equipment important to safety located in a mild environment are not included within the scope of this Section. A mild environment is an environment

that would at no time be significantly more severe than the environment that would occur during normal plant operation, including anticipated operational occurrences."

The definition of **mild environment** within the standard states:

"An environment expected as a result of normal service conditions and extremes (abnormal) in service conditions where seismic is the only design basis event (DBE) of consequences."

Therefore the normal operating environment for a SSC is considered a "mild environment" by this definition.

The following definition is applicable for the RPP-WTP:

- The definition of **design basis events** shall be added with the definition from DOE/RL-96-0006, which states:

  "Postulated events providing bounding conditions for establishing the performance requirements of structures, systems, and components that are necessary to: 1) ensure the integrity of the safety boundaries protecting the worker; 2) place and maintain the facility in a safe state indefinitely; or 3) prevent or mitigate the event consequences so that the radiological exposures to the general public or the workers would not exceed appropriate limits. The Design-Basis Events also establish the performance requirements of the structures, systems and components whose failure under Design-Basis Event conditions could adversely affect any of the above functions."

Justification: The above listed definition was added to be applicable to the RPP-WTP project.

Section 7, Simulated Test Profiles

Delete this section.

Justification: This section is specific to Nuclear Power Generating Stations and describes profiles and margin for LOCA/HELB harsh environments.

Appendix J WTP Specific Tailoring of IEEE Std. 344

22.0 IEEE-344, IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations

Revision: 1987(R1993)
Sponsoring Organization: The Institute of Electrical and Electronics Engineers, Inc.

RPP-WTP Specific Tailoring

The following tailoring of IEEE-344 is required for use by the RPP-WTP project as an implementing standard for SDC/SDS or SC/SS Seismic Class I electrical and instrument system design.

Pages 1-43, All Sections Clarification of Nuclear Power Generating Station Terminology

The term "Class 1E" in the Standard applies to "SC-I" in the RPP-WTP.

Justification: The Scope, Section 1.0 of IEEE-344 applies to equipment that needs to function during and after an SSE for a Nuclear Power Generating Station. For RPP-WTP the equipment that needs to function during and after a design basis earthquake is SDC/SDS/SC/SS equipment which must be qualified to SC-1.

Page 1, Section 1.2 References

Delete reference [5] CFR (Code of Federal Regulations), Title 10 Energy, Part 100 Reactor Site Criteria, published by office of the Federal Register, 1992

Justification: Reference [5] contains radiation dose criteria and seismic criteria for Nuclear Power Generating Stations and is not applicable to the RPP-WTP project. The applicable criteria for RPP-WTP is found in 24590-WTP-SRD-ESH-01-001-02, Safety Requirements Document (SRD) Volume II, Safety Criteria 2.0-1 for radiological dose and 2.0-2 for chemical hazards. The applicable seismic criteria is contained in 24590-WTP-SRD-ESH-01-001-02, Safety Requirements Document (SRD) Volume II, in Section 4.1 General Design, Safety Criterion 4.1-3. This Safety Criterion defines Seismic Category (SC) I, II and III and provides seismic loads and source documents.

Delete reference [3] ANSI/IEEE Std 382-1985, *IEEE Standard for Qualification of Actuators for Power Operated Valve Assemblies with Safety-Related Functions for Nuclear Power Plants.*

Justification: This standard will be replaced with IEEE Std 382-1996. The IEEE Std 382-1996 includes a Required Input Motion (RIM) curve.

Pages 1-2, Section 2 Definitions

Delete the definitions for **Operating basis earthquake (OBE)** and **safe shutdown earthquake (SSE).**

Add a definition for **design basis earthquake** as: Earthquakes for RPP-WTP and the applicability to systems, structures and components (SSCs) is contained in 24590-WTP-SRD-ESH-01-001-02, Safety Requirements Document (SRD) Volume II, in Section 4.1 General Design, Safety Criterion 4.1-3. This Safety Criterion defines Seismic Classes (SC) I, II and III and provide seismic loads and source documents.

Justification: The definition of OBE and SSE are applicable to Nuclear Power Generating Stations and the new definitions is applicable to the RPP-WTP project as defined in the SRD. This is consistent with the tailoring of AISC N690 as documented in ABCN-013.

Pages 1-43, All Sections Clarification of OBE and SSE

The term SSE in the standard is treated as a design basis earthquake. The requirement to apply and document the loads of a number of OBEs before an SSE is deleted from the standard.

Justification: The earthquake applicable to RPP-WTP is the design basis earthquake. The requirement to subject equipment to several OBEs prior to an SSE is not included in the requirements of the SRD for the RPP-WTP project. This is consistent with the tailoring of AISC N690 as documented in ABCN-013.

Page 13, Section 7.1.3.2, Repairs

In the fifth line delete the words, ", such as LOCA,".

Justification: LOCA is a term specific to Nuclear Power Generating Stations and not to the RPP-WTP project.

Page 15, Section 7.1.5, Vibrational Aging

In the last paragraph change the first sentence to read, "The purpose of the vibrational aging is to show that the lower levels of normal and transient vibration associated with plant operation will not adversely affect an equipment's performance of its safety function nor cause any condition to exist that, if undetected, would cause failure of such performance during a subsequent design basis earthquake.

Justification: This sentence within the standard included additional vibration aging of an OBE, but used the terms "lower intensity earthquake" rather than OBE. The rewording is needed to clarify the meaning of the sentence. The requirement to subject equipment to several OBEs prior to an SSE is not included in the requirements of the SRD for the RPP-WTP project. The earthquake applicable to RPP-WTP is the design basis earthquake. This is consistent with the tailoring of AISC N690 as documented in ABCN-013.

Page 16, Section 7.1.6.1, Hydrodynamic Loads

Delete the words, "and the loss-of-coolant accident (LOCA)

Justification: LOCA is a term specific to Nuclear Power Generating Stations and not to the RPP-WTP project.

Appendix K Environmental Equipment Requirements for SS-Chemical Toxicity Equipment

Environmental Qualification Requirements for SS - Chemical Toxicity Equipment

1. The equipment shall be designed under applicable codes and standards to withstand the effects of its environmental and process conditions and perform its safety function under the applicable Design Basis Event (DBE) conditions.

2. The Seller shall establish and document the ability of the supplied safety equipment to perform its safety function under the most severe environmental and process conditions to which it is subject during its installed life.

   The evaluation necessary for this purpose may be based on testing, analyses or operating experience. The necessary data shall have been obtained under quality assurance requirements imposed elsewhere in the procurement documents.

   The environmental service conditions considered shall be those contained in the Equipment Qualification Datasheets (EQD) applicable to the supplied equipment. The EQD are provided as part of the procurement documents. The process conditions considered shall be those stated in the equipment datasheets or elsewhere in the procurement documents.

3. The Seller shall consider the aging effects of the environmental and process conditions. The Seller shall consider the effects of temperature (thermal aging), radiation and wear as aging mechanisms.

   For radiation exposure evaluation, a total radiation dose of less than 1.0E03 Rad is not a significant radiation aging mechanism for electronic components. A total dose of less than 1.0E04 Rad is not a significant radiation aging mechanisms for organic compounds.

   The results of the aging evaluation shall be documented as recommended maintenance, replacement and/or surveillance actions which are required in response to the aging effects.

   The desired qualified life for the supplied equipment for the WTP is 40 years. However, if agreed to by the BUYER, the equipment/component qualified life may be less than 40 years.

4. Components not involved in the equipment's safety function(s) may be excluded from the SELLER's qualification process if it can be shown, through a documented means such as analysis that assumed failures, including spurious operation, have no adverse effect on the stated safety function(s) or by way of interfaces, on the safety function(s) of other equipment.

5. The results of the qualification evaluations required above shall be specific to the equipment items supplied to WTP. Any modifications made to the equipment after the evaluations are complete shall also be evaluated in accordance with the above requirement and the results shall be similarly documented. Modifications to the equipment include changes in its design, materials, manufacturing process, clearances, lubricant, or mounting conditions.

6. Documentation of Qualification.

a. The Seller shall provide signed certification of conformance to the specified performance requirements. The certification shall be in the form shown in Appendix L of this specification.
b. Passive Equipment
   i. The Seller shall provide a documented evaluation confirming that the applicable bounding normal, abnormal, accident and post accident environmental and process conditions will not degrade non-metallic component/subcomponent performance in such a manner as to prevent the equipment from performing its required passive safety function(s).
c. Active Equipment (including all electrical, instrumentation and controls equipment)
   i. The Seller shall provide an analysis and material evaluation of passive function(s), if any, as required for passive equipment (above) with additional documentation of testing, analysis, operating experience, or any combination of the three, demonstrating that the equipment assembly is qualified to perform its intended active safety function(s).
d. The Seller shall either: a) document recommended replacement (whole equipment or parts) or maintenance actions which are required in response to the aging effects and include a specific statement that the recommended replacement (whole equipment or parts) or maintenance actions are based on the aging considerations, or b) if the equipment is not susceptible to aging, provide a statement that no maintenance / components replacements are required due to aging considerations
e. All qualification documentation shall be submitted to WTP under document category 35 of BNI Form G-321-E.

Appendix L Certificate of Conformance

I (Signer's Name) , (Signer's Title) of (SELLER), being duly authorized by (SELLER) to make this certification, do hereby certify that:

1) The (Equipment descriptive name - Example: Pressure Transmitter), Model No.(s) or Equivalent Identification), supplied to the WTP Project for application as Nuclear Safety Related Item(s) under MR /P.O. No., or equivalent Buyer's purchase document no.) is (are) environmentally and seismically qualified in accordance with the requirements in the standards, specifications, data sheets and technical notes in the said purchase documents and will meet the acceptance criteria stated for its safety related function.

2) The said environmental and seismic qualification are based on the tests, analyses and results documented in: (List of documents establishing Environmental and Seismic Qualification to WTP requirements)

3) The particular items (Equipment descriptive name(s), Model (Model designation(s) and List of serial numbers or other identification of the particular items supplied for Nuclear Safety Related application to the WTP project) supplied for Nuclear Safety Related application at the WTP Project are identical to, or have been shown to be sufficiently similar to, the test sample(s) subjected to qualification testing/analyses documented in the qualification documents listed above, such that the data and results in the said documents are specifically applicable to the particular items supplied to the WTP project. (If necessary) Sufficient similarity between the test sample(s) and the safety related items supplied to WTP is documented in (Document title).

4) All modifications to the test sample and manufacturing methods which were necessary to establish qualification have been effected in the particular items supplied to the WTP Project.

5) All maintenance, surveillance requirements necessary to maintain the qualified status of the equipment in the installed configuration and service conditions at the WTP Project are stated in (Document Title).

6) All replacements of parts necessary to maintain the qualified status of the equipment in the installed configuration and service conditions at the WTP Project are stated in (Document Title).

Seller (Company name)

_____

Signature of Authorized Representative _____

_____

Date Signed

Name of Authorized Representative _____

Title of Authorized Representative _____

RCRA Operating Record Cover Sheet

Document Number: 24590-WTP-PCN-ENV-11-006

Waste Management Records:

- ☐ **R101** List of Waste Management Areas
- ☐ **R102** Waste Analysis Records
- ☐ **R103** Waste Designation Information
- ☐ **R104** Waste Transfer Records
- ☐ **R105** Movement of Containerized Waste Onsite
- ☐ **R106** Release/Spill Records
- ☐ **R114** Field Change Request/Field Change Notice
- ☐ **R116** Field Monitoring / Surveillance Checklists
- ☐ **R119** Reserved
- ☐ **R120** Reserved
- ☐ **R126** Satellite and 90-Day Accumulation Area

Compliance Schedule Submittals:

- ☐ **R401** Pretreatment Facility
- ☐ **R402** LAW Facility
- ☐ **R403** HLW Facility
- ☐ **R404** Laboratory
- ☐ **R405** Balance of Facility
- ☐ **R406** WTP All Facilities
- ☐ **R407** Human Health & Ecological Risk Assessment

Other Operating Record Documents:

- ☐ **R601** Outgoing Correspondence (RCRA Permit Relating)
- ☐ **R602** Contingency Plan Implementation
- ☐ **R603** Closure Plan Deviation
- ☐ **R604** Permit Equivalency Notice (PEN)
- ☒ **R605** Permit Change Notice (PCN)
- ☐ **R606** Annual RCRA Permit Closure and Post-Closure Cost Adjustment Report
- ☐ **R607** Permit Modification
- ☐ **R608** Incoming Correspondence (RCRA Permit Relating)

Non-Operating Record Documents:

- ☐ **N101** Meeting Minutes
- ☐ **N102** Memoranda

Special Instructions to PDC:

Link CCNs:

243298

245202

246922

Quarter Ending June 30, 2012 24590-HLW-PCN-ENV-12-001

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 Engineering Specification for the HLW Canister Decontamination Handling System (HDH) Canister Rinse Bogie in Appendix 10.7 of the Dangerous Waste Permit (DWP).

Submitted by Co-Operator:

D. M. Busche — Date: 3/19/12

Reviewed by ORP Program Office:

D. L. Noyes — Date: 4/16/12

Quarter Ending June 30, 2012 24590-HLW-PCN-ENV-12-001

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

Description of Modification:

The purpose of this Class 1 prime modification is to update and replace the following Engineering Specification for the HDH Canister Rinse Bogie in Appendix 10.7 of the DWP.

Appendix 10.7			
Replace:	24590-HLW-3PS-MQR0-T0002, Rev. 4	With:	24590-HLW-3PS-MQR0-T0002, Rev. 5

This modification requests Ecology approval and incorporation into the permit the specific changes to the engineering specification that are indicated by revision notes and bars. The engineering specification includes changes provided in applicable document change forms (e.g., DCN, SCN, SDDR, FCN, FCR, etc.). In addition, this engineering specification includes changes associated with the resolution to comments on change documents since the issuance of the last revision of the permitted document.

Summary of changes to the engineering specification:

- Revised Section 3.8 to include specifics on relocation of an overflow line (instead of a drain valve on the rinse vessel to restrict the generation of hydrogen during off normal event)
- Added Section 5.1.8 to include clarification on an embed spacer
- Revised Section 5.2.1.14 to change the weight of the shield door
- Revised Section 5.2.2.16 to clarify information on the vessel vent pipe
- Added Sections 5.2.2.22 and 5.2.2.23 to provide more details on thermowells, pipe supports, and overflow line
- Added Sections 7.5 and 11.12.3 regarding surface finish details
- Revised Section 8.2.3.1 to add shop details on the vessel hydrostatic leak test
- Deleted vendor submittal information as detailed in Sections 11.3, 11.3.1, 11.3.2, and 11.3.3
- Editorial additions were added to Sections 11.8.3.1, 11.10.1, and 11.14

This modification requests Ecology approval and incorporation of the following list of outstanding change documents into the permit. Although not yet incorporated into the revised documents attached to this PCN, this list of outstanding SDDRs are intended to be incorporated into this modification.

- 24590-WTP-SDDR-MH-11-00148
- 24590-WTP-SDDR-MH-11-00158
- 24590-WTP-SDDR-MH-11-00204
- 24590-WTP-SDDR-MH-12-00020

Quarter Ending June 30, 2012 24590-HLW-PCN-ENV-12-001

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

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

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

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

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

Reason for denial:

Reviewed by Ecology:

Annette Carlson 5-11-12

A. Carlson Date

ISSUED BY
RPP-WTP PDC

R11432794

RIVER PROTECTION PROJECT – WASTE TREATMENT PLANT

ENGINEERING SPECIFICATION

FOR

HLW System HDH Canister Rinse Bogie

Content applicable to ALARA? ☒ **Yes** ☐ **No**

ADR No.
24590-HLW-ADR-M-02-048

Rev
001

Specification changes retroactive? ☐ **Yes** ☒ **No**
☐ **N/A (alpha revision or revision 0)**

NOTE: Contents of this document are Dangerous Waste Permit affecting.

Quality Level
Q

DOE Contract No.
DE-AC27-01RV14136

REV	DATE	BY	CHECK	REVIEW	E&NS	EGS
5	9/28/11	T. Fullmer	J. Osborne	T. Semmens	N/A	J. Leam
4	6/3/08	D. Lopez	A. Ceja	J. Hancock	N/A	D. J. Wilsey
3	4-18-05	J. Hancock	R. Wight	P. Snider	C. Meng	D. J. Wilsey
2	2-3-04	J. Hancock	E. Szavay	J. L. Weamer	N/A	D. J. Wilsey
1	4-14-03	J. Hancock	J. Roach	J. L. Weamer	N/A	D. J. Wilsey
0	9-12-02	S. Bradshaw	J. Hancock	N/A	N/A	G. Duncan

SPECIFICATION No.
24590-HLW-3PS-MQR0-T0002

Rev
5

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

Revision History

Revision	Reason for Revision
0	Issued for Procurement
1	Issued for Purchase. Seismic requirements clarified. Appendix A updated. Appendix B & C added. Additional revisions indicated with revision bars.
2	Issued for Purchase. SCN 24590-HLW-3PN-MQR0-00002 & 24590-HLW-3PN-MQR0-00002 incorporated. Additional revisions indicated with revision bars.
3	Issued for Purchase. SCN's 24590-HLW-3PN-MQR0-00003, 24590-HLW-3PN-MQR0-00004, 24590-HLW-3PN-MQR0-00005, 24590-HLW-3PN-MQR0-00006, 24590-HLW-3PN-MQR0-00007 & 24590-HLW-3PN-MQR0-00008 incorporated. SDDR's 24590-WTP-SDDR-PROC-04-00857, 24590-WTP-SDDR-PROC-05-00041, 24590-WTP-SDDR-PROC-05-00180, 24590-WTP-SDDR-PROC-05-00551, & 24590-WTP-SDDR-PROC-05-00552 incorporated. Exclusions to general specifications identified in sections 5.1.6, 5.2.2.2, 5.2.2.17, 5.7.1, 5.7.8, 5.8.1.1, 6.1, 7.2, 8.2.3.1, and 8.5.1.
4	Issued for purchase SCN's: 24590-HLW-3PN-MQR0-00009, 24590-HLW-3PN-MQR0-00010, and 24590-HLW-3PN-MQR0-00011 Incorporated. SDDR'S: 24590-WTP-SDDR-M-05-00403, 24590-WTP-SDDR-MH-07-00115 incorporated. SDDRs incorporated by Reference: 24590-WTP-SDDR-M-05-00117, 24590-WTP-SDDR-MH-07-00110, 24590-WTP-SDDR-MH-07-00111, 24590-WTP-SDDR-MH-07-00114, 24590-WTP-SDDR-MH-07-00117, and 24590-WTP-SDDR-MH-07-00118. QA and E&NS signatures are not required on the sign off sheet because they have both previously reviewed and approved all the incorporated change documents for this revision.
5	Issued for purchase TCN's incorporated: 24590-QL-MRA-MQTS-00002-T0003, 24590-QL-MRA-MQTS-00002-T0004, and 24590-QL-MRA-MQTS-00002-T0005. SDDR's incorporated: 24590-WTP-SDDR-MH-10-00130, 24590-WTP-SDDR-MH-10-00131, 24590-WTP-SDDR-MH-11-00048, and 24590-WTP-SDDR-MH-11-00130 SDDR's incorporated by reference: 24590-WTP-SDDR-MH-07-00287, 24590-WTP-SDDR-MH-08-00174, 24590-WTP-SDDR-MH-08-00271, 24590-WTP-SDDR-MH-09-00227, 24590-WTP-SDDR-MH-11-00009, 24590-WTP-SDDR-MH-11-00018, 24590-WTP-SDDR-MH-11-00020, 24590-WTP-SDDR-MH-11-00039, and 24590-WTP-SDDR-MH-11-00056. E&NS signature is not required on the sign off sheet because they have previously reviewed and approved all the incorporated change documents for this revision.

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Figure 1 "Type B" Package A-1

1 Scope

1.1 Project Description and Location

1.1.1 The Office of River Protection (ORP) and its contractors manage 177 underground radioactive waste storage tanks at the Hanford Site in Washington. These tanks contain approximately 55.5 million US gallons of radioactive waste. Bechtel National, Inc. (BNI) has entered into a contract with the US Department of Energy (DOE) to design, construct, and commission a Hanford Tank Waste Treatment and Immobilization Plant (WTP) to process and vitrify the waste into a stable form that is suitable for permanent storage. The WTP will be constructed in the 200 East Area of the Hanford Site, near Richland, Washington. The main facilities within the WTP complex will be the Pretreatment (PTF), Low-Activity Waste (LAW) and High-Level Waste (HLW) Facilities.

1.2 Equipment, Material, and Services Required

1.2.1 This engineering specification covers the equipment, materials and services required for the design and supply of the HLW Canister Decontamination Handling (HDH) System, Canister Rinse Bogie and associated equipment.

1.2.2 A bogie is a four (4) wheeled trolley that travels on a pair of parallel rails.

1.2.3 The Canister Rinse Bogie is used to transport Immobilized High-Level Waste (IHLW) Canisters containing radioactive material from one location to another during process activities. A vessel located on the bogie holds the canister and performs a pre-wash of the canister at an intermediate station. The bogie travels in a process tunnel during normal operation, but has the ability to leave the tunnel and enter an adjoining room for maintenance purposes. A shield door separates the process and maintenance areas, and provides radiological shielding.

1.2.4 This specification supports Material Requisition (MR) No. 24590-QL-MRA-MQTS-00002

1.2.5 The Seller shall design, fabricate, inspect and functionally test equipment as specified in this specification. The equipment shall be fabricated and assembled in compliance with this specification, referenced codes and standards, and detail drawings reviewed by the Buyer. The Seller is responsible for:

- Design
- Procurement of materials
- Fabrication
- Assembly
- Tagging equipment with a component tag number (CTN)
- Functional Testing
- Examination/inspection
- Packaging and preparation for shipping
- Loading of equipment on Buyer arranged conveyance
- Umbilical electric cable located in Bogie Maintenance Area, see Section 3

- Submittals as identified in the submittal requirements found in the Purchase Order (PO) and this specification
- Installation, Operation, and Maintenance Manuals
- Lists of recommended spare parts
- Field support for installation and testing

1.2.6 The Seller shall provide the following equipment and any other equipment as necessary to perform the requirements identified in this specification:

Plant Item Number 24590-HLW-	**Description**
MQ-HDH-TRLY-00003	Canister Rinse Bogie
MV-HDH-VSL-00001	Canister Rinse Bogie Decon Vessel
MH-HDH-RAIL-00002	Canister Rinse Bogie Rails
MH-HDH-RAIL-00004	Canister Rinse Bogie Seismic Rails
MH-HDH-MHAN-00016	Canister Rinse Vessel Service Track
MH-HDH-MHAN-00017	Canister Rinse Bogie Service Track
MH-HDH-RCVY-00009	Canister Rinse Bogie Recovery System
MH-HDH-MHAN-00011	Canister Rinse Bogie Spool Piece
MH-HDH-MHAN-00015	Canister Rinse Vessel Lid
MP-HDH-PMP-00001	Bogie Decon Canister Pump
JC-HDH-PNL-00001	Canister Rinse Bogie ASD Control Cabinet

1.2.7 The Seller shall provide any special lifting equipment and tools, for assembly (or disassembly), installation, or maintenance of the bogie and associated equipment.

1.2.8 The Buyer shall provide a "mock-up" canister for shop testing, see Section 8.2 of this specification.

1.2.9 The Seller shall verify the accuracy and applicability of design information to meet the requirements identified in this specification. The Seller is encouraged to propose design improvements, which could result in quality, performance, cost, or schedule benefits beyond those offered by the Design Proposal Drawings (DPDs), and Mechanical Data Sheets (MDSs) accompanying the Purchase Order.

1.2.10 All requests for substitutions, modifications, or relaxation of this specification or requirements specified in the referenced documents shall be identified in writing for the consideration of the Buyer. For DPDs and MDSs, the following shall be considered required elements: parameters indicated as bounding ("max", "min", "not-to-exceed", or similar qualifier); information present on the DPDs and MDSs that includes the term "required", "mandatory", "shall", or similar term; components or equipment identified as pre-selected or mandatory by the Buyer. The Seller shall document such changes in a Supplier Deviation Disposition Request (SDDR) in accordance with Section 2 of the Purchase Order.

1.2.11 The following items and services will be supplied by the Buyer and are not included in the Seller's scope of work:

- Embed plates embedded in structural concrete to which equipment is anchored
- Waste Neutralization Vessel (PI. No. 24590-HLW-MV-HDH-VSL-00003)

- Shipment from Seller's location to the Hanford receiving location
- Unloading at Hanford receiving location
- Field assembly, installation, erection and field testing of the bogie, vessel, and associated equipment
- Field startup, test, and run-in labor and materials
- Installation of conduit and wiring from the Seller provided control cabinets to the Buyer's Motor Control Center (MCC), Buyer's Controller, and Buyer's Remote I/O
- Mains electric power supply and connections
- Field touch-up painting
- Programming of the bogie control system
- Startup and commissioning
- Mock-up canister

1.3 Work by Others

1.3.1 The Seller may subcontract portions of the work, including any portion of the design, fabrication, manufacturing, or inspection, provided it meets the conditions of this specification and the Buyer's approval is obtained.

1.3.2 The Seller shall be ultimately responsible for the completeness and quality of all materials and services provided.

1.4 Definitions and Abbreviations

1.4.1 Definitions

1.4.1.1 Buyer: Bechtel National, Inc. (BNI)

1.4.1.2 Offeror: The party submitting a proposal for the equipment and/or services described in this specification.

1.4.1.3 Seller: The party selected to provide the equipment and/or services described in this specification.

1.4.1.4 Shall: Indicates a mandatory requirement in order to comply

1.4.1.5 Should: Indicates a recommendation for compliance

1.4.2 Abbreviations

ANSI	American National Standards Institute
AISC	American Institute of Steel Construction
API	American Petroleum Institute
ASD	Adjustable Speed Drive
ASME	American Society of Mechanical Engineers
AWS	American Welding Society
BNI	Bechtel National, Inc.
CFR	Code of Federal Regulations
CM	Commercial Quality

CMAA	Crane Manufacturers Association of America
CTN	Component Tag Number
DOE	Department of Energy
DPD(s)	Design Proposal Drawing(s)
EMI	Electromagnetic Interface
HDH	HLW Canister Decontamination Handling
HLW	High-Level Waste
HMI	Human-Machine Interface
ICN	Integrated Control Network
ICS	Industrial Controls and Systems
IEEE	Institute of Electrical and Electronics Engineers
IHLW	Immobilized High-Level Waste
IJB	Instrument Junction Box
I/O	Input/Output
ISA	Instrumentation, Systems, and Automation Society
ITS	Important to Safety
LAW	Low-Activity Waste
LOI	Local Operator Interface
MCC	Motor Control Center
MDS(s)	Mechanical Data Sheet(s)
MHD(s)	Mechanical Handling Diagram(s)
MR	Material Requisition
MSDS	Material Safety Data Sheet
MTR(s)	Material Test Report(s)
NDE	Non-Destructive Examination
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Agency
NQA	Nuclear Quality Assurance
ORP	Office of River Protection
OSHA	Occupational Safety and Health Administration
P&ID(s)	Piping and Instrumentation Diagram(s)
PO	Purchase Order
PTF	Pretreatment Facility
PTFE	Polytetrafluoroethylene
QAP	Quality Assurance Program
QL	Quality Level
RFI	Radio Frequency Interface
RIO	Remote I/O
SC	Seismic Category
SDC	Safety Design Class
SDDR	Supplier Deviation Disposition Request
SDS	Safety Design Significant
SSC(s)	Structures, Systems or Components
TEFC	Totally Enclosed Fan Cooled
TFE	Tetrafluoroethylene
UBC	Uniform Building Code
UL	Underwriters Laboratories
WNRF	Weld Neck Raised Face
WTP	Hanford Tank Waste Treatment and Immobilization Plant

1.5 Safety/Quality Classifications

1.5.1 Important to Safety

1.5.1.1 Structures, Systems, and Components (SSCs) that serve to provide reasonable assurance that the facility can operate without undue risk to the health and safety of the workers and public are classified as Important to Safety (ITS). ITS encompasses the broad class of facility features addressed in the top-level radiological, nuclear, and process safety standards and principles that contribute to the safe operation and protection of workers and the public during all phases and aspects of facility operations (i.e., normal operation and accident mitigation).

1.5.1.2 SSCs designated as ITS are classified as either Safety Design Class (SDC) or Safety Design Significant (SDS).

- The classification Safety Design Class (QL-1) is assigned to SSCs that prevent or mitigate offsite public, worker, or co-located worker radiological exposures that could exceed the standards.

- The classification Safety Design Significant (QL-2) is assigned to SSCs that ensure the that radiological standards for normal operation are not exceeded.

1.5.1.3 For Quality Assurance requirements of ITS SSCs refer to Section 10 of this specification.

1.5.2 Non Important to Safety

1.5.2.1 SSCs designated as Non-ITS, or Commercial Quality (CM), are those SSCs not classified as SDS, SDC, or Immobilized High-Level Waste (IHLW) product-quality affecting. Non-ITS items are manufactured using standard commercial practices as required by applicable industry standards, with the quality requirements identified in the Seller's Quality Assurance Program (QAP).

1.5.2.2 For Quality Assurance requirements of Non-ITS SSCs refer to Section 10 of this specification.

1.5.3 Equipment Classifications

1.5.3.1 The table below identifies equipment that have components designated as ITS.

Equipment	Components	Safety Classification (Quality Level)	Critical Characteristics
Canister Rinse Bogie	All components that maintain structural integrity (i.e. load path items) of the bogie and vessel support stand. These include but are not limited to, bogie chassis, vessel support stand, uplift restraints, bumpers, bogie rail end stops, and bolted/welded connections on the load path, including connections to bogie chassis.	SDS (QL-2)	Maintain vessel and canister on bogie and prevent bogie from derailing under normal operating conditions (following a wheel failure) or an SC-II design basis earthquake.
	All other components (including drive system and wheel modules)	Non-ITS	N/A
Canister Rinse Bogie Seismic Rails	All load path components that maintain the structural integrity, including bolted/welded connections.	SDS (QL-2)	Prevent bogie from derailing under normal operating conditions (following a wheel failure) or an SC-II design basis earthquake.
	All other components	Non-ITS	N/A

1.5.3.2 All other equipment identified in this specification are designated as Non-ITS. SSCs, identified as Non-ITS can include, but are not limited to, non-load path items and proprietary items such as motors, gearboxes and winches.

1.5.3.3 For seismic loading requirements, refer to Section 5.6.4 of this specification.

2 Applicable Documents

2.1 General

2.1.1 Work shall be carried out in accordance with, but not limited to, the applicable codes and standards listed in the following subsections. The specific revision or effective date identified, as well as the specific revision or effective date of codes and standards that they incorporate by reference (daughter codes and standards) shall be followed. If a date or revision is not identified, the latest issue, including addenda, in effect at the date of contract award or later, shall be used. Deviation from the dated codes and standards shall only apply with the agreement of the Buyer, or when in accordance with Sections 6.5 and 6.6 of this specification.

2.1.2 The Seller shall refer to Section 2 of the Purchase Order for the appropriate revisions of the WTP project documents identified in Sections 2.3, 2.4 and 2.5 of this specification.

2.1.3 Any known or suspected conflicts between the specifications, drawings, and the applicable codes and standards, shall be brought to the attention of the Buyer, via a SDDR, for resolution prior to start of work.

2.1.4 Where requirements in this specification exceed code requirements, this specification shall govern.

2.1.5 Deleted

2.2 Codes and Standards

2.2.1 American Society of Mechanical Engineers (ASME)

ASME NQA-1-1989, *Quality Assurance Program Requirements for Nuclear Facility Applications*

ASME B&PV Section VIII Division 1, *Rules for Construction of Pressure Vessels DIVISION 1 Non-Interfiled (Boiler and Pressure Vessel Codes)*

ASME B31.3 -1996, *Process Piping*

ASME NOG-1-2002, *Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)*

ASME/ANSI B73.2M, *Specification for Vertical In-Line Centrifugal Pumps for Chemical Process*

ASME B46.1, *Surface Texture (Surface Roughness, Waviness & Lay)*

2.2.2 American Welding Society (AWS)

AWS D1.1 2002, *Structural Welding Code – Steel*

AWS D1.6, *Structural Welding Code – Stainless Steel*

2.2.3 American Institute of Steel Construction (AISC)

AISC MO16, *Manual of Steel Construction, Allowable Stress Design, 9th Edition*

2.2.4 Crane Manufacturers Association of America (CMAA)

CMAA 70-2000, *Specification for Top Running Electric Overhead Traveling Cranes*

2.2.5 Department of Energy (DOE) Orders and Directives

DOE O 414.1A, *Quality Assurance*

2.2.6 Instrumentation, Systems, and Automation Society (ISA)

ISA 5.1, *Instrument Symbols and Identification*

2.2.7 National Electrical Manufacturers Association (NEMA)

NEMA, MG-1-1998, *Motors and Generators*

2.2.8 Institute of Electrical and Electronics Engineers (IEEE)

IEEE Std 1023-1988, *IEEE Guide for the Application of Human Factors Engineering to Systems, Equipment, and Facilities of Nuclear Power Generating Stations*

IEEE Std 1205-2000, *IEEE Guide for Assessing, Monitoring, and Mitigating Aging Effects on Class 1E Equipment used in Nuclear Power Generating Stations, Annex D*

2.2.9 Code of Federal Regulations (CFR)

FED-STD 595B-1994, *Colors Used in Government Procurement*

10 CFR Part 830, *Quality Assurance Criteria*

2.2.10 Uniform Building Code (UBC)

UBC-1997, *Uniform Building Code*

2.2.11 Underwriters Laboratories (UL)

UL 508 -1999, *Standard for Safety Industrial Control Equipment*

2.2.12 National Fire Protection Association (NFPA)

NFPA Volume 70, 1999 National Electric Code (NEC)

2.2.13 Department of Defense and Energy Standards, Nuclear Regulations

MIL-STD-1472F Human Engineering

DOE-HDBK-1140, 2001 of	Human Factors/Ergonomics Handbook for the Design for Ease Maintenance
NUREG-0700	Human System Interface Design Review Guidelines
NUREG-0711	Human Factors Engineering Program Review Model

2.2.14 American Society of Testing Materials (ASTM)

ASTM A554 Standard Specification for Welded Stainless Steel Mechanical Tubing.

2.2.15 EN 292-1 Safety of Machinery - Basic Concepts, General Principles of Design - Part 1; Basic Terminology, Methodology.

2.2.16 EN 292-2 Safety of Machinery - Basic Concepts, General Principles of Design - Part 2; Technical Principle and Specifications.

2.2.17 ISO 281:1990 Roller bearings - Dynamic load ratings and rating life.

2.2.18 AGMA 908 Geometry Factors for Determining Pitting Resistance and Bending Strength of Spur, Helical, and Herringbone Gear Teeth.

2.2.19 AGMA 2001 Fundamental Rating Factors and Calculation Methods for Involute Spur and Helical Gears.

2.3 WTP Project Specifications

2.3.1 24590-WTP-3PS-M000-T0002, Rev 0, *General Specification for Mechanical Handling Equipment Design and Manufacture,* Bechtel National, Inc., Richland, Washington. Sections which do not apply to this equipment: 3.5.8.1, 3.5.8.2, 3.5.8.5, 3.6, 3.7, 4.1.9, 4.1.10, 4.1.11, 4.1.12, 4.10.1, 4.10.4, 4.12, and 4.13.

2.3.2 24590-WTP-3PS-P000-T0001, Rev 4, *Engineering Specification for Piping Material Classes,* Bechtel National, Inc., Richland, Washington. Section which does not apply to this equipment: 16.

2.3.3 24590-WTP-3PS-EKP0-T0001, Rev 2, *Engineering Specification for Electrical Requirements for Packaged Equipment*, Bechtel National, Inc., Richland, Washington. Sections which do not apply to this equipment: 6.4.2.3, 6.4.3.1, 6.6.1, 6.6.3, and 6.8.

2.3.4 24590-WTP-3PS-JQ07-T0001, Rev 1, *Engineering Specification for Instrumentation for Package Systems*, Bechtel National, Inc., Richland, Washington. Sections which do not apply to this equipment: 3.4.5.1, 3.4.5.2.3, 3.4.5.4.4, 3.4.5.9, 3.4.5.10, 3.4.5.12, 3.4.5.13, 3.4.5.14, 3.4.5.15, 3.4.5.16, 3.4.5.17, 3.7.1, 3.8.3, 3.8.4, 3.8.6, 3.8.7, and 3.8.8.1.

2.3.5 24590-WTP-3PS-MUMI-T0002, Rev 2, *Engineering Specification for Low Voltage Induction Motors,* Bechtel National, Inc., Richland, Washington. Sections which do not apply to this equipment: 5.1.1, 5.3, and 5.4.1.

2.3.6 24590-WTP-3PS-JD02-T0001, *Engineering Specification for Intelligent Drives for Packaged Equipment,* Bechtel National, Inc., Richland, Washington

2.3.7 Deleted.

2.3.8 24590-WTP-3PS-G000-T0003, *Engineering Specification for Packaging, Handling, and Storage Requirements*, Bechtel National, Inc., Richland, Washington

2.3.9 24590-WTP-3PS-AFPS-T0001, *Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment,* Bechtel National, Inc., Richland, Washington

2.3.10 24590-WTP-3PS-G000-T0001, *General Specification for Supplier Quality Assurance Program Requirements,* Bechtel National, Inc., Richland, Washington

2.3.11 24590-WTP-3PS-SS00-T0001, Rev 5, *Welding of Carbon Structural Steel*, Bechtel National, Inc., Richland, Washington. Section which does not apply to this equipment: 8.18.

2.3.12 24590-WTP-3PS-SS00-T0002, *Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel*, Bechtel National, Inc., Richland, Washington

2.3.13 24590-WTP-3PS-JV15-T0001, *Engineering Specification for Actuators for On/Off Valves*, Bechtel National, Inc., Richland, Washington

2.3.14 24590-WTP-3PS-PV00-T0001, Rev 1, *Engineering Specification for Technical Supply Conditions for Valves*, Bechtel National, Inc., Richland, Washington. Section which does not apply to this equipment: 5.4.

2.4 WTP Design Documents

2.4.1 Design Proposal Drawings (DPDs)

Document Number	Document Description
24590-HLW-M0-HDH-00013	Canister Rinse Bogie Arrangement
24590-HLW-M0-HDH-00012001	Canister Rinse Bogie
24590-HLW-M0-HDH-00012002	Canister Rinse Bogie
24590-HLW-M0-HDH-00008	Canister Rinse Bogie Rails
24590-HLW-M0-HDH-00010	Canister Rinse Bogie Seismic Rails
24590-HLW-M0-HDH-00043	Canister Rinse Bogie Service Tracks
24590-HLW-M0-HDH-00029	Canister Rinse Bogie Recovery System

2.4.2 Mechanical Data Sheets (MDSs)

Document Number	Document Description
24590-HLW-M0D-HDH-00029	Canister Rinse Bogie Spool Piece

Document Number	Document Description
24590-HLW-M0D-HDH-00030	Canister Rinse Vessel Lid
24590-HLW-MPD-HDH-00001	HDH-PMP-00001 Canister Rinse Bogie Pump
24590-HLW-MVD-HDH-00009	HDH-VSL-00001 Canister Rinse Bogie Vessel

2.4.3 Reference Drawings and Data Sheets

Document Number	Document Description
24590-HLW-M6-HDH-00002	P&ID – HLW Canister Decontamination Handling System
24590-HLW-M0-HDH-00001001	DPD, Canister Rinse Bogie Decon/Maint Shield Door Arrangement
24590-HLW-M0-HDH-00001002	DPD, Canister Rinse Bogie Decon/Maint Shield Door Arrangement & Details
24590-HLW-M0-HDH-00002	DPD, Canister Rinse Bogie Decon/Maint Shield Door Embed Plates
24590-HLW-M0-30-00001001	HLW Test Canister Assembly
24590-HLW-M0D-HDH-00002	MDS, Canister Rinse Bogie Maint Crane 1
24590-HLW-M0D-HDH-00003	MDS, Canister Rinse Bogie Maint Crane 2

2.5 Other WTP Documents

2.5.1 24590-WTP-3PD-MQTS-00002, *Supplier Quality Assurance Program Requirements Data Sheet*, Bechtel National, Inc., Richland, Washington

2.5.2 24590-WTP-3PD-MQTS-00004, *Supplier Quality Assurance Program Requirements Data Sheet*, Bechtel National, Inc., Richland, Washington

2.5.3 24590-HLW-SOC-S15T-00009, Rev 0D, *HLW Vitrification Building Seismic Analysis - In-Structure Response Spectra (ISRS)*, Bechtel National, Inc., Richland, Washington.

2.5.4 24590-HLW-SOC-S15T-00039, Rev D, *HLW Vitrification Building Seismic Analysis - Enveloped In-Structure Response Spectra*, Bechtel National, Inc., Richland, Washington.

3 System Description

3.1 The Canister Rinse Bogie operates in the HLW Canister Decontamination Handling (HDH) System.

3.2 The Canister Rinse Bogie travels in the Canister Rinse Tunnel (Room H-B039B) during normal operations. The Canister Rinse Tunnel is classified as a C5/R5 and C3/R3 transition zone. Maintenance activities are performed in an adjoining Bogie Maintenance Area (Room H-B039A), separated by a shield door from the process area. The Bogie Maintenance Area is classified as C3/R3. For environmental conditions and definitions of the classification of areas refer to project specification 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design and Manufacture*.

3.3 Where dual classifications are identified on the DPDs, for example, C5/R5 and C3/R3, they indicate a transition zone where the room is designated as C5/R5 when a container is present and C3/R3 when a container is not present.

3.4 The Canister Rinse Bogie transfers glass filled IHLW Canisters from a position below the Canister Handling Cave (Room H-136) to a position below the Canister Decontamination, Swabbing and Monitoring Cave (Room H-133). A vessel located on the bogie holds the canister and performs a pre-wash of the canister at an intermediate station.

3.5 The purpose of the pre-wash is to perform a general rinse of the canister prior to transfer into the Canister Decontamination, Swabbing and Monitoring Cave.

3.6 The basic operations are as follows:

- Bogie and vessel positioned under the hatch located in the Canister Handling Cave
- Canister lowered into vessel, through hatch, by overhead crane located in the Canister Handling Cave
- Bogie, vessel and canister travel to the Canister Rinse Station
- Canister rinse cycle, see Section 4.2 of this specification
- Bogie, vessel and canister travel to a position under the hatch located in the Canister Decontamination, Swabbing, and Monitoring Cave
- Canister removed from bogie after 30 minute drying period, through hatch, by overhead crane located in the Canister Decontamination, Swabbing, and Monitoring Cave
- Bogie and vessel travel to a position under the hatch located in the Canister Handling Cave

3.7 Process and electrical services are provided to the bogie and vessel through service tracks (energy chains) located in the Canister Rinse Tunnel. When the bogie requires transferring from the process area to the maintenance area the service tracks and the service connections (process and electrical) are manually disconnected from the bogie at the shield door aperture and parked on a bracket located at the door aperture. A Seller provided umbilical electrical cable, located in the maintenance area, is manually connected to the bogie terminal box allowing the bogie to transfer into the maintenance area. The umbilical electrical cable provides the power and control to the bogie only. Once the bogie is located in the maintenance area the shield door is closed prior to any maintenance activities being performed.

3.8 An overflow line shall be placed on the rinse vessel at a height such that the level of the liquid in the vessel restricts the generation of Hydrogen (HPAV) if the system were to shut down with a canister on the rinse bogie for an extended period of time.

4 Equipment Description

4.1 Canister Rinse Bogie

4.1.1 The bogie is a motorized trolley used for transporting IHLW Canisters containing radioactive material from one location to another during process activities.

4.1.2 The bogie is driven by an on-board geared motor, and travels on a pair of floor-mounted rails.

4.1.3 Power and control are provided to the bogie through a service track.

4.1.4 The bogie control system uses bogie mounted proximity switches and the motor brake to control the process stopping positions of the bogie

4.1.5 The bogie control system uses a bogie mounted ultimate travel limit switch to prevent the bogie from impacting the rail end stops in the event of a proximity (positioning) switch failure.

4.1.6 A stand mounted to the bogie chassis supports the Canister Rinse Vessel.

4.1.7 Restraints mounted to the side of the vessel support stand, in conjunction with the seismic rails (see Section 4.4), prevent the bogie from overturning or derailing in the event of a wheel failure or a seismic event.

4.2 Canister Rinse Vessel

4.2.1 The vessel is mounted to a support frame located on the bogie chassis. The vessel locates the canister for transfer and provides the containment and associated services for canister washing.

4.2.2 An inflatable seal mounted to the top flange of the vessel provides the seal between the vessel and the spool piece (see Section 4.7) to provide containment of the water spray during the rinse cycle. Process air is supplied to the inflatable seal from the Buyer's plant utility system through a 1" pipe, and has a line pressure of 90 - 100 psig. The line pressure is reduced to 25 psig by a pressure regulator for the inflatable seal air supply.

4.2.3 A series of spray nozzles located in the vessel directs demineralized water to spray the entire surface of the canister. The proposal drawings provided with this specification show an upper and lower spray ring. This allows the canister to be sprayed in stages due to the limiting flow rate. Demineralized water is supplied to the vessel from the Buyer's plant utility system through a 2" pipe, and has a maximum flow rate of 90 gpm and pressure 60 psig.

4.2.4 The maximum batch transfer to the vessel is 360 gallons. Maximum batch transfer is defined as the maximum water volume transferred to the vessel during the rinse cycle.

4.2.5 Two (2) solenoid operated on/off control valves divert the water flow between the upper and lower spray rings while a centrifugal pump continually discharges the water from the vessel during the rinse cycle. Water is discharged from the vessel to the Buyer's Waste Neutralization Vessel through a 2" pipe.

4.2.6 A high-high level switch and continuous level instrument monitor the water levels in the vessel during the rinse cycle.

4.2.7 The following rinse cycle is based on the proposal drawings provided with this specification:

- Pressurize the inflatable seal to make the seal between the vessel and the spool piece.

- Open the upper demineralized water line for the upper spray ring to begin the water wash.
- After the vessel has filled to 10 gallons, confirm that the vessel discharge pump has begun discharging the water at 80 gpm.
- After washing with 180 gallons of water in 2 minutes, close upper demineralized water line. After 2.5 minutes the vessel should be fully drained (check the level indicator on the vessel).
- Open the lower demineralized water line for the lower spray ring to finish the water wash.
- After the vessel has filled to 10 gallons, check that the vessel discharge pump has begun discharging the water at 80 gpm.
- After washing with 180 gallons of water in 2 minutes, close lower demineralized water line. After the vessel is emptied (2.5 minutes), ensure the vessel discharge pump is shut off.
- Depressurize the inflatable seal.

4.2.8 The pressurized demineralized water and plant process air are provided to, and removed from, the vessel through a dedicated process service track. Power and control are provided to the vessel equipment through the same service track that provides the electrical services to the bogie.

4.3 Canister Rinse Bogie Rails

4.3.1 The bogie rails run between the Canister Rinse Tunnel and the Bogie Maintenance Area. The rail supports are mounted on embeds located in the floor.

4.3.2 The rails guide the bogie between the process stations maintaining the relative position of the bogie to the process stations.

4.3.3 End-stops are located at the end of the rails to prevent bogie over-travel.

4.4 Canister Rinse Bogie Seismic Rails

4.4.1 The seismic rails are mounted on embeds located in the North and South walls of the Canister Rinse Tunnel.

4.4.2 The seismic rails, in conjunction with the bogie restraints, prevent the bogie from overturning or derailing in the event of a wheel failure or a seismic event.

4.5 Canister Rinse Bogie Service Tracks

4.5.1 Two (2) service tracks (energy chains) are located in the Canister Rinse Tunnel. One service track provides the routing for the electrical services to the bogie and the vessel, the other provides the routing for process services (water and air) to the vessel. The service tracks are dynamic tracks that allow movement of the bogie while maintaining fixed connections at the entry to and exit from the track for connection and routing of services.

4.5.2 The proposed design includes 4 cable systems: (1) mechanical handling power - bogie motor, (2) mechanical handling instrumentation - position sensors/limit switches, (3) process power - pumps and valves, (4) process instrumentation - level switches and transmitters.

4.5.3 The proposed design includes 3 process hoses: (1) water supply, (2) water discharge, and (3) air supply.

4.5.4 A Seller supplied bracket, at the shield door aperture, allows the service tracks to be parked in position prior to transferring the bogie into the maintenance area.

4.6 Canister Rinse Bogie Recovery System

4.6.1 The recovery system provides a means of recovering the bogie in the event of a component failure that would cause the bogie to become immobile.

4.6.2 In a recovery event the bogie is towed by a recovery block located at the West end of the bogie rail. The recovery block is connected, via a static cable, to a wall-mounted electric winch located in the maintenance area.

4.6.3 In a recovery event the canister is either removed from a position directly under the Canister Handling Cave (if the bogie has not moved from its park position), or the bogie is recovered to a position under the Canister Decontamination, Swabbing and Monitoring Cave where the canister is removed. The bogie is then recovered into the Bogie Maintenance Area where hands-on maintenance can be performed.

4.7 Canister Rinse Bogie Spool Piece

4.7.1 The spool piece is mounted to an embed located on the ceiling of the Canister Rinse Tunnel at the Canister Rinse Station. The spool piece provides the sealing surface for the vessel mounted inflatable seal.

4.8 Canister Rinse Vessel Lid

4.8.1 The vessel lid is placed over the top of the vessel while the bogie and vessel are located in the maintenance area. The vessel lid minimizes the potential for transfer of radioactive particulate (contamination) from inside the vessel while it is located in the maintenance area. The vessel lid is stored in the maintenance area.

5 Design Requirements

5.1 General

5.1.1 System components and equipment provided in accordance with this specification shall not exceed the bounding equipment envelope dimensions implied or explicitly indicated on the DPDs and MDSs referenced in Section 2.4 of this specification.

5.1.2 Equipment weights shall not exceed the bounding weights indicated on the DPDs and MDSs without Buyer authorization. The Seller shall be responsible for any analysis required to determine embed loadings for equipment weights exceeding the bounding weights indicated on the DPDs and MDS, and are subject to Buyer review.

5.1.3 System components and equipment provided in accordance with this specification shall utilize the facility concrete embedments as depicted in the DPDs and MDSs referenced in Section 2.4 of this specification. Equipment mountings shall be capable of accommodating embed plate placement and orientation tolerances specified in sections 5.1.3.1 and 5.1.3.2 of this specification.

5.1.3.1 Tolerances for concrete placement shall be in accordance with the Table for Concrete Placement Tolerances, unless noted otherwise on the project drawings.

Table for Concrete Placement Tolerances

Component	Category	Tolerance
Footings	Lateral Alignment – As cast to center of individual footing.	0.02 times width of footing in direction of misplacement but not more than 2 in.
	Horizontal dimension for unformed members cast against soil.	
	2 feet or less	+3 in. or –1/2 in
	Over 2 feet, but less than 6 feet	+6 in. or –1/2 in.
	Over 6 feet	+12 in. or –1/2 in.
	Level Alignment – Top of footings	+1/2 in. and –2 in.
	Cross-Sectional Dimensions – Horizontal dimension of formed members.	+2 in. and –1/2 in.
	Cross-Sectional Dimensions – Vertical dimension (thickness)	+5%
	Relative Alignment – Single footing side and top surface slope with respect to specified plane.	+1 in. within 10 feet
Cast-In-Place Concrete for Buildings	Vertical Alignment/Plumbness – (Lines, surfaces, and rises):	±1 in.
	Outside corner of exposed corner columns and control joint grooves in concrete exposed to view.	±1/2 in.
	Lateral Alignment: (Horizontal Location)	
	Members	±1 in.
	Centerline location of openings 12 in. or smaller in slabs and edge location of larger openings.	±1/2 in.
	Sawcuts, joints, and weakened plane embeds.	±3/4 in.

	Level Alignment:	
	Elevation of top of slabs and other formed surfaces before removal of shoring	±3/4 in.
	Elevation of lintels, sills, parapets, horizontal grooves, and other lines exposed to view	±1/2 in.
	Elevation of slabs on grade	±3/4 in.
	Cross-Sectional Dimensions: Members such as columns, beams, piers, or walls with thickness:	
	12 in. dimension or less	+ 3/8 in. or –1/4 in.
	More than 12 in. dimension but not over 3 ft dimension	+ 1/2 in. of –3/8 in.
	Over 3 ft dimension	+ 1 in. or –3/4 in.
	Relative Alignment:	
	Vertical alignment of outside corner of exposed corner columns and control joint grooves in concrete exposed to view	±1/4 in. in 10 ft.
	All other formed surfaces may slope in 10 ft with respect to the specified plane	±3/8 in. in 10 ft.
	Offset between adjacent pieces of formwork facing material shall not exceed:	
	Surfaces that receive special protective coatings-Class B See Section 3.1.4 for further clarifications.	± 1/4 in.
	For a Class C surface	±1/2 in.
	Openings Through Members:	
	Cross-sectional size of openings	–1/4 in. or +1 in.
	Location of centerline of opening	±1/2 in.

5.1.3.2 Placement tolerances for embedded items shall be in accordance with the Table for Embedded Item Placement Tolerances, unless noted otherwise on the project drawings:

Table for Embedded Item Placement Tolerances

Conditions	Embed Type	Tolerance
Lateral alignment in both directions in the plane of the slab or wall. Level alignment through the slab or wall.	Standard Embeds per drawing 24590-WTP-DD-S13T-00002	±2 in.

5.1.4 Equipment standardization shall be employed throughout equipment designs where safety requirements and cost requirements can be satisfied. Items performing similar duties should,

as far as possible, be standardized so that one particular make, model and size can be used in all similar applications.

5.1.5 The design shall consider human factors engineering and ergonomic requirements to ensure good human factor principles, guidelines, and methods are integrated into equipment design in accordance with IEEE Std 1023-1988 *IEEE Guide for the Application of Human Factors Engineering to Systems, Equipment, and Facilities of Nuclear Power Generating Stations*. The codes and standards identified in Appendix H, or buyer approved equal, shall be used to implement IEEE Std 1023. The specific human factor attributes applying to the equipment shall be invoked.

5.1.6 For general design requirements of mechanical handling equipment refer to project specification 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design & Manufacture,* excluding sections 3.5.8.1, 3.5.8.2, 3.5.8.5, 3.6, 3.7, 4.1.9, 4.1.10, 4.1.11, 4.1.12, 4.10.1, 4.10.4, 4.12, and 4.13.

5.1.7 Equipment that is not painted (or otherwise coated) and exposed to radiation that can cause surface contamination shall have decontaminable surface finishes of 63 microinches (or better) roughness average in accordance with ASME B46.1. Except when the equipment is infrequently handled or decontaminated, in which case it can have decontaminable surface finishes of 125 microinches (or better) roughness average in accordance with ASME B46.1.

5.1.8 Stainless steel items that are attached to Buyer supplied wall embeds shall have a carbon steel spacer between the stainless steel and the embed.

5.2 Mechanical Requirements

5.2.1 Canister Rinse Bogie

5.2.1.1 The bogie shall be designed to travel on stainless steel fabricated rails with rail centers of 82 inches, see Section 5.2.3.

5.2.1.2 The bogie shall be capable of transporting a glass filled IHLW Canister, weighing 9260 lbs (max), and the Canister Rinse Vessel including rinse water.

5.2.1.3 Special attention shall be paid to the bogie chassis, to ensure plain surfaces can be cleaned easily, and potential contamination traps are minimized. Tube sections should be used in preference to structural 'I' beams and channels. All tubing shall be sealed to prevent the ingress of contamination. Drain holes shall be provided wherever water may collect during wash down, except in sealed tubing.

5.2.1.4 The bogie chassis shall accommodate a support frame for the Canister Rinse Vessel. The support frame shall be capable of supporting the vessel while located on the bogie.

5.2.1.5 The bogie chassis and vessel support frame shall be fitted with appropriate lifting features to assist with maintenance activities, using an overhead crane, while the bogie is located in the maintenance area. The combined weight of the bogie chassis and the vessel support frame shall not exceed 10,000 lbs. The Seller shall provide any special lifting equipment required. The Buyer will provide to the Seller details of the crane hook prior to final design.

5.2.1.6 The bogie chassis and vessel support frame should be fabricated from ASTM A36 steel. Proprietary items shall be "as supplied" providing they are suitable for the operating conditions.

5.2.1.7 The bogie chassis shall accommodate equipment associated with the Canister Rinse Vessel.

5.2.1.8 The vessel support frame shall have location features to aid in the alignment and set down of the Canister Rinse Vessel.

5.2.1.9 The bogie shall have two driven wheels.

5.2.1.10 The bogie shall be guided by two (2) double flanged wheels on one side of the bogie. The opposite two wheels shall be plain. The flanged wheels shall be located on the same rail as the recovery winch. The wheel flanges shall be of adequate size to withstand skew forces from track misalignment and forces imposed due to recovering the bogie with a seized drive system.

5.2.1.11 Clearances between wheel flanges and rail, accounting for manufacturing tolerances, shall be sufficient to allow free running of the bogie while achieving the required positional tolerances in accordance with Section 5.3.4 of this specification.

5.2.1.12 Seismic restraints shall be mounted to the vessel support frame, to prevent the bogie from derailing in the event of a flanged wheel failure under normal operation, or an SC-II design basis earthquake, in accordance with Sections 1.5.3 and 5.6 of this specification.

5.2.1.13 The drive system and wheel modules shall be designed for ease of maintenance and replacement.

5.2.1.14 The bogie shall have four (4) bumpers, one at each corner of the bogie; to prevent damage to the bogie, shield door, or rail end-stops. The bumpers shall be designed to absorb the impact of a fully laden bogie, traveling at full operating speed, with a closed shield door, such that the resulting force imparted on the shield door does not exceed 2500 lbf.

5.2.1.15 There shall be two (2) proximity switches mounted on the bogie chassis for operational positioning of the bogie.

5.2.1.16 There shall be one (1) ultimate-travel limit switch mounted on the bogie chassis to prevent over travel of the bogie in the event of a proximity switch failure. The limit switch shall be capable of operating with the bogie traveling in both directions.

5.2.1.17 Adjustable proximity switch targets and limit switch strikers shall be supplied with the bogie as required per the system drawings. The targets and strikers shall be designed to be adjustable for on-site installation.

5.2.1.18 A means of detecting a canister is present in the vessel shall be provided.

5.2.1.19 The bogie shall be designed to limit individual wheel loads during normal operation to less than 1/3 of the total laden bogie weight while traveling on rails installed per paragraph 5.2.3.5. This requirement can be demonstrated by analysis or test.

5.2.1.20 Gears and gearboxes, shall comply with AGMA Standards, or, EC Machinery Directive 98/37/EC, EN 292-1 & 292-2 *Safety of Machinery*, and ISO 281 - 1990 *Roller bearings, Dynamic load ratings and rating life.*

5.2.1.21 In addition to the requirement defined in 24590-WTP-3PS-M000-T0002, Rev 0, Section 4.10.6, gear cases can be split vertically provided that, in the event of a fluid leak, the fluid is contained in a driptray. The driptray shall have a minimum fluid capacity of 1.5 times greater than the fluid capacity of the gearbox.

5.2.2 Canister Rinse Vessel

5.2.2.1 The vessel shall be designed in accordance with ASME B&PV Section VIII, Division 1, except that code stamping is not required.

5.2.2.2 Process piping shall be designed in accordance with the applicable requirements identified in ASME B31.3 and project specification 24590-WTP-3PS-P000-T0001, *Engineering Specification for Piping Material Classes,* excluding section 16. The piping material class for interfacing to the Buyer provided piping shall be S11B.

5.2.2.3 The centrifugal discharge pump shall be in accordance with the requirements identified in ASME/ANSI B73.2M *Specification for Vertical In-Line Centrifugal Pumps for Chemical Process.*

5.2.2.4 The vessel shall have lifting features to allow the vertical removal of the vessel from the bogie, using an overhead crane, while located in the maintenance area. Pipe connections shall be configured such that vessel can be removed easily. The weight of the vessel and internal components shall not exceed 10,000 lbs. The Seller shall provide any special lifting equipment required. The Buyer will provide to the Seller details of the crane hook prior to final design.

5.2.2.5 The design of the spray system shall ensure that the spray pattern is generally in a downward direction, minimizing "back spray" within the vessel, and providing full coverage of the canister surface. The canister can be sprayed in stages due to the limit on flow rate. If the canister is sprayed in stages it shall be sprayed from top to bottom.

5.2.2.6 The Seller shall make every effort to minimize the volume of water used during the rinse cycle while achieving the full coverage of the canister.

5.2.2.7 The vessel shall contain guides and a pedestal for locating and seating the canister. The guides internal diameter shall be 27 inches ± 1/4 inch. This diameter takes into account misalignment, due to tolerance build-up, between the bogie and the overhead crane during loading and unloading of the canister. The guides shall be designed such that the potential for scratching of the canister surface is minimized during loading and unloading.

5.2.2.8 The container guides shall be configured such that spray coverage is not affected. Lifting features shall be located at the top of the guides to allow removal from the vessel, using an overhead crane, while the bogie is located in the maintenance area. The Seller shall provide any special lifting equipment required. The Buyer will provide to the Seller details of the crane hook prior to final design.

5.2.2.9 The spray system shall be removable from the vessel without the requirement for hands on access to the internals of the vessel. Pipe connections shall be located at the top of the vessel and shall be arranged to allow manual disconnection and removal of the spray system, using an overhead crane, while the bogie is located in the maintenance area. The Seller shall provide any special lifting equipment required. The Buyer will provide to the Seller details of the crane hook prior to final design.

5.2.2.10 The vessel piping and internal components shall be designed to minimize contamination traps and maximize contamination removal through rinsing.

5.2.2.11 The inflatable seal shall be mounted to the top flange of the vessel. The seal shall be capable of containing the water spray in the vessel during the rinse cycle.

5.2.2.12 The centrifugal discharge pump shall be capable of discharging water from the vessel such that the static head of water does not contact the canister or compromise the spray nozzles.

5.2.2.13 The vessel shall have a high-high penetration point for a level switch to detect the maximum static head of water. The penetration shall be a 2" Weld Neck Raised Face (WNRF) flange. Initiation of the high-high level switch shall terminate the spray sequence.

5.2.2.14 The vessel shall have an external chamber located on the side of the vessel for a continuous level instrument. The external chamber shall have a minimum internal diameter of 2". The top of the chamber shall be flanged for device mounting. The bottom leg of the chamber shall interconnect to the vessel drain pipe at the bottom of the vessel. The top leg of the chamber shall penetrate the vessel at a point above the maximum static head of water such that the operating range of the level instrument places the maximum static head of water at the 50% - 75% point of the level instruments range. The continuous level instrument shall initiate the discharge of the rinse water at a set level.

5.2.2.15 Transmitters for both the level switch, and the continuous level instrument, will be mounted in the corridor adjacent to the transfer tunnel.

5.2.2.16 The vessel shall have a vent pipe located within the vessel for venting during the normal rinse cycle. The vent pipe shall exit from a point just below the top of the vessel. The design of the vent pipe shall prevent the release of mist carryover from the vessel during a normal rinse cycle. The Seller shall determine during shop tests the levels of mist carryover released from the vent pipe, see Section 8.2.3 of this specification.

5.2.2.17 The control valves shall be of the pneumatic operated actuator type. The control valves shall meet the applicable requirements identified in 24590-WTP-3PS-JV15-T0001, *Engineering Specification for Actuators for On/Off Valves*, and 24590-WTP-3PS-PV00-T0001, *Engineering Specification for Technical Supply Conditions for Valves*, excluding section 5.4.

5.2.2.18 The operating position of the control valves shall be monitored by position switches on the actuator. The actuator shall operate the valve to a "failed closed" condition in the event of power failure.

5.2.2.19 The vessel, and associated rigid piping supplying demineralized water to the vessel, shall be constructed from 316L stainless steel.

5.2.2.20 The canister shall not come into contact with any material other than stainless steel.

5.2.2.21 The vessel shall accommodate all static, dynamic, and seismic loads in accordance with Section 5.6 of this specification.

5.2.2.22 Thermowells and pipe supports are the same intergrity/classification as the SSC that they are supporting ensuring waste or hydrogen does not leak into thermowells or pipe supports. NDE of welds associated with thermowells and pipe supports (pipe supports with the potential to trap waste or hydrogen) shall be in accordance with ASME B31.3.

5.2.2.23 The vessel shall have an overflow line exiting from a point between the high-high level switch and a maximum of 70 inches from the bottom of the vessel. The overflow line shall discharge vessel contents during an off normal rinse cycle. The design of the overflow line shall prevent the release of mist carryover from the vessel during a normal rinse cycle. The Seller shall determine during shop tests the levels of mist carryover release from the overflow line, see Section 8.2.3 of this specification. The overflow line shall be designed to prevent direct spray from entering the overflow line.

5.2.3 Canister Rinse Bogie Rails

5.2.3.1 The rail assembly shall be fabricated from a suitable grade stainless steel, with the running rail made from an age-hardened martensitic stainless steel.

5.2.3.2 The rail hardness shall be suitable for the intended application, but as a minimum shall be greater than that of the wheel. The rail and wheels should both be of similar high hardness to avoid unnecessary wear, and shall be of a dissimilar material such that galling does not take place.

5.2.3.3 End-stops shall be provided at the ends of each rail. The end-stops shall be capable of withstanding the impact of a fully laden bogie traveling at full operating speed, without exceeding allowable stresses.

5.2.3.4 The Seller shall provide shim packs for site adjustment to achieve the required installation tolerances. Refer to Section 3.5.3 of project specification 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design & Manufacture*, for details of installation features.

5.2.3.5 The bogie rails shall be fabricated to achieve the following installation tolerances:

Rail Span	± 1/8 inch
Rail straightness	± 1/8 inch
Rail elevation	± 1/8 inch
Difference in rail heights	± 1/16 inch

5.2.4 Canister Rinse Bogie Seismic Rails

5.2.4.1 The seismic rails shall prevent the bogie from derailing in the event of a flanged wheel failure under normal operation, or an SC-II design basis earthquake, in accordance with Sections 1.5.3 and 5.6 of this specification.

5.2.4.2 The seismic rails shall be constructed from a suitable grade stainless steel.

5.2.4.3 The seismic rails shall accommodate the full process travel of the bogie.

5.2.4.4 The seismic rails shall be adjustable in both the vertical and the North-South directions for on-site setting. Refer to Section 3.5.3 of project specification 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design & Manufacture*, for details of installation features.

5.2.5 Canister Rinse Bogie Service Tracks

5.2.5.1 One (1) each service track shall be provided for electrical cables and process hoses associated with the operation of the Canister Rinse Bogie and Canister Rinse Vessel.

5.2.5.2 The service track for the process hoses shall be located on the South side of the bogie. The service track for the electrical cables shall be located on the North side of the bogie.

5.2.5.3 The service tracks shall be capable of operating over the full process movement of the bogie and have sufficient additional capacity to transfer the bogie to the shield door aperture.

5.2.5.4 The process service track shall be capable of accommodating the loads exerted when the process hoses (water and air) are pressurized.

5.2.5.5 The service tracks shall contain sufficient lengths of electrical cable and process hoses to allow for remaking of connections at the Buyer's facility to the Buyer provided cables and piping. The Buyer will provide to the Seller interface details prior to final design.

5.2.5.6 The service tracks, electrical cables and process hoses shall be capable of being manually disconnected and reconnected to the bogie at the shield door aperture.

5.2.5.7 The electrical cables and process hoses shall be capable of being easily disconnected and reconnected to the bogie using quick disconnect type connectors. The process hose connectors shall be of the non spill double shutoff type. The Seller shall consider the use of manifolds or multi-pin connectors to simplify the operation with the aim to minimize operator time while the shield door is in the open position.

5.2.5.8 The service tracks shall provide protection for the cable and hoses as the bogie moves to prevent them from becoming entangled or damaged.

5.2.5.9 The service tracks shall be constructed from a suitable grade stainless steel.

5.2.5.10 The tracks shall be of an open construction to allow for ease of decontamination and access to electrical cables and process hoses for inspection.

5.2.6 Canister Rinse Bogie Recovery System

5.2.6.1 The bogie recovery system shall be capable of recovering a fully laden bogie with a seized drive system, as a minimum.

5.2.6.2 The wire rope shall be polyethylene sheathed for ease of decontamination.

5.2.6.3 The design shall ensure that proper fleet angles are maintained between the winch and the pulley to ensure correct cable winding during recovery.

5.2.6.4 The Seller shall provide all support structures required for mounting of the recovery winches to the embeds identified on the DPDs.

5.2.6.5 The gearbox shall be capable of being decoupled from the winch drum to allow periodic maintenance. The decoupling process shall be a simple procedure with minimal effort by maintenance personnel.

5.2.6.6 The recovery block shall be capable of being pushed along the rails by the bogie to its park position.

5.2.7 Canister Rinse Bogie Spool Piece

5.2.7.1 The spool piece shall provide the sealing surface for the vessel mounted inflatable seal.

5.2.7.2 The spool piece shall include features to allow on-site adjustment of the sealing face to accommodate the inflatable seal operating parameters and installation tolerances. Refer to Section 3.5.3 of project specification 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design & Manufacture*, for details of installation features.

5.2.7.3 The spool piece shall be constructed from a suitable grade stainless steel.

5.2.8 Canister Rinse Vessel Lid

5.2.8.1 The vessel lid shall be fitted with appropriate lifting features to assist with handling, using an overhead crane located in the maintenance area. The Seller shall provide any special lifting equipment. The Buyer will provide to the Seller details of the crane hook prior to final design.

5.2.8.2 The lid shall contain guide features to assist with the location of the lid over the vessel.

5.2.8.3 The lid shall not interfere with the inflatable seal.

5.2.8.4 The lid shall be constructed from a suitable grade stainless steel.

5.3 Performance

5.3.1 Design Life

5.3.1.1 All equipment shall be designed to operate over a plant life of 40 years and in accordance with the duty cycles identified in Section 5.3.2 of this specification.

5.3.1.2 It is recognized that some commercially available components may not have a design life of 40 years. These components shall be configured and incorporate features to allow hands-on maintenance and replacement.

5.3.2 Duty Cycles

5.3.2.1 A cycle consists of the complete movement of a bogie from its starting position to its final destination and back to its starting position, including all process activities between.

5.3.2.2 The Canister Rinse Bogie is subject to the following duty cycles:

Duty Cycles (per year)		Duty Cycles (per day)
Min	Max	Max
180	730	2

5.3.3 Speeds

5.3.3.1 The Canister Rinse Bogie shall travel between process stations at a nominal speed of 10 ft per minute (normal) and shall ramp down when approaching a station to a suitable creep speed which maintains throughput and positional accuracy. The Seller shall determine and document the creep speed during testing.

5.3.3.2 After each process stop, the bogie shall ramp up to the normal operating speed. The Seller shall confirm the suitability of the acceleration and deceleration rates during the shop tests, to ensure smooth starting and stopping of the bogie.

5.3.3.3 The Canister Rinse Bogie shall be recovered at an appropriate speed to ensure smooth movement of the bogie during the full recovery travel. The proposal drawings show the recovery speed at 1 ft per minute. However, the Seller shall determine the most appropriate speed whether identical to the proposal or otherwise.

5.3.4 Positional Accuracy

5.3.4.1 The Canister Rinse Bogie shall be capable of repeatable positioning to within ±1/8 inch in all directions. The accuracy is required to minimize misalignment, due to tolerance build-up, between the bogie and the overhead crane used to load/unload the canister.

5.4 Design Conditions

5.4.1 For general design conditions refer to Section 3.3 of project specification 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design & Manufacture.*

5.5 Environmental Conditions

5.5.1 For Hanford Site Climatological Data refer to Section 1 of the Purchase Order, *Information and Instructions to Bidders.*

5.5.2 For general facility internal conditions refer to Section 3.4 of project specification 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design & Manufacture.*

5.5.3 The bogie, vessel, and associated equipment may be subject to decontamination prior to hands-on maintenance being performed. This could include wiping equipment with wet rags and washing with water or dilute nitric acid.

5.5.4 The Canister Rinse Tunnel will be subject to periodic washdown with demineralized water, from a fixed spray system, to maintain general cleanliness of the tunnel.

5.6 Design Loads

5.6.1 General

5.6.1.1 The equipment identified in this specification shall accommodate all static, dynamic, and seismic loads, in accordance with this section and the requirements identified in Sections 1.5.3 and 5.2.

5.6.1.2 For normal service conditions a bogie shall be treated as a crane trolley and shall be evaluated in accordance with the applicable requirements identified in CMAA 70.

5.6.1.3 The bogie and bogie components, SC-I and SC-II SSCs, shall be seismically qualified to not fail during all operating conditions, including the design basis earthquake, and shall be in accordance with the requirements of ASME NOG-1-2002, *Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder),* Sections 4150 and 5481. Extraordinary loadings, in addition to the loadings identified in CMAA 70, Section 3.3.2, shall include seismic acceleration loads identified in Section 5.6.4, and test loads (125%) applied during load test. The permissible stresses for seismic conditions shall be in accordance with CMAA 70, Section 3.4.3. Stress Level and Case 3.

5.6.1.4 Design of SC-III and SC-IV SSCs shall be governed by the provisions of AISC MO16, *Manual of Steel Construction, Allowable Stress Design, 9th Edition.*

5.6.1.5 ITS (load path) items shall be designed in accordance with ASME NOG-1-2002, Sections 4130, 4200, 4300, 4400, 5100, 5300, 5456 and 5458, as applicable.

5.6.1.6 For SC-II SSCs, loads shall be combined in accordance with ASME NOG-1-2002. For SC-III and SC-IV SSCs, loads shall be combined in accordance with the Uniform Building Code (UBC) Section 1612.3.2.

5.6.2 Static Loads

5.6.2.1 The bogie shall be capable of transporting a glass filled IHLW Canister, weighing 9260-lbs (max), and the canister rinse vessel during normal operation under the duty cycles identified in Section 5.3.2 of this specification.

5.6.2.2 Canister dimensions:

Diameter: 24.12 inches (maximum)
24 inches (nominal)

Height: 177.165 inches (maximum)
176.75 inches (nominal)

5.6.3 Dynamic loads

5.6.3.1 The bogie, vessel, and bogie rails shall be capable of withstanding impact loads from the canister under normal service conditions. Under normal service conditions the crane hoist operating speed at point of impact will be 5 feet per minute maximum.

5.6.3.2 The bogie and bogie rails shall be capable of withstanding all loads associated with impacts to the rail end-stops by the bogie (with load) traveling at full operating speed.

5.6.4 Seismic Loads

5.6.4.1 The following table identifies equipment requiring seismic protection and their associated Seismic Category (SC). Definitions of the seismic categories:

Seismic Category I (SC-I):
SSC important to safety and which has a seismic safety function.

Seismic Category II (SC-II):
SSC important to safety, whose failure during a seismic event could prevent a Seismic Category I SSC from performing its seismic safety function.

Seismic Category III (SC-III):
(a) SSC important to safety, but without seismic safety function.
(b) SSC not important to safety, but which has an inventory of radioactive or hazardous material in an amount less than that which would lead to an "important to safety" designation.

Seismic Category IV (SC-IV):
SSC not important to safety and without an inventory of radioactive or hazardous material, but requiring seismic protection.

Plant Item Number 24590-HLW-	Description	Seismic Category
MQ-HDH-TRLY-00003	Canister Rinse Bogie	SC-II
MV-HDH-VSL-00001	Canister Rinse Bogie Decon Vessel	SC-III
MH-HDH-RAIL-00002	Canister Rinse Bogie Rails	SC-III
MH-HDH-RAIL-00004	Canister Rinse Bogie Seismic Rails	SC-II
MH-HDH-MHAN-00016	Canister Rinse Vessel Service Track	SC-III
MH-HDH-MHAN-00017	Canister Rinse Bogie Service Track	SC-IV
MH-HDH-RCVY-00009	Canister Rinse Bogie Recovery System	SC-IV
MH-HDH-MHAN-00011	Canister Rinse Bogie Spool Piece	SC-IV
MP-HDH-PMP-00001	Bogie Decon Canister Pump	SC-III

5.6.4.2 Where specific seismic requirements are identified in Section 1.5.3, for the Canister Rinse Bogie and the Canister Rinse Bogie Seismic Rails, the applicable components shall be designed to SC-II. All other components shall be designed to SC-III.

5.6.4.3 SSCs designated SC-II, see Section 1.5.3 of this specification, the seismic loads imparted on the equipment shall be evaluated in accordance with the response spectra identified in the table below. A damping value of 7% shall be used.

Equipment	Seismic Response Spectra Reference
Canister Rinse Bogie (24590-HLW-MQ-HDH-TRLY-00003, and associated equipment)	See 24590-HLW-S0C-S15T-00009 Rev 0D Fig. 10 Seismic Response at -31 ft and -21 ft Elevation, East-West (attached) Fig. 11 Seismic Response at -31 ft and -21 ft Elevation, North-South (attached) Fig. 12 Seismic Response at -31 ft and -21 ft Elevation, Vertical (attached)
Canister Rinse Bogie Seismic Rails (24590-HLW-MH-HDH-RAIL-00004, and associated equipment)	See 24590-HLW-S0C-S15T-00039 Rev D Sheet No. B-9, Fig. B-7 Seismic Response, East-West (attached) Sheet No. B-10, Fig. B-8 Seismic Response, North-South (attached) Sheet No. B-11, Fig. B-9 Seismic Response, Vertical (attached)

5.6.4.4 For SSCs designated as SC-III, the seismic loads shall be evaluated in accordance with the Uniform Building Code (UBC), Section 1632, using the following parameters:

Ip = 1.5

Ca = 0.24

hr = 91

hx = rail elevation

5.6.4.5 For all other SSCs, the seismic loads imparted on the equipment shall be evaluated in accordance with the Uniform Building Code (UBC), Section 1632, using the parameters above with an Ip of 1.0.

5.6.4.6 The 200 East Area of the Hanford Site is located in Seismic Zone 2B.

5.7 Electrical Requirements

5.7.1 The requirements in 24590-WTP-3PS-EKP0-T0001, *Engineering Specification for Electrical Requirements for Packaged Equipment*, excluding sections 6.4.2.3, 6.4.3.1, 6.6.1, 6.6.3, and 6.8, shall apply to this specification. Where there is a conflict between this specification and 24590-WTP-3PS-EKP0-T0001, the Seller shall report all conflicts to the Buyer. At such time, all conflicts shall be resolved.

5.7.2 All electrical equipment and material, including industrial control panels and cabinets that are assemblies of industrial control devices, shall be suitable for installation and use in conformity with the provisions of NFPA 70. Suitability of equipment shall be evidenced by listing or labeling as a completed assembly by Underwriters Laboratories (UL). Equipment and assemblies not listed or labeled shall be required to bear a UL "Field Evaluated Product" mark. Equipment and materials listed, labeled or field evaluated by other nationally recognized testing laboratories (NRTLs) as recognized by OSHA, may be accepted only after receipt of prior written approval from the Buyer.

5.7.3 The Seller shall provide all cables and multi-conductor cable systems from the bogie and associated equipment to the Buyer's designated interface point, see Section 5.8.2. The Seller shall recommend connector types at the Buyer's interface for connection to the Buyer-provided cabling.

5.7.4 All cables shall be evaluated for radiation tolerance by addressing IEEE Std 1205-2000, *IEEE Guide for Assessing, Monitoring, and Mitigating Aging Effects on Class 1E Equipment used in Nuclear Power Generating Stations, Annex D* for acceptable insulation for radiation environments. Generally Tetrafluoroethylene (TFE) and Polytetrafluoroethylene (PTFE) should be avoided in radiation areas.

5.7.5 The Seller shall provide details of the electrical cable end connections (at bogie terminal box) to the Buyer for interfacing of the Seller provided umbilical electrical cable, located in the maintenance area. Unique pin arrangements and/or color coding shall be provided for the electrical connectors to prevent incorrect engagement.

5.7.6 The Seller shall specify within the proposal the full load amp and voltage rating for the bogie and associated electrically powered equipment.

5.7.7 When more than one motor is powered from a single control cabinet the Seller shall specify the ampere rating for the main over current device serving the cabinet.

5.7.8 Induction motors shall meet the requirements of 24590-WTP-3PS-MUMI-T0002, *Engineering Specification for Low Voltage Induction Motors*, excluding sections 5.1.1, 5.3, and 5.4.1, and shall be of a Totally Enclosed Fan Cooled (TEFC) type. Deviation from the specifications shall be submitted, on an SDDR form, to the Buyer and may be accepted based on the application and technical requirements. When deviating from the specifications, the motors shall comply with the equivalent International Electrotechnical Commission standard (IEC). The Seller shall provide certification that the manufacturer satisfactorily performed standard and routine tests on electric motors.

5.7.9 Flux Vector or Servo Drives shall meet the requirements of 24590-WTP-3PS-JD02-T0001, *Engineering Specification for Intelligent Drives for Packaged Equipment.*

5.7.10 All electrical equipment and electrical cables shall be suitable for the environment in which they will operate.

5.7.11 Separate disconnects shall be provided from the control cabinet for each major component. Seller shall provide all necessary schematics, wiring diagrams and details necessary to facilitate installation and connection to Buyer's system.

5.7.12 All conductors shall be numbered on both ends for ease of identification.

5.7.13 Cable design and construction shall take account of Electromagnetic Interface (EMI) and Radio Frequency Interface (RFI).

5.7.14 Individual and overall shields shall be provided, as appropriate, to ensure that circuits are not subjected to or affected by interference. The shields shall be terminated at individual slip rings/brush gears. The Buyer will then make arrangements to terminate them at a suitable ground point. All special grounding design requirements are the responsibility of the Seller.

5.7.15 The Seller shall be responsible for assuring operability of the cable system under all design conditions.

5.7.16 In addition to tagging requirements defined in Engineering Specification for Instrumentation for Packaged Systems, 24590-WTP-3PS-JQ07-T0001 Rev 1, and Engineering Specification for Electrical Requirements for Packaged Equipment, 24590-WTP-3PS-EKP0-T0001 Rev 2. Tags subject to high radiation environments, stainless steel is preferred.

5.8 Instrumentation and Control Requirements

5.8.1 General

5.8.1.1 The requirements in project specification 24590-WTP-3PS-JQ07-T0001, *Engineering Specification for Instrumentation for Package Systems,* excluding sections 3.4.5.1, 3.4.5.2.3, 3.4.5.4.4, 3.4.5.9, 3.4.5.10, 3.4.5.12, 3.4.5.13, 3.4.5.14, 3.4.5.15, 3.4.5.16, 3.4.5.17, 3.7.1, 3.8.3, 3.8.4, 3.8.6, 3.8.7, and 3.8.8.1, shall apply to this specification. Where there is a conflict between this specification and 24590-WTP-3PS-JQ07-T0001, the Seller shall report all conflicts to the Buyer. At such time, all conflicts shall be resolved.

5.8.1.2 Control panels, including Supplier Packaged Equipment panels, shall be provided with an Alarm Test function such as a "push to test" button that verifies that alarm indicating functions operate satisfactorily. In order to maintain consistent operation between equipment items, this requirement shall apply to all alarm indicating lights, including LED's. This requirement is limited to alarm indications and is not applicable to other indications.

5.8.1.3 The Seller shall be responsible for the final determination of the required level and type of controls and instrumentation necessary for the proper operation and monitoring of the Seller's proposed system. Any changes to the required control and monitoring features shall be reflected in the Seller's submittals for control and instrumentation (as required by this specification and the G321-E form) and shall be subject to Buyer authorization. The Seller's submittals that necessitate changes to the control and instrumentation shall not generally require that an SDDR be submitted. An SDDR shall be submitted if the Seller's control and instrumentation submittals fail to reflect incorporation of any functional requirement of the supplied equipment (as described in this specification, DPDs, or Arrangement).

5.8.1.4 The Seller shall provide, as early as practicable in the design process (but no later than as required by the submittal schedule), required control and instrumentation submittals necessary to support the Buyer's revisions to their Mechanical Handling Diagrams (MHDs).

These submittals are required in order to finalize the relevant facility interfaces (e.g., wall penetrations, conduit, and Integrated Control Network interfacing) to suit the Buyer's construction schedules.

5.8.1.5 To ensure commonality across project equipment, 24590-WTP-3PS-JQ07-T0001 identifies preferred instrument vendors for some components. Components not included in the specification are selected at the Seller's discretion with review and permission to proceed from the Buyer unless otherwise specifically stated within this specification.

5.8.1.6 The Seller shall provide all limit switches and proximity switches as required in the design of the bogie system, and shall meet the requirements of sections 3.4.5.7 and 3.4.5.8 of 24590-WTP-3PS-JQ07-T0001.

5.8.1.7 The bogie control systems shall utilize the Integrated Control Network (ICN) platform described in 24590-WTP-3PS-JQ07-T0001.

5.8.1.8 Instrumentation for control and positioning is defined on the DPDs. The instrument tag numbers on the DPDs shall be used to tag instruments. Additional instruments provided by the Seller shall be tagged using ISA 5.1, and sequence numbers provided by the Buyer.

5.8.1.9 The Seller shall provide to the Buyer control logic diagrams and a structured description of the control requirements, procedures, interlocks, and sequences of operation necessary to perform the basic functions of the bogie, vessel, and associated equipment. Documentation of the control requirements shall conform to the requirements of 24590-WTP-3PS-JQ07-T0001, Section 3.5, *Control Software*.

5.8.1.10 The Buyer will develop the application software that controls the bogie, vessel, and associated equipment identified in this specification. All Human Machine Interfaces (HMI), including facility control room HMI, Local Operator Interfaces (LOI), and Bogie Maintenance Areas, will be interfaced to and controlled by the Buyer-developed Intergrated Control Network (ICN). The Buyer's software shall be tested during the Seller's Factory Acceptance Tests (FAT).

5.8.1.11 Motor drives and other 'intelligent' devices as applicable shall have Profibus DP® capability where feasible.

5.8.1.12 Where integral brake motors are used on adjustable speed drives the brake shall be wired independently from the motor winding. All brakes shall be "fail-on" in the event of loss of power.

5.8.1.13 All instrumentation and instrument cables shall be suitable for the environment in which they will operate.

5.8.1.14 The Seller shall provide a phase monitor relay to provide protection against phase loss, phase reversal, phase unbalance, undervoltage and overvoltage of the 3Ph 480 voltage feed to Seller's equipment.

5.8.2 Interfaces Between Buyer and Seller

5.8.2.1 General

5.8.2.1.1 This specification identifies equipment that is classified as a "Type B-Option 1" package. A "Type B" package is one in which the Seller provides the starters/drives and shall have the equipment located near the Seller's equipment in a Seller provided control cabinet.

5.8.2.2 Type B Package

5.8.2.2.1 Appendix A, Figure 1, shows a pictorial representation of a "Type B-Option 1" package definition that the Seller shall comply with. This Type B package shall include Seller provided equipment control cabinets that include Seller provided starters/drives, control transformers, Profibus DP® interface(s), Fiber Optic cable interfaces, control wiring interface, etc. The Buyer will be responsible for the Profibus DP® cable from the Buyer Controller, the control signal wiring from the Remote I/O (RIO), a single 480 VAC, 3 phase power supply from the Buyer's MCC to the Seller's equipment control cabinets. The Buyer will also be responsible for all cabling between the Seller's equipment control cabinet and the Seller's equipment "skid" with the exception of specialty cable. Specialty cable is defined as cable assemblies normally part of the equipment package such as drag chains and festoon or cable that is not included in the Buyer's standard cable list. For the purpose of this specification, a "skid" is defined as the part of a Seller's package which is shipped pre-assembled and pre-wired.

5.8.3 Bogie Positioning Control

5.8.3.1 Bogie shall have a minimum of two proximity switches mounted to the bogie chassis used for operational positioning of the bogie. Both switches shall provide a signal under normal operating conditions.

5.8.3.2 The bogie utilizes two (2) or three (3) targets for each stopping position as required per the system drawings. The first target, approached from a specific direction (two targets required if approaching stopping position from two directions), is used to slow the bogie to creep speed; the second target stops the bogie. To achieve positional accuracy, the bogie may require to be stopped by approaching the target from one direction only. In this case the bogie will proceed past the stopping point then reverse to approach the position target from the designated stopping direction.

5.8.3.3 Under a recovery event the bogie mounted proximity switches are also used to position the bogie, in conjunction with the proximity switch targets, at the appropriate process station for canister removal.

5.8.3.4 The recovery winch drive shall include a Profibus DP® interface to enable operation from the Buyer's LOI.

5.8.4 Communication Network Interface

The Buyer has selected the Industrial^{IT} platform from ABB, Inc. as the primary control system for the WTP Facility. A Profibus DP® communication network will be used to communicate

to drives and intelligent positioning instruments. The Seller shall provide the following components for a fiber optic cable interface:

5.8.4.1 Profibus DP Communication Interface

5.8.4.1.1 The Seller shall provide a native Profibus DP® slave interface for the control panel or instrument and the associated drivers (GSD files) for communication with the Buyer's control system. The interface should support communication speeds up to 12 Mbit/sec over the Profibus DP® network.

5.8.4.2 Fiber Optic Connections

5.8.4.2.1 The Seller shall provide a fiber optic connection external to the control panel or instrument per the following requirements:

a) The Seller shall install a Hirschmann OZD Profi 12M G12 fiber optic converter within the control panel or near the instrument for each communication network.
b) The Seller shall patch the Hirschmann fiber optic converter(s) to a fiber optic patch plate where the Buyer will terminate the Buyer's fiber optic cable(s). The patch plate shall utilize MT-RJ multimode fiber optic connectors.
c) The Seller shall use multimode 62.5/125 glass fiber in the patch cable with appropriate connectors on each end of the patch cable to connect between the fiber optic converter and the patch plate. Any unused fiber optic connections shall be fitted with protective caps to guard against extraneous light and dirt.
d) The Seller shall derive the appropriate power for the fiber optic converter(s) from the control panel. A separate power supply shall be provided for each communication network.

5.8.4.3 Alternate Communication Interface

5.8.4.3.1 If a native Profibus DP® interface is not available, then the Seller may propose an alternate communication interface or network that is compatible with the Buyer's control system for Buyer review.

If an alternate communication interface is proposed:

a) The Seller shall provide all necessary interfaces or converters required to provide the Buyer's control system with the appropriate communications.
b) The Seller shall provide any required drivers, software, and protocol conversion information to the Buyer for design, development, testing, and maintenance of the supplied networks and interfaces for the period of performance of the contract, including software or firmware upgrades or revisions.

6 Materials

6.1 For general material requirements refer to Section 4 of 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design & Manufacture*, and applicable requirements identified in the project specifications referenced in this document. Sections 4.1.9,

4.1.10, 4.1.11, 4.1.12, 4.10.1, 4.10.4, 4.12, and 4.13 of 24590-WTP-3PS-M000-T0002 do not apply.

6.2 The Seller may use cast iron for the bogie wheels and wheel housings provided they meet the design requirements identified in Section 5 of this specification.

6.3 For specific material requirements refer to Section 5 of this specification.

6.4 Welded stainless steel mechanical tubing, conforming to ASTM A554, is acceptable for use, in the manufacture of structural members and support brackets.

6.5 All material supplied to ASTM standards, pertaining to QL or ITS equipment, shall be in accordance with the codes and standards identified in Section 2 of this specification, otherwise an SDDR shall be submitted to the Buyer, to obtain a material equivalency. Equivalency of materials shall, as a minimum, consider physical and chemical properties.

6.6 All material supplied to ASTM standards, pertaining to CM, Non-ITS equipment, shall be in accordance with any year of the standard.

7 Fabrication

7.1 For general fabrication requirements refer to Section 5 of 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design & Manufacture*, and applicable requirements identified in the project specifications referenced in this document.

7.2 Welding shall be in accordance with the applicable requirements identified in project specification 24590-WTP-3PS-SS00-T0001, *Specification for Welding of Carbon Structural Steel*, excluding section 8.18, and in accordance with 24590-WTP-3PS-SS00-T0002, *Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel.*

7.3 The vessel shall be fabricated in accordance with ASME B&PV Section VIII, Division 1, except that code stamping is not required.

7.4 Process piping shall be fabricated in accordance with the applicable requirements identified in ASME B31.3, Category D Fluid Service.

7.5 All vessel components that come into contact with the canister shall have a surface finish of 125 micro inches or better. This includes all canister guides and canister set down pads.

8 Tests and Inspections

8.1 General

8.1.1 Test and inspections shall be performed in accordance with the requirements identified in this section and the project specifications referenced in this document.

8.1.2 The Seller shall be responsible for performing and documenting all inspections and testing necessary to demonstrate compliance with all relevant specifications, drawings, and related standards.

8.1.3 Shop tests identified in section 8.2 are defined as Factory Acceptance Tests (FAT). A FAT procedure shall be submitted to the Buyer along with the Inspection and Test Plan. FAT reports shall also be submitted to the Buyer.

8.2 Shop Tests

8.2.1 General

8.2.1.1 The Seller shall perform, in-house, full-scale, Buyer-witnessed, functional testing of the bogie, vessel, and associated equipment, to demonstrate, as a minimum, the requirements identified in this section.

8.2.1.2 The Seller may combine some of the tests providing each requirement can be verified.

8.2.1.3 The tests and demonstrations identified in this specification are not limiting, and shall not relieve the Seller of their responsibilities to fully test and demonstrate the performance of the bogie, vessel, and associated equipment, to the satisfaction of Buyer, in accordance with the Buyer-reviewed Inspection and Test Plan.

8.2.1.4 Where maintenance tests are identified they shall be performed wearing appropriate personnel protective clothing (e.g. gloves, coveralls) to simulate in-cell maintenance conditions. The Buyer will provide, to the Seller, the appropriate personnel protective clothing prior to performing the maintenance tests. The tests shall be video taped, timed, and recorded in the maintenance procedures.

8.2.1.5 The bogie control and instrumentation shall be tested in accordance with a defined schedule. All steps shall be taken to ensure that tests are realistic and representative of the bogie operating sequences. Operation of switches and contacts shall be via movement of the bogie and not by the shorting or open circuit action of terminals.

8.2.1.6 The Seller shall provide all wiring, electrical feeds, power supplies, transformers, operator panels, test equipment, and connections for shop testing of the bogie and associated equipment.

8.2.1.7 The Seller shall be responsible for any alterations to the Seller's facility that may be required to perform the tests, and any additional equipment and materials required.

8.2.1.8 The Buyer shall provide a "mock-up" canister, fabricated from a cylindrical tube, replicating the canister envelope dimensions, key features, and weight, for performing the shop tests.

8.2.1.9 The Seller shall notify the Buyer of any failed tests or defective components following testing. All corrective actions suggested by the Seller shall be reviewed by the Buyer prior to implementation and subsequent re-testing.

8.2.2 Canister Rinse Bogie

8.2.2.1 The Seller shall replicate normal service design load conditions (with and without canister), and operating speeds, as required, to represent the normal operating conditions of the bogie.

8.2.2.2 The Seller shall ensure that, as a minimum, the following requirements are demonstrated and verified in accordance with the requirements identified in Section 5.2.1 of this specification:

- Smooth and free running of the drive shaft, gearbox, and wheels, through the full operating travel of the bogie.
- Running clearances between interfacing equipment through the full operating travel of the bogie.
- Bogie operating speeds in accordance with Sections 5.3.3 and 5.8.3 of this specification.
- Positional accuracy of the bogie in accordance with Sections 5.3.4 and 5.8.3 of this specification.
- Operation of the ultimate-travel limit switch.
- Maximum buffer impact load.
- Proof load test the bogie and rails to 1.25 times rated load capacity.
- Lubrication points are accessible without major disassembly.
- Removal and replacement of maintainable and modular components.

8.2.3 Canister Rinse Vessel

8.2.3.1 The Seller shall ensure that, as a minimum, the following requirements are demonstrated and verified in accordance with the requirements identified in Section 5.2.2 of this specification:

- Perform a hydrostatic leak test of the vessel, pump and associated piping by filling the vessel with water to the top of overflow line and holding for a minimum of one (1) hour, after which, run the pump until all water is discharged from the vessel.
- Inspection and testing of the vessel, pump and associated piping as required by the applicable requirements identified in ASME B&PV Section VIII Division 1, ANSI B73.2M, and ASME B31.3.
- Functional testing of the spray system using the "mock-up" canister. The spray test shall be performed such that full visual observation of the spray coverage and "back spray" can be achieved by eye and with a video camera. Part of the test should be performed using food coloring or dye to aid in visualization.
- Level of mist carryover released from the vent tube during the rinse cycle.
- Operation of the inflatable seal and the sealing interface with the spool piece.
- Inspect and test the control valves in accordance with the applicable requirements identified in 24590-WTP-3PS-JV15-T0001, *Engineering Specification for Actuators for On/Off Valves*, and 24590-WTP-3PS-PV00-T0001, *Engineering Specification for Technical Supply Conditions for Valves,* excluding section 5.4.
- Performance of the level switch and continuous level instrument.
- Canister set-down at nominal handling speed of 5 feet per minute.
- Disconnection of the vessel services and removal of the vessel from the bogie.
- Mounting of vessel on the bogie and reconnection of the vessel services.

- Removal and installation of the canister guides and spray rings.

8.2.4 Canister Rinse Bogie Rails

8.2.4.1 During performance and maintenance testing, the Seller shall ensure that, as a minimum, the following requirements are demonstrated and verified in accordance with the requirements identified in Section 5.2.3 of this specification.

- Assemble rail sections and verify rail alignment to drawing tolerances and CMAA 70.

8.2.5 Canister Rinse Bogie Service Tracks

8.2.5.1 The Seller shall ensure that, as a minimum, the following requirements are demonstrated and verified in accordance with the requirements identified in Section 5.2.5 of this specification:

- Service tracks are moved freely by the bogie through the full operating travel.
- Replicate on-site shield door aperture interfaces and demonstrate the disconnection and reconnection of the electrical and process services and service tracks.

8.2.6 Canister Rinse Bogie Recovery System

8.2.6.1 The Seller shall ensure that, as a minimum, the following requirements are demonstrated and verified in accordance with the requirements identified in Section 5.2.6 of this specification:

- Proof load test the cable connection to the recovery block to 1.25 times the winch rating.
- Recovery of the bogie (with load), with a seized drive system, over the full operating travel of the bogie.
- Monitor and record the bogie recovery forces at incremental positions as the bogie moves along the rails. The recovery block, rails and cable shall be inspected following the test. The results shall be documented in the Inspection and Test Report.
- During the recovery test stop the bogie at a proximity switch target to demonstrate the stopping accuracy.
- Repositioning of the recovery block at the end of the rail using the bogie to push the recovery block into position.
- Decoupling of the recovery winch gearbox from the winch drum.

8.3 Temporary Structures

8.3.1 The Seller shall supply a test rig, as required, in the form of temporary structures that simulate the site conditions for the bogie and associated equipment. This shall include replicating key facility interfaces to verify equipment clearances.

8.3.2 The plant installation relationship between the bogie and associated equipment shall be maintained for the shop tests.

8.3.3 The structures provided shall be designed to allow safe access for viewing at equipment levels.

8.3.4 For in-cell equipment, which may lack conventional guarding, the Seller shall apply, as a minimum, the OSHA requirements to protect personnel from the danger of moving equipment during shop tests.

8.4 Cyclic Tests

8.4.1 Following satisfactory completion in all specific shop tests, cyclic testing shall be conducted on the bogie over the full operating travel. As a minimum requirement, 5 consecutive full cycles shall be completed within a period that shall not exceed 120% of the predicted nominal duration for such a program, subject to all duty restrictions.

8.4.2 The cyclic tests shall follow the on-site sequence of operations, with exception of the rinse cycle, as defined in Section 3 of this specification. For the rinse cycle the Seller shall demonstrate the operation of the inflatable seal and incorporate an appropriate time delay to replicate the rinse cycle. The "mock-up" canister shall be used to replicate normal service design load conditions.

8.4.3 Following completion of the cyclic tests a general visual inspection shall be performed on the equipment with results from the inspection being documented in the Inspection and Test Report.

8.5 Weld Inspections

8.5.1 Weld inspections and Non-Destructive Examinations (NDE) shall be performed in accordance with project specification 24590-WTP-3PS-SS00-T0001, excluding section 8.18, and in accordance with 24590-WTP-3PS-SS00-T0002, and welding standards AWS D1.1 and AWS D1.6, unless specified otherwise.

8.5.2 All welds shall be visually inspected.

8.5.3 As a minimum, all load-bearing welds shall be non-destructively examined by either liquid penetrant or magnetic particle examination as appropriate to the material and configuration.

8.5.4 All welds that maintain the structural integrity of the bogie in accordance with the Important to Safety (ITS) requirements identified in section 1.5.3 of this specification shall be non-destructively examined. Full penetration welds shall be examined by either radiographic or ultrasonic examination as appropriate to the material and configuration. Partial penetration and fillet welds shall be examined by magnetic particle or liquid penetrant examination, as appropriate to the material and configuration.

8.5.5 The Seller shall perform 100% radiographic examination of the vessel and associated piping in accordance with the applicable requirements identified in ASME B&PV Section VIII, Division 1 and ASME B31.3.

9 Preparation for Shipment

9.1 General

9.1.1 Packaging, shipping, handling, and storage shall be performed in accordance with Project Specification 24590-WTP-3PS-G000-T0003, *Engineering Specification for Packaging, Handling and Storage Requirements*, and Section 7 of the Purchase Order.

9.2 Cleaning and Coating

9.2.1 Surfaces shall be cleaned and coated in accordance with 24590-WTP-3PS-AFPS-T0001, *Engineering Specification for Shop Applied Special Protective Coatings for Steel Items and Equipment*. The paint system to be used for the bogie and associated equipment shall be in accordance with System Code T as identified in 24590-WTP-3PS-AFPS-T0001.

9.2.2 The final paint color for all equipment as applicable shall be in accordance with Appendix E of 24590-WTP-3PS-AFPS-T0001.

9.2.3 All Manufacturers Standard Coating (Mfg. Std) must be identified on Appendix H of 24590-WTP-3PS-AFPS-T0001, and be submitted to the Buyer, along with technical data sheets and Material Safety Data Sheets (MSDS).

9.2.4 Stainless Steel shall not be coated.

9.3 Tagging

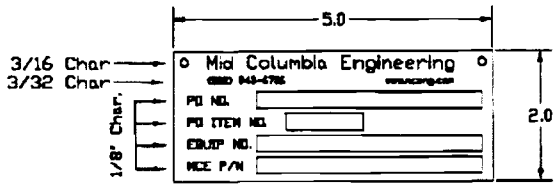
9.3.1 The equipment shall be tagged in accordance with the following:

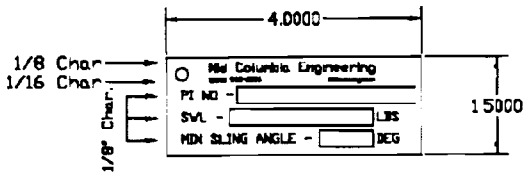
- A separate stainless steel nameplate shall be provided to include the Buyer's plant item number (identification number) and purchase order number.

- The separate stainless steel nameplate shall have the information impressed, stamped, or etched directly on the stainless steel surface with characters at least 1/8" inch high. The nameplate, where physically possible, shall be secured to the body of the equipment by corrosion resistant screws tapped into a low stress area of the assembly, or welded, so the structural integrity and functional capability of the assembly are not impaired. If it is not physically possible to secure the nameplate to the body of the equipment, then the nameplate shall be attached using a stainless steel wire.

- Instruments shall be tagged according to *Specification for Instrumentation for Package Systems*, 24590-WTP-3PS-JQ07-T0001, Rev 1, Section 8.

(Example)





10 Quality Assurance

10.1 QA requirements specific to item(s) or service

10.1.1 The Seller's Quality Assurance Program (QAP) requirements are specified in 24590-WTP-3PS-G000-T0001, *General Specification for Supplier Quality Assurance Program Requirements*, and in the Supplier Quality Assurance Program Requirements Data Sheet(s) included in the procurement documents.

10.1.2 The Seller's QAP Manual shall be submitted to Buyer for review in accordance with 24590-WTP-3PS-G000-T0001.

10.1.3 For SSCs indicated in this specification as ITS, the Seller shall have and maintain a Buyer approved Quality Assurance Program meeting the applicable sections of ASME NQA-1-1989, as per 24590-WTP-3PS-G000-T0001, and the Supplier Quality Assurance Program Requirements Data Sheet, 24590-WTP-3PD-MQTS-00002.

10.1.4 For SSCs indicated in this specification as Non-ITS, or Commercial Quality, the Seller shall have and maintain a Buyer approved Quality Assurance Program meeting the applicable sections of DOE Order O 414.1A, as per 24590-WTP-3PS-G000-T0001, and the Supplier Quality Assurance Program Requirements Data Sheet, 24590-WTP-3PD-MQTS-00004.

10.1.5 The Seller, including all sub-tier suppliers providing items or services, that affect, or may affect, nuclear safety of DOE nuclear facilities shall, as a minimum, have a quality assurance program in place that complies with the requirements of 10 CFR Part 830.122.

10.1.6 Should any portion of the work defined within this specification be subcontracted, these requirements shall be passed on to the sub-contractor as applicable to the work being performed.

10.2 Program QA Elements

10.2.1 The Seller's QAP as a minimum, shall contain the requirements detailed in the Supplier Quality Assurance Program Requirements Data Sheets listed in Section 2 of the Purchase Order.

11 Documentation and Submittals

11.1 General

11.1.1 Documentation shall be submitted to the Buyer in accordance with this specification, and as summarized on the G321-E and G321-V forms in section 3 of the Purchase Order. The G321-V form lists all the documents required for quality verification and the G321-E form lists those engineering documents required.

11.1.2 General requirements and submittal procedures are also covered in Section 3 of the Purchase Order. Each document to be submitted must be listed on the "Seller's Index/Schedule" (Form 15EX). This form tracks the scheduled and actual delivery of each submittal.

11.2 Quality Assurance Manual

11.2.1 The Offeror's Quality Assurance Manual shall be submitted to the Buyer with the Offeror's proposal in accordance with the G321-E form.

11.3 Deleted

11.3.1 Deleted

11.3.2 Deleted

11.3.3 Deleted

11.4 Safety Equipment List

11.4.1 The Safety Equipment List shall identify which components of the supplied equipment are to be provided as Important to Safety (ITS) or Commercial Quality (CM).

11.4.2 The Safety Equipment List shall be based on the requirements identified in Sections 1.5.3 and 10.1 of this specification.

11.4.3 The Offeror shall provide a Safety Equipment List with the Offeror's proposal that communicates the Offeror's understanding of which components of the equipment identified in this specification are to be provided as ITS and which components are to be provided as CM. The list shall be a detailed listing of components for the supplied equipment along with the designation of each item in the list as either CM or ITS.

11.4.4 The Safety Equipment List, or specific components of the Safety Equipment List, shall be submitted to the Buyer for review and permission to proceed prior to procurement of

materials. The document shall be submitted with the 50% design review package as a preliminary document and at the 90% design review as a final document.

11.5 Software Requirements Document

11.5.1 The Seller shall develop a Software Requirements Document that describes the protocols and requirements for programming the bogie control system. The document shall be submitted with the 50% and 90% design review package as a preliminary document and as a final document following shop tests.

11.6 Drawings

11.6.1 General

11.6.1.1 The Seller shall prepare and submit drawings per Section 3 of the MR, Drawings and Data Requirements.

11.6.1.2 The Seller shall prepare drawings in accordance with American Society of Mechanical Engineers (ASME) Y14 series, Engineering Drawing and Related Document Practice. The drawings shall be assigned a unique number in accordance with Section 3 of the MR, Drawings and Data Requirements.

11.6.1.3 SELLER shall specify all dimensions, tolerances, materials, surface finishes, weld symbols, special filler material used, torque values, set points and special fabrication instructions on drawings supplied to BUYER.

11.6.1.4 SELLER drawings shall show critical interface dimensions and their tolerances as specified by BUYER on DPDs or MDSs. This information shall be identified by using an asterisk or another method and note shall be included that explains how to distinguish these dimensions.

11.6.1.5 Seller drawings shall include as a minimum, but not be limited to, the following:

- Descriptive title blocks that are relevant to the information on the drawing
- Notes that will clarify all vague or obscure details that would not otherwise be understandable without a note
- A drawing cross-reference section that will cross-reference other drawings/documents that are relevant to make drawings more complete or more understandable
- A bill of material that will list all items shown on an assembly drawing
- Legend of symbols. Symbols shall be used consistently throughout all drawings related to weld systems

11.6.1.6 Sufficient information shall be included on these drawings to permit manufacture of any replacement parts in the event that the original Seller is not able to supply parts at the time future needs may arise. All drawings shall be specific to the system addressed in this

specification and shall be exact up to the time of delivery. The final set of drawings are to be "as-built" drawings. Drawings that are "typical" shall not be provided.

11.6.1.7 Where required, the Seller shall prepare MDSs on data sheets furnished by the Buyer.

11.6.2 Arrangement Drawings:

11.6.2.1 An arrangement drawing shall be submitted at all the design reviews for each piece of equipment. These drawings shall show all major dimensions, supports, arrangements, interfaces, and component identification numbers where appropriate. These drawings shall also show weight(s) and center of gravity (CG) location(s) for installation.

11.6.3 Assembly Drawings:

11.6.3.1 An assembly drawing shall be submitted at the formal, final design closeout meeting for each piece of equipment. These drawings shall show the arrangement of the equipment's components, junction boxes, and interfaces with existing systems/structures. These drawings shall identify utilities required to be supplied by the facility.

11.6.3.2 General assembly drawings shall identify sub-assemblies and drawings.

11.6.3.3 Bill of Materials shall contain the minimum following information:

- an item number for each individual part or material,
- quantity of an item or part,
- description of an item or part,
- reference code (ASTM, ANSI) of an item or part,
- material callout or SELLER part number.

11.6.3.4 Component identification numbers shall be included on drawings where appropriate.

11.6.4 Shop Fabrication/Detail Drawings:

11.6.4.1 Shop Fabrication/Detail drawings of all designed components shall be submitted for the formal, final design closeout meeting. Component identification numbers shall be included on drawings where appropriate.

11.6.4.2 All nameplates and labels shall be shown.

11.6.5 Installation Drawings:

11.6.5.1 An installation drawing shall be submitted for the formal, final design closeout meeting for each piece of equipment. These drawings shall detail modifications required to accommodate equipment installation. Component identification numbers shall be included on drawings where appropriate.

11.6.5.2 The installation drawings shall clearly indicate lifting and rigging points and safe lifting load at each for initial installation and any other lifting evolutions.

11.6.6 Any proposed changes to required elements identified on the Buyer's DPDs, as defined in Section 1.2 of this specification, shall be submitted to the Buyer via SDDR in accordance with Section 2 of the Purchase Order.

11.7 Calculations

11.7.1 Calculations shall be submitted to the Buyer to document engineering analysis performed to verify the adequacy of the supplied equipment designs, including calculations for stress, deflection, and fatigue, for seismic and normal service conditions, electrical loads and machine component selection (e.g., motors, bearings, gears, and drive shafts).

11.7.2 The Seller shall submit, as early as practical in the design process (but no later than as required by the Buyer approved schedule), an analysis of the reaction loads at all embeds and other support locations.

11.7.3 Stress reports and additional calculations affecting ITS components (including calculations for Non-ITS components that may affect ability of the ITS related component to perform the associated ITS function) shall be subject to the requirements of the applicable sections of ASME NQA-1-1989.

11.7.4 If commercial off the shelf computer software is used in performing calculations, it shall be validated before use in the documents it supports. The validation test report shall be provided to the Buyer and shall meet, as a minimum, the following requirements:

- Validation testing shall be performed to a Seller approved procedure
- The testing shall validate the functions and requirements relevant to calculations that it supports
- The test environment conditions shall be described
- Testing shall be performed on the same computer platform that the calculations will be performed.

11.7.5 Spreadsheet and mathematical program calculations shall be treated like hand calculations. Each equation used in the spreadsheet or program shall be presented in the calculation so the result can be reproduced by hand calculations. The title and version of the program shall also be provided. Evidence of hand calculation reproduction at all key steps in the spreadsheet or program shall be presented in the calculation.

11.7.6 English system units of measure shall be used.

11.7.7 Calculations and analyses shall be validated, checked, and approved by qualified personnel independent of the preparer. All calculations shall be provided as part of the design report. Independent reviewers shall be qualified in the subject area and shall not have participated in the calculations and analysis under review. Check review comments are subject to audit.

11.7.8 Seismic calculations and analyses shall be validated, checked, and approved by qualified personnel independent of the preparer. Evidence shall be provided that both the preparer, the checker, and the independent reviewer are fully qualified including a minimum of 10 years experience in structural seismic analysis. Preliminary seismic calculations shall be provided at the 50 % design review. Final seismic calculations shall be provided at the 90 % design review.

11.7.9 The Seller shall ensure that independent checking of critical calculations that bear on long-term performance and reliability are performed.

11.7.10 References shall be provided for all physical properties and/or derived physical quantity data and used as input to calculations or analysis.

11.7.11 References shall be provided for all formulas or references extracted from applicable codes and standards.

11.7.12 Checking shall be performed to confirm the accuracy of the calculations. The checker shall be capable of originating the document. The checker shall not be the originator. Calculations shall be checked and approved prior to use for design or other calculation input.

11.7.13 All calculations shall include headers (on all pages) with the following information:

- Calculation number
- Project name
- Revision
- Author
- Date Subject
- Pagination

11.7.14 All calculations shall include the following sections:

- Objective
- Inputs
- Background
- Applicable codes and standards
- Methodology
- Assumptions
- Calculations
- Results and discussions
- References
- Attachments

11.7.15 Attachments to calculations shall include the following information (on every page):

- Calculation number
- Revision
- Page numbering

11.8 Design Reviews

11.8.1 Contract Award Kick-Off Meeting

11.8.1.1 The contract award kick-off meeting will be an informal discussion conducted at the Seller's facility to ensure the newly awarded contract is clear and concise, and that the Seller has a clear understanding of the scope of the contract.

11.8.1.2 The Seller shall provide to the Buyer, a minimum of five (5) working days prior to the scheduled meeting, copies of documentation or information that is expected to be discussed and/or presented in the meeting. Documentation may be provided as either hard copies or as electronic files via email.

11.8.2 20% Design Review

11.8.2.1 The first interim review will be an informal review conducted at the Buyer's facility after approximately 20% of the design is completed. Preliminary design media, including arrangement and assembly drawings, calculations and analyses will be reviewed by the Buyer. The Seller shall be prepared to discuss any Seller recommended changes to the approaches indicated on the Buyer's proposal drawings and identify any conflicts with equipment envelope dimensions. The Seller shall participate in the design review and shall be prepared to discuss any comments.

11.8.2.2 The Seller shall be responsible for producing and submitting meeting minutes, as a formal document of record.

11.8.3 50% Design Review

11.8.3.1 The second interim review will be an informal review conducted at the Buyer's facility after approximately 50% of the design is completed. Preliminary design media, including arrangement and assembly drawings, calculations and analyses, Software Requirements Document, and Safety Equipment List shall be provided to the Buyer for review. The preliminary design media shall be provided to the Buyer at a mutually agreed time prior to the scheduled meeting. The Seller shall participate in the design review and shall be prepared to discuss any comments.

11.8.3.2 Upon buyer's approval, Seller may be authorized to procure (at Buyer's risk) "specific long-lead items", upon satisfactory completion of 50% design review of these items. The Seller shall transmit a detailed list of the "specific long-lead items" that require procurement prior to obtaining code [1] status on the formal drawing submittal. The Seller shall provide sufficient reference documentation for the Buyer to review and authorize the early procurement of these "specific long-lead items".

11.8.3.3 The Seller shall be responsible for producing and submitting meeting minutes, as a formal document of record.

11.8.4 90% Design Review

11.8.4.1 At the conclusion of definitive design, a formal 90% design review will be conducted at the Buyer's facility in accordance with WTP procedures. The (draft) final design report,

including all design media, supporting calculations and analyses, Software Requirements Document, Safety Equipment List, and other required submittals that document the design, shall be provided to the Buyer.

11.8.4.2 The Seller is encouraged to provide to the Buyer copies of documentation or information that is expected to be discussed and presented at the design review approximately 5 working days prior to the scheduled meeting (if not previously submitted in accordance with the submittal schedule).

11.8.4.3 The Seller shall participate in the design review and present the design, including discussion of the provided submittals.

11.8.4.4 Following the design review meeting, the Buyer will formally transmit comments or other requests on the design submittals. The Seller is required to provide response/resolution to the Buyer's comments in accordance with the submittal schedule, or request deviation from the Buyer's requirements through use of the Buyer's SDDR form.

11.8.4.5 The resolved/corrected submittals shall be provided in the final design report in accordance with the submittal schedule.

11.8.4.6 The Seller shall be responsible for producing and submitting meeting minutes, as a formal document of record.

11.9 Deleted

11.9.1 Deleted.

11.9.2 Deleted.

11.10 Material Test Reports

11.10.1 The Seller shall submit to the Buyer, a complete package of Material Test Reports (MTRs) for all stock steel used for components designated as ITS in Section 1.5.3 of this specification, and as required per the applicable codes and standards referenced in this specification, validating critical parameters as applicable. Where a Material Test Report (MTR) for ITS materials is not available, a Certificate of Compliance (C ofC) shall be provided to Buyer for approval via a SDDR.

11.11 Spare Parts List

11.11.1 The Seller shall provide to the Buyer a recommended spare parts list for all equipment within the Seller's scope of supply for the preventive maintenance of three distinct classifications of spare parts. The Seller's recommendations are to address a startup and warranty period, operational spare parts, and capital spare parts. The recommendations shall also include intervals of replacement based on the operating life of the equipment subject to the duty cycles identified in this specification.

- Startup and warranty spare parts are those parts that may be required at any time during equipment installation, startup, testing, and unit operation through the warranty period.

- The operational spare parts are those parts that require replacement at regular intervals to maintain continuous operation of the supplied equipment and/or system.

- Capital spare parts are major parts or equipment that provide reliable equipment operation throughout the plant life and having a significant lead time for manufacture and delivery.

11.11.2 The spare parts list shall include names of manufacturers with appropriate model numbers and special ordering instructions (if applicable) for replaceable parts. The spare parts list shall also include pricing and delivery information valid for one year after delivery of the equipment.

11.12 Inspection and Test Plan

11.12.1 The Seller shall prepare a detailed Inspection and Test Plan including insertion of Buyer-designated source inspection/witness notification points in accordance with Section 5 of the Purchase Order.

11.12.2 Prior to starting work, the plan shall be submitted to the Buyer for review.

11.12.3 The plan shall include, but not be limited to, the following:

- Equipment to be inspected and tested
- Description of inspection and tests to be performed
- Sequential points for inspection and tests to be performed
- Each characteristic or attribute to be evaluated
- The inspection and test report form to be used
- Other requirements as required by Codes, Standards, or Purchase Order
- Surface finish inspected as stated in Section 7.5.

11.12.4 The plan shall include provisions for increased hold and notification points as the project progresses.

11.12.5 The results of the inspections and tests shall be documented in the Inspection and Test Report.

11.12.6 The Seller shall provide an inspection and test procedure documenting the process followed for determining that specified requirements (dimensions, properties, performance results, etc.) are met.

11.13 Manuals

11.13.1 The Seller shall provide a clearly written instruction manual(s). The manual(s) shall include:

- Storage maintenance instructions
- Rigging instructions
- Installation instructions
- Spare parts list
- General description of the equipment identifying as applicable, significant technical characteristics, test and adjustment information, and safety and warning notices

- Instructions for equipment operation (start-up, shut down, normal, and abnormal), referencing drawings and diagrams as appropriate
- General maintenance instructions
- Recommended inspection points if any, with procedures and period for inspection
- Maintenance instructions for any required lubrication

11.14 Design Changes Incorporated by Reference

24590-WTP-SDDR-PROC-05-00180	Material Equivalency
24590-WTP-SDDR-M-05-00117	Material Equivalency of QL materials for the Canister Rinse Bogie equipment.
24590-WTP-SDDR-MH-07-00110	MR25 Canister Rinse Bogie Control Panel HDH-PNL-00001 -Wire Insulation Colors
24590-WTP-SDDR-MH-07-00111	MR25 Canister Rinse Bogie Control Panel HDH-PNL-00001 - Wire Splicing
24590-WTP-SDDR-MH-07-00114	MR25 Canister Rinse Bogie Control Panel HDH-PNL-00001 - Nameplates
24590-WTP-SDDR-MH-07-00117	MR25 Canister Rinse Bogie -Shim Packs
24590-WTP-SDDR-MH-07-00118	MR25 Canister Rinse Bogie - Factory Acceptance Cycle Testing & Recovery Positional Accuracy

Design changes incorporated by reference in revision 5

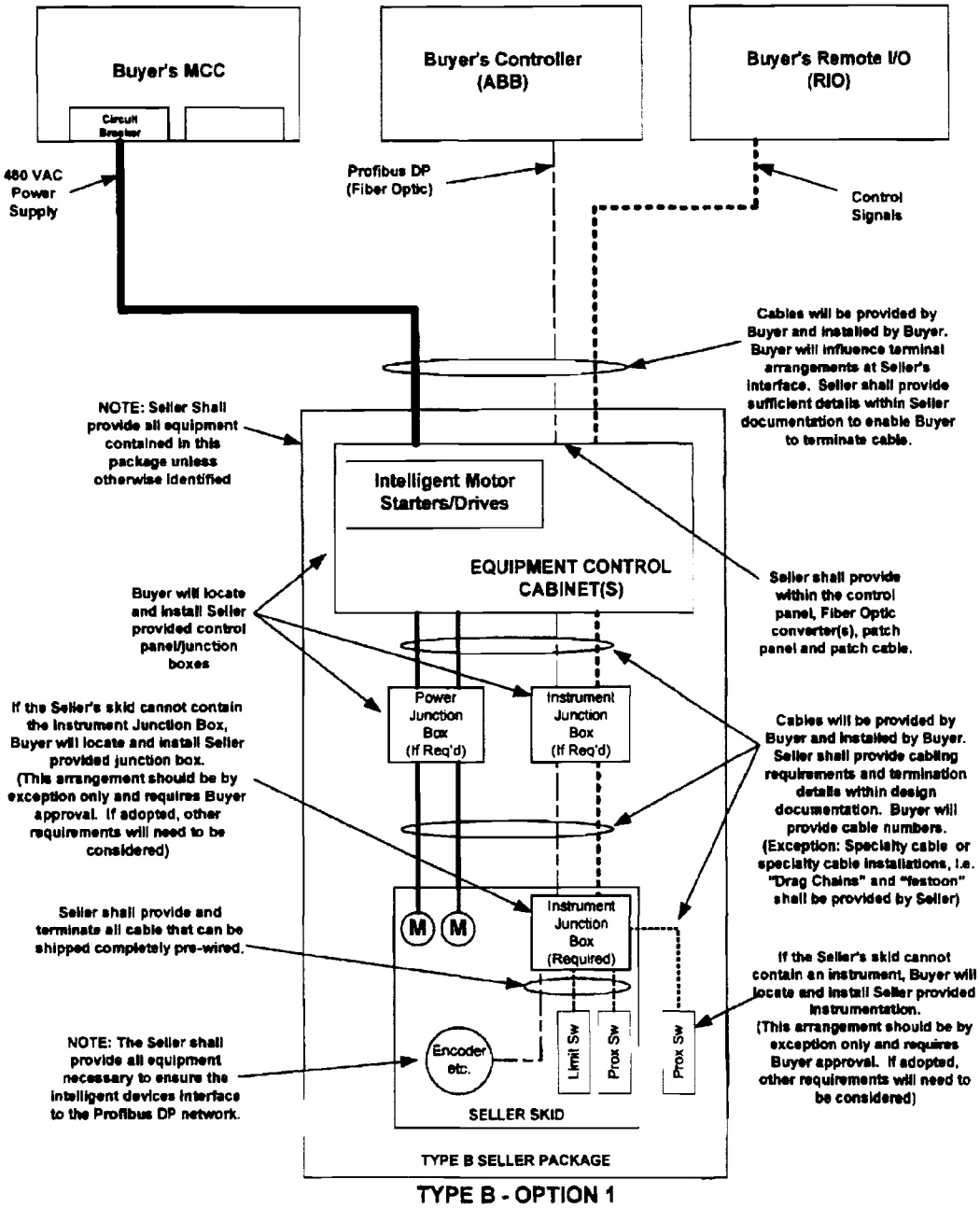
24590-WTP-SDDR-MH-07-00287	Acceptance of Versions 01 and 03a of ASTM A36
24590-WTP-SDDR-MH-08-00174	Wright Industries (MR 25) - Years for ASTM material standards
24590-WTP-SDDR-MH-08-00271	Materials not certified to the correct revision levels
24590-WTP-SDDR-MH-09-00227	MR MH025 Pump Coating
24590-WTP-SDDR-MH-11-00009	MR 25 Reduction of RT Exam Requirements
24590-WTP-SDDR-MH-11-00018	MR 25 Resolution of AWS Code Years
24590-WTP-SDDR-MH-11-00020	MR 25 Material Equivalency of QL Materials for the Canister Rinse Bogie Equipment
24590-WTP-SDDR-MH-11-00039	MR 25 Reduction of RT Exam Requirements
24590-WTP-SDDR-MH-11-00056	MR 56 Material Selection for ASME NOG-1, CMAA 70, and AISC MO16

Appendix A

Instrumentation and Control Interfaces

Appendix A
Instrumentation and Control Interfaces

Figure 1 "Type B" Package



TYPE B - OPTION 1

DATE	REV.
05/06/03	D

Appendix B

Seismic Response Spectra

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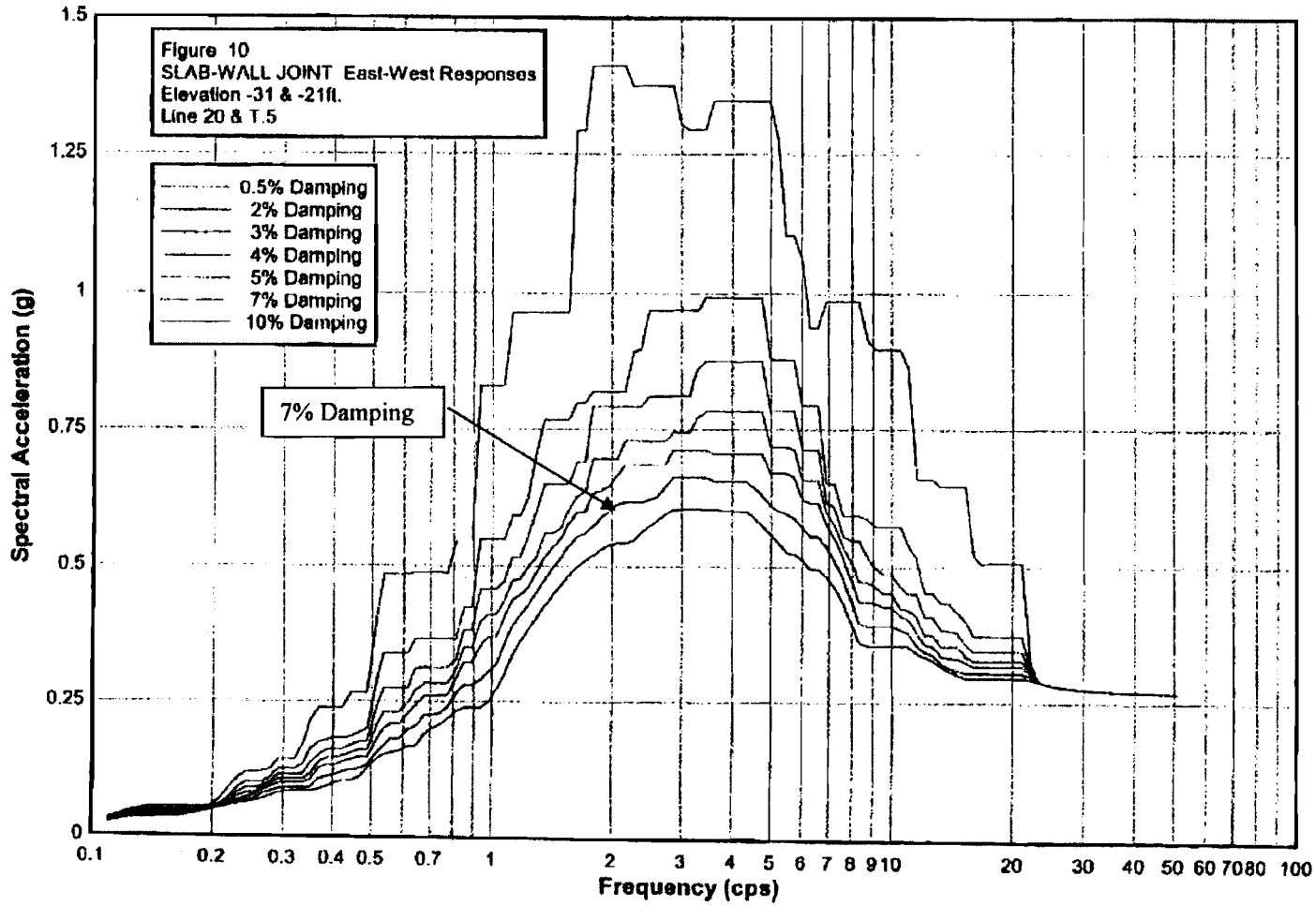
Calc No.: 24590-HLW-S0C-S15T-00009, Rev. 0D



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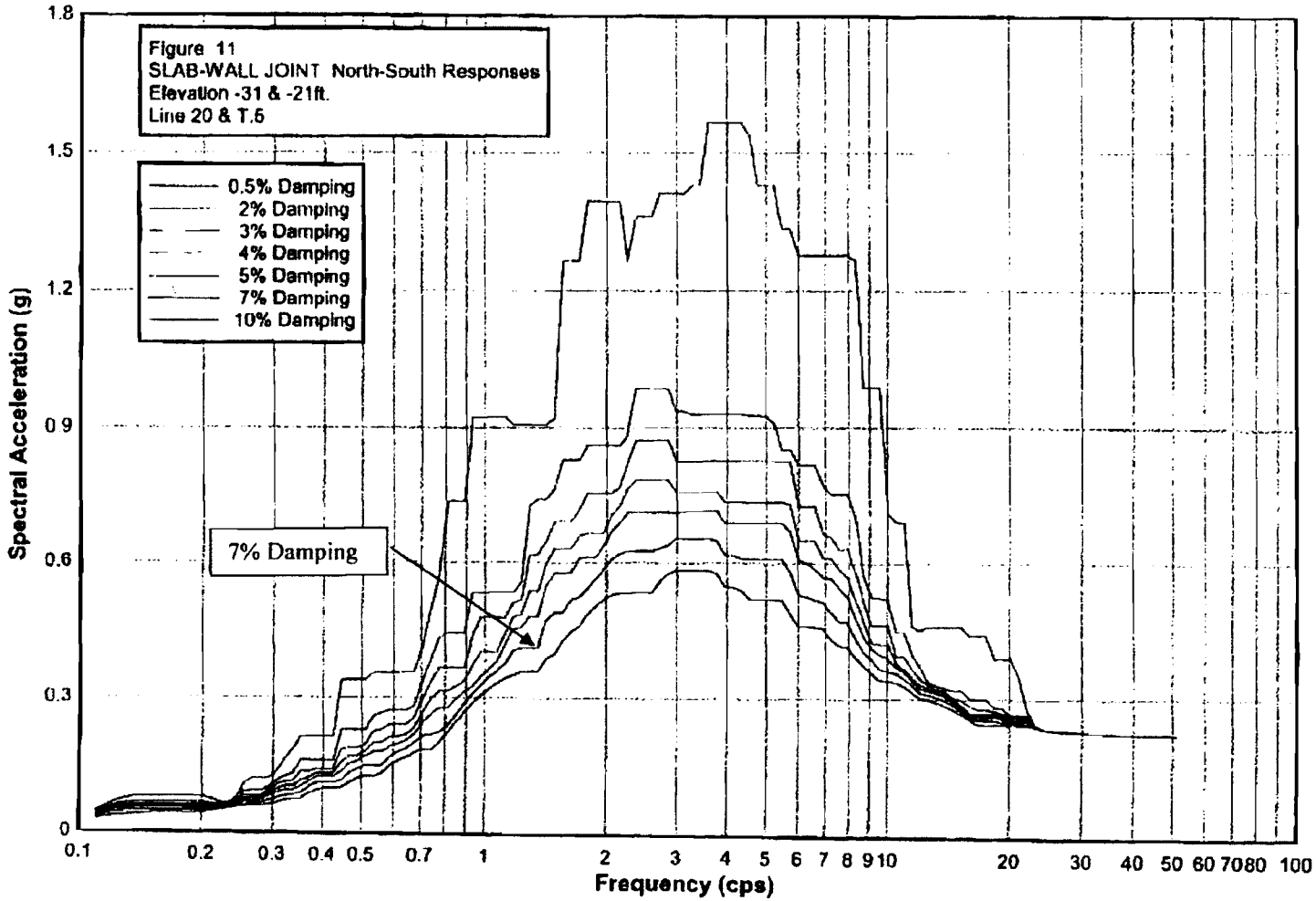

RPP-WTP HLW Vitrification Facility ISRS

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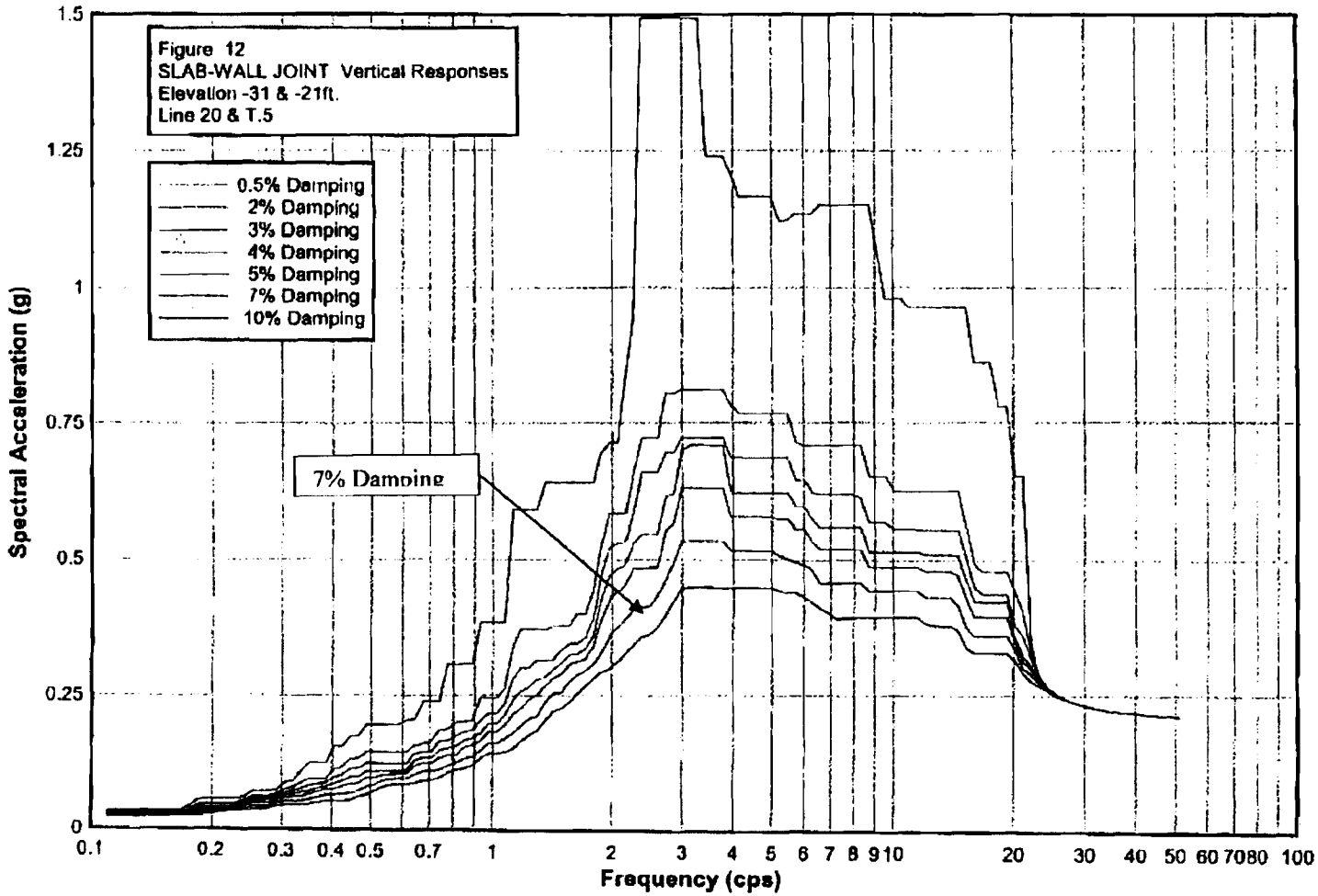
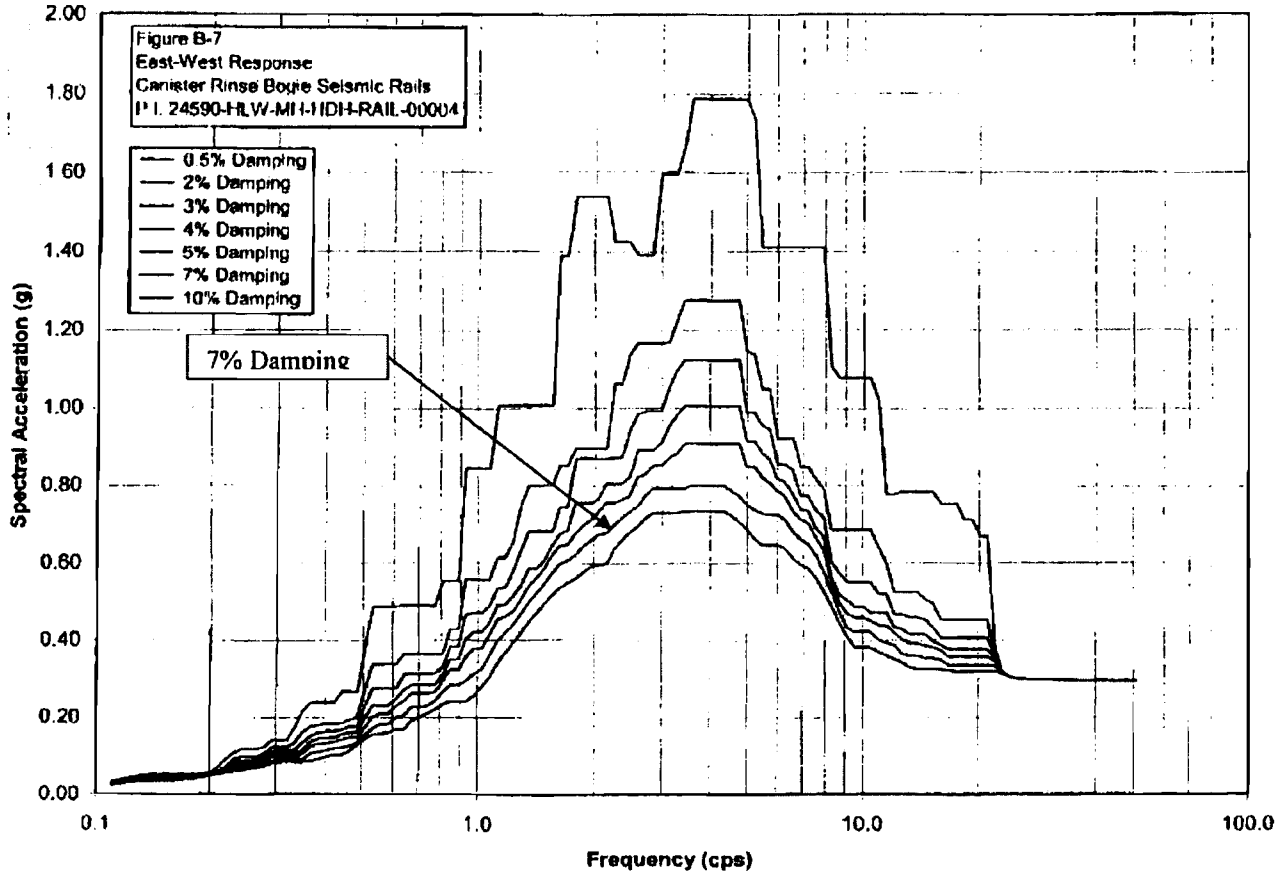


CALCULATION SHEET

PROJECT: RPP-WTP
JOB NO.: 24590
CALC NO.: 24590-HLW-S0C-S15T-00039
SHEET REV: D
SHEET NO.: B-9

BY: Ed Ulle
DATE: 6/19/05

SUBJECT: HLW Vitrification Building Seismic Analysis – Enveloped In-Structure Response Spectra



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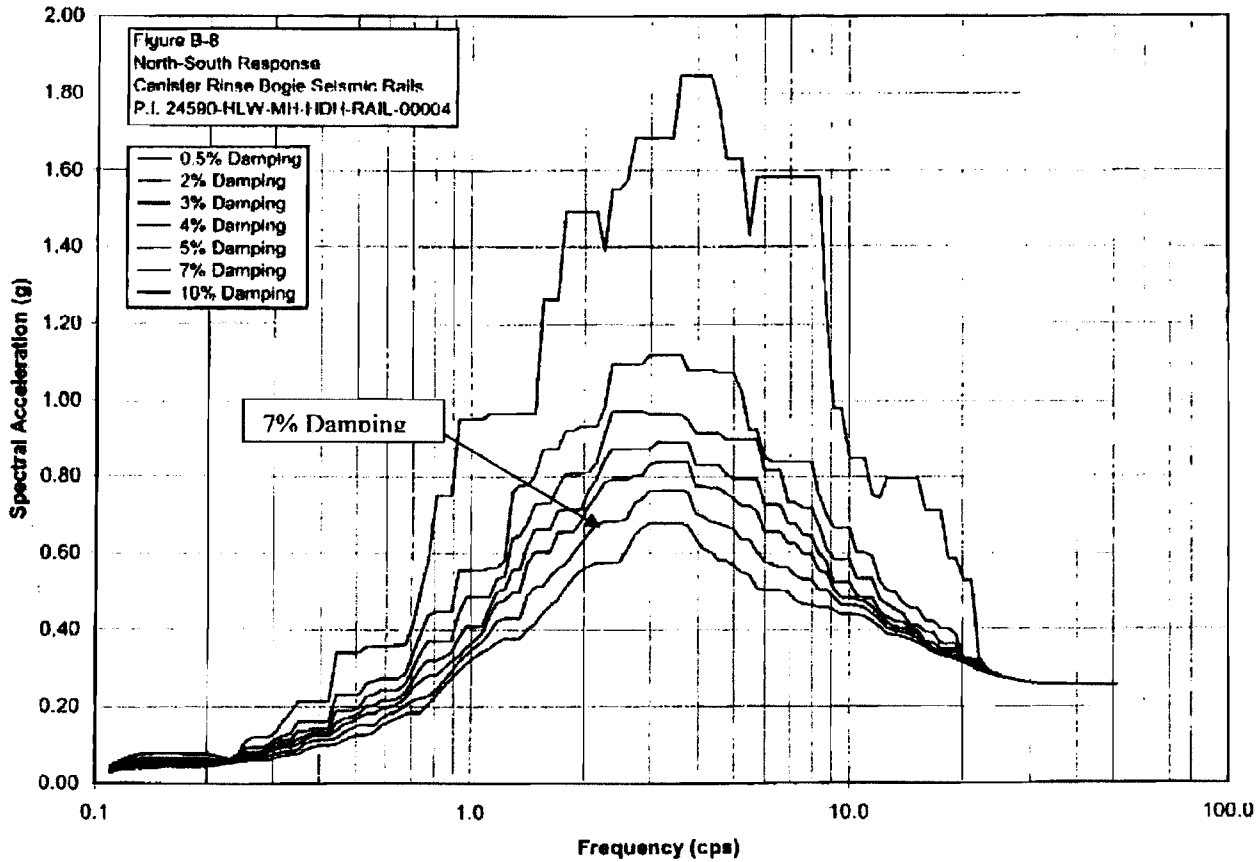
JOB NO.: 24590
CALC NO.: 24590-HLW-S0C-S15T-00039
SHEET REV: D
SHEET NO.: B-10

BY: Ed Ulle
DATE: 8/19/05

SUBJECT: HLW Vitrification Building Seismic Analysis – Enveloped In-Structure Response Spectra

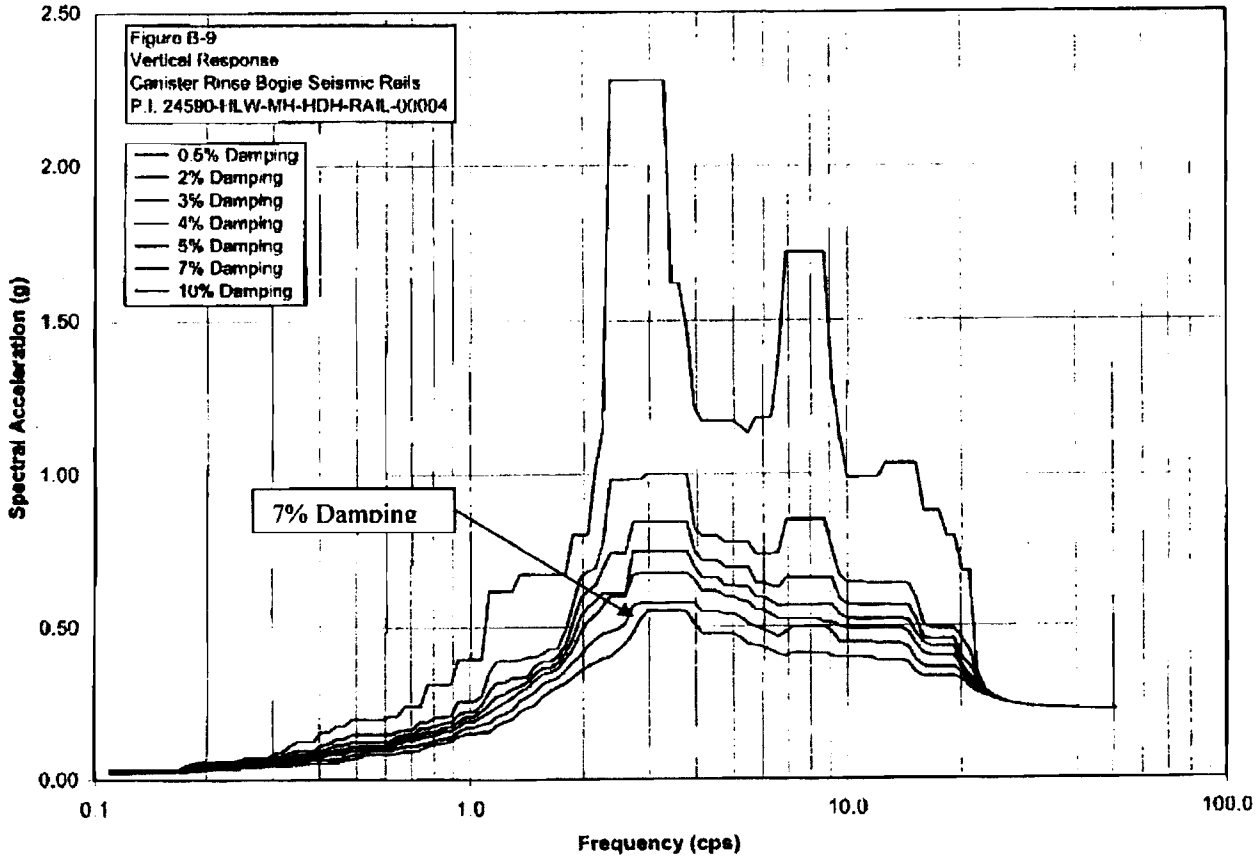


CALCULATION SHEET

PROJECT: RPP-WTP
JOB NO.: 24590
CALC NO.: 24590-HLW-S0C-S15T-00039
SHEET REV: D
SHEET NO.: B-11

BY: Ed Ulle
DATE: 8/19/05

SUBJECT: HLW Vitrification Building Seismic Analysis – Enveloped In-Structure Response Spectra



Appendix C

ALARA Design Review (ADRs)

24590-HLW-ADR-M-02-005	HLW Canister Rinse Bogie Services Design Evaluation, Rev. 1
24590-HLW-ADR-M-02-006	HLW Bogie Recovery Systems, Rev 1
24590-HLW-ADR-M-02-007	Rinse Bogie Energy Chain, Rev 1
24590-HLW-ADR-M-02-013	Power and Control Supplies for the Canister Rinse Bogie (System HDH), Drum Transfer Bogie (RWH) and Cask Transfer Bogie (RWH), Rev. 1
24590-HLW-ADR-M-02-048	ALARA Review of HLW System Bogies, Rev. 1
24590-HLW-ADR-M-02-050	ALARA Design Review for HLW System HDH & RWH Bogie Rails, Rev. 0

Appendix D

Deleted

Appendix E

Deleted

Appendix F

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Appendix G

Deleted

Appendix H

Human Factor Codes and Standards

Appendix H
Human Factor Codes and Standards

IEEE 1023-1988 Application Areas for Mechanical Handling	Applicable Human Factor Attributes	Applicable Code, Standard, or Requirement
3.0 Planning for Human Factors Engineering		
	HFE Program Management	NUREG-0711, Section 2
	Human Reliability Analysis	NUREG-0711, Sec. 7
	Functional Requirements Analysis and Function Allocation	NUREG-0711, Section 4
	Human Factors Engineering Program Review	NUREG-0711
	Human Engineering Information Display	Part 1 of NUREG-0700, Rev 1
4.1 Task considerations	Task Analysis	NUREG-0711, Section 5
4.2 Environmental considerations:		
	Environment, Internal Design Conditions	See Section 5.5 of this specification
	Acoustical Noise	MIL-STD-1472F, sec. 5.8.3
	Anthropometric Data	MIL-STD-1472F, sec. 5.6.3
	Illuminance & Illumination	MIL-STD-1472F, Sections 5.8.2, 5.10.5
4.3 Equipment considerations		
	Cranes, Material Handling and construction	MIL-STD-1472F, section 5.12.8
	Vibration	MIL-STD-1472F, Section 5.8.4
	Remote Handling Equipment	
	• Controls: General	DOE-STD-1140-2001 Section 2.5
	• Handle and Grasp Area Design	DOE-STD-1140-2001 Section 2.13
	• Remote Handling	MIL-STD-1472F Section 5.10
	• Self-Alignment	MIL-STD-1472F Section 5.10.1.1
	• Quick-Disconnect	MIL-STD-1472F Section 5.10.1.2
	• Fasteners	MIL-STD-1472F Section 5.10.1.3
	• Lock or Latching	MIL-STD-1472F Section 5.10.1.4
	• Feedback	MIL-STD-1472F Section 5.10.2
	• Manipulators	MIL-STD-1472F Section 5.10.3
	• Position Control	MIL-STD-1472F Section 5.10.3.2

IEEE 1023-1988 Application Areas for Mechanical Handling	Applicable Human Factor Attributes	Applicable Code, Standard, or Requirement
	• Mutual Force Reflection	MIL-STD-1472F Section 5.10.3.2
	• Degrees of Freedom	MIL-STD-1472F Section 5.10.3.2
	• Power Assist	MIL-STD-1472F Section 5.10.3.3
	• Viewing Equipment	MIL-STD-1472F Section 5.10.4
	• Direct Viewing	MIL-STD-1472F Section 5.10.4.2
	• Viewing Angle	MIL-STD-1472F Section 5.10.4.3
	• Indirect Viewing	MIL-STD-1472F Section 5.10.4.4
	Viewing Equipment - Coding	MIL-STD-1472F Section 5.10.4.5
	Viewing Equipment - Lettering	MIL-STD-1472F Section 5.10.4.6
	• Illumination - Reflected Light	MIL-STD-1472F Section 5.10.5.1
	• Threshold Viewing	MIL-STD-1472F Section 5.10.5.2
4.4 Personnel Considerations		
	Hand Tools	DOE-HDBK-1140-2001 Section 4.7
	Interface Design Evaluation,(Human Machine Interface)	NUREG-0711, Section 8
	Labeling	MIL-STD-1472F, section 5.5
4.5 Nuclear Operations Considerations		
	Remote Handling (Power Manipulators)	MIL-STD-1472F, section 5.10.3
	Workplace Design	Part III of NUREG-0700, Rev 2, Section 12
	Workstation Design	Part III of NUREG-0700, Rev 2, Section 11.1
	Radiological Hot Workshops	DOE-HDBK-1140-2001, Section3.4
4.6 Documentation Considerations	No attribute identified	
5. Methodology	No attribute identified	
5.1 None observational methods	No attribute identified	
5.2 Observational methods	No attribute identified	
5.3 Expert Opinion Techniques	No attribute identified	
	Procedure Development	NUREG-0711, Section 9
	Task Analysis	NUREG-0711, Section 5,
6: Implementation in Design, Operations, Testing and Maintenance process		
	Maintenance/Maintainability	DOE-HDBK-1140-2001, Section 5.2 & Section 6.6

IEEE 1023-1988 Application Areas for Mechanical Handling	Applicable Human Factor Attributes	Applicable Code, Standard, or Requirement
6.1 Program Plan		
	Training Program Development	NUREG-0711, Section 10
6.2 Documenting HFE in the Design, Operations, Testing and Maintenance Process		
	Verification and Validation	NUREG-0711, Section 11
	Maintenance/Maintainability	DOE-HDBK-1140-2001, Section 5.2 & Section 6.6
6.3 Operational Experience Review:		
	Operating Experience Review	NUREG-0711, Section 3
	Staffing & Qualifications	NUREG-0711, Section 6

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Rec'd: 06/14/2012

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May 31, 2012

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2435 Stevens Center Place, MSIN: H4-02
Richland, Washington 99354

RE: Request to the Department of Ecology to Grant Confidentiality

Dear Mr. Samuelson and Mr. Russo:

The Department of Ecology (Ecology) has reviewed your request (reference) to keep the following piping and instrumentation diagrams confidential:

- 24590-HLW-M6-HMP-00001001, Revision 0, *P&ID - HLW Melter Process System Melter 1 Feed and Agitation.*
- 24590-HLW-M6-HMP-00001002, Revision 0, *P&ID - HLW Melter Process System Melter 1 Feed and Agitation.*
- 24590-HLW-M6-HMP-20001001, Revision 0, *P&ID - HLW Melter Process System Melter 2 Feed and Agitation.*
- 24590-HLW-M6-HMP-20001002, Revision 0, *P&ID - HAW Melter Process System Melter 2 Feed and Agitation.*

We have determined the diagrams meet confidentiality requirements of Revised Code of Washington 43.21A.160, and I am granting your request. Please note, these documents may be made available to the Ecology Director, appropriate Ecology staff, and the Attorney General's Office.

If you have any questions, please contact Suzanne Dahl at (509) 372-7892 or suzanne.dahl@ecy.wa.gov.

Sincerely,

Ted Sturdevant
Director

cc: Distribution List on Page 2

Reference: Letter CCN: 243305, received March 7, 2012, from F. M. Russo, BNI, to V. Peery, Ecology, "Contract No. DE-AC27-01RV14136 – Request for Certification of Records as Confidential"

cc electronic:

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Administrative Record: Waste Treatment Plant (TSD #H-0-8)
BNI Correspondence Control
Environmental Portal
Hanford Operating Record General File
PADC w/a
USDOE-ORP Correspondence Control