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

18-ESQ-0079

JUN 29 2018

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

Dear Ms. Smith:

CLASS 1 MODIFICATIONS TO THE HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY ACT PERMIT, QUARTER ENDING JUNE 30, 2018

In accordance with the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion for the Treatment, Storage, and Disposal of Dangerous Waste (Permit) Condition I.C.3, enclosed are Class 1 permit modification documents for the quarter ending June 30, 2018.

The enclosed modification package updates information in Parts III and V of the Permit Revision 8C. The changes address the 242-A Evaporator, the 325 Hazardous Waste Treatment Units, the Waste Treatment and Immobilization Plant, the 1324-N Surface Impoundment, 1324-NA Percolation Pond, and the 1706-KE Waste Treatment System. The modifications are being made to ensure activities are conducted in compliance with the Permit. A record of the modifications is maintained in the Hanford Facility Operating Record.

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

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PCN Identifier:	Affected Permit Section:
PCN-242-A-2017-02	OUG-4, Unit Specific Conditions and Chapter 3, 4, and 6
PCN-325-2018-01	OUG-5, Addendum J – Applicability Matrix
24590-LAB-PCN-ENV-14-001	OUG-10, Appendices 11.6 and 11.11
24590-LAB-PCN-ENV-17-002	OUG-10, Appendix 11.2
24590-LAW-PCN-ENV-17-002	OUG-10, Appendix 9.11
24590-LAW-PCN-ENV-17-006	OUG-10, Appendices 9.2 and 9.9
24590-LAW-PCN-ENV-17-008	OUG-10, Appendix 9.2
24590-LAW-PCN-ENV-17-010	OUG-10, Appendices 9.11
24590-LAW-PCN-ENV-17-012	OUG-10, Appendices 9.2
24590-WTP-PCN-ENV-18-002	OUG-10, Unit Specific Conditions (multiple tables)
24590-WTP-PCN-ENV-18-005	OUG-10, Appendix 1.2
1324-N Surface Impoundment & 1324-NA Percolation Pond	CUG-3, Parts I & II, Attachment 9, Unit Conditions and Addenda
1706-KE Waste Treatment System	CUG-14, Parts I & II, Attachment 9, Unit Conditions and Addenda

If you have any questions, please contact me, or your staff may contact William F. Hamel, Assistant Manager for Safety and Environment, at (509) 376-6727.

Sincerely,

Doug S. Shoop
Manager

ESQ:ACM

Enclosure:
Class 1 Mod for Qtr Ending 6/30/18

cc w/encl:
Debra J. Alexander, Ecology (CD)
Jennifer L. Cantu, Ecology (CD)
Rob G. Hastings, ORP (CD)
Administrative Record, TSD: H-0-1, T-2-6, T-3-4, H-0-8, T-1-2, T-1-3 (Hard Copy & CD)
Ecology NWP Library (Hardcopy & CD)
Environmental Portal, G3-35 (CD)
HF Operating Record, (J. K. Perry, MSA, A3-01) (CD)

cc w/o encl: See page 3

cc w/o encl:
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Jeff E. Bramson, CHPRC
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ENCLOSURE

Class 1 Modifications for Quarter Ending June 30, 2018

Consisting of 188 pages,
including this cover page

Hanford Facility RCRA Permit Modification Forms

Part III, Operating Unit Group 4

242-A Evaporator

Index

Page	Permit Section
Page 2 of 6:	Hanford Facility RCRA Permit III.4, Permit Conditions
Page 3 of 6:	Chapter 3, Waste Analysis Plan
Page 4 of 6:	Chapter 4, Process Information
Page 5 of 6:	Chapter 4, Process Information
Page 6 of 6:	Chapter 6, Procedures to Prevent Hazards

Submitted by WRPS Co-Operator:

3/14/18

D. Kent Smith Date

Reviewed by DOE-ORP Program Office:

3-16-18

Glyn D. Trenchard Date

Hanford Facility RCRA Permit Modification Form

Unit:	Permit Part
242-A Evaporator	**Part III, Operating Unit Group 4**

Description of Modification:

Part III, Operating Unit Group 4 Permit Conditions

CHAPTERS SPECIFIC TO OPERATING UNIT GROUP 4:

Update dates to reflect date Ecology approves the modification:

Chapter 3.0 Waste Analysis Plan, dated ~~March 31, 2014~~

Chapter 4.0 Process Information, dated ~~June 30, 2017~~

Chapter 6.0 Procedures to Prevent Hazards, dated ~~November 16, 2017~~

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

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

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

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

Reason for denial:

Reviewed by Ecology:

S. L. Dahl Crumpler 4/9/18 Date

Hanford Facility RCRA Permit Modification Form

Unit:	Permit Part
242-A Evaporator	**Part III, Operating Unit Group 4**

Description of Modification:

Chapter 3.0, Waste Analysis Plan

- Section 3.10.1.4: Deleted "SAMP-RC3-2 sampler or other"
  Change reflects replacement of obsolete sampler with functionally equivalent sample port for obtaining grab samples of the process condensate as described in this section.

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: Permit Condition II.R / A.3

Enter wording of WAC 173-303-830, Appendix I Modification citation: Equipment replacement or upgrading with functionally equivalent components

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

Reason for denial:

Reviewed by Ecology:

S. L. Dahl-Crumpler 4/9/18

Date

Hanford Facility RCRA Permit Modification Form

Unit:	Permit Part
242-A Evaporator	**Part III, Operating Unit Group 4**

Description of Modification:

Chapter 4.0, Process Information

- Chapter 4, Figure 4.1: Replaced sampler "R-C-3-2" with "Sample Port" in upper right portion of drawing
- Chapter 4, Figure 4.4: Replaced "Sampler RC3-2" with "Sample Port" in lower right portion of drawing

Changes reflect replacement of obsolete sampler with functionally equivalent sample port for obtaining grab samples of the process condensate.

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: Permit Condition II.R / A.3

Enter wording of WAC 173-303-830, Appendix I Modification citation: Equipment replacement or upgrading with functionally equivalent components

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

Reason for denial:

Reviewed by Ecology:

S. L. Dahl-Crumpler 4/9/18 Date

Hanford Facility RCRA Permit Modification Form

Unit:	Permit Part
242-A Evaporator	**Part III, Operating Unit Group 4**

Description of Modification:

Chapter 4.0, Process Information

- Regenerated Table of Contents due to correction of the heading for Section 4.1.3 (see below)
- Section 4.1.2: Corrected format error by moving text from beginning of Heading for Section 4.1.3 "The PC-5000 transfer line leaving the 242-A Evaporator is considered ancillary equipment to the 242-A Evaporator up to LERF and 200 Area ETF" to the end of last paragraph in Section 4.1.2.
- Section 4.1.3: Corrected format error (see above), by deleting "The PC-5000 transfer line leaving the 242-A Evaporator is considered ancillary equipment to the 242-A Evaporator up to LERF and 200 Area ETF" from Section 4.1.3 heading. Section 4.1.3 heading should read "Vapor Liquid Separator (C-A-1) and Ancillary Equipment".
- Section 4.1.7.2.2: Removed metric unit of measure
- Section 4.1.7.3.3: Made informational changes, including correction of an error with the encasement catch tank number for alternate visual inspection of the PC-5000 transfer line.
- Figures 4.1: Changed "R-C-3" to "RC3 Radiation Monitor" to clarify this is the rad monitor.
- Figures 4.4: Changed "Sampler RC3-1" to "RC3 Radiation Monitor" to clarify this is the rad monitor.

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

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

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

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

Reason for denial:

Reviewed by Ecology:

S. L. Dahl-Crumpler — Date: 4/9/18

Hanford Facility RCRA Permit Modification Form

Unit:	Permit Part
242-A Evaporator	**Part III, Operating Unit Group 4**

Description of Modification:

Chapter 6.0, Procedures to Prevent Hazards

- Section 6.2.2.3: Made informational change to correct errors with the encasement catch tank number for alternate visual inspection of the PC-5000 transfer line.
- Sections 6.2.5 and 6.2.6: Clarified documentation can be retained on electronic media; this is consistent with Permit Condition I.E.10.b.
- Section 6.4.4: Corrected editorial error (add missing "to") with Class 2 modification

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

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

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

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

Reason for denial:

Reviewed by Ecology:

S. L. Dahl-Crumpler 4/9/18

Date

Remove and Replace the Following Pages:

Replace:

- Operating Unit Group 4, Permit Conditions
- Chapter 3.0, Waste Analysis Plan
- Chapter 4.0, Process Information
- Chapter 6.0, Procedures To Prevent Hazards

242-A EVAPORATOR
OPERATING UNIT 4 UNIT-SPECIFIC CONDITIONS
CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
11/16/2017	8C.2017.5F
07/19/2017	8C.2017.Q2
04/26/2017	8C.2017.Q1
02/18/2016	8C.2015.Q4

OPERATING UNIT 4 UNIT-SPECIFIC CONDITIONS
242-A EVAPORATOR

UNIT DESCRIPTION

The 242-A Evaporator is a mixed waste treatment and storage unit consisting of a conventional forced-circulation, vacuum evaporation system to concentrate mixed-waste solutions located in the 200 East Area.

This document sets forth the operating conditions for the 242-A Evaporator.

III.4.A COMPLIANCE WITH UNIT SPECIFIC PERMIT CONDITIONS

The Permittees shall comply with all requirements set forth in the Hanford Facility Resource Conservation and Recovery Act (RCRA) Permit (Permit) as specified in Permit Attachment 9, Permit Applicability Matrix, including all approved modifications. All chapters, subsections, figures, tables, and appendices included in the following unit-specific Permit Conditions are enforceable in their entirety.

In the event that the Part III-Unit-Specific Conditions for Operating Unit 4, 242-A Evaporator conflict with the Part I-Standard Conditions and/or Part II-General Facility Conditions of the Permit, the unit-specific conditions for Operating Unit 4, 242-A Evaporator prevail.

CHAPTERS SPECIFIC TO OPERATING UNIT GROUP 4:

Chapter 1.0	Part A Form, dated November 16, 2017
Chapter 3.0	Waste Analysis Plan, dated ~~March 31, 2014~~
Chapter 4.0	Process Information, dated ~~June 30, 2017~~
Chapter 5.0	Groundwater Monitoring, (not applicable)
Chapter 6.0	Procedures to Prevent Hazards, dated ~~November 16, 2017~~
Chapter 7.0	Contingency Plan, dated November 16, 2017
Chapter 8.0	Personnel Training, dated September 30, 2013
Chapter 11.0	Closure, dated September 30, 2013

III.4.B COMPLIANCE WITH UNIT-SPECIFIC PERMIT CONDITIONS

III.4.B.1 Portions of permit attachment 4 (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.

242-A EVAPORATOR
CHAPTER 3.0
WASTE ANALYSIS PLAN

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
03/31/2014	

3.10.1.4 Process Condensate Sample Collection

Process condensate samples, when performed at 242-A Evaporator instead of LERF, are taken from the process condensate transfer line in the condenser room of the 242-A Building. Grab sampling is performed during the campaign at the ~~SAMP-RC3-2 sampler or other~~ sample port by opening a valve and allowing a small volume of process condensate to flush valve and line/piping. The required volume of sample is collected into labeled bottles and chain of custody is maintained. Samples of process condensate are collected in a manner to produce a representative sample. Testing methods are used consistent with SW-846 procedures as listed in Table 3.4.

3.10.1.5 Process Condensate Sampling Quality Assurance and Quality Control

For information on process condensate sample collection, including the number and types of sample bottles, sampling QA/QC, etc., refer to the Permit, Part III, LERF and 200 Area ETF unit-specific conditions and Chapter 3.0, Waste Analysis Plan.

3.10.2 Analyte Selection and Rationale

The DQO analysis for the 242-A Evaporator examined the data needs for sampling the candidate feed tanks and determined that the analyses in Table 3.4 should be conducted to satisfy WAC 173-303-300 requirements. Table 3.4 also contains the rationale for these parameters being selected. Section 3.7 provides additional detail on the rationale.

For information on process condensate sample analyte selection and rationale, refer to the Permit, Part III, LERF and 200 Area ETF unit-specific conditions and Chapter 3.0, Waste Analysis Plan.

Table 3.3. Candidate Feed Tank Sample Point Selection.

Number of Samples	Location of Sample Points
Four samples, no layering suspected	One surface sample to address the potential for a separable organic layer and three subsurface samples: one sample each obtained from the upper third (near the half way point), one sample in the middle third and one sample in the lower third (near the lower limit) of the supernatant layer.
Four samples, layering suspected	One sample taken from the waste surface to address the potential for a separable organic layer. Three samples targeting the expected midpoint of the suspected layers. If more than three layers are suspected, The larger layers have sampling priority.

242-A EVAPORATOR
CHAPTER 4.0
PROCESS INFORMATION

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
07/19/2017	8C.2017.Q2
04/26/2017	8C.2017.Q1
02/18/2016	8C.2015.Q4

CHAPTER 4.0
PROCESS INFORMATION

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mode when required to maintain safe facility operations. Once the configuration parameters and other process control inputs are set, the MCS maintains the process parameters within specified ranges by sending output signals that operate specific pieces of equipment (e.g., control valves). There are redundant MCS components in place that are not used to maintain the integrity of the mixed waste handling system and are not addressed in further detail in this permit.

4.1 Tank Systems

This section discusses information associated with design requirements, integrity assessments, and any additional requirements for tanks used to treat and store mixed waste in the 242-A Evaporator.

The 242-A Evaporator is divided into three major systems that manage mixed wastes. The systems are listed below:

- PC-5000 transfer line
- Vapor-liquid separator (C-A-1) and ancillary equipment
- Condensate collection tank (TK-C-100) and ancillary equipment.

4.1.1 Design Requirements

The following design requirements were addressed in the 242-A Evaporator/Crystallizer Tank System Integrity Assessment Reports (IARs), which are identified in Section 4.1.5:

- Minimum design wall thicknesses and measured wall thicknesses at various points throughout the tank systems.
- Design standards used in construction, including references.
- Waste characteristics.
- Materials of construction and compatibility of materials with the waste being processed.
- Corrosion protection.
- Seismic design basis evaluation.

The conclusion of the latest IARs are that the 242-A Evaporator system and associated PC-5000 transfer line is not leaking and is fit for use. The inspections, tests, and analyses performed provide assurance that the tank system has adequate design, sufficient structural strength, and sufficient compatibility with the waste to not collapse, rupture, or fail during operation. The report also states that a review of construction files indicates that the building structure was designed and constructed to withstand a design-basis earthquake and recommends a frequency of future integrity assessments. The codes and standards applicable to the design, construction, and testing of the 242-A Evaporator tank system are evaluated as part of the fit for use determination [WAC 173-303-640(2)(d)] reached by the latest IARs for the 242-A Evaporator and associated PC-5000 transfer line.

4.1.2 PC-5000 Transfer Line

Process condensate from the 242-A Evaporator is transferred to the LERF using a pump located in the 242-A Evaporator and approximately 5,000 feet of pipe, consisting of a 3-inch carrier pipe within a 6-inch outer containment pipeline. Flow through the pump is controlled through a valve at approximate flow rates from 40 to 80 gpm.

The encased fiberglass transfer line (PC-5000) exits the 242-A Evaporator below grade and remains below grade at a minimum 4-feet depth for freeze protection, until the pipeline emerges at the LERF catch basin, at the corner of each basin. All piping at the catch basin that is less than 4 feet below grade is wrapped with electric heat tracing tape and insulated for protection from freezing. Additional detail including information on secondary containment, leak detection and integrity assessment for this line is provided in Sections 4.1.7.3.3 and 4.1.5.1. The PC-5000 transfer line leaving the 242-A Evaporator is considered ancillary equipment to the 242-A Evaporator up to LERF and 200 Area ETF.

4.1.3 ~~The PC-5000 transfer line leaving the 242-A Evaporator is considered ancillary equipment to the 242-A Evaporator up to LERF and 200 Area ETF~~ Vapor-Liquid Separator (C-A-1) and Ancillary Equipment

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

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

Waste feed will be sampled from 241-AW-102 or identified candidate feed tanks as described in the Waste Analysis Plan (Chapter 3.0). The feed sampler (SAMP-F-1) located in a sample enclosure located in the hot equipment storage room has been isolated and blanked, and will be closed in accordance with the approved Closure Plan.

Evaporator Process Loop. The 242-A Evaporator process loop equipment components are as follows:

- Reboiler (E-A-1)
- Vapor-liquid separator (C-A-1)
- Recirculation pump (P-B-1)
- Recirculation loop

Figure 4.2 is a simplified process flow diagram showing the major components of the process loop.

Reboiler (E-A-1). Waste is heated as the waste passes through the reboiler before entering the vapor-liquid separator (C-A-1). The reboiler (E-A-1) is a vertical tube unit with steam on the shell-side and process solution on the tube-side. The 364 tubes in the reboiler (E-A-1) are enclosed in an approximately 40-inch-outside diameter, 15-feet-long stainless steel shell. Both the reboiler shell and tubes are constructed of 304L stainless steel. The shell is 1/4-inch thick and the tubes are 14-gauge steel. The reboiler is designed to distribute steam evenly and to prevent tube damage from water droplets that may be present in the steam.

Vapor-Liquid Separator (C-A-1). Process solution from the reboiler enters the vapor-liquid separator (C-A-1) via the upper recirculation line. Some of the solution flashes into vapor, which exits through a vapor line at the top of the vapor-liquid separator (C-A-1). The remaining solution (slurry) exits through the recirculation line at the bottom.

The vapor-liquid separator (C-A-1) consists of a lower and upper section. The lower (liquid) section is a stainless steel shell 14 feet in diameter having a 22,500 to 26,000 gallon normal operating capacity (including recirculation loop and reboiler). The maximum design capacity is 35,600 gallons. The upper (vapor) section is a stainless steel shell is 11.5 feet in diameter containing two deentrainment pads. These wire mesh pads remove liquids and solids that entrain into the vapor section of the vessel. Spray nozzles, using recycled process condensate or filtered raw water, wash collected solids from the deentrainment pads and vessel walls. Both sections of the vapor-liquid separator (C-A-1) are constructed of 3/8-inch-thick stainless steel.

Operating parameters in the vapor-liquid separator (C-A-1) are monitored to provide an indication of process problems such as slurry foaming, deentrainer flooding, or excessive vapor temperatures. Instrumentation also is available to monitor the liquid levels in the vapor-liquid separator (C-A-1). Interlocks are activated when high pressures or high- or low-liquid levels are detected, shutting down the evaporation process and placing the facility in a safe configuration. Three configurations can be achieved during operation of the 242-A Evaporator:

4.1.7.2.2 Evaporator Room

The evaporator room contains the vapor-liquid separator vessel (C-A-1), part of the recirculation loop, the reboiler, the 42-inch vapor line, and line used to empty the vapor-liquid separator to feed tank 241-AW-102.

The evaporator room secondary containment walls are ~~0.56-meter (~~22-inch~~)~~-thick reinforced concrete. The secondary containment floor is ~~0.51-meter (~~20-inch~~)~~-thick reinforced concrete. Leaks in the evaporator room flow to a floor drain that routes through a 3-inch line to the pump room sump described in Section 4.1.7.2.1. A leak in the evaporator room would be detected by a rise in the pump room sump level. The floor of the evaporator room and a portion of the pump room floor are 10 feet below grade to contain the entire contents of the vapor-liquid separator, reboiler, and recirculation loop in the event of a catastrophic failure. The floor and walls of the evaporator room up to an elevation of 6 feet are painted with a special protective coating.

4.1.7.2.3 Condenser Room

The condenser room contains all the components of the process condensate system described in Section 4.1.4 (refer Figure 4.4), including the condensate collection tank TK-C-100.

The condenser room secondary containment walls are 12 to 22-inch-thick reinforced concrete. The secondary containment floor is 20-inch-thick reinforced concrete. Leaks in the condenser room flow to two floor drains that join and route through a 6-inch line to feed tank 241-AW-102. Leaks in the condenser room are detected by the following:

- Unexpected changes in liquid level in the condensate collection tank (TK-C-100). Instrumentation is provided to monitor liquid level in the tank, including high- and low-level alarms.
- Daily visual inspections of process condensate system components and piping.
- Unexplained level increases in feed tank 241-AW-102 because of liquid entering the common drain line from 242-A Evaporator.

The floor and walls of the condenser room up to an elevation of 4 feet are painted with a special protective coating.

4.1.7.2.4 Ion Exchange Room

The ion exchange room is a small room connected to the condenser room. This room previously contained an ion exchange column that has since been removed from the processing unit in 2003. The ion exchange room walls are 12 inches thick reinforced concrete. The floor is 20-inch thick reinforced concrete. The room contains a single pipeline used to transfer process condensate during a campaign if the process condensate is diverted to feed tank 241-AW-102. The pipeline within the ion exchange room does not contain valves or other components that could release waste into the ion exchange room other than by a rupture of the line.

Surveillance of the ion exchange room is only required if the piping is returned to service and dangerous waste is reintroduced to the piping as would be the case for diverting process condensate to feed tank 241-AW-102.

4.1.7.2.5 Loading Room and Loadout and Hot Equipment Storage Rooms

The loading room and the load-out and hot equipment storage rooms are used to support maintenance of pump room equipment and store contaminated reusable equipment. Movement of equipment, waste, personnel and other items in and out of the unit as necessary to support ongoing operations and maintenance activities in contaminated zones can occur in these rooms. A contamination control curtain may also be closed in support of evolutions conducted in the load-out and hot equipment storage room to control the spread of contamination. The load-out and hot equipment storage room contains a slurry sampling system.

transfer, the transfer operator notifies the 242-A Evaporator Control Room operator of the appropriate action regarding processing operations.

4.1.7.3.2 Slurry Line Piping

The slurry pump (P-B-2) transfers mixed waste through one of two transfer lines: SL-167, for transfer to valve pit 241-AW-B (standard configuration), or SL-168 for transfer to valve pit 241-AW-A (alternate configuration). Slurry solution can be routed via double-encased piping from these valve pits to any designated DST System slurry receiver tank. Both slurry transfer lines consist of 2-inch transfer piping within a 4-inch secondary containment encasement piping. Both the transfer and encasement pipes are constructed of Schedule 40 carbon steel. The lines run below grade about 240 feet between the 242-A Building and the valve pits. If the DST System MCS annunciates a leak alarm associated with the DST System transfer, the transfer operator notifies the 242-A Evaporator Control Room operator of the appropriate action regarding processing operations.

4.1.7.3.3 PC-5000 Transfer Line

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

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

This permit includes the portion of the PC-5000 transfer line leaving the 242-A Evaporator to the TSD unit group boundary of LERF and 200 Area ETF (Part A Form, Addendum A).

Single-point electronic leak detection elements are installed along the transfer line at 1000-foot intervals. The leak detection elements are located in the bottom of specially designed test risers. Each sensor element employs a conductivity sensor, which provides a signal to the 242-A Evaporator control room when a potential leak is detected. If a leak develops in the primary pipe, fluid will travel down the exterior surface of the primary pipe or the interior of the secondary containment pipe. As moisture contacts a sensor unit, a general alarm sounds in the 242-A Evaporator control room on the MCS. In addition, the zone of the sensor unit causing the general alarm can be determined using the leak detection-monitoring panel. Upon verification of a leak, the pump located in the 242-A Evaporator is shutdown, stopping the flow of aqueous waste through the transfer line. When the transfer line is not in use a low-volume air purge of the annulus between the primary pipe and the secondary containment pipe can be used, if needed to prevent condensation buildup and minimize false alarms by the leak detection elements. If the leak detection system is not available, visual inspection is employed ~~as discussed below. If a leak is detected using visual inspection of the PC-5000 transfer line encasement~~ at the encasement catch tank 60M-TK-1,~~(TK-PC-101) in the~~ at the LERF catch basin (242AL-43). If a leak is detected using visual inspection of the PC-5000 transfer line encasement, the shift manager is notified. The ~~S~~shift manager ~~Manger~~ will direct shutdown of the aqueous waste through the PC-5000 transfer line.

4.1.7.4 Additional Requirements for Specific Types of Systems

Addressed in this section are additional requirements in WAC 173-303-640 for vault systems like the 242-A Building to ensure neither buildup of ignitable vapors nor does infiltration of precipitation occur. This section also addresses secondary containment for ancillary equipment and piping associated with the tank systems.

4.1.7.4.1 Vault Systems

The 242-A Building is a vault constructed partially below ground, providing secondary containment for the tank systems. The 242-A Evaporator Part A Form (Chapter 1) contains the ignitable waste number because of the presence of nitrite and nitrate salts, which in sufficient concentrations are considered oxidizers per WAC 173-303-090(5)(a)(iv). Because of their low volatility, these compounds are unlikely

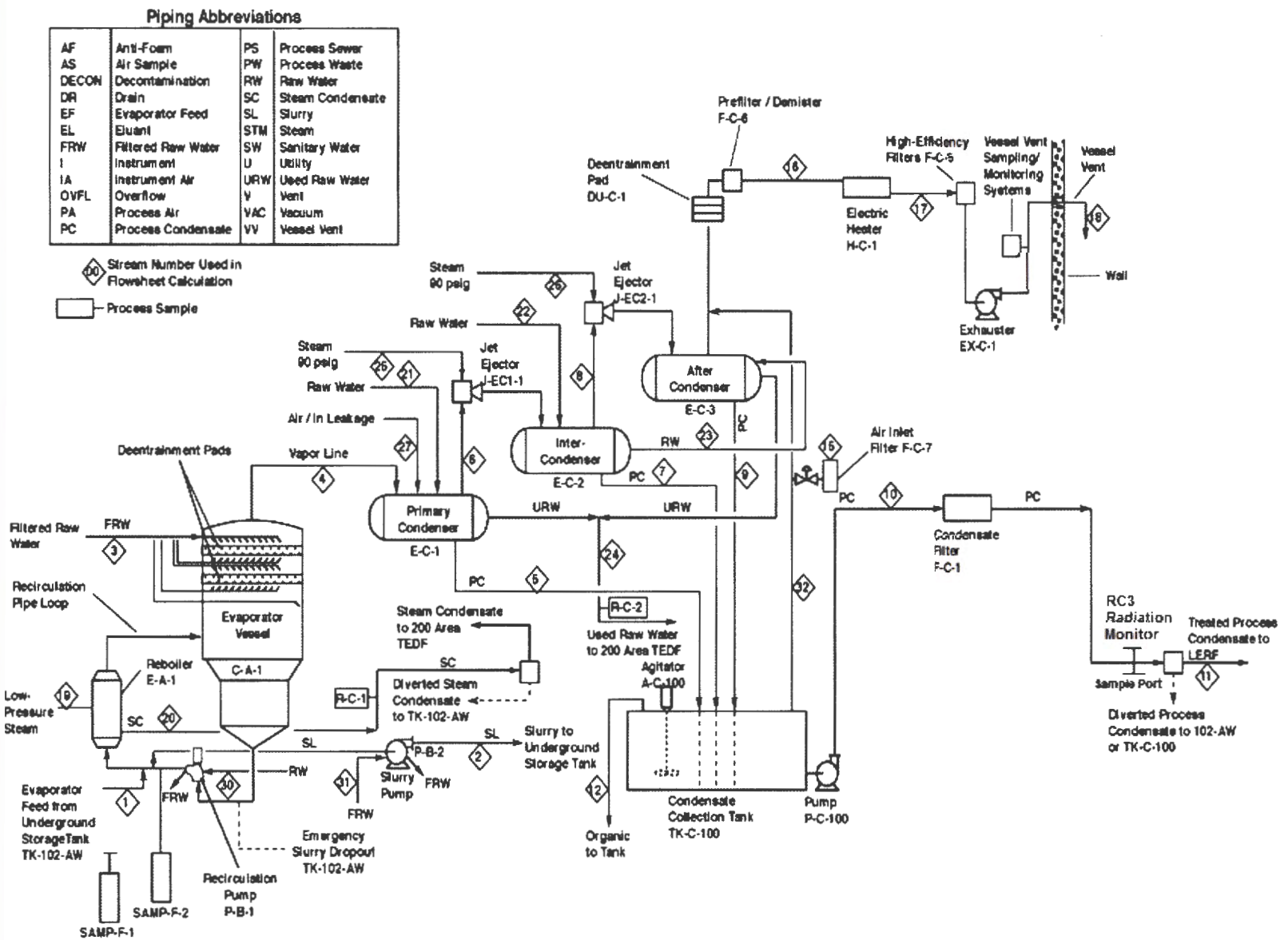

Figure 4.1. 242-A Evaporator Simplified Process Flow Diagram

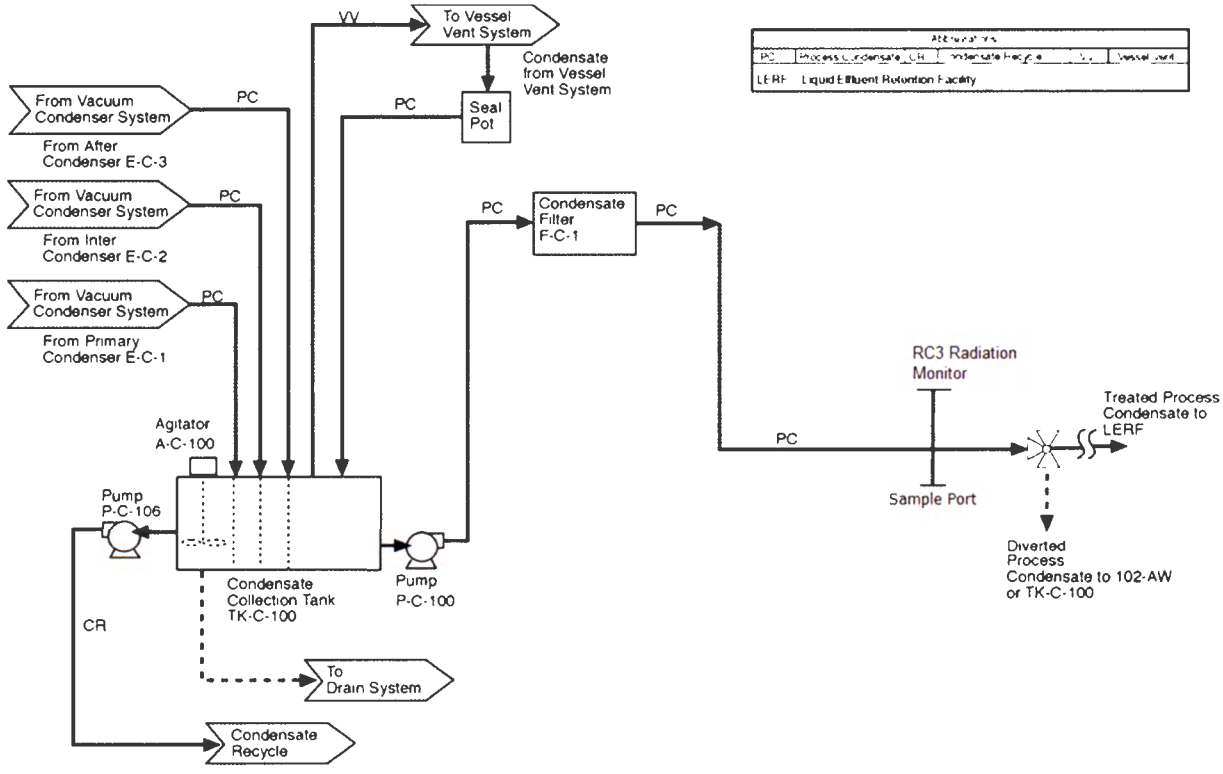

Figure 4.4. 242-A Evaporator Process Condensate System

242-A EVAPORATOR
CHAPTER 6.0
PROCEDURES TO PREVENT HAZARDS

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
11/16/2017	8C.2017.5F
02/18/2016	8C.2015.Q4

load out room to reduce the likelihood of contaminants reaching the environment through the load out door. When extended, the contamination control curtain will limit visibility to the load out and hot equipment storage room from the shielding window on the AMU mezzanine while completing inspections. When this is the case, inspection forms will denote that the containment curtain was extended. Leaks in the evaporator room, pump room, and the loadout and hot equipment storage room drain to the pump room sump. The sump high-level alarm serves as a leak detector for these rooms. For information on the rooms and their drain systems, refer to Chapter 4.0, Process Information.

The PC-5000 transfer line may be continuously monitored during transfers by an electronic leak detection system (Chapter 4.0, Process Information) or visually inspected at the encasement catch tank (~~TK-PC-101~~60M-TK-1) in the Liquid Effluent Retention Facility (LERF) catch basin (242AL-43). The leak detection system alarms are monitored in the 242-A Evaporator Control Room on the Monitoring and Control System (Chapter 4.0, Process Information). When necessary, visual inspections of the PC-5000 transfer line encasement are administratively controlled by the 242-A Evaporator Shift Manager and occur at a minimum once every 24 hours during waste water transfers through the PC-5000 transfer line to ensure compliance with WAC 173-303-640(4)(c)(iii). Visual inspection for leaks from the PC-5000 transfer line are performed by 242-A Evaporator Operations, by looking for signs of any liquid not attributed to rain/precipitation at the encasement catch tank (~~TK-PC-101~~60M-TK-1). If any liquid is observed the 242-A Evaporator Shift Manager is notified to take corrective actions.

6.2.2.4 Alternative Leak Detection during Electrical/Ventilation Outages

As part of maintenance or system upgrades, the need to secure electrical power or ventilation to the 242-A Evaporator sometimes becomes necessary. This includes activities such as, but not limited to: cleaning and inspection of the motor control centers (MCCs) for distributing electrical power to the systems at the 242-A Evaporator, ventilation system maintenance and upgrades. Planned electrical or ventilation outages are performed during periods when Double Shell Tank System waste is not being processed.

During times when access is limited as a result of electrical or ventilation outages, performance of daily inspections specified in Table 6.1 may be impacted. When impacted, an alternative method of leak detection is implemented for the condenser room, and the inspections are suspended in the pump room, loadout and hot equipment storage room, and the loading room.

When impacted in the condenser room, a camera will be placed above the floor drain to detect the presence of leaks or spills. The process condensate collection tank (TK-C-100), located in the condenser room, is the only tank storing dangerous waste on a routine basis. It is not normal to allow personnel access into the condenser room during extended electrical or ventilation outages unless maintenance activities or upgrades require entry. If required, the camera and subsequent television monitor will be provided electrical power via an alternative source. Operators will complete their daily observations for leaks or spills using this method for the condenser room. Facility personnel will document the use of this alternative method in the Hanford Facility Operating Record, 242-A Evaporator unit specific portion.

For the pump room, loadout and hot equipment storage room, and the loading room, these rooms do not have the capability for a camera so those inspections are suspended during maintenance activities affecting the electrical power supply to the overhead lighting.

Performance of Table 6.1 daily inspections is not possible. Storage of mixed waste does not occur in these rooms because systems which manage mixed waste within the pump room and the loadout and hot equipment storage room are flushed and gravity drained to the extent possible after each campaign. Should any remaining liquid leak from primary containment; it is captured by the secondary containment system and routed to the pump room sump and ultimately to the 241-AW-102 DST System feed tank. Quantities of liquid sufficient to reach 241-AW-102 would cause a change in tank level. Facility personnel will document when inspections cannot be performed due to electrical outages in the Hanford Facility Operating Record, 242-A Evaporator unit specific portion.

The process described in the preceding paragraphs of this section may also be implemented when external events cause electrical or ventilation outages.

6.2.2.5 Cathodic Protection

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

6.2.2.6 Tank Assessments

The IARs were issued in 1998 and 2008. The frequency and nature of these assessments are discussed in Chapter 4.0, Process Information.

6.2.3 Storage of Reactive and Ignitable Wastes

Inspection of areas where ignitable or reactive wastes are stored is conducted by a professional person who is familiar with the International Fire Code, or in the presence of the local, state, or federal fire marshal. The inspection record includes the date and time of the inspection, the name of the professional inspector, a notation of the observations made, and any remedial actions which were taken as a result of the inspection. The completed inspection record is included in the Hanford Facility Operating Record, 242-A Evaporator unit-specific portion.

6.2.4 Air Emissions Control and Detection Inspections

The process vent at the 242-A Evaporator is subject to 40 CFR 264, Subpart AA, which requires organic emissions be limited to 1.4 kilograms (3 pounds) per hour, and 2.8 mega grams (3.1 tons) per year, or controls be installed to reduce organic emissions by 95 percent. Organic concentrations in the waste processed at the 242-A Evaporator are limited to ensure the values of 1.4 kilograms (3 pounds) per hour and 2.8 mega grams (3.1 tons) per year are not exceeded. Therefore, no emission control devices are installed on the 242-A Evaporator vessel ventilation system and no inspections are required (Chapter 4.0, Process Information).

6.2.5 Inspection Logs

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

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

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

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

6.2.6 Schedule for Remedial Action for Problems Revealed

If while performing a visual inspection (Table 6.1), a leak or spill is discovered, 242-A Evaporator management responds immediately per Chapter 7.0, Contingency Plan. Action is taken to stop the leak and determine the cause. The waste is removed from the secondary containment within 24 hours or in a timely manner that prevents harm to human health and the environment. The specific actions for the pump room sump are described in Chapter 4.0, Process Information.

If an alarm activates during inspections, an operator responds immediately and implements appropriate actions.

If an inspection identifies equipment that is missing, damaged, or not operating properly, the operator records the problem on a deficiency log in the 242-A Evaporator control room or on electronic media. Repair work is prioritized by 242-A Evaporator management to mitigate health and environmental risks.

6.3 Preparedness and Prevention Requirements

The following sections document the preparedness and prevention measures taken at the 242-A Evaporator.

6.3.1 Equipment Requirements

The following sections describe the internal and external communications and emergency equipment located at the 242-A Evaporator that can be activated by the 242-A Evaporator Building Emergency Director (BED). Hanford Facility-wide equipment is identified in Permit Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02).

6.3.2 Internal Communications

The 242-A Evaporator is equipped with internal communication systems to provide immediate emergency instruction to personnel. The onsite communication systems at the 242-A Evaporator include telephones, hand-held two-way radios, a public address system, and alarm systems. The telephone and radio systems provide for internal and external communication. Alarm systems allow personnel to appropriately respond to various emergencies, including building evacuations, take cover events, fires and/or explosions. The locations of telephones, public address systems, and alarms are given in the Chapter 7.0, Contingency Plan.

Immediate emergency instruction to personnel is provided by a public address system using speaker horns and speakers located throughout the 242-A and 242-AB Buildings and outside.

6.3.2.1 External Communications

The 242-A Evaporator is equipped with devices for summoning emergency assistance from the Hanford Fire Department, the Hazardous Materials Response Team, and/or Hanford Patrol, as necessary. External communication to summon emergency assistance is made by using a telephone communication system, fire alarm pull boxes, or hand-held radio as described in Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02). These devices are provided throughout the 242-A Evaporator.

During certain periods, only one operator may be available within the 200 East plateau. This operator has access to external communication using telephones located throughout the building.

6.3.2.2 Emergency Equipment

Emergency equipment is available throughout the 242-A Building. The locations of emergency equipment are provided in Chapter 7.0, Contingency Plan.

Major fire damage is unlikely at the 242-A Evaporator because of the concrete construction and because the amount of combustible material is minimized. Temperature activated water sprinkler systems, emergency lights, fire alarms pull boxes, and fire extinguishers are located throughout the 242-A Evaporator. The 242-A Evaporator relies primarily on the Hanford Fire Department to respond to fires and other emergencies as described in Permit Attachment 4, *Hanford Emergency Management Plan*, (DOE/RL-94-02). The Hanford Fire Department is capable of providing rapid response to fires within the 200 East Area.

Safety showers are used to decontaminate personnel. Water for these devices is supplied from the sanitary water system.

line. This system allows either raw water or process condensate to be used for the pump seal water and deentrainment pad spray water without risk of contamination of the raw water system.

The sanitary water system provides water to the lunchroom, drinking fountains, men's and women's change rooms, and safety showers. There are no connections between sanitary water and any system or piping containing mixed waste.

6.4.4 Equipment Failure and Power Outages

The 242-A Evaporator is designed to mitigate the effects of failure of a major piece of equipment. In the event of equipment failure or power outages, the evaporator process can be shut down and the vapor liquid separator (C-A-1) gravity drains to the DST System feed tank, 241-AW-102, and the process condensate collection tank (TK-C-100), is designed to overflow to DST System feed tank, 241-AW-102. This places the 242-A Evaporator in a safe configuration, and mitigates failure of the process condensate pump used to transfer the process condensate to LERF.

Upon loss of power the following automatically occur:

- Supernate feed pump AW-P-102, which is located in a DST tank, de-energizes, stopping feed to the vapor liquid separator C-A-1 vessel.
- Supernate feed valve HV-CA1-1 opens, initiating emptying of the vapor liquid separator C-A-1 vessel to 241-AW-102.
- Steam supply valve HV-EA1-5 to the E-A-1 reboiler closes, ceasing boil off in the vapor liquid separator C-A-1 vessel.
- Vapor liquid separator C-A-1 vessel vacuum breaker HV-EC1-5 opens, ceasing boil off in the vapor liquid separator C-A-1 vessel.
- Recirculation pump P-B-1 de-energizes, stopping recirculation through the recirculation loop.
- Dump valves HV-CA1-7 and HV-CA1-9 open, draining waste in the vapor liquid separator C-A-1 vessel to 241-AW-102.
- Uninterruptible power supply (UPS) will provide temporary power to the MCS long enough to monitor the safe shutdown of the process described above.
- Personnel emergency equipment (Fire Alarm Control Panels, Emergency lighting and exit lights) operates on backup battery power to support safe exit from the facility if an emergency condition occurs.

Power Outages are discussed in Chapter 7.0, Contingency Plan.

6.4.5 Personnel Exposure

Design, administrative controls, and personal protective equipment are used at the 242-A Evaporator to prevent undue exposure of personnel to mixed waste.

The following features were incorporated into the 242-A Evaporator design to minimize personnel exposure.

- The 242-A Evaporator is designed for remote operation of equipment containing highly radioactive solutions such as waste feed and slurry. These solutions usually are present only in the pump room and evaporator room, which are heavily shielded and routinely are not entered by operating personnel.
- The 242-A Building ventilation system is designed to provide airflow from uncontaminated zones to progressively more contaminated zones.
- Emergency lighting devices are located strategically throughout the 242-A Evaporator.
- Eyewash stations and safety showers are located as identified in Chapter 7.0, Contingency Plan.

Hanford Facility RCRA Permit Modification Notification Forms

Part III, Operating Unit Group 5

325 Hazardous Waste Treatment Units

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Page 2 of 3 Addendum J – Applicability Matrix

Page 3 of 3: Revision Instructions

Submitted by Co-Operator:

Cameron M. Andersen 5-29-18

Cameron M. Andersen Date

Reviewed by DOE Program Office:

Jeffery L. Bird 31 May 2018

Jeffery L. Bird Date

Hanford Facility RCRA Permit Modification Form

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

Description of Modification:

Modify Addendum J, "Applicability Matrix", as follows:

- Revise the document header as follows:
  Attachment to Addendum J Building Emergency Procedure Applicability Matrix
- Revise footnotes 1 and 2 to refer to "Current Revision" and delete the date reference.
- Delete Footnote 3

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

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

Modification Concurrence: [X] Yes [ ] No
Reason for Non-concurrence:

Reviewed by Ecology:
S. L. Dahl-Crumpler 6/11/18
Date

Revision Instructions:

Revise Addendum J, Applicability Matrix to incorporate the changes shown herein.

Attachment to Addendum J **Building Emergency Procedure Applicability Matrix**

325 Hazardous Waste Treatment Units
Location of Preparedness and Prevention, Contingency Planning, and Emergency Response Information Required by WAC 173-303-340, -350, and -360, -630, and -640

WAC Requirement WAC 173-303-XXX	**Permit Attachment 4** *Hanford Emergency Management Plan,* DOE/RL-94-02[1]	**Addendum J, 325 Building Emergency Procedure[2]**	**Permit, Part III, Operating Unit Group 5, 325 HWTUs[3]**
-340(1)(a), internal communications and alarms	Table 5-1	Section 10.3	Addendum F, Sections F.1.1.1 and F.1.1.2
-340(1)(b), device capable of summoning emergency assistance		Section 10.3	Addendum F, Sections F.1.1.1 and F.1.1.2
-340(1)(c), fire extinguishing, spill control, and decontamination equipment	Section 11.2.8 (Hanford Fire Department)	Sections 10.2, 10.4 and 10.5	Addendum F, Sections F.1.1.3 and F.2.5
-340(1)(d), water supply			Addendum F, Sections F.1.1.3 and F.1.1.4
-340(1)(d), periodic testing and maintenance	Section 11.3 (communications and alarms)	Section 3.4, second paragraph, 24th bullet	Addendum I, Sections I.1.1.2 and I.1.1.3
-340(2)(a), alarm availability		Section 10.3	Addendum F, Sections F.1.1.1 and F.1.1.2 Addendum C, Section C.1.2
-340(2)(b), immediate access to alarm by single person on premises		Section 10.3	Addendum F, Sections F.1.1.1 and F.1.1.2 Addendum C, Section C.1.2
-340(3), aisle space			Addendum F, Section F.1.2 Addendum C, Section C.1.2
-340(4), arrangements with local authorities	Sections 3.2.3, 3.3.1, 3.3.2, 3.4, 3.4.1.1, 3.4.1.2, 3.4.1.3, 3.7, and Table 3-1	Section 1.6	Permit Condition II.B.4, Permit Condition II.I.1.g and Attachment 6
-340(5), records of local authorities declining to make advance arrangements			Permit Condition II.I.1.g and Attachment 6
-350(1), contingency plan and implementation	Sections 1.1 and 4.2	Section 1.0	

[1] Current Revision ~~6, June 2014.~~

[2] Current Revision ~~14, 2/12/2015.~~

[3] ~~Class 3 modification, May 2014 (325 HWTUs addenda); Permit Rev. 8C, December 2014 (general conditions and attachments).~~

-350(2), contingency plan and "one plan"	Sections 1.1 and 4.2	Section 1.0	
-350(3)(a), descriptions of actions personnel must take		Section 3.4, first and second paragraphs (building emergency director), Section 3.15, first and sixth bullets (all facility staff), and Sections 6.1, 6.2, and 6.3 (specific actions for fires, explosions, releases, odors)	
-350(3)(b), actions for damaged waste shipments		Section 6.2.3	Addendum B, §B.2.2.1.1.1.2 (activation of plan for damaged shipment)
-350(3)(c), description of arrangements with local authorities	Sections 3.2.3, 3.3.1, 3.3.2, 3.4, 3.4.1.1, 3.4.1.2, 3.4.1.3, 3.7, and Table 3-1	Section 1.6	
-350(3)(d), list of emergency coordinators		Section 3.1[4]	
-350(3)(e), list of emergency equipment	Section 11.2.8 (Hanford Fire Department)	Section 10 and Section 13, Attachments 1-3	Addendum F, Sections F.1.1.3 (emergency equipment) and F.2.5 (protective clothing)
-350(3)(f), evacuation signals and routes	Table 5-1 (signals), Figure 7-3 (routes)	Section 1.5 (signals), Section 13, Attachments 1, 2, 3, 7, and 8 (routes)	Addendum F, Section 1.1.1 (signals)
-350(4)(a), maintain copy at facility	Section 14.3.7 (copies of 94-02)	Section 2.1 (copies of 325 BEP)	Permit Condition II.I.1.e; Permit Attachment 6
-350(4)(b), provide copies to emergency response agencies	Section 14.3.7		
-350(5), amendment of plan	Section 14.3.1.1	Section 1.0	
-355(1), coordination with local agencies	Sections 3.2.3, 3.3.1, 3.3.2, 3.4, 3.4.1.1, 3.4.1.2, 3.4.1.3, 3.7, and Table 3-1	Section 1.6	
-355(2), use of computer models	Sections 1.3.3.2 and 2.2.2.3.3	Section 3.4, 2nd paragraph, 17th bullet (use of UDAC)	
-360(1), designation of emergency coordinator	Sections 1.3.4 (Incident Command) and 2.2 (designated BED for the facility)	Section 3.4, 1st paragraph and 2nd paragraph, 29th bullet	Addendum G, Section G.1 and Table G-1 (BED training)
-360(2)(a), activate alarms and notify agencies for assistance if needed	Sections 1.3.4 (incident command) and 2.2.1.1.3(b) (BED)	Section 3.4, 5th, 8th, and 16th bullets	
-360(2)(b), immediately characterize any release of materials	Section 2.2.1.1.3(g)	Section 3.4, 17th bullet	

[4] This information is not required pursuant to Permit Condition II.A.4 and is included only in order to avoid modification to the complete Building Emergency Procedure.

-360(2)(c), concurrently assess health and environmental threat	Sections 2.2.1.1.3(c), 4.2, 5.1.1, and 5.1.2	Section 3.4, 3rd and 17th bullets; Section 4 criteria	
-360(2)(d)(i), notify local authorities if evacuation required	Sections 2.2.1.1.3(e) and 5.1.1.2	Section 3.4, 8th bullet[5]	
-360(2)(d)(ii) and (e), notify Ecology and EPA	Sections 4.2 and 5.1.2.1	Section 3.4, 25th bullet	
-360(2)(f), measures to prevent occurrence, spread, or recurrence	Section 2.2.1.1.3(g)	Section 3.4, 17th bullet	
-360(2)(g), monitoring during facility shutdown	Section 2.2.1.1.3(g)	Section 3.4, 17th bullet	
-360(2)(h), provision for disposal of contaminated materials	Section 9.2.3	Section 9.2, first paragraph	Addendum F, Section 1.1.1.3 (management of contaminated water)
-360(2)(i)(i), prohibition of incompatible material	Section 9.2.3	Section 9.2, first and third paragraphs	Addendum F, Section 3.2 (management of incompatible wastes)
-360(2)(i)(ii), emergency equipment cleaned and fit for use	Section 11.2	Section 9.2, second paragraph and 9.3, last paragraph	
-360(2)(j), notification to Ecology prior to restart	Section 5.1.2.3	Section 3.4, 25th bullet; Section 3.20, second paragraph, and Section 9.2, third paragraph	
-360(2)(k), 15-day reporting	Section 5.1.2.2	Section 3.4, 25th bullet; Section 3.20, second paragraph, and Section 9.2, third paragraph	
-630(2), response to leaks from containers	Section 4.2	Section 3.4, 17th bullet; Sections 4 and 6.2	Addendum C, Section C.1.2 (repackaging of waste if container leaks)
-640(7)(d)(ii) and -640(7)(f), response to and reports of tank leaks	Sections 5.1.2.2 and 5.1.2.3	Section 3.4, 25th bullet; Section 3.20, second paragraph; Section 6.2; Section 9.2, third paragraph	Addendum C, Sections C.2.1.2.3 (non-emergency reporting) and C.2.1.2.4 (response to tank leaks)

[5] Any emergency requiring offsite evacuation constitutes an operational emergency and would meet one or more of the PNNL emergency action levels criteria.

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Quarter Ending March 31, 2018 24590-LAB-PCN-ENV-14-001

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

Index

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

Replace the Mechanical Data Sheet for the LAB Area Sink Drain Collection Vessel (RLD-VSL-00164) in Appendix 11.6 of the Dangerous Waste Permit (DWP).

Replace the Independent Qualified Registered Professional Engineer (IQRPE) Structural Integrity Assessment for the LAB RLD LAB Area Sink Drain Collection Vessel (RLD-VSL-00164) and Hot Cell Drain Collection Vessel (RLD-VSL-00165) in Appendix 11.11 of the DWP.

Submitted by Co-Operator:

Roger J. Landon 1/23/18

Roger J. Landon Date

Reviewed by ORP Program Office:

2/26/18

J. F. Grindstaff Date

Quarter Ending March 31, 2018 24590-LAB-PCN-ENV-14-001

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

Description of Modification:

The purpose of this Class 1 prime modification is to update and replace the following mechanical data sheet and IQRPE structural integrity assessment report in Appendices 11.6 and 11.11 of the DWP:

Appendix 11.6			
Replace:	24590-LAB-MVD-RLD-P0164, Rev. 1	With:	24590-LAB-MVD-RLD-00164, Rev. 3
Appendix 11.11			
Replace:	AREVA-IA-3007244-000 - 24590-CM-HC4-HXYG-00240-02-00004	With:	IA-3007244-001

This modification requests Ecology approval and incorporation into the permit the specific changes to the mechanical data sheet and IQRPE structural integrity assessment report indicated by revision notes, clouds and change bars. These documents include changes provided in applicable document change forms (e.g., DCN, SCN, SDDR, FCN, FCR, etc.). In addition, the mechanical data sheet and IQRPE structural integrity assessment report 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 mechanical data sheet (24590-LAB-MVD-RLD-00164, Rev. 3) are summarized below:

- Revised and added reference document numbers for the P&ID, calculation, and vessel drawing.
- Added a new field labeled "Reports/Other Documentation."
- Updated Design Data such as quality level, seismic category, reference document number for fabrication specs, estimated weights (empty, operating, and test), and reference document number for seismic design.
- Updated Materials of Construction Data for the pipe material and minimum thickness/size of the support (skirt).
- Revised Remarks section.
- Added Seismic section below the Remarks section.

Updates to the integrity assessment report for vessels RLD-VSL-00164 and RLD-VSL-00165 are summarized below:

- The documents listed in the "References" row and under the "Source of Information" column were updated. These documents were reviewed to assess the design of the vessels.
- For each item of "Information Assessed" in the updated report, the items listed under the "Source of Information" column were reviewed and found to furnish adequate design requirements and controls to ensure the design fully satisfies the requirements of Washington Administrative Code (WAC), WAC-173-303-640, Dangerous Waste Regulations for Tank Systems.

This PCN updates information in Appendices 11.6 and 11.11 to reflect current design. This DWP component may be re-evaluated to confirm design adequacy. If the re-evaluation results in future design changes, the changes will be reviewed by Ecology in subsequent permit modifications.

The following outstanding change documents have been submitted to Ecology pursuant to Permit Condition III.10.C.9.h and are maintained in the WTP Operating Record:

24590-LAB-MVD-RLD-00164, Rev. 3
24590-WTP-CDR-CON-12-0524 – provided to Ecology in milk run (CCN 261745 and CCN 261749)

Quarter Ending March 31, 2018 24590-LAB-PCN-ENV-14-001

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

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

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

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

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

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

Reason for denial:

Reviewed by Ecology:

S. Dahl 5/15/18 Date

24590-CM-HC4-HXYG-00240-02-00016 REV 00A

AREVA

R11800301

AFS-16-0195

September 21, 2016

ISSUED BY
RPP-WTP PDC

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

Dear Ms. Klatt:

BECHTEL NATIONAL, INC. CONTRACT NO. 24590-CM-HC4-HXYG-00240 IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAB RLD-LAB AREA SINK DRAIN COLLECTION VESSEL (RLD-VSL-00164) AND HOT CELL DRAIN COLLECTION VESSEL (RLD-VSL-00165) (IA-3007244-001)

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

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

Sincerely,

Elizabeth W. Smith, C.P.M
Contract Administrator
AREVA Federal Services LLC
Richland Office

Enclosure (1)

LP

cc: D. C. Pfluger, MS12-2A w/enclosure (1)

AREVA Federal Services LLC

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AREVA

IA-3007244-001

IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAB RLD LAB AREA SINK DRAIN COLLECTION VESSEL (RLD-VSL-00164) AND HOT CELL DRAIN COLLECTION VESSEL (RLD-VSL-00165)

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

AREVA

IA-3007244-001

IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAB RLD LAB AREA SINK DRAIN COLLECTION VESSEL (RLD-VSL-00164) AND HOT CELL DRAIN COLLECTION VESSEL (RLD-VSL-00165)

"I, Tarlok Singh Hundal, have reviewed and certified a portion of the design of a new tank system or component located at the Hanford Waste Treatment Plant, owned/operated by Department of Energy, Office of River Protection, Richland, Washington. My duties were independent review of the current design for the LAB Area Sink Drain Collection Vessel (RLD-VSL-00164) and Hot Cell Drain Collection Vessel (RLD-VSL-00165), as required by the Washington Administrative Code, Dangerous Waste Regulations, Section WAC-173-303-640(3) (a) through (g) applicable components."

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

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

The attached review is nineteen (19) pages numbered one (1) through nineteen (19).

TARLOK SINGH HUNDAL
STATE OF WASHINGTON
20213
REGISTERED
PROFESSIONAL ENGINEER

Signature

9/21/2016
Date

Scope	Scope of this Integrity Assessment	This Integrity Assessment includes the following two vessels located in the Analytical Laboratory Building: • LAB Area Sink Drain Collection Vessel (RLD-VSL-00164), located in cell A-B003 at Elevation (-) 18'-7" as shown on Drawing 24590-LAB-P1-60-00007 (see pages 4-11), and • Hot Cell Drain Collection Vessel (RLD-VSL-00165), located in cell A-B004 at Elevation (-) 19'-2" as shown on Drawing 24590-LAB-P1-60-00007 (see pages 12-19). **Note: This report IA-3007244-001, supersedes previous report 24590-CM-HC4-HXYG-00240-02-00004, Rev. 00A, (IA-3007244-000)**
Summary of Assessment		For each item of "Information Assessed" (i.e., Criteria) on the following pages, the documents listed under "Source of Information" were reviewed and found to furnish adequate design requirements and controls to ensure that the design fully satisfies the requirements of Washington Administrative Code (WAC), Chapter 173-303 WAC, *Dangerous Waste Regulations,* Section WAC-173-303-640 (3) (a) through (g) applicable elements of the *Tank Systems.*

References	Material Requisitions, Specifications, and Drawings	Material Requisitions (MR): 24590-CM-MRA-MVA0-00010, Rev. 1, Pressure Vessels, High Alloy or Clad-LAB (MS099) (N130) (for vessel RLD-VSL-00164, including Material Requisition Supplement Nos. S0003, S0004, S0005, S0006, S0007, and S0008 to MR Rev. 1); 24590-QL-MRA-MVA0-00008, Rev. 2, Pressure Vessels, Shop Fabricated, Large, QL-LAB (MS004) (N142) (for vessel RLD-VSL-00165, including Material Requisition Supplement No. S0006 to MR Rev. 2). Specifications: The following Specifications with their respective revision and Specification Change Notices (SCNs) are listed in the above listed Material Requisitions: 24590-WTP-3PS-MV00-T0001, Engineering Specification for Pressure Vessel Design and Fabrication; 24590-WTP-3PS-MV00-T0002, Engineering Specification for Seismic Qualification Criteria for Pressure Vessels; 24590-WTP-3PS-MVB2-T0001, Engineering Specification for Welding of Pressure Vessels, Heat Exchangers, and Boilers; 24590-WTP-3PS-G000-T0002, Engineering Specification for Positive Material Identification (PMI) for Shop Fabrication; 24590-WTP-3PS-G000-T0003, Engineering Specification for Packaging, Handling, and Storage Requirements; 24590-WTP-3PS-FB01-T0001, Engineering Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks. Plant Drawings: 24590-LAB-P1-60-00007, Rev. 3, Analytical Laboratory General Arrangement Plan at El. (-) 19'-2", Sections E-E, F-F, & G-G; 24590-LAB-M5-V17T-00029, Rev. 4, WTP Analytical Laboratory Process Flow Diagram Radioactive Liquid Disposal; 24590-LAB-M6-RLD-00001001, Rev. 1, P & ID-LAB Radioactive Liquid Waste Disposal System - C5 Collection and Transfer; 24590-LAB-M6-RLD-00002001, Rev. 1, P & ID-LAB Radioactive Liquid Waste Disposal System - C3 Collection & Transfer.

References (Cont'd)	Drawings, Mechanical Data Sheets, and System Design Description	Vendor Fabrication Drawings (*Bechtel Status Code 1 Drawings): 24590-CM-POA-MVA0-00010-01-02, Rev. 00H, (+LAB-VDCN-MS-14-00002) General Arrangement (RLD-VSL-00164); 24590-CM-POA-MVA0-00010-01-00006, Rev. 00F, Skirt Detail (RLD-VSL-00164); 24590-CM-POA-MVA0-00010-01-00007, Rev. 00G, (+LAB-VDCN-MS-14-00002) Nozzle Details (RLD-VSL-00164); 24590-CM-POA-MVA0-00010-01-00008, Rev. 00F, (+LAB-VDCN-MS-14-00002) Nozzle Details (RLD-VSL-00164); 24590-CM-POA-MVA0-00010-01-00012, Rev. 00D, (+LAB-VDCN-MS-14-00002) Nozzle Details (RLD-VSL-00164); 24590-CM-POA-MVA0-00010-01-00015, Rev. 00B, (+LAB-VDCN-MS-14-00003) Internal Nozzle Support Details (RLD-VSL-00164); 24590-CM-POA-MVA0-00010-01-00016, Rev. 00B, (+LAB-VDCN-MS-14-00003) Internal Support Details (RLD-VSL-00164); 24590-QL-POC-MVA0-00008-01-00001, Rev. 00G, Hot Cell Drain Collection Vessel Assembly Section & Details (RLD-VSL-00165); 24590-QL-POC-MVA0-00008-01-00002, Rev. 00D, Hot Cell Drain Collection Vessel Assembly Section & Details (RLD-VSL-00165); 24590-QL-POC-MVA0-00008-01-00004, Rev. 00D, Hot Cell Drain Collection Vessel Nozzle Shell & Repad Details (RLD-VSL-00165); 24590-QL-POC-MVA0-00008-01-00007, Rev. 00D, Hot Cell Drain Collection Vessel Nozzle Shell & Repad Details (RLD-VSL-00165); 24590-QL-POC-MVA0-00008-01-00009, Rev. 00D, Hot Cell Drain Collection Vessel Skirt Assembly & Details (RLD-VSL-00165); 24590-QL-POC-MVA0-00008-01-00010, Rev. 00C, Hot Cell Drain Collection Vessel Skirt Assembly & Details (RLD-VSL-00165). * Bechtel Status Code 1 Drawing is an "as fabricated vendor drawing" approved/accepted by Bechtel. Mechanical Data Sheets: 24590-LAB-MVD-RLD-00164, Rev. 3, Lab Area Sink Drain Collection Vessel (RLD-VSL-00164); 24590-LAB-MVD-RLD-00165, Rev. 2, Hot Cell Drain Collection Vessel (RLD-VSL-00165). System Design Description : 24590-LAB-3ZD-RLD-00001, Rev. 0, Lab Radioactive Liquid Waste Disposal (RLD) System Design Description.

	Information Assessed	Source of Information	Assessment
Design	Vessel design standards are appropriate and adequate for the vessel's intended use.	Specifications, Drawings, and Mechanical Data Sheet listed above under References; ASME Boiler and Pressure Vessel (B&PV) Code, Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers.	The RLD system LAB Area Sink Drain Collection Vessel, RLD-VSL-00164 and all appurtenances are designed to the ASME B&PV Code, Section VIII, Division 1 rules which are appropriate for pressure vessels operating with mixed waste solutions over the pressure and temperature ranges specified for this vessel. Supplementary requirements are specified in the Engineering Specification for Pressure Vessel Design and Fabrication. Supplementary requirements address pressure vessel fatigue analysis, positive material identification, lifting attachment design, equipment drop evaluation, fabrication tolerances, acceptable welding procedures for the vessel and appurtenances, welder qualifications and testing records, NDE inspections and records, and lifting, packaging, shipping, handling and storage requirements. These are adequate and acceptable design standards for the intended use of the vessel. The Mechanical Data Sheet for the vessel identifies it as Quality Level (CM) and Seismic Category (SC-IV) equipment. The RLD-VSL-00164 is a vertical vessel with a 102 in. ID and a height of 69 in. from the bottom tangent line to the top tangent line. The vessel's shell is built with 3/8" thick plate and top and bottom Flanged & Dished (F & D) heads are built with 15/16" and 3/8" thick plates, respectively. The vessel is supported on a cylindrical skirt (approx. 1'-10" high) which in turn is supported on a base plate anchored to the concrete floor at Elev. (-) 18'-7". The vessel has internal equipment such as eductors, spray nozzles, and piping that are supported from the vessel's top head. Material for the shell, bottom and top head, and the vessel's internal equipment is UNS N08367 (6% Molybdenum stainless steel alloy) and hereafter referred to as 6% Mo. The supporting skirt is specified as SA-240 304 stainless steel plate (0.030% maximum carbon content) and is hereafter referred to as 304 stainless steel. The operating volume is to be about 2,740 gallons and the total internal volume is to be about 3,180 gallons.

	Information Assessed	Source of Information	Assessment
Design (cont'd)	If a non-standard vessel is to be used, the design calculations demonstrate sound engineering principles of construction.	Specifications, Material Requisition, Drawings, and Mechanical Data Sheet listed above under References; ASME Boiler and Pressure Vessel (B&PV) Code, Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; 24590-CM-POA-MVA0-00010-05-02, Rev. 00D, Pressure Vessel Calculations of Lab Area Sink Drain Collection Vessel (RLD-VSL-00164); 24590-LAB-VDCN-MS-11-00002, Revise Supplier Calculation for CM LAB RLD Collection Vessel 24590-LAB-MV-VSL-00164 to Incorporate IQRPE Comments (Vessel Anchorage Calculation); 24590-LAB-VDCN-MS-14-00002, Update Nozzle BOM and Code Calculation for Vessel 24590-LAB-MV-VSL-00164; 24590-LAB-VDCN-MS-14-00003, RLD-VSL-00164, Evaluation of Interior Pipe Guides Weld Deficiencies for Vessel 24590-LAB-MV-VSL-00164.	The RLD system LAB Area Sink Drain Collection Vessel, RLD-VSL-00164 is a non-standard ASME B&PV Code, Section VIII, Division 1 vessel. The Mechanical Data Sheet requires that the ASME B&PV Code, Section VIII, Division 1 vessel be delivered after design, fabrication, inspection and testing with an ASME code stamp and that the vessels be nationally registered. Supplemental design information is provided by the reference documents listed in the Source of Information column for utilizing sound engineering principles of construction of the vessels. Review of the Pressure Vessel Calculations (including listed VDCNs) shows that the vessel has been designed as a non-standard vessel per applicable requirements of ASME B&PV Code, Section VIII, Division 1 and other documents listed in the Material Requisition for the vessel. The aforementioned statements and the vendor fabrication drawings reviewed demonstrate that sound engineering principles of construction and fabrication have been used for the vessel.

	Information Assessed	Source of Information	Assessment
Design (cont'd)	Vessel has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.	Specifications, Material Requisition, Drawings, and Mechanical Data Sheet listed above under References; ASME Boiler and Pressure Vessel (B&PV) Code, Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; ASME Boiler and Pressure Vessel (B&PV) Code, Section VIII, Division 2, Alternate Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; 24590-CM-POA-MVA0-00010-05-02, Rev. 00D, Pressure Vessel Calculations of Lab Area Sink Drain Collection Vessel (RLD-VSL-00164); 24590-LAB-VDCN-MS-11-00002, Revise Supplier Calculation for CM LAB RLD Collection Vessel 24590-LAB-MV-VSL-00164 to Incorporate IQRPE Comments (Vessel Anchorage Calculation); 24590-LAB-VDCN-MS-14-00002, Update Nozzle BOM and Code Calculation for Vessel 24590-LAB-MV-VSL-00164; 24590-LAB-VDCN-MS-14-00003, RLD-VSL-00164, Evaluation of Interior Pipe Guides Weld Deficiencies for Vessel 24590-LAB-MV-VSL-00164.	The Mechanical Data Sheet identifies the vessel's operating pressure and temperature ranges, the materials selected for the vessel, the corrosion allowance, and the vessel quality level, and requirements for seismic design. The specifications for the vessel require specific consideration of the operating pressures and temperatures and seismic loads in the design process. ASME B&PV Code, Section VIII, Division 1 requires that corrosion allowance thickness shall be excluded from nominal vessel thickness when evaluating the adequacy of vessel components for these loads at end of life. The Engineering Specification for Seismic Qualification Criteria for Pressure Vessels adopts ASME B&PV Code, Section VIII, Division 2 design rules to address seismic design and analysis acceptance criteria for the vessel proper and ASME B&PV Code, Section VIII, Division 1 for the vessel supports. Detailed requirements for seismic load determination are furnished in the specification for Seismic Category III & IV Equipment and Tanks. Review of the Pressure Vessel Calculations (including listed VDCNs) shows that the vessel has adequate strength after the appropriate consideration of corrosion allowance, operating temperature and pressure, seismic, and other applicable loads have been accounted for. Furthermore, approval and acceptance of the vendor fabrication drawings by Bechtel National Inc. (BNI) is an added assurance that all applicable requirements stated above and as described in documents (including daughter documents) listed in Material Requisition for the vessel have been met.

	Information Assessed	Source of Information	Assessment
Foundation	Vessel foundation will maintain the load of a full vessel.	Specifications listed above under References; ASME Boiler and Pressure Vessel (B&PV) Code, Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; 24590-CM-POA-MVA0-00010-05-02, Rev. 00D, Pressure Vessel Calculations of Lab Area Sink Drain Collection Vessel (RLD-VSL-00164); 24590-LAB-VDCN-MS-11-00002, Revise Supplier Calculation for CM LAB RLD Collection Vessel 24590-LAB-MV-VSL-00164 to Incorporate IQRPE Comments (Vessel Anchorage Calculation); 24590-LAB-VDCN-MS-14-00002, Update Nozzle BOM and Code Calculation for Vessel 24590-LAB-MV-VSL-00164; 24590-LAB-VDCN-MS-14-00003, RLD-VSL-00164, Evaluation of Interior Pipe Guides Weld Deficiencies for Vessel 24590-LAB-MV-VSL-00164; 24590-WTP-DB-ENG-01-001, Rev. 3, Basis of Design.	The Engineering Specification for Pressure Vessel Design and Fabrication requires the use of ASME B&PV Code, Section VIII, Division 1 for the design of the vessel supports. This code ensures an adequate design for the vessel supports. Review of the Pressure Vessel Calculations (including listed VDCNs) shows that the vessel's support skirt has adequate strength to maintain the load of full vessel. Furthermore, Chapter 14 of the Basis of Design document requires that the foundation underlying the vessel support must be adequate to support the load from full vessel, which is out of scope of this assessment. The assessment of the adequacy of the underlying foundation is part of a separate integrity assessment report for the Secondary Containment of the vessel.

	Information Assessed	Source of Information	Assessment
Foundation (cont'd)	If in an area subject to flooding, the vessel is anchored.	Specifications listed above under References and Mechanical Data Sheet; 24590-CM-POA-MVA0-00010-05-02, Rev. 00D, Pressure Vessel Calculations of Lab Area Sink Drain Collection Vessel (RLD-VSL-00164); 24590-LAB-VDCN-MS-11-00002, Revise Supplier Calculation for CM LAB RLD Collection Vessel 24590-LAB-MV-VSL-00164 to Incorporate IQRPE Comments (Vessel Anchorage Calculation); 24590-LAB-VDCN-MS-14-00002, Update Nozzle BOM and Code Calculation for Vessel 24590-LAB-MV-VSL-00164; 24590-LAB-VDCN-MS-14-00003, RLD-VSL-00164, Evaluation of Interior Pipe Guides Weld Deficiencies for Vessel 24590-LAB-MV-VSL-00164. 24590-LAB-DDC-S13T-00003, Rev. 1, C3 Vessel Anchorage-LAB Area Sink Drain Collection. 24590-LAB-DDC-S13T-00014, Rev. 0, Anchor Bolts Design for C2, C3, and C5 Vessel (including 24590-LAB-DDE-S13T-00041).	The Specification for Pressure Vessel Design and Fabrication requires the anchors be designed to secure the buoyant vessel in case the vessel is submerged to the level indicated in the Mechanical Data Sheet (MDS). The MDS does not indicate any submerged conditions for the vessel. However, review of the Design Calculations (including listed VDCNs) of the vessel shows that the vessel is adequately anchored to the concrete floor to sustain other applicable forces such as seismic and sloshing loads on the vessel.
	Vessel system will withstand the effects of frost heave.	24590-WTP-DC-ST-01-001, Rev. 13, Structural Design Criteria.	The Structural Design Criteria document requires that all structural foundations extend a distance below grade that exceeds the depth of the 30" frost line. The vessel is located inside/interior of the building at below grade elevation {(-) 18'-7"}, therefore, the vessel foundation is not subject to frost heave.

	Information Assessed	Source of Information	Assessment
Waste Characteristics	Characteristics of the waste to be stored or treated have been identified (ignitable, reactive, toxic, specific gravity, vapor pressure, flash point, storage temperature)	Mechanical Data Sheet listed above under References; 24590-LAB-N1D-RLD-00002, Rev. 2, Corrosion Evaluation, RLD-VSL-00164 (LAB) Lab Area Sink Drain Collection Vessel (RLD C3 Vessel); 24590-WTP-PSAR-ESH-01-002-01, Rev. 6a, Preliminary Documented Safety Analysis to Support Construction Authorization; General Information; 24590-WTP-PER-PR-03-001, Rev. 1, Prevention of Hydrogen Accumulation in WTP Tank Systems And Miscellaneous Treatment Unit Systems.	The Mechanical Data Sheet presents the waste specific gravity, storage temperatures and pressures. The Corrosion Evaluation document addresses the pH range and chemical composition of the waste to select appropriate vessel materials and specify the corrosion allowance. Other waste characteristics that are hazardous, such as ignitability, reactivity, and toxicity are addressed by the Preliminary Documented Safety Analysis report as an integral part of the design process. The RLD vessels provide primary confinement of the waste during normal operations, abnormal operations and during and after a Design Basis Earthquake. The vessel has mixing eductors to mitigate any sludge buildup and the vessel is actively vented via the LAB vent system to prevent any build-up of flammable gases. Prevention of Hydrogen Accumulation document shows that the contents of the vessels are not expected to generate hydrogen gas that would accumulate 1% by volume (i.e., 25% of the LFL) in the headspace. Therefore, this vessel does not pose hydrogen accumulation hazard. The vessel is also grounded to control ignition sources.
	Vessel is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	System Design Description listed above under Reference; 24590-LAB-N1D-RLD-00002, Rev. 2, Corrosion Evaluation, RLD-VSL-00164 (LAB) Lab Area Sink Drain Collection Vessel (RLD C3 Vessel).	The System Design Description discusses normal and abnormal operations for the RLD vessels. Diluted acid or water will be used for flushing/rinsing. The Corrosion Evaluation document demonstrates that the 6% Mo material selected for vessel design is appropriate to process, treat or store the waste discussed above.
	The waste types are compatible with each other.	System Design Description listed above under Reference.	The System Design Description for the LAB (RLD) does not describe any operations where incompatible wastes are mixed in these vessels for processing. The RLD vessel's primary function is to collect, contain, and transfer liquid streams.

	Information Assessed	Source of Information	Assessment
Corrosion Protection	Vessel material and protective coatings ensure the vessel structure is adequately protected from the corrosive effects of the waste stream and external environments (expected to not leak or fail for the design life of the system)	Drawings, Mechanical Data Sheet and System Design Description listed above under References; 24590-LAB-N1D-RLD-00002, Rev. 2, Corrosion Evaluation, RLD-VSL-00164 (LAB) Lab Area Sink Drain Collection Vessel (RLD C3 Vessel).	The Corrosion Evaluation document shows that the LAB Area Sink Drain Collection Vessel, RLD-VSL-00164 normally operates at a pH range of 6 to 8 and at a temperature of 78°F. The vessel is designed for a 15 psig pressure and a temperature of 240°F. Other pertinent vessel operation and design information is provided in the Mechanical Data Sheet. Potential acid cleaning operations of the vessel were also considered. The materials selected are 6 % Mo and a corrosion allowance of 0.04 in. The RLD vessel is located in the LAB cell (A-B003) at Elevation (-) 18'-7". The vessel's support skirt material is 304 stainless steel. This cell is equipped with a sump to pump out any leaks. Therefore, the cell should remain dry during normal operations which will limit external corrosion of the vessel over the facility design life. The RLD vessel receives waste from Floor Drain Collection Vessel (RLD-VSL-00163) and various floor and sink drains in the LAB facility for short term storage, and transfers it to the LAB Hot Cell Drain Collection Vessel (RLD-VSL-00165) for further processing.
Corrosion Allowance	Corrosion allowance is adequate for the intended service life of the vessel.	Mechanical Data Sheet listed above under References; 24590-LAB-N1D-RLD-00002, Rev. 2, Corrosion Evaluation, RLD-VSL-00164 (LAB) Lab Area Sink Drain Collection Vessel (RLD C3 Vessel).	The bases for the RLD vessel's material selection and corrosion allowance are furnished in the Corrosion Evaluation document. Selection of 6% Mo material for the vessel with a corrosion allowance of 0.04 in. for a service life of 40 years is adequate and appropriate. The material selections and corrosion allowances are carried forward to the Mechanical Data Sheet consistently and correctly.

	Information Assessed	Source of Information	Assessment
Pressure Relief	Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the vessel are exceeded.	Drawings and System Design Description listed above under References.	The RLD system LAE Area Sink Drain Collection Vessel, RLD-VSL-00164 is designed to have unrestricted overflow through an 8" pipe line to the cell sump (RLD-SUMP-00041) as shown on the drawings and described in the System Design Description document. The sump contents will be transferred via pump (RLD-PMP-00182A/B) to the LAB Hot Cell Drain Collection Vessel (RLD-VSL-00165) for further processing. The vessel is also connected to the LAB vent system via an 8" pipe vent line to prevent its over pressurization.

	Information Assessed	Source of Information	Assessment
Design	Vessel design standards are appropriate and adequate for the vessel's intended use.	Specifications, Drawings, and Mechanical Data Sheet listed above under References; ASME Boiler and Pressure Vessel (B&PV) Code, Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers.	The RLD system Hot Cell Drain Collection Vessel, RLD-VSL-00165 and all appurtenances are designed to the ASME B&PV Code, Section VIII, Division 1 rules which are appropriate for pressure vessels operating with mixed waste solutions over the pressure and temperature ranges specified for this vessel. Supplementary requirements are specified in the Engineering Specification for Pressure Vessel Design and Fabrication. Supplementary requirements address pressure vessel fatigue analysis, positive material identification, lifting attachment design, equipment drop evaluation, fabrication tolerances, acceptable welding procedures for the vessel and appurtenances, welder qualifications and testing records, NDE inspections and records, and lifting, packaging, shipping, handling and storage requirements. These are adequate and acceptable design standards for the intended use of the vessel. The Mechanical Data Sheet for the vessel identifies it as a Quality Level (Q-2) and Seismic Category (SC-III) equipment. The RLD-VSL-00165 is a vertical vessel with a 192 in. ID and a height of 28.75 in. from the bottom tangent line to the top tangent line. The vessel's top and bottom Flanged & Dished (F & D) heads are built with 0.715" thick plate. Vessel's shell is built with 0.688" thick plate. The vessel is supported on a cylindrical skirt (approx. 3'-1" high) which in turn is supported on a base plate anchored to the concrete floor at Elev. (-) 19'-2". The vessel has internal equipment such as eductors, spray nozzles, and piping that are supported from the vessel's top head. Material for the shell, bottom and top head, and the vessel's internal equipment is UNS N08367 (6% Molybdenum stainless steel alloy) and hereafter referred to as 6% Mo. The supporting skirt is specified as SA-240 304 stainless steel plate (0.030% maximum carbon content, dual certified) and is hereafter referred to as 304 stainless steel. The operating volume is to be about 6,615 gallons and the total internal volume is to be about 9,100 gallons.

	Information Assessed	Source of Information	Assessment
Design (cont'd)	If a non-standard vessel is to be used, the design calculations demonstrate sound engineering principles of construction.	Specifications, Material Requisition, Drawings, and Mechanical Data Sheet listed above under References; ASME Boiler and Pressure Vessel (B&PV) Code, Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; 24590-QL-POC-MVA0-00008-02-00002, Rev. 00C, Design Report of the Hot Cell Drain Collection Vessel (RLD-VSL-00165); 24590-LAB-VDCN-MS-11-00003, Revise Supplier Calculation for LAB Hot Cell RLD Collection Vessel 24590-LAB-MV-VSL-00165 to Incorporate IQRPE Comments (Vessel Anchorage Calculation); 24590-LAB-VDCN-MS-14-00001, RLD-VSL-00165 Seismic Lateral Load on Vessel per UBC 97 and Nozzle Neck calculation per UG-45(a). 24590-LAB-MVC-RLD-00005, Rev. 0, RLD-VSL-00165 Nozzle Neck Evaluation per ASME Section VIII, Div-2, Appendix-4-138.	The RLD system Hot Cell Drain Collection Vessel, RLD-VSL-00165 is a non-standard ASME B&PV Code, Section VIII, Division 1 vessel. The Mechanical Data Sheet requires that the ASME B&PV Code, Section VIII, Division 1 vessel be delivered after design, fabrication, inspection and testing with an ASME code stamp and that the vessels be nationally registered. Supplemental design information is provided by the reference documents listed in the Source of Information column for utilizing sound engineering principles of construction of the vessels. Review of the Design Calculations (including listed VDCNs) of the vessel shows that it has been designed as a non-standard vessel per applicable requirements of ASME B&PV Code, Section VIII, Division 1 and other documents listed in the Material Requisition for the vessel. The aforementioned statements and the vendor fabrication drawings reviewed demonstrate that sound engineering principles of construction and fabrication have been used for the vessel.

	Information Assessed	Source of Information	Assessment
Design (cont'd)	Vessel has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.	Specifications, Material Requisition, Drawings, and Mechanical Data Sheet listed above under References; ASME Boiler and Pressure Vessel (B&PV) Code, Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; ASME Boiler and Pressure Vessel (B&PV) Code, Section VIII, Division 2, Alternate Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; 24590-QL-POC-MVA0-00008-02-00002, Rev. 00C, Design Report of the Hot Cell Drain Collection Vessel (RLD-VSL-00165); 24590-LAB-VDCN-MS-11-00003, Revise Supplier Calculation for LAB Hot Cell RLD Collection Vessel 24590-LAB-MV-VSL-00165 to Incorporate IQRPE Comments (Vessel Anchorage Calculation); 24590-LAB-VDCN-MS-14-00001, RLD-VSL-00165 Seismic Lateral Load on Vessel per UBC 97 and Nozzle Neck Calculation per UG-45(a). 24590-LAB-MVC-RLD-00005, Rev. 0, RLD-VSL-00165 Nozzle Neck Evaluation per ASME Section VIII, Div-2, Appendix-4-138.	The Mechanical Data Sheet identifies the vessel's operating pressure and temperature ranges, the materials selected for the vessel, the corrosion allowance, and the vessel quality level, and requirements for seismic design. The design specifications for the vessels require specific consideration of the operating pressures and temperatures and seismic loads in the design process. ASME B&PV Code, Section VIII, Division 1 requires that corrosion allowance thickness shall be excluded from nominal vessel thickness when evaluating the adequacy of vessel components for these loads at end of life. The Engineering Specification for Seismic Qualification Criteria for Pressure Vessels adopts ASME B&PV Code, Section VIII, Division 2 design rules to address seismic design and analysis acceptance criteria for the vessel proper and ASME B&PV Code, Section VIII, Division 1 for the vessel supports. Detailed requirements for seismic load determination are furnished in the specification for Seismic Category III & IV Equipment and Tanks. Review of the Design Report (including listed VDCNs) of the vessel shows that it has adequate strength after the appropriate consideration of corrosion allowance, operating temperature and pressure, seismic, and other applicable loads have been accounted for. Furthermore, approval and acceptance of the vendor fabrication drawings by Bechtel National Inc. (BNI) is an added assurance that all applicable requirements stated above and as described in documents (including daughter documents) listed in Material Requisition for the vessel have been met.

	Information Assessed	Source of Information	Assessment
Foundation	Vessel foundation will maintain the load of a full vessel.	Specifications listed above under References; ASME Boiler and Pressure Vessel (B&PV) Code, Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; 24590-QL-POC-MVA0-00008-02-00002, Rev. 00C, Design Report of the Hot Cell Drain Collection Vessel (RLD-VSL-00165); 24590-LAB-VDCN-MS-11-00003, Revise Supplier Calculation for LAB Hot Cell RLD Collection Vessel 24590-LAB-MV-VSL-00165 to Incorporate IQRPE Comments (Vessel Anchorage Calculation); 24590-LAB-VDCN-MS-14-00001, RLD-VSL-00165 Seismic Lateral Load on Vessel per UBC 97 and Nozzle Neck calculation per UG-45(a); 24590-LAB-MVC-RLD-00004, Rev. 1, Supplemental Seismic Calculation per UBC-97 for 24590-LAB-MV-RLD-VSL-00165 Vessel; 24590-WTP-DB-ENG-01-001, Rev. 3, Basis of Design.	The Engineering Specification for Pressure Vessel Design and Fabrication requires the use of ASME B&PV Code, Section VIII, Division 1 for the design of the vessel supports. This code ensures an adequate design for the vessel supports. Review of the Design Report (including listed VDCNs) of the vessel shows that the vessel's support skirt has adequate strength to maintain the load of full vessel. Furthermore, Chapter 14 of the Basis of Design document requires that the foundation underlying the vessel support must be adequate to support the loads from full vessel, which is out of scope of this assessment. The assessment of the adequacy of the underlying foundation is part of a separate integrity assessment report for the Secondary Containment of the vessel.

	Information Assessed	Source of Information	Assessment
Foundation (cont'd)	If in an area subject to flooding, the vessel is anchored.	Specifications listed above under References and Mechanical Data Sheet; 24590-QL-POC-MVA0-00008-02-00002, Rev. 00C, Design Report of the Hot Cell Drain Collection Vessel (RLD-VSL-00165); 24590-LAB-VDCN-MS-11-00003, Revise Supplier Calculation for LAB Hot Cell RLD Collection Vessel 24590-LAB-MV-VSL-00165 to Incorporate IQRPE Comments (Vessel Anchorage Calculation); 24590-LAB-VDCN-MS-14-00001, RLD-VSL-00165 Seismic Lateral Load on Vessel per UBC 97 and Nozzle Neck calculation per UG-45(a); 24590-LAB-MVC-RLD-00004, Rev. 1, Supplemental Seismic Calculation per UBC-97 for 24590-LAB-MV-RLD-VSL-00165 Vessel; 24590-LAB-DDC-S13T-00001, Rev. 1, C5 Vessel Anchorage-Hot Cell Drain Collection; 24590-LAB-DDC-S13T-00014, Rev. 0, Anchor Bolts Design for C2, C3, and C5 Vessel (including 24590-LAB-DDE-S13T-00041).	The Specification for Pressure Vessel Design and Fabrication requires the anchors be designed to secure the buoyant vessel in case the vessel is submerged to the level indicated in the Mechanical Data Sheet (MDS). The MDS does not indicate any submerged conditions for the vessel. However, review of the Design Calculations (including listed VDCNs) of the vessel shows that the vessel is adequately anchored to the concrete floor to sustain the other applicable forces on the empty and full vessel.
	Vessel system will withstand the effects of frost heave.	24590-WTP-DC-ST-01-001, Rev. 13, Structural Design Criteria.	The Structural Design Criteria document requires that all structural foundations extend a distance below grade that exceeds the depth of the 30" frost line. The vessel is located inside/interior of the building at below grade elevation {(-) 19'-2"}, therefore, the vessel foundation is not subject to frost heave.

	Information Assessed	Source of Information	Assessment
Waste Characteristics	Characteristics of the waste to be stored or treated have been identified (ignitable, reactive, toxic, specific gravity, vapor pressure, flash point, storage temperature)	Mechanical Data Sheet listed above under References; 24590-LAB-N1D-RLD-00003, Rev. 4, Corrosion Evaluation, RLD-VSL-00165 (LAB) Hot Cell Drain Collection Vessel; 24590-WTP-PSAR-ESH-01-002-01, Rev. 6a, Preliminary Documented Safety Analysis to Support Construction Authorization: General Information; 24590-WTP-PER-PR-03-001, Rev. 1, Prevention of Hydrogen Accumulation in WTP Tank Systems And Miscellaneous Treatment Unit Systems.	The Mechanical Data Sheet presents the waste specific gravity, storage temperatures and pressures. The Corrosion Evaluation document addresses the pH range and chemical composition of the waste to select appropriate vessel materials and specify the corrosion allowance. Other waste characteristics that are hazardous, such as ignitability, reactivity, and toxicity are addressed by the Preliminary Documented Safety Analysis report as an integral part of the design process. The RLD vessels provide primary confinement of the waste during normal operations, abnormal operations and during and after a Design Basis Earthquake. The vessel has continually mixing eductors to mitigate any sludge buildup and the vessel is actively vented via the LAB vent system to prevent any build-up of flammable gases. Prevention of Hydrogen Accumulation document shows that the contents of the vessels are not expected to generate hydrogen gas that would accumulate 1% by volume (i.e., 25% of the LFL) in the headspace. Therefore, this vessel does not pose hydrogen accumulation hazard. The vessel is also grounded to control ignition sources.
	Vessel is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	System Design Description listed above under Reference; 24590-LAB-N1D-RLD-00003, Rev. 4, Corrosion Evaluation, RLD-VSL-00165 (LAB) Hot Cell Drain Collection Vessel.	The System Design Description discusses normal and abnormal operations for the RLD vessels. Diluted acid or water will be used for flushing/rinsing. The Corrosion Evaluation document demonstrates that the 6% Mo material selected for vessel design is appropriate to process, treat or store the waste discussed above.
	The waste types are compatible with each other.	System Design Description listed above under Reference.	The System Design Description for the LAB (RLD) does not describe any operations where incompatible wastes are mixed in these vessels for processing. The RLD vessel's primary function is to collect, contain, and transfer liquid streams.

	Information Assessed	Source of Information	Assessment
Corrosion Protection	Vessel material and protective coatings ensure the vessel structure is adequately protected from the corrosive effects of the waste stream and external environments (expected to not leak or fail for the design life of the system)	Drawings, Mechanical Data Sheet, and System Design Description listed above under References; 24590-LAB-N1D-RLD-00003, Rev. 4, Corrosion Evaluation, RLD-VSL-00165 (LAB) Hot Cell Drain Collection Vessel.	The Corrosion Evaluation document shows that the Hot Cell Drain Collection Vessel, RLD-VSL-00165 normally operates at a pH range of 6 to 8 and at a temperature of 78°F. The vessel is designed for a 15 psig pressure and a temperature of 240°F. Other pertinent vessel operation and design information is provided in the Mechanical Data Sheet. Potential acid cleaning operations of the vessel were also considered. The material selected is 6 % Mo and a corrosion allowance of 0.04 in. The RLD vessel is located in the LAB cell (A-B004) at Elevation (-) 19'-2". The vessel's support skirt material is 304 stainless steel. This cell is equipped with a sump to pump out any leaks. Therefore, the cell should remain dry during normal operations which will limit external corrosion of the vessel over the facility design life. The RLD vessel receives waste from Floor Drain Collection Vessel (RLD-VSL-00163) and cell sump, Lab Area Sink Drain Collection Vessel (RLD-VSL-00164) and cell sump, and various floor and sink drains in the LAB facility for short term storage, and transfers it to the PTF plant wash disposal vessel (PWD-VSL-00044 or PWD-VSL-00033) for further processing.
Corrosion Allowance	Corrosion allowance is adequate for the intended service life of the vessel.	Mechanical Data Sheet listed above under References; 24590-LAB-N1D-RLD-00003, Rev. 4, Corrosion Evaluation, RLD-VSL-00165 (LAB) Hot Cell Drain Collection Vessel.	The bases for the RLD vessel's material selection and corrosion allowance are furnished in the Corrosion Evaluation document. Selection of 6% Mo material for the vessel with a corrosion allowance of 0.04 in. for a service life of 40 years is adequate and appropriate. The material selections and corrosion allowances are carried forward to the Mechanical Data Sheet consistently and correctly.

	Information Assessed	Source of Information	Assessment
Pressure Relief	Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the vessel are exceeded.	Drawings and System Design Description listed above under References.	The RLD system Hot Cell Drain Collection Vessel, RLD-VSL-00165 is designed to have unrestricted overflow through a 6" dip pipe to the cell sump (RLD-SUMP-00042) as shown on the drawings and described in the System Design Description document. The sump contents will be transferred via pump (RLD-PMP-00183A/B) to the PTF plant wash disposal vessel (PWD-VSL-00044 or PWD-VSL-00033) for further processing. The vessel is also connected to the LAB vent system via a 6" pipe vent line to prevent its over pressurization.

ISSUED BY
RPP-WTP PDC

R11651153

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-LAB-MV-RLD-VSL-00164

Project:	***RPP-WTP***	P&ID: 3	***24590-LAB-M6-RLD-00002001***
Project No:	***24590***	Calculation 3	***24590-LAB-M6C-RLD-00004***
Project Site:	***Hanford***	Vessel Drawing	***24590-LAB-MV-RLD-00001***
Description:	***LAB Area Sink Drain Collection Vessel (RLD C3 Vessel)*** 3	*Reports/Other Documentation* 3	***N/A***

Reference Data

Charge Vessels (Tag Numbers)	***None***
Pulsejet Mixers / Agitators (Tag Numbers)	***None***
RFDs/Pumps (Tag Numbers)	***None***

Design Data

Quality Level	***CM*** 3			Fabrication Specs	***24590-WTP-3PS-MV00-T0001***		
Seismic Category		***SC-IV*** 3		Design Code	***ASME Sec VIII Div 1***		
Service/Contents		***Radioactive Liquid Drain***		Code Stamp	***Yes***		
Design Specific Gravity		***1.02***		NB Registration	***Yes***		
Maximum Operating Volume	gal	***2740 (Note 5)***		Weights (lbs)	Empty	Operating	Test
Total Volume	gal	***3180 (Note 5)***		Estimated	3 ***10,278***	3 ***31,188***	3 ***36,988***
Environmental Qualification 3		***Mild***		Actual *			

Inside Diameter	inch	***102***			Wind Design	***Not Required***	
Length/Height (TL-TL)	inch	***69***			Snow Design	***Not Required***	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	***24590-WTP-3PS-MV00-T0002 & 24590-WTP-3PS-FB01-T0001***	
Internal Pressure	psig	***0***	***15***	***N/A***	Seismic Base Moment *	ft*lb	
External Pressure	psig	***0.15***	***7***	***N/A***	Postweld Heat Treat	***Not Required***	
Temperature	°F	***78***	***240***	***N/A***	Corrosion Allowance	Inch	***0.04***
Min. Design Metal Temp.	°F	***-20***			Hydrostatic Test Pressure *	psig	

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	***UNS N08367***	***See Drawing***	***Auxiliary***
Shell	***UNS N08367***	***See Drawing***	***Primary***
Bottom Head	***UNS N08367***	***See Drawing***	***Primary***
Support (skirt)	***SA 240 304 (Carbon Content Max .030%)***	***See Vendor Drawing*** 3	***N/A***
Jacket/Coils/Half-Pipe Jacket	***N/A***	***N/A***	***N/A***
Internals	***UNS N08367***	***See Drawing***	***Secondary***
Pipe	***UNS N08367, N10276/N06022,Note 4*** 3	***See Drawing***	***See Note-1***
Forgings/ Bar stock	***UNS N08367***	***See Drawing***	***See Note-1 for Nozzle Necks***
Gaskets/Bolting	***None***	***N/A***	***N/A***

Miscellaneous Data

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

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-LAB-MV-RLD-VSL-00164***

Remarks

***** To be confirmed by Seller***
Note 1: Nozzle necks below maximum operating level are primary, others auxiliary.
Note 2: Design life is 40 years
Note 3: Deleted
Note 4: Material of construction for nozzle No7 and No6 shall be Hastelloy N06022 or Hastelloy N010276
Note 5: Vessel volumes are approximates and do not account for manufacturing tolerances, nozzles, and displacement of internals
Note 6: Revised design data and deleted note No3
3 ***Note 7: Revised as identified by triangle's.***
Note 8: Contents of this document are Dangerous Waste Permit Affecting 3
3 Note 9: Beta/gamma dose exposure rate is 3.05E+02 Rad/hr @ 1m 05/22/14

Seismic 3

Seismic Per UBC-97

DOE Radioactive Materials Disclaimer: 3

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.

Approval 3

Rev	Description	Vessel Engineer	Checked	System Engineer	MET	E&NS	Approved	Date
0	Issue for purchase	MA	CS/SK	MP	N/A	N/A	MH	08/26/03
1	Revised as per note No 6 and Issue for Purchase	MA	CS/SK	MP	N/A	N/A	MH	12/18/03
2	Added Pipe Material	MA	WK/RT	MP	Atri Sri	N/A	MH	07/29/04
3	Revise to remove Material Specification No. SB-622 for Seamless pipe, and revisions are identified by triangles. 24590-LAB-M6N-RLD-00080 incorporates	M. Arulampalam	Kuldip Singh	Pete Omel	Debbie Adler	Jim Aris	Sean Sweeney	5/22/14

24070-WTP-M6N-M80T-00005

Table III.10.E.D – Analytical Laboratory Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
Radioactive Liquid Waste Disposal System RLD-VSL-00164 (Laboratory Area Sink Drain Collection Vessel) RLD-VSL-00165 (Hotcell Drain Collection Vessel)	RLD	**24590-LAB** -3YD-RLD-00001[a] -M5-V17T-00029, Rev 4 -M6-RLD-00001001, Rev 1 -M6-RLD-00001002, Rev 0 -M6-RLD-00001003, Rev 0 -M6-RLD-00001004, Rev 0 -M6-RLD-00002001, Rev 1 -M6-RLD-00002003, Rev 0 -M6-RLD-00006001, Rev 0 -M6-RLD-00006002, Rev 0 -M6-RLD-00006003, Rev 0 -M6-RLD-00007001, Rev 0 -M6-RLD-00007002, Rev 0 -M6-RLD-00008001, Rev 0 -M6-RLD-00008002, Rev 0 -MVD-RLD-~~P~~00164, Rev 3~~1~~ -MVD-RLD-P0165, Rev 1 -MV-RLD-P0001, Rev 0 -N1D-RLD-P0002, Rev 1 -N1D-RLD-P0003, Rev 1 -P1-60-00007, Rev 3 -P1-60-00008, Rev 3	Section 4H.2.1; Table 4H-1 of Operating Unit Group 10, Chapter 4 of this Permit.	RLD-VSL~~1~~-00164 = 3180 RLD-VSL-00165 = 9100

Table III.10.E.D – Analytical Laboratory Tank Systems Description

Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
		24590-WTP -3PS-G000-T0002, Rev 9 -3PS-MV00-T0001, Rev 5 -3PS-MV00-T0002, Rev 3 -3PS-MV00-T0003, Rev 3		

[a]System Descriptions are maintained in the Administrative Record, and are listed here for information only.

1

Quarter Ending March 2018 24590-LAB-PCN-ENV-17-002

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
Remove Drawing Change Notice 24590-LAB-M6N-RLD-00103 listed in Appendix 11.2 of the Dangerous Waste Permit (DWP)

Submitted by Co-Operator:

Roger J. Landon 2/26/18
Roger J. Landon Date

Reviewed by ORP Program Office:

Joanne Grindstaff 3/19/18
J. F. Grindstaff Date

Quarter Ending March 2018 24590-LAB-PCN-ENV-17-002

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 remove the following Drawing Change Notice (DCN) listed in Appendix 11.2 of the DWP:

Appendix 11.2			
Remove:	24590-LAB-M6N-RLD-00103		

DCN 24590-LAB-M6N-RLD-00103 adds and modifies pipelines and valves to isolate the Analytical Laboratory (LAB) Radioactive Liquid Waste Disposal System (RLD), Floor Drain Collection Vessel (RLD-VSL-00163) to support phased commissioning of the LAB and other Direct Feed Low-Activity Waste (DFLAW) facilities. This DCN affects piping and instrumentation diagram (P&ID) 24590-LAB-M6-RLD-00005002, line list 24590-LAB-M6WX-RLD-00005002, and valve list 24590-LAB-M6VX-RLD-00005002. Since the P&ID does not depict any DWP-permitted equipment, it should not be included in Appendix 11.2 of the DWP. The line and valve lists are also not included in the DWP.

The DCN was originally provided to Ecology during informal review to reflect the isolation of RLD-VSL-00163, a non-DWP vessel, during DFLAW operations. The DCN was mistakenly submitted to Ecology in 24590-BOF-PCN-ENV-15-001, and the Permittees request that the DCN be removed from Appendix 11.2 of the DWP.

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

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

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

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

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

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

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

Reason for denial:

Reviewed by Ecology:

S. Dahl 5/10/18

S. Dahl Date

Quarter Ending March 2018 24590-LAW-PCN-ENV-17-002

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

This Integrity Assessment addresses ancillary equipment associated with the Low Activity Waste (LAW) Below Grade RLD System Tank (RLD-VSL-00004).

This vessel is located in Room L-B001B at Floor Elev (-) 21 '-0" of the LAW Vitrification Building.

Submitted by Co-Operator:

Roger J. Landon 3/20/18
Roger J. Landon Date

Reviewed by ORP Program Office:

Joanne Jobbett 4/23/18
J. F. Grindstaff Date

Quarter Ending March 2018 24590-LAW-PCN-ENV-17-002

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

Description of Modification:

This Class 1[1] modification requests Ecology approval and incorporation into the permit the below referenced structural integrity assessment report. The report has been updated by the Independent Qualified Registered Professional Engineer (IQRPE).

Appendix 9.11			
Replace	24590-CM-HC4-HXYG-00138-01-05 (COGEMA-IA-005), *Structural Integrity Assessment Report of the Low Activity Waste Below Grade RLD System Tank (RLD-VSL-00004)*	With	24590-CM-HC4-HXYG-00240-02-00029 (IA-3020952-000) *Structural Integrity Assessment Report for LAW RLD C3/C5 Drains/Sumps Collection Vessel (RLD-VSL-00004)*

The IQRPE structural integrity assessment report includes changes provided in applicable document change forms (e.g., DCN, SCN, SDDR, FCN, FCR, etc.). In addition, the document includes changes associated with the resolution to comments on change documents since the issuance of the last revision of the permitted document.

Updates to the integrity assessment report for the LAW RLD C3/C5 Drains/Sumps Collection Vessel (RLD-VSL-00004) are summarized below:

- A new "References" row was added to list documents. The documents listed in the "Source of Information" column were updated. These documents were reviewed to assess the design of the LAW RLD system vessel; C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004). Note three references: 24590-LAW-M6-LOP-00001004, 24590-LAW-M6-LOP-00002004, and 24590-WTP-DB-ENG-01-001 have been revised since the report was prepared.

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

The documents listed in the "Source of Information" column were updated. These documents were reviewed to assess the design of the LAW RLD system vessel; C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004).

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

This PCN updates information in Appendix 9.11 to reflect current design. This DWP component may be re-evaluated to confirm design adequacy. If the re-evaluation results in future design changes, the changes will be reviewed by Ecology in subsequent permit modifications.

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

Quarter Ending March 2018

24590-LAW-PCN-ENV-17-002

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: A.1

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: [X] Yes [ ] Denied (state reason below)

Reason for denial:

Reviewed by Ecology:

ECSchmidt for

S. Dahl

6/12/18

Date

24590-CM-HC4-HXYG-00240-02-00029
Rev. 00A

R11881943

ISSUED BY
RPP-WTP PDC

FS-18-0048

26 February 2018

Ms. Andrea Dorsey
Subcontractor Administrator
Bechtel National, Inc.
2435 Stevens Center Place
Richland, WA 99354

Orano Federal
Services LLC

2101 Horn Rapids Rd
Richland, WA 99354

Tel +1 509 371 1893

Dear Ms. Dorsey,

BECHTEL NATIONAL, INC. CONTRACT NO. 24590-CM-HC4-HXYG-00240 IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAW RLD C3/C5 DRAINS/SUMPS COLLECTION VESSEL (RLD-VSL-00004) (IA-3020952-000)

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

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

Sincerely,

Tess Klatt
Contract Administrator
Orano Federal Services LLC
Richland Office

lap
cc: J.S. Evans, w/Enclosure (1)

orano

IA-3020952-000

IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAW RLD C3/C5 DRAINS/SUMPS COLLECTION VESSEL (RLD-VSL-00004)

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

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IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT
FOR
LAW RLD C3/C5 DRAINS/SUMPS
COLLECTION VESSEL (RLD-VSL-00004)

"I, Tarlok Singh Hundal, have reviewed and certified a portion of the design of a new tank system component located at the Hanford Waste Treatment Plant, owned/operated by Department of Energy, Office of River Protection, Richland, Washington. My duties were independent review of the current design for the LAW RLD C3/C5 Drains/Sumps Collection Vessel (RLD-VSL-00004), as required by the Washington Administrative Code, *Dangerous Waste Regulations*, Section WAC-173-303-640(3) (a) through (g) applicable components."

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

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

The attached review is nine (9) pages numbered one (1) through nine (9).

TARLOK SINGH HUNDAL
STATE OF WASHINGTON
20213
REGISTERED
PROFESSIONAL ENGINEER

Signature

2/26/2018
Date

Scope	Scope of this Integrity Assessment	This integrity assessment includes the LAW RLD system vessel; C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004) including its appurtenances or offspring items. This vessel is located in Room L-B001B at Floor Elev. (-) 21'-0" of the LAW Vitrification Building as shown on drawing 24590-LAW-P1-P01T-00001.
Summary of Assessment		For each item of "Information Assessed" (i.e., Criteria) on the following pages, the items listed under "Source of Information" were reviewed and found to furnish adequate design requirements and controls to ensure that the design fully satisfies the requirements of Washington Administrative Code (WAC), Chapter 173-303 WAC, *Dangerous Waste Regulations,* WAC-173-303-640, *Tank Systems.*

References	Material Requisitions, Specifications, Mechanical Data Sheets, System Design Description, and Corrosion Evaluations	Material Requisitions: 24590-CM-MRA-MVA0-00004, Rev. 3, Pressure Vessels-Medium, High Alloy, Shop Fabricated, 60"-167" Dia. (VXNM). Specifications: The following Specifications with their respective revision and Specification Change Notices (SCNs) are listed in the above listed Material Requisitions: 24590-WTP-3PS-MV00-T0001, Engineering Specification for Pressure Vessel Design and Fabrication; 24590-WTP-3PS-MV00-T0002, Engineering Specification for Seismic Qualification Criteria for Pressure Vessels; 24590-WTP-3PS-MV00-T0003, Engineering Specification for Pressure Vessel Fatigue Analysis; 24590-WTP-3PS-MVB2-T0001, Engineering Specification for Welding of Pressure Vessels, Heat Exchangers, and Boilers; 24590-WTP-3PS-M000-T0002, Engineering Specification for Mechanical Handling, Equipment Design, and Manufacture; 24590-WTP-3PS-G000-T0002, Engineering Specification for Positive Material Identification (PMI) for Shop Fabrication; 24590-WTP-3PS-G000-T0003, Engineering Specification for Packaging, Handling, and Storage Requirements; 24590-WTP-3PS-G000-T0014, Engineering Specification for Supplier Design Analysis; 24590-WTP-3PS-FB01-T0001, Engineering Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks. Mechanical Data Sheet: 24590-LAW-MVD-RLD-00001, Rev. 3, C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004). System Design Description: 24590-LAW-3ZD-RLD-00001, Rev. 2, LAW Facility Radioactive Liquid Waste Disposal (RLD) System Design Description. Corrosion Evaluations: 24590-LAW-N1D-RLD-00001, Rev. 6, C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004).

References (cont'd)	Drawings	Plant Drawings: 24590-LAW-P1-P01T-00001, Rev. 4, LAW Vitrification Building General Arrangement Plan at El. (-) 21'-0"; 24590-LAW-DD-S13T-00002, Rev. 2, LAW Vitrification Building Main Building Conc Embedment C3/C5Grillage at El. (-) 21'-0"; 24590-LAW-DD-S13T-00012, Rev. 1, LAW Vitrification Building Main Building Conc Embedment C3/C5 Collection Vessel Embed Assy; 24590-LAW-M5-V17T-00014, Rev. 6, Process Flow Diagram LAW Liquid Effluent (System RLD); 24590-LAW-M6-RLD-00002001, Rev. 1, P&ID-LAW Radioactive Liquid Waste Disposal System C3/C5 Drains/Sump Collection (RLD-VSL-00004); 24590-LAW-M6-RLD-00002003, Rev. 0, P&ID-LAW Radioactive Liquid Waste Disposal System C3/C5 Drains/Sump Collection (RLD-BULGE-00001); 24590-LAW-M6-RLD-00002004, Rev. 0, P&ID-LAW Radioactive Liquid Waste Disposal System C3/C5 Drains/Sump Collection (RLD-BULGE-00001); 24590-LAW-M6-RLD-00002005, Rev. 0, P&ID-LAW Radioactive Liquid Waste Disposal System C3/C5 Sumps (RLD-SUMP-00010/11/28); 24590-LAW-M6-RLD-00003001, Rev. 0, P&ID-LAW Radioactive Liquid Waste Disposal System C3/C5 Floor Drains Collection; 24590-LAW-M6-RLD-00003003, Rev. 2, P&ID-LAW Radioactive Liquid Waste Disposal System Process and Effluent Cell Sumps at El. 2 ft.; 24590-LAW-M6-DIW-00003002, Rev. 0, P&ID-LAW Radioactive Liquid Waste Disposal System Drain Collection Vessel Manifolds; 24590-LAW-M6-LVP-00003001, Rev. 0, P&ID-LAW LAW Secondary Offgas/Vessel Vent Process System Equip Vents; 24590-LAW-M6-LOP-00001004, Rev. 2, P&ID-LAW LAW Primary Offgas Process System Melter 1 LOP-WESP-00001; 24590-LAW-M6-LOP-00002004, Rev. 2, P&ID-LAW LAW Primary Offgas Process System Melter 2 LOP-WESP-00002; 24590-LAW-M6-ASX-00007001, Rev. 1, P&ID-LAW Autosampling System Isolok Details ASX-SMPLR-00013; 24590-LAW-M6-PSA-00003001, Rev. 0, P&ID-LAW Plant Service Air System Distribution El. 3ft. Vendor Fabrication Drawings (Bechtel Status Code 1 Drawings*): 24590-CM-POA-MVA0-00004-02-03, Rev. 00C, C3/C5 Drains/Sump Collection Vessel Details (RLD-VSL-00004); 24590-CM-POA-MVA0-00004-02-04, Rev. 00C, C3/C5 Drains/Sump Collection Vessel General Arrangement (RLD-VSL-00004); 24590-CM-POA-MVA0-00004-02-06, Rev. 00C, C3/C5 Drains/Sump Collection Vessel Weld Map (RLD-VSL-00004); 24590-CM-POA-MVA0-00004-02-08, Rev. 00D, C3/C5 Drains/Sump Collection Vessel General Arrangement (RLD-VSL-00004); 24590-CM-POA-MVA0-00004-02-12, Rev. 00C, C3/C5 Drains/Sump Collection Vessel Details (RLD-VSL-00004). * Bechtel Status Code 1 Drawing is an "as fabricated vendor drawing" approved/accepted by Bechtel.

	Information Assessed	Source of Information	Assessment
Design	Vessel design standards are appropriate and adequate for the vessel's intended use.	Mechanical Data Sheet, Specifications and Drawings and listed above under References. ASME Boiler and Pressure Vessel Code (BPV), Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers.	The Material Data Sheet requires that the LAW RLD vessel (RLD-VSL-00004) and its appurtenances are to be designed to the ASME Section VIII, Division 1 code rules. Supplementary requirements are specified in the Engineering Specification for Pressure Vessel Design and Fabrication. Supplementary requirements address pressure vessel positive material identification, lifting attachment design, fabrication tolerances, acceptable welding procedures for the vessel and appurtenances, welder qualifications and testing records, Non-Destructive Examinations (NDE) records, lifting, packaging, handling and storage requirements. These specified requirements, standards and codes identified above are appropriate and adequate for the intended use of the vessel. The drawings show that the LAW RLD Vessel (RLD-VSL-00004) is a vertical vessel with a 120" ID x 186" approximate height from base to top of its manway flange. The vessel is supported on a cylindrical skirt (1/2" thick plate x 24"approximate height), which in turn is supported on a base plate anchored to the concrete floor at Elev. (-) 21'-0". The vessel's top and bottom F&D heads and shell are built with 1/2" thick 316 stainless steel plates (max. carbon content of 0.03%, dual certified). The vessel's internals are also built of 316 stainless steel material. The operating volume is to be about 6,510 gallons and the total internal volume is 7,696 gallons.

	Information Assessed	Source of Information	Assessment
Design (cont'd)	If a non-standard vessel is to be used, the design calculations demonstrate sound engineering principles of construction.	Mechanical Data Sheet, Specifications, Material Requisition, Drawings, and listed above under References; ASME Boiler and Pressure Vessel Code (BPV), Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; 24590-CM-POA-MVA0-00004-02-11, Rev. 00B, Compress Pressure Vessel Design Calculations for C3/C5 Drains/Sump Collection Tank (RLD-VSL-00004); 24590-LAW-MVC-RLD-00010, Rev. 0, Supplemental Calculation for LAW-MV-RLD-VSL-00004 Vessel; 24590-CM-POA-MVA0-00004-04-02, Rev. 00C, Compress Nozzle FEA Design Calculations for C3/C5 Drains/Sump Collection Tank (RLD-VSL-00004); 24590-CM-POA-MVA0-00004-08-01, Fatigue Assessment Report for C3/C5 Drains/Sump Collection Tank (RLD-VSL-00004).	The LAW RLD vessel (RLD-VSL-00004) is a non-standard ASME Section VIII vessel. The Mechanical Data Sheet requires that the ASME Section VIII, Division 1 code vessel be delivered after design, fabrication, inspection and testing with an ASME code stamp and that the vessels be nationally registered. This is a shop fabricated vessel that is delivered for service in the LAW Facility. Review of the Design Calculations documents for this vessel show that it has been designed as per applicable requirements of ASME Section VIII, Division 1 code and Specifications and other documents listed in the Material Requisition for the vessel. The aforementioned statements and the vendor fabrication drawings of the vessel reviewed demonstrate that sound engineering principles of design, construction, and fabrication have been used for the vessel.

	Information Assessed	Source of Information	Assessment
Design (cont'd)	Vessel has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.	Mechanical Data Sheet, Specifications, Material Requisition, and Drawings, listed above under References; ASME Boiler and Pressure Vessel Code (BPV), Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; UBC 1997, Uniform Building Code, International Conference of Building Officials; 24590-CM-POA-MVA0-00004-02-11, Rev. 00B, Compress Pressure Vessel Design Calculations for C3/C5 Drains/Sump Collection Tank (RLD-VSL-00004); 24590-LAW-MVC-RLD-00010, Rev. 0, Supplemental Calculation for LAW-MV-RLD-VSL-00004 Vessel; 24590-CM-POA-MVA0-00004-04-02, Rev. 00C, Compress Nozzle FEA Design Calculations for C3/C5 Drains/Sump Collection Tank (RLD-VSL-00004); 24590-CM-POA-MVA0-00004-08-01, Fatigue Assessment Report for C3/C5 Drains/Sump Collection Tank (RLD-VSL-00004).	The Mechanical Data Sheet identifies vessel's operating pressure and temperature ranges, the material selected for the vessel, the corrosion allowance, the vessel quality level, and its seismic category, and design requirements. The Mechanical Data Sheet also requires that the vessel be designed to ASME Section VIII, Division 1 code rules. This code requires specific consideration of the operating pressures, temperatures, seismic loads, and corrosion allowance in the design process. Supplementary design criteria are specified in the Engineering Specifications for Seismic Qualification Criteria and Structural Design Loads for Seismic Category III & IV Equipment and Tanks to provide for the seismic design analysis. ASME Section VIII, Division 1 code requires that corrosion allowance thickness shall be excluded from nominal vessel thickness when evaluating the adequacy of vessel components for these loads at end of life. The Engineering Specification for Seismic Qualification Criteria for Pressure Vessels provides pertinent requirements for determination of seismic loads, analysis, and acceptance criteria for the vessel and its supports. The Mechanical Data Sheet identifies the vessel's Quality Level as (CM) and Seismic Category as SC-III. For SC-III vessels, the detailed requirements for seismic load determination (per UBC 1997) are furnished in the Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks. Review of the Design Calculations documents of this vessel show that the vessel has adequate strength after consideration of corrosion allowance to withstand the applicable operating pressure, temperature, fatigue, and seismic loads for the specified design life of the vessel. Furthermore, approval and acceptance of the vendor fabrication drawings by Bechtel National Inc. (BNI) is an added assurance that all applicable requirements stated above and as described in the documents (including daughter documents) listed in Material Requisition for the vessels have been met.

	Information Assessed	Source of Information	Assessment
Foundation	Vessel foundation will maintain the load of a full vessel.	Specifications listed above under References; ASME Boiler & Pressure Vessel Code (BPV), Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; 24590-WTP-DB-ENG-01-001, Rev. 6, Basis of Design; 24590-LAW-DDC-S13T-00003, Rev. 3, C3/C5 Drain Tank Embedment Analysis (Design Calculation).	The Engineering Specification for Pressure Vessel Design and Fabrication requires the use of ASME Section VIII, Division 1 code for the design of the vessel supports. This code ensures an adequate design for the vessel supports. Review of the Design Calculation document of the vessel shows that the vessel's support skirt has adequate strength to maintain the load of full vessel. Furthermore, Chapter 14 of the Basis of Design document requires that the foundation underlying the vessel support must be adequate to support the loads from full vessel, which is out of scope of this assessment. The assessment of the adequacy of the underlying foundation is part of a separate integrity assessment report for the Secondary Containment of the vessel.
	If in an area subject to flooding, the vessel is anchored.	Specifications, Material Data Sheet, and Drawings listed above under References; 24590-LAW-DDC-S13T-00003, Rev. 3, C3/C5 Drain Tank Embedment Analysis (Design Calculation).	The Specification for Pressure Vessel Design requires designing the vessel supports and anchors to secure the buoyant vessel in case the vessel is empty and submerged to the level indicated in the Mechanical Data Sheet. The Mechanical Data Sheet for this vessel does not indicate any such condition; therefore, the flooding consideration does not apply. However, the Design Calculation document and drawings show that the vessel is anchored to the concrete floor for seismic loads.
	Vessel system will withstand the effects of frost heave.	24590-WTP-DB-ENG-01-001, Rev. 6, Basis of Design.	The Basis of Design document requires that all structural foundations for outdoor equipment to extend a distance below grade that exceeds the 30" depth of the frost line. The vessel is located inside/interior of the building at Elev. (-) 21'-0", therefore, the vessel's foundation is not subject to the frost heave effects.

	Information Assessed	Source of Information	Assessment
Waste Characteristics	Characteristics of the waste to be stored or treated have been identified (ignitable, reactive, toxic, specific gravity, vapor pressure, flash point, storage temperature).	Mechanical Data Sheet and Corrosion Evaluation listed above under References; 24590-WTP-PER-PR-03-002, Rev. 4, Control of Toxic Vapors and Emissions from WTP Tank and Miscellaneous Unit Systems; 24590-WTP-PER-PR-03-001, Rev. 2, Prevention of Hydrogen Accumulation in WTP Tank Systems and Miscellaneous Treatment Unit Systems.	The Mechanical Data Sheet presents process conditions and design parameters of the vessel, such as the waste specific gravity, temperatures, and pressures, etc. The Corrosion Evaluation document addresses the pH range and chemical composition of the waste and selects appropriate vessel materials and the corrosion allowance. Waste characteristics that are hazardous, such as ignitability, reactivity, and toxicity are appropriately addressed in the Toxic Vapors and Emissions document and Prevention of Hydrogen Accumulation document. These two documents do not specifically list this vessel to exhibit any hazardous characteristics. Additionally, the vessel is grounded to control ignition sources.
	Vessel is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	Corrosion Evaluation and System Design Description listed above under References.	The Corrosion Evaluation document demonstrates that the vessel material is designed to process the wastes discussed above. The System Design Description document discusses normal and abnormal operations for the RLD vessel. Demineralized water is used for interior surface washdown for scheduled cleaning purpose, decontamination of the vessel, or dilution of liquid inside the vessel. The pH of the vessel contents can be adjusted by addition of sodium hydroxide (NaOH) to the supplied water.
	The waste types are compatible with each other.	System Design Description and Drawings listed above under References.	The System Design Description document for the LAW RLD system does not describe any operations where incompatible wastes are mixed in this vessel for processing. This RLD vessel (RLD-VSL-00004) located at Elev. (-) 21'-0" receives waste from various LAW facility plant items, drains, and sumps, which includes vessel wash liquid, condensate, and effluent as shown on the P&ID drawings. Two pumps (RLD-PMP-00002A/00002B) located in bulge (RLD-BULGE-00001), are used to discharge effluent to RLD vessel (RLD-VSL-00003) or (RLD-VSL-00005), recirculate effluent back into the vessel through three mixing eductors (RLD-EDUC-00001A/B/C), or send a sample to autosampler (ASX-SMPLR-00013).

	Information Assessed	Source of Information	Assessment
Corrosion Protection	Vessel material and protective coatings ensure the vessel structure is adequately protected from the corrosive effects of the waste stream and external environments (expected to not leak or fail for the design life of the system).	Corrosion Evaluation, Mechanical Data Sheet and Drawings listed above under References.	The Corrosion Evaluation and Mechanical Data Sheet documents describe and list the operating and design parameters of the LAW RLD vessel (RLD-VSL-00004). The material selected for the vessel is 316 stainless steel and a corrosion allowance of 0.04". The material for the vessel's support skirt is 304 stainless steel. The drawings show that RLD vessel is located in Room (L-B001B) at Elev. (-) 21''-0". This room is equipped with a sump to pump out any liquid collected in it. Therefore, the room should remain dry during normal operations, which will limit external corrosion. The design features described above ensures that the vessel will not leak or fail during its service design life.
Corrosion Allowance	Corrosion allowance is adequate for the intended service life of the vessel.	Corrosion Evaluation and Mechanical Data Sheet listed above under References; 24590-CM-POA-MVA0-00004-02-11, Rev. 00B, Compress Pressure Vessel Design Calculations for C3/C5 Drains/Sump Collection Tank (RLD-VSL-00004); 24590-LAW-MVC-RLD-00010, Rev. 0, Supplemental Calculation for LAW-MV-RLD-VSL-00004 Vessel.	The RLD vessel's material selection and corrosion allowance are furnished in the Corrosion Evaluation document and in the Mechanical Data Sheet. The selection of 316 stainless material for vessel with a corrosion allowance of 0.04" for a service life of 40 years is adequate and appropriate for the intended use of the vessel. The Design Calculations appropriately account for the corrosion allowance of 0.04" for computing the required thickness of the vessel components.
Pressure Relief	Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the vessel are exceeded.	Drawings and System Design Description listed above under References.	The LAW RLD vessel (RLD-VSL-00004) is designed to unrestricted overflow through an 8" line to sump (RLD-SUMP-00028) also located in the same Room (L-B001B) as the vessel, at Elev. (-) 21'-0" as shown on the drawings and as described in the System Design Description document. The 6" vent from the vessel is routed to the LVP vessel vent header. Overflow line and the vessel vent prevent over pressurization of the vessel.

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

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

Replace the Piping and Instrumentation Diagrams (P&IDs) for the following Low-Activity Waste (LAW) Secondary Offgas/Vessel Vent Process System (LVP) equipment in Appendix 9.2 of the Dangerous Waste Permit (DWP):

- Melter Offgas High Efficiency Particulate Air (HEPA) Preheaters (LVP-HTR-00001A/B and -00003A/B)
- HEPA Filters (LVP-HEPA-00001A/B, -00002A/B, and -00003A)
- Melter Offgas Exhausters (LVP-EXHR-00001A/B/C)
- Caustic Scrubber Bypass
- Melter Offgas Caustic Scrubber (LVP-SCB-00001)
- Stack Discharge Monitoring System
- Mercury Mitigation Equipment Bypass
- Mercury Mitigation Equipment (LVP-SKID-00001)
- Activated Carbon Bed Adsorbers (LVP-ADBR-00001A/B)
- Catalytic Oxidizer/Reducer Skid (LVP-SKID-00002)

Replace the Corrosion Evaluation for the LAW Melter Offgas HEPA Preheaters (LVP-HTR-00001A/B and -00003A/B) in Appendix 9.9 of the DWP.

Submitted by Co-Operator:

Roger J. Landon 4/17/18
Roger J. Landon Date

Reviewed by ORP Program Office:

J. F. Grindstaff 5/16/18
J. F. Grindstaff Date

Quarter Ending June 2018 24590-LAW-PCN-ENV-17-006

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 replace the following P&IDs and Corrosion Evaluation in Appendices 9.2 and 9.9 of the DWP:

Appendix 9.2			
Replace:	24590-LAW-M6-LVP-00001002, Rev. 0	With:	24590-LAW-M6-LVP-00001002, Rev. 2
	24590-LAW-M6-LVP-00001003, Rev. 0	With:	24590-LAW-M6-LVP-00001003, Rev. 1
	24590-LAW-M6-LVP-00001004, Rev. 1	With:	24590-LAW-M6-LVP-00001004, Rev. 2
	24590-LAW-M6-LVP-00001005, Rev. 1	With:	24590-LAW-M6-LVP-00001005, Rev. 2
	24590-LAW-M6-LVP-00001006, Rev. 1	With:	24590-LAW-M6-LVP-00001006, Rev. 2
	24590-LAW-M6-LVP-00002001, Rev. 0	With:	24590-LAW-M6-LVP-00002001, Rev. 1
	24590-LAW-M6-LVP-00002002, Rev. 0	With:	24590-LAW-M6-LVP-00002002, Rev. 1
	24590-LAW-M6-LVP-00002006, Rev. 1	With:	24590-LAW-M6-LVP-00002006, Rev. 2
	24590-LAW-M6-LVP-00004001, Rev. 1	With:	24590-LAW-M6-LVP-00004001, Rev. 2
	24590-LAW-M6-LVP-00004002, Rev. 1	With:	24590-LAW-M6-LVP-00004002, Rev. 3
	24590-LAW-M6-LVP-00004003, Rev. 1	With:	24590-LAW-M6-LVP-00004003, Rev. 2
	24590-LAW-M6-LVP-00005002, Rev. 3	With:	24590-LAW-M6-LVP-00005002, Rev. 4
Appendix 9.9			
Replace:	24590-LAW-N1D-LVP-00009, Rev. 2	With:	24590-LAW-N1D-LVP-00009, Rev. 3

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

Changes to the P&ID (24590-LAW-M6-LVP-00001002, Rev. 2) for the LAW Secondary Offgas/Vessel Vent Process System HEPA Preheaters are summarized below:

- Added, modified or deleted notes in the Notes section. Deleted hold note in the Hold Open Items section. Revised the References section.
- Revised preheater interlock strategy by the addition, modification or deletion of instrumentation, lines, and valves (multiple grids).
- Removed symbols for the preheaters (Grids B5 to B6 and C4 to C5).
- Added, revised or deleted off-sheet connectors (Grids E2, G2, and F8).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LVP-00001003, Rev. 1) for the LAW Secondary Offgas/Vessel Vent Process System HEPA Filters are summarized below:

- Added, modified or deleted notes in the Notes section. Revised the References section.
- Revised interlock control strategy by the addition, modification or deletion of instrumentation, lines, and valves (multiple grids).
- Revised pressure differential transmitters PDT-0007, PDT-0008, PDT-0011, and PDT-0012 (Grids D5, D7, G4, and G6).
- Connected HEPA Prefilters bellows LVP-BLWS-00048 and LVP-BLWS-00050 directly to nozzle N01 of the HEPA housings (Grid B7 and C6).

- Changed label of valve position from "normally open (NO)" to "locked open (LO)" for valves LVP-V-01649 and LVP-V-01651 (Grids C4 and D8).
- Changed symbol of valve position from normally open to normally close for valves LVP-V-72253 and LVP-V-72256 to LVP-V-72258 (Grids C3, E3, E8, and G6).
- Added valves LVP-V-72908 to LVP-V-72913 (Grids C5 and G4 to G6).
- Deleted the "Z" safety specification for control switches and valves of pneumatic cylinder valves-actuators (multiple grids).
- Added the label "A/M" (auto/manual selector switch on operator display faceplate) for hand (manual) switches (Grids D3, E3, E8, and G6).
- Deleted off-sheet connectors (Grids D2 and E2).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LVP-00001004, Rev. 2) for the LAW Secondary Offgas/Vessel Vent Process System Offgas Exhausters LVP-EXHR-00001A are summarized below:

- Added, modified or deleted notes in the Notes section. Revised the References section.
- Deleted Exhauster Seal Purge Bottle Rack LVP-RK-00009 and associated lines, valves, and instrumentation (Grids A7 to A8, B7 to B8, and H7).
- Updated the boundaries of LVP-RK-00006.
- Added backup seal purge air lines, valves, and instrumentation (Grids A3 to A6, B3, and C3 to C4).
- Changed label of valve position from "normally open (NO)" to "normally open/locked open (NO/LO)" for valves LVP-V-00141, LVP-V-01549, and LVP-V-01653 (Grids F3 to F4).
- Updated the set pressure of pressure control valves PCV-0176 and PCV-0180 from 25 to 50 psig (Grids B4 and C5).
- Removed the note callout beneath LVP-HOSE-00012 (Grid B5).
- Added or revised off-sheet connectors (Grids F8, G8, and H8).

Changes to the P&ID (24590-LAW-M6-LVP-00001005, Rev. 2) for the LAW Secondary Offgas/Vessel Vent Process System Offgas Exhausters LVP-EXHR-00001B are summarized below:

- Added, modified or deleted notes in the Notes section. Revised the References section.
- Deleted Exhauster Seal Purge Bottle Rack LVP-RK-00010 and associated lines, valves, and instrumentation (Grids A7 to A8, B7 to B8, and H7).
- Updated the boundaries of LVP-RK-00007.
- Added backup seal purge air lines, valves, and instrumentation (Grids A3 to A6, B3, and C3 to C4).
- Changed label of valve position from "normally open (NO)" to "normally open/locked open (NO/LO)" for valves LVP-V-00140, LVP-V-01550, and LVP-V-01655 (Grids F3 to F4).
- Updated the set pressure of pressure control valves PCV-0184 and PCV-0188 from 25 to 50 psig (Grids B4 and C5).
- Removed the note callout beneath LVP-HOSE-00011 (Grid B5).
- Added or revised off-sheet connectors (Grid G8).

Changes to the P&ID (24590-LAW-M6-LVP-00001006, Rev. 2) for the LAW Secondary Offgas/Vessel Vent Process System Offgas Exhausters LVP-EXHR-00001C are summarized below:

- Added, modified or deleted notes in the Notes section. Revised the References section.
- Deleted Exhauster Seal Purge Bottle Rack LVP-RK-00011 and associated lines, valves, and instrumentation (Grids A7 to A8, B7 to B8, and H7).
- Updated the boundaries of LVP-RK-00008.
- Added backup seal purge air lines, valves, and instrumentation (Grids A3 to A6, B3, and C3 to C4).
- Changed label of valve position from "normally open (NO)" to "normally open/locked open (NO/LO)" for valves LVP-V-00139, LVP-V-01551, and LVP-V-01657 (Grids F3 and G3 to G4).
- Updated the set pressure of pressure control valves PCV-0192 and PCV-0196 from 25 to 50 psig (Grids B4 and C5).
- Removed the note callout beneath LVP-HOSE-00010 (Grid B6).

- Added or revised off-sheet connectors (Grid G8).

Changes to the P&ID (24590-LAW-M6-LVP-00002001, Rev. 1) for the LAW Secondary Offgas/Vessel Vent Process System Caustic Scrubber Bypass are summarized below:

- Added a note in the Notes section. Revised the References section.
- Added drawing 24590-LAW-M6-LVP-00002007 to the Drawing Index table, located above the title block.
- Revised interlock control strategy by the addition, modification or deletion of instrumentation, lines, blind flanges, and valves (multiple grids).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LVP-00002002, Rev. 1) for the LAW Secondary Offgas/Vessel Vent Process System Caustic Scrubber LVP-SCB-00001 are summarized below:

- Added or modified notes in the Notes section. Deleted hold note in the Hold Open Items section. Revised the References section.
- Added vacuum breakers LVP-VACB-00001 and LVP-VACB-00002 and associated lines, valves, and instrumentation (Grids G3 to G4 and H3 to H4).
- Modified top of LVP-SCB-00001 to a flanged and removable dished head. Deleted the top manway (nozzle N21). Added nozzles N51 to N54 and N51A to N54A to the top head. Relocated nozzle N10 to a location above the demisters and nozzle N18 to a location below the demisters. Added valves LVP-V-72317, LVP-V-72321, LVP-V-72322, and LVP-V-72324 and hand (manual) control valves HV-0243 to HV-0246 to nozzles N07A to N07D (Grids B5 to H5).
- Updated pipe specification of line PSA-GQ-51059-CA14A-02 to PSA-GQ-51059-CA12A-02 (Grid B8).
- Revised valve type for LVP-V-00131, LVP-V-01502 to LVP-V-01508, and LVP-V-01572 from needle valves to globe valves (Grids B6 to D6).
- Modified off-sheet connector from LAW-M6-LVP-00002006 to LAW-M6-LVP-00002007 and flow indicator symbol for FI-0238. Removed hold note. Updated the fluid code from WP to PW for line LVP-WP-00074-S11N-02 (Grids B6 to B8).
- Added pipe section numbers LVP-PW-00074-S11N-02 and LVP-PW-00075-S11N-02 (Grids B3 to B4).
- Added or revised off-sheet connectors (Grids E8, F8, G2, G8, and H8).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LVP-00002006, Rev. 2) for the LAW Secondary Offgas/Vessel Vent Process System Stack Discharge Monitoring System are summarized below:

- Added, modified or deleted notes in the Notes section. Added new hold note in the Hold Open Items section. Revised the References section.
- Revised the Nozzle Schedule (Grids G7 to G8 and H7 to H8).
- Added or revised the instrumentation between flow transmitter SDJ-FT-2113 and controllers UC-2110 and UC-2124 (Grids D6 to D8, E6 to E8, and F2 to F7).
- Added condensate drains with hold note (Grids B6 to B7).
- Added, modified or deleted lines, valves, and instrumentation connected to nozzles N07, N08, and N13 to N16 (Grids B3 to B4, B6, C3 to C4, and C6).
- Removed CEMS Panels SDJ-PNL-00124 and SDJ-PNL-00126 (Grids C4 and C6).
- Added off-sheet connectors (Grids D8 and F2).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LVP-00004001, Rev. 2) for the LAW Secondary Offgas/Vessel Vent Process System Mercury Mitigation Equipment Bypass are summarized below:

- Added or modified notes in the Notes section and revised the References section.
- Revised interlock control strategy by the addition, modification or deletion of instrumentation, lines, and valves (multiple grids).

Changes to the P&ID (24590-LAW-M6-LVP-00004002, Rev. 3) for the LAW Secondary Offgas/Vessel Vent Process System Mercury Mitigation Equipment LVP-SKID-00001 are summarized below:

- Added, modified or deleted notes in the Notes section. Deleted hold note in the Hold Open Items section. Revised the References section.
- Updated skid design by the addition, modification or deletion of instrumentation, nozzles, lines, and valves (multiple grids).
- Added, revised or deleted off-sheet connectors (Grids A3, B8, C2, C8, D2, E8, G8, and H8).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LVP-00004003, Rev. 2) for the LAW Secondary Offgas/Vessel Vent Process System Mercury Mitigation Equipment LVP-ADBR-00001A/B are summarized below:

- Added note in the Notes section and revised the References section.
- Moved locations of nozzles N17, N49, N50, and N53 and labeled nozzle N55 of Activated Carbon Bed Adsorber LVP-ADBR-00001A (Grids E5, F4 to F7, and G7).
- Moved location of nozzle N51 of LVP-ADBR-00001B (Grids C5 and C7).
- Revised the analyzer equipment and instrumentation, added a sample booster pump, removed lines LVP-PW-00098-S11N-04 and LVP-PW-00105-S11N-04, and removed analysis indicators AI-0423 and AI-0423A and analysis switch (high) ASH-0423A located between nozzle N23 of LVP-ADBR-00001A and nozzle N36 of LVP-ADBR-00001B (Grids A3 to A4, B3 to B4, C2 to C4, D2 to D4, and E2 to E4).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LVP-00005002, Rev. 4) for the LAW Secondary Offgas/Vessel Vent Process System SCO/SCR Skid are summarized below:

- Added or modified notes in the Notes section and revised the References section.
- Revised temperature indicators TI-0517 and TI-0519, added a new temperature switch (high-high) TSHH-0517, and modified temperature switch (high-high) TSHH-0519 (Grids A5 to A7, B5 to B7, and C5 to C7).
- Deleted hand (manual) switches HS-9051 and HS-9052, pressure differential alarms (high-high) PDAHH-0502 and PDAHH-0504, pressure differential switch (high-high) PDSHH-0504, and pressure differential indicator PDI-0504 (Grids F2 to F4 and G2 to G4).
- Deleted pressure differential transmitter PDT-0504 and flow indicators FI-0503 and FI-0505. Revised pressure differential transmitter PDT-0502 and flow indicators FI-0556 and FI-0557 (Grids E3 and F3).
- Added 3/8-inch-diameter tubings, sample booster pumps, enclosures LVP-ENCL-0021 and LVP-ENCL-0022, valves LVP-V-72891, LVP-V-72892, LVP-V-72906, and LVP-V-72907 to carry instrument service air from valves ISA-V-72875 and ISA-V-72876 to analyzer enclosures LVP-PNL-00006 and LVP-PNL-00027 (Grids B4 to B8 and C4 to C8).
- Added 1/2-inch-diameter tubings, lines RLD-ZR-67187-S11B-001/2 and RLD-ZR-67188-S11B-001/2 and associated instrumentation (Grids A2 to A4 and B2 to B4).
- Deleted hand (manual) switches HS-9311 and HS-9312, temperature switches (low-low) TSLL-0552 and TSLL-0554, and temperature alarms (low-low) TALL-0552 and TALL-0554. Revised temperature indicators TI-0552 and TI-0554 (Grids B3 to B4, C3 to C4, and D3 to D4).
- Moved locations of test ports (Grid D4).
- Added or revised off-sheet connectors (Grids D2, B2, G8, and H8).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the Corrosion Evaluation (24590-LAW-N1D-LVP-00009, Rev. 3) for the LAW Melter Offgas HEPA Preheaters (LVP-HTR-00001A/B and LVP-HTR-00003A/B) were made to update the information in the Inputs and References, Corrosion/Erosion Detailed Discussion and References sections.

This PCN updates information in Appendices 9.2 and 9.9 to reflect current design. These DWP components may be re-evaluated to confirm design adequacy. If the re-evaluation results in future design changes, the changes will be reviewed by Ecology in subsequent permit modifications.

Quarter Ending June 2018 24590-LAW-PCN-ENV-17-006

The following outstanding change documents have been submitted to Ecology pursuant to Permit Condition III.10.C.9.h and are maintained in the WTP Operating Record:

For 24590-LAW-M6-LVP-00001002, Rev. 2, the change document is:

- 24590-LAW-M6N-LVP-00158 – provided to Ecology in milk run (CCN 297327)

For 24590-LAW-M6-LVP-00001004, Rev. 2, the change document is:

- 24590-LAW-TMOD-LVP-0001 – provided to Ecology in milk run (CCN 254068)

For 24590-LAW-M6-LVP-00001005, Rev. 2, the change document is:

- 24590-LAW-TMOD-LVP-0001 – provided to Ecology in milk run (CCN 254068)

For 24590-LAW-M6-LVP-00001006, Rev. 2, the change document is:

- 24590-LAW-TMOD-LVP-0001 – provided to Ecology in milk run (CCN 254068)

For 24590-LAW-M6-LVP-00002006, Rev. 2, the change document is:

- 24590-LAW-M6N-LVP-00155 – provided to Ecology in milk run (CCN 297313)

For 24590-LAW-M6-LVP-00004002, Rev. 2, the change documents are:

- 24590-LAW-M6N-LVP-00160 – provided to Ecology in milk run (CCN 302268)

For 24590-LAW-M6-LVP-00004003, Rev. 2, the change documents are:

- 24590-LAW-M6N-LVP-00104 – provided to Ecology in milk run (CCN 297322)
- 24590-LAW-M6N-LVP-00155 – provided to Ecology in milk run (CCN 297313)
- 24590-LAW-M6N-LVP-00160 – provided to Ecology in milk run (CCN 302268)
- 24590-LAW-M6N-LVP-00161 – provided to Ecology in milk run (CCN 302268)

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

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

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

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

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

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

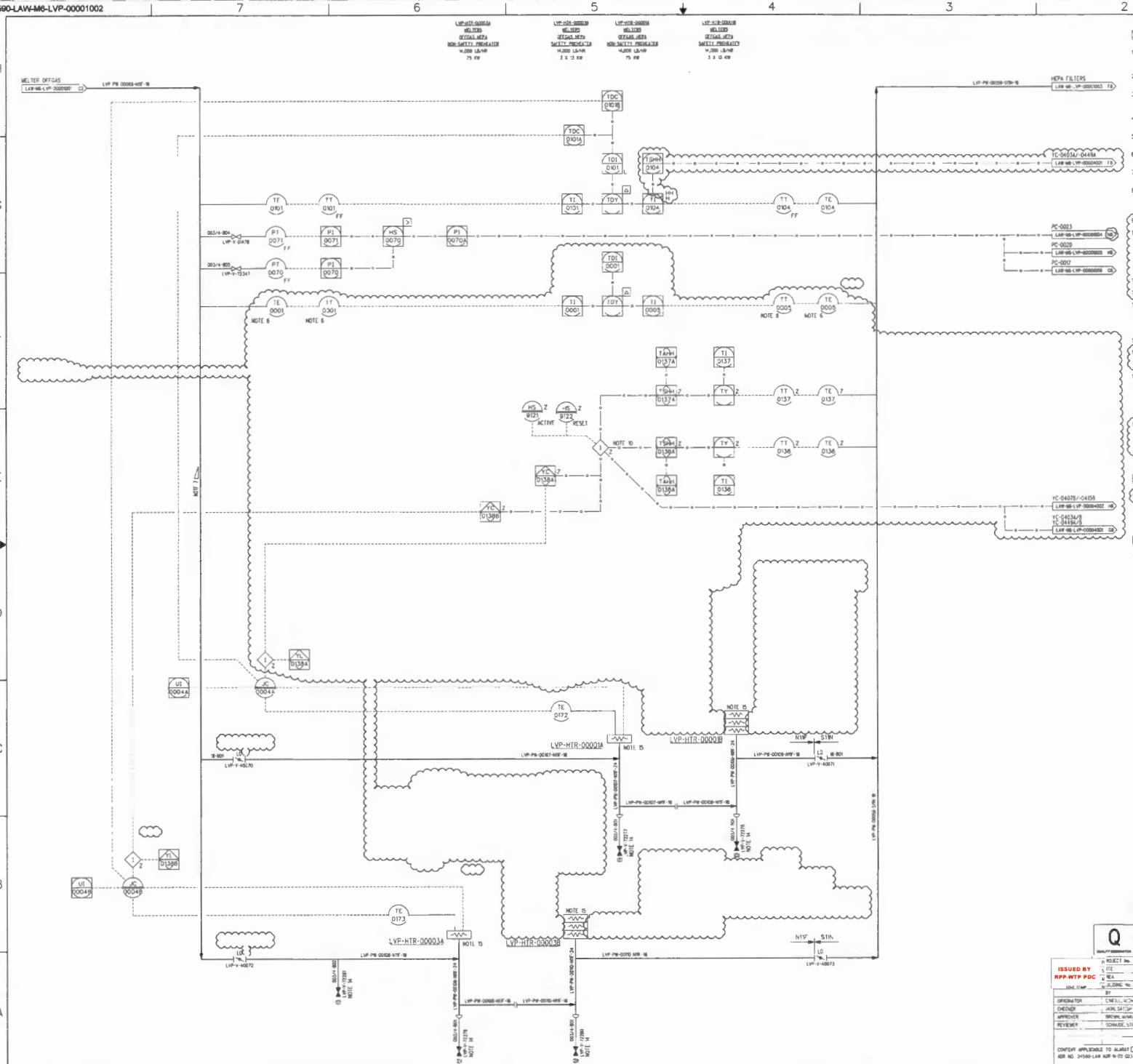
Reason for denial:

Reviewed by Ecology:

S. Dahl for — 6/8/18

S. Dahl — Date

24590-LAW-M6-LVP-00001002



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-SC-00001 THROUGH 24590-WTP-M6-SC-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. ALL SSCS ARE SC-III AND SHALL BE DESIGNED ACCORDING TO ENGINEERING SPECIFICATION 24590-WTP-3PS-FB01-T0001.
6. THIS INSTRUMENT PERFORMS AN AIR PERMIT FUNCTION. INDICATION IS DISPLAYED AT PCJ.
7. MELTER OFF GAS PIPING SHALL BE SLOPED FROM HIGH POINT OF LINE TO THE HEPA PREHEATERS BACK TO WESP.
8. ACCESSIBLE AREAS OF EQUIPMENT SHALL HAVE 2.5' OF INSULATION FOR PERSONNEL PROTECTION OR HAVE GUARDS, BARRIERS, AND OR SHIELDS WHERE INSULATION IS NOT FEASIBLE OR APPROPRIATE.
9. DELETED.
10. HIGH HIGH OUTLETS TEMPERATURE INITIATES AN INTERLOCK IN PPJ THAT ISOLATES POWER TO NON-SAFETY PREHEATERS LVP-HTR-00001A AND 00003A. OPENS CARBON BED BYPASS VALVE YV-0403, AND ISOLATES CARBON BED INLET VALVES YV-0449, YV-0407, YV-0415. INLET VALVES ARE VENTED VIA PNEUMATIC CONNECTION TO PREVENT ISOLATING THE INLET VALVES WHILE BYPASS VALVE IS CLOSED.
11. DELETED.
12. DELETED.
13. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LVP-00001 REV. 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LVP-00043, -00062, -00063, AND -00072. IMPLEMENTED HEPA HEATER REDESIGN.
14. DRAIN VALVES TO BE LOCATED ABOVE FLOOD ZONE.
15. TYPE K THERMOCOUPLES ATTACHED TO HEATERS ARE VENDOR SUPPLIED. SAFETY HEATERS LVP-HTR-00001B/00003B ARE ABANDONED IN PLACE.
16. REVISION 1: INCORPORATED 24590-LAW-M6N-LVP-00083, 24590-LAW-M6N-LVP-00093, 24590-LAW-M6N-LVP-00095, 24590-LAW-M6N-LVP-00133 AND FURTHER REVISED THE CHANGES TO 24590-LAW-M6-LVP-00001002 ON 24590-LAW-M6N-LVP-00083 TO ENSURE THE DCN IS IN ALIGNMENT WITH 24590-LAW-M6N-LVP-00133. ADDED NOTE CALLOUTS, INSTRUMENTS FOR LVP TW-0136 AND -0137 (TAHH-0136A, TSHH-0136A, TAHH-0137A, AND TSHH-0137A).
17. REVISION 2: MODIFIED NOTES 10 AND 15, PREHEATER INTERLOCK STRATEGY PER REVISED PDSA AND REMOVED HOLD 1. DELETED NOTES 9, 11, AND 12. ADDED OFF SHEET CONNECTORS AND NOTE CALLOUTS. INCLUDES INFORMATION FROM 24590-LAW-ETE-MS-17-0001, REV. 0.

HOLD OPEN ITEMS:

1. DELETED.

REFERENCES:

1. 24590-LAW-3ZD-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated in 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.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
2	REVISED PER NOTE 17	JLS	MK	JLB	MK	7/31/17
1	REVISED PER NOTE 16	CIT	EJV	NK	TPG	01/17/08
3	ISSUED FOR CONSTRUCTION, SEE NOTE 13	MD	SJ	SS	MB/DM	12/01/17

REVISION HISTORY

ISSUED BY RPP-WTP PDC

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	20	
ISSUE STAMP		
ORIGINATOR	CNEELL, MICHAEL	12/01/17
CHECKER	JAIN, SATISH	12/01/17
APPROVER	BROWN, MARK D.	12/01/17
REVIEWER	SCHAUER, STEVEN	12/01/17

CONTENT APPLICABLE TO ALARA? [ ] YES [X] NO
ADR NO. 24590-LAW-ADR-N-02 (22) REV. 4

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

CONTRACT No. DE-AC27-01RV14136

P&ID - LAW
LAW SECONDARY OFFGAS/ VESSEL VENT PROCESS SYSTEM HEPA PREHEATERS

SCALE: NONE

24590-LAW-M6-LVP-00001002

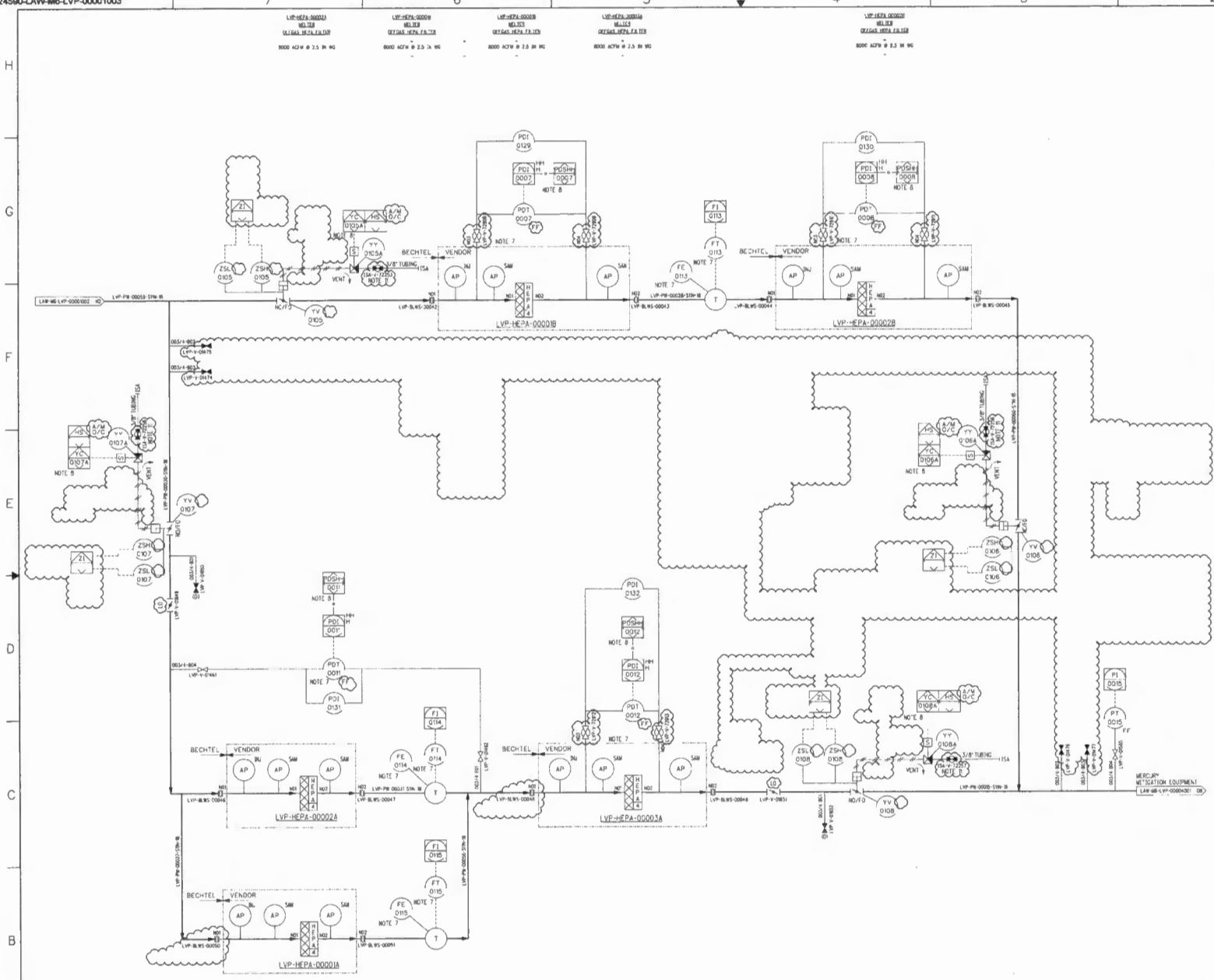
REV 2

C SIZE 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

7/31/2017 7:28:48 AM

PLOTTED BY Authorized

24590-LAW-M6-LVP-00001003



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. DELETED.
6. ABBREVIATIONS: INJ - INJECTION, SAM - SAMPLE.
7. THIS INSTRUMENT PERFORMS AN AIR PERMIT FUNCTION. INDICATION IS DISPLAYED AT PCJ.
8. IN THE EVENT OF A HI HI DIFFERENTIAL PRESSURE SIGNAL FROM A HEPA FILTER, MELTER FEED WILL BE TERMINATED AND THE OPERATOR WILL BE ALERTED. THE ALARMED FILTER TRAIN CAN THEN BE MANUALLY ISOLATED TO CORRECT THE PROBLEM. FAILURE TO OPEN THE ALTERNATE TRAIN WILL RESULT IN THE INABILITY TO ISOLATE THE FAULTY TRAIN.
9. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LVP-00001 REV 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LVP-00018, -00043, -00063, AND -00071. THIS DRAWING ADDS ADDITIONAL PURGE INSTRUMENTATION (FI-0168/0169/0170/0171) TO PRESSURE SENSING LINES.
10. FOR LVP-HPA-00001A/B, 00002A/B, AND -00003A, HOUSINGS AND DUCTWORK SHOWN INSIDE VENDOR BOUNDARY LINES ARE DESIGNED AND TESTED PER ASME AG-1 TEST BOUNDARY FOR INPLACE PRESSURE LEAK TESTING OF HEPA 1B & 2B INCLUDING FLANGED CONNECTION TO INTERCONNECTING PIPING BY UTILIZING VALVES LVP-YV-0105 AND LVP-YV-0106. TEST BOUNDARY FOR INPLACE PRESSURE LEAK TESTING HEPA 1A, 2A, & 3A INCLUDING FLANGED CONNECTION TO INTERCONNECTING PIPING BY UTILIZING ISOLATION VALVES LVP-V-0648 AND LVP-V-0651.
11. IN-USE HEPA TRAIN SHALL HAVE ISA VALVE LOCKED CLOSED TO MAINTAIN OPEN OFFGAS PATH.
12. REVISION 1: INCORPORATED 24590-LAW-M6N-LVP-00112, -00114, 24590-WTP-FC-M-16-0002, 24590-LAW-M6N-M80T-00016, -00033, AND INFORMATION FROM 24590-LAW-ITE-NS-17-0001, REV. 0. REVISED HEPA INTERLOCK CONTROL STRATEGY, NOTE 8 AND REFERENCE 1. ADDED HEPA PDT ISOLATION VALVES AND NOTE 11. DELETED NOTE 5.

HOLD OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3ED-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 12	MO	LR	MM	MRS	7/24/17
0	ISSUED FOR CONSTRUCTION, SEE NOTE 9	MO	SJ	SS	TWOM	11/22/16

ISSUED BY RPP-WTP PDC

PROJECT No.	24590	
SITE	HANFORD	
YEAR	2006	
DRAWING No.	73	

	BY	DATE
ORIGINATOR	ONEILL, M. MAE	11/18/16
CHECKER	JAIN, SATISH	11/18/16
APPROVED	HUGHES, T/WILDOM, D	11/22/16
REVIEWER	SCHAUDE, STEVEN	11/18/16

CONTENT APPLICABLE TO ALARA? YES NO
ADR NO. 24590-LAW-ADR-M-02-023 REV. 4

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

CONTRACT No. DE-AC27-01RV14136

P&ID - LAW
LAW SECONDARY OFFGAS/ VESSEL VENT PROCESS SYSTEM HEPA FILTERS

SCALE: NONE

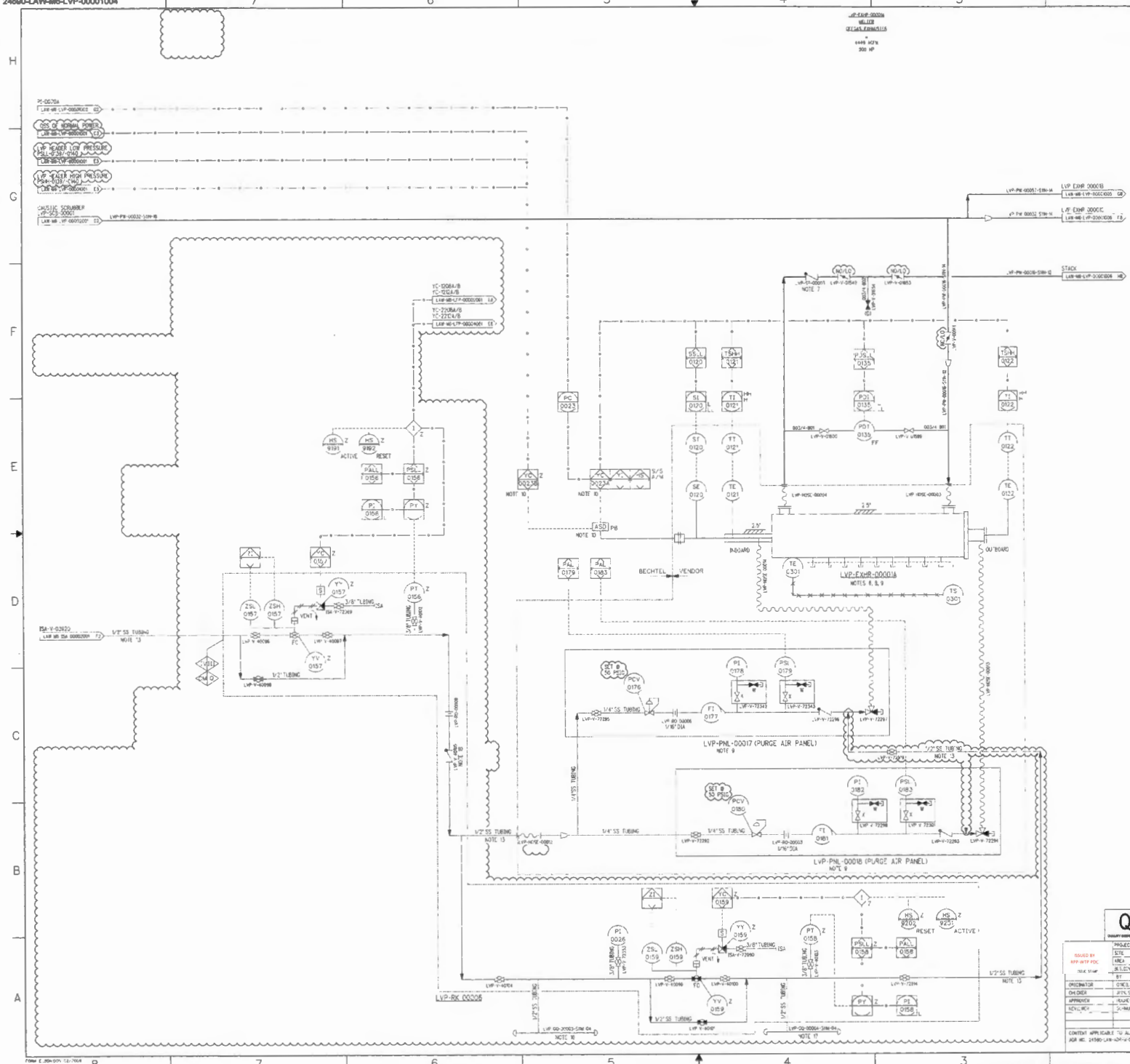
24590-LAW-M6-LVP-00001003 REV 1

C SIZE 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

7/24/2017 11:24:58 AM

FORM 1, SEN DGN 02/2006

24590-LAW-M6-LVP-00001004



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. ALL SSCS ARE SC-III AND SHALL BE DESIGNED ACCORDING TO ENGINEERING SPECIFICATION 24590-WTP-SPS-FB01-T000.
6. EXHAUSTERS ARE FURNISHED WITH AIR PURGED MECHANICAL INBOARD AND OUTBOARD SHAFT SEALS TO PREVENT ESCAPE OF OFF GAS. EXHAUSTER VENDOR PROVIDES FLEXIBLE HOSES AT SUCTION, DISCHARGE, AND FOR PURGE AIR USED IN MECHANICAL SHAFT SEALS. REQUIRED DRAIN PLUGS FOR EACH EXHAUSTER STAGE HOUSING ARE PROVIDED BY VENDOR. EXHAUSTERS HAVE HEAT TRACE TO PREVENT CONDENSATION.
7. SPECIALTY VALVE PROVIDED BY BNI MECHANICAL SYSTEMS.
8. ACCESSIBLE AREAS OF EQUIPMENT SHALL HAVE 2.5 INCHES OF INSULATION FOR PERSONNEL PROTECTION OR HAVE GUARDS, BARRIERS, AND OR SHIELDS WHERE INSULATION IS NOT FEASIBLE OR APPROPRIATE.
9. AIR DEMAND RATE FOR INBOARD AND OUTBOARD SHAFT SEALS IS 10 SCFH. CONTROLS FOR AIR FLOW AND PRESSURE ARE PROVIDED BY EXHAUSTER VENDOR DOWNSTREAM OF FLEXIBLE HOSE CONNECTION. EXHAUSTER VENDOR PROVIDES TWO PURGE PANELS, ONE FOR INBOARD SHAFT SEALS AND ONE FOR OUTBOARD SHAFT SEALS.
10. DURING NORMAL OPERATION AND SPEED IS MODULATED BY PCN CONTROLLER LVP PC 0023 UPON RECONFIGURATION (E.G. LOSS OF POWER) FROM PRU (LVP-YC-00234) THE ASD IS SET TO A FIXED SPEED. THE ASD HAS A SAFETY CLASS "0" SS.
11. DELETED.
12. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-LAW-M6-LVP-00001 REV. 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LVP-00018, -00021, -00034, -00043, -00060, -00082 AND -00083. ADDED NORMAL AND BACKUP AIR PURGE CONTROLS FOR EXHAUSTER SHAFT SEALS.
13. CONSTRUCTION SHALL FIELD ROUTE TUBING. SEE DRAWING 24590-WTP-M0-50-00078 FOR ROUTING DETAILS.
14. DELETED.
15. REVISION 1: INCORPORATED 24590-LAW-M6N-LVP-00083, -00094, AND -00100. ADDED EXHAUSTER CONFIGURATION AND INTERFACE POINTS FOR CONNECTIONS TO THE ASSEMBLY (E.G. INBOARD/OUTBOARD SHAFT SEAL CONTROL PANELS WITH FLEX HOSE CONNECTIONS). DELETED NOTE 11. EXHAUSTER INSTRUMENTS VT-015A AND VT-015B. REVISED PAL-0179A/-0183 FROM CONTINUOUS SOFTWARE TO DISCRETE SOFTWARE. REVISED/ADDED BECHTEL/VENDOR BOUNDARIES, VALVES, INSTRUMENTS, INSTRUMENT RACK, AND BOTTLE RACK/ DETAIL INCLUDING PCV'S, NOTES, OFFSHEET CONNECTOR, AND OTHER MISCELLANEOUS DETAILS.
16. VOLUME OF PIPE SHALL BE GREATER THAN OR EQUAL TO 7.4 CU FT.
17. VOLUME OF PIPE SHALL BE GREATER THAN OR EQUAL TO 3.2 CU FT.
18. VALVE IS Q/SC-III FOR PRESSURE BOUNDARY ONLY.
19. REVISION 2: INCORPORATED 24590-LAW-E/E-NS-17-0001 (REV. 0) AND 24590-WTP-E/E-J-17-0013 (REV. 0). DELETED LVP-RK-00009 AND ASSOCIATED CONTROLS. ADDED BACKUP SEAL PURGE AIR PIPES AND ASSOCIATED CONTROLS. NOTES 16, 17, AND 18 REVISED. SHAFT SEAL PURGE DESIGN PANEL PCV SET PRESSURE REFERENCE 1. NOTES 9 AND 10 DELETED. NOTE 14 AND NOTE CALLOUT IN LVP-HOSE-00012 UPDATED. LVP-RK-00008 BOUNDARIES AND OFF SHEET CONNECTOR'S DESTINATION CHANGED. VALVES POSITION FROM "NO" TO "NO/LO" ADDED VALVE.

HOLD OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3D-1-DP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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.

REV.	DESCRIPTION	ORG.	CHKD	REVWD	APVD	DATE
3	REVISED PER NOTE 19					
1	REVISED PER NOTE 15	LB	KC	BL	SK/DT/JN	6/4/15
0	ISSUED FOR CONSTRUCTION, SEE NOTE 12	MD	SJ	SS	RVDM	11/22/11

REVISION HISTORY

Q QUALITY DISTINGUISHED

ISSUED BY RPP-WTP PDC

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	00	
TITLE BLOCK	BY	DATE
ORIGINATOR	O'NEILL, MICHAEL	11/18/11
CHECKER	JAYNE, DAVID	11/18/11
APPROVER	HAWKES, THOMAS	11/18/11
REVIEWER	SCHMUCKER, STEVEN	11/18/11

CONTENT APPROPRIATE TO ALARM? YES NO
AOR NO. 24590-LAW-AOR-V-02-023 REV. 4

BECHTEL

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

CONTRACT No. DE-AC27-01RL14136

P&ID - LAW
LAW SECONDARY OFFGAS/ VESSEL VENT PROCESS SYSTEM OFFGAS EXHAUSTERS LVP-EXHR-00001A

SCALE NONE

24590-LAW-M6-LVP-00001004

REV 2

R 5372 - 44434
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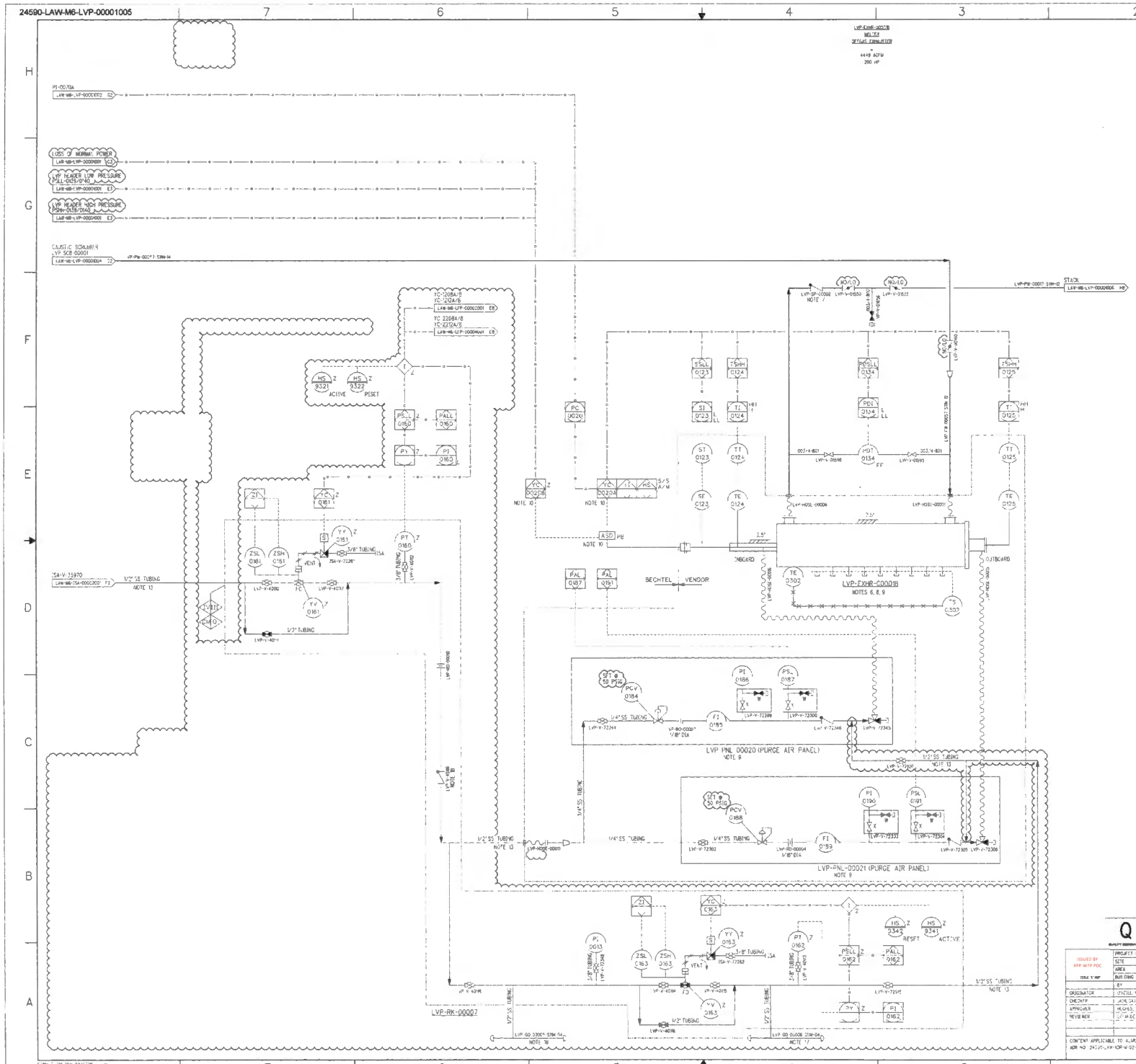


NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. ALL SSC'S ARE SC-III AND SHALL BE DESIGNED ACCORDING TO ENGINEERING SPECIFICATION 24590-WTP-3PS-FB01-T0001
6. EXHAUSTERS ARE FURNISHED WITH AIR PURGED MECHANICAL INBOARD AND OUTBOARD SHAFT SEALS TO PREVENT ESCAPE OF OFF GAS. EXHAUSTER VENDOR PROVIDES FLEXIBLE HOSES AT SUCTION, DISCHARGE AND FOR PURGE AIR USED IN MECHANICAL SHAFT SEALS. REQUIRED DRAIN PLUGS FOR EACH EXHAUSTER STAGE HOUSING, ARE PROVIDED BY VENDOR. EXHAUSTERS HAVE HEAT TRACE TO PREVENT CONDENSATION.
7. SPECIALTY VALVE PROVIDED BY BNI MECHANICAL SYSTEMS
8. ACCESSIBLE AREAS OF EQUIPMENT SHALL HAVE 2.5 INCHES OF INSULATION FOR PERSONNEL PROTECTION OR HAVE GUARDS, BARRIERS, AND OR SHIELDS WHERE INSULATION IS NOT FEASIBLE OR APPROPRIATE.
9. AIR DEMAND RATE FOR INBOARD AND OUTBOARD SHAFT SEALS IS NO SOFT CONTROLS FOR AIR FLOW AND PRESSURE ARE PROVIDED BY EXHAUSTER VENDOR DOWNSTREAM OF FLEXIBLE HOSE CONNECTION. EXHAUSTER VENDOR PROVIDES TWO PURGE PANELS, ONE FOR INBOARD SHAFT SEALS AND ONE FOR OUTBOARD SHAFT SEALS.
10. DURING NORMAL OPERATION ASD SPEED IS MODULATED BY CON CONTROLLER LVP-PC-0020 (UPON RECONFIGURATION (EG LOSS OF POWER) FROM PPC (LVP YC-00020) THE ASD IS SET TO A FIXED SPEED. THE ASD HAS A SAFETY CLASS OF SS.
11. DELETED.
12. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-LAW-M6-LVP-00001 REV 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LVP-00001, -00021, -00034, -00043, -00060, -00062, AND -00063. ADDED NORMAL AND BACKUP AIR PURGE CONTROLS FOR EXHAUSTER SHAFT SEALS.
13. CONSTRUCTION SHALL FIELD ROUTE TUBING. SEE DRAWING 24590-WTP-M0-50-00078FOR ROUTING DETAILS.
14. DELETED.
15. REVISION 1: INCORPORATED 24590-LAW-M6N-LVP-00083 ADDED EXHAUSTER CONFIGURATION AND INTERFACE POINTS FOR CONNECTIONS TO THE ASSEMBLY, (E.G INBOARD/OUTBOARD SHAFT SEAL CONTROL PANELS WITH FLEX HOSE CONNECTIONS). DELETED NOTE 11 EXHAUSTER INSTRUMENTS VT-0152 AND VE-0152 REVISED FAL-0187/-0191 FROM CONTINUOUS SOFTWARE TO DISCRETE SOFTWARE. REVISED/ADDED BECHTEL/VENDOR BOUNDARIES, VALVES, INSTRUMENTS, INSTRUMENT RACK, AND BOTTLE RACK / DETAIL INCLUDING PCV'S. NOTES, OFFSHEET CONNECTOR, AND OTHER MISCELLANEOUS DETAILS.
16. VOLUME OF PIPE SHALL BE GREATER THAN OR EQUAL TO 7.4 CU.FT
17. VOLUME OF PIPE SHALL BE GREATER THAN OR EQUAL TO 0.2 CU.FT.
18. VALVE IS Q/SC-III FOR PRESSURE BOUNDARY ONLY.
19. REVISION 2: INCORPORATED 24590-LAW-E-IN5-T-00001 (REV 0) AND 24590-WTP-ESE-S-T-00013 (REV 0). DELETED LVP-RK-00006 AND ASSOCIATED CONTROLS AND ADDED BACKUP SEAL PURGE AIR PIPES AND ASSOCIATED CONTROLS. NOTES 16, 17, AND 18 REVISED. SHAFT SEAL PURGE DESIGN, PANEL PCV SET PRESSURE, REFERENCE 1, NOTES 9, AND 10 DEFINED. NOTE 14 AND NOTE 24 LOUT IN LVP HOSE 00011 UPDATED. VP RK-00007 BOUNDARIES AND OFF SHEET CONNECTORS DESTINATION. CHANGED VALVES POSITION FROM NO TO NO/LO. ADDED VALVE.

HOLD OPEN ITEMS:

NONE

REFERENCES:

24590-LAW-3PD-OP-00001 LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION

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

REV.	DESCRIPTION	DRG	CHKD	REVWD	APVD	DATE
2	REVISED PER NOTE 19	MRG	DRB			
1	REVISED PER NOTE 15	N	MO	RSK	SK/OT/RK	08/14/11
0	ISSUED FOR CONSTRUCTION, SEE NOTE 12	MD	SJ	TS	TWGM	11/22/11

REVISION HISTORY

ISSUED BY RPP-WTP PDC	PROJECT No	24590
	SITE	HANFORD
	AREA	LAW
	BUILDING No	N/A
	BY	DATE
ORIGINATOR	VAZILL, MICHAEL	11-08-11
CHECKER	JAIN, SATISH	11-08-11
APPROVER	HUGHES, TIMOTHY L	11-22-11
REVIEWER	COMBS, JACKIE	11-08-11

CONTENT APPLICABLE TO ALARA? ☐ YES ☒ NO
ADR NO 24590-LAW-ADR-M-02-013 REV. 4

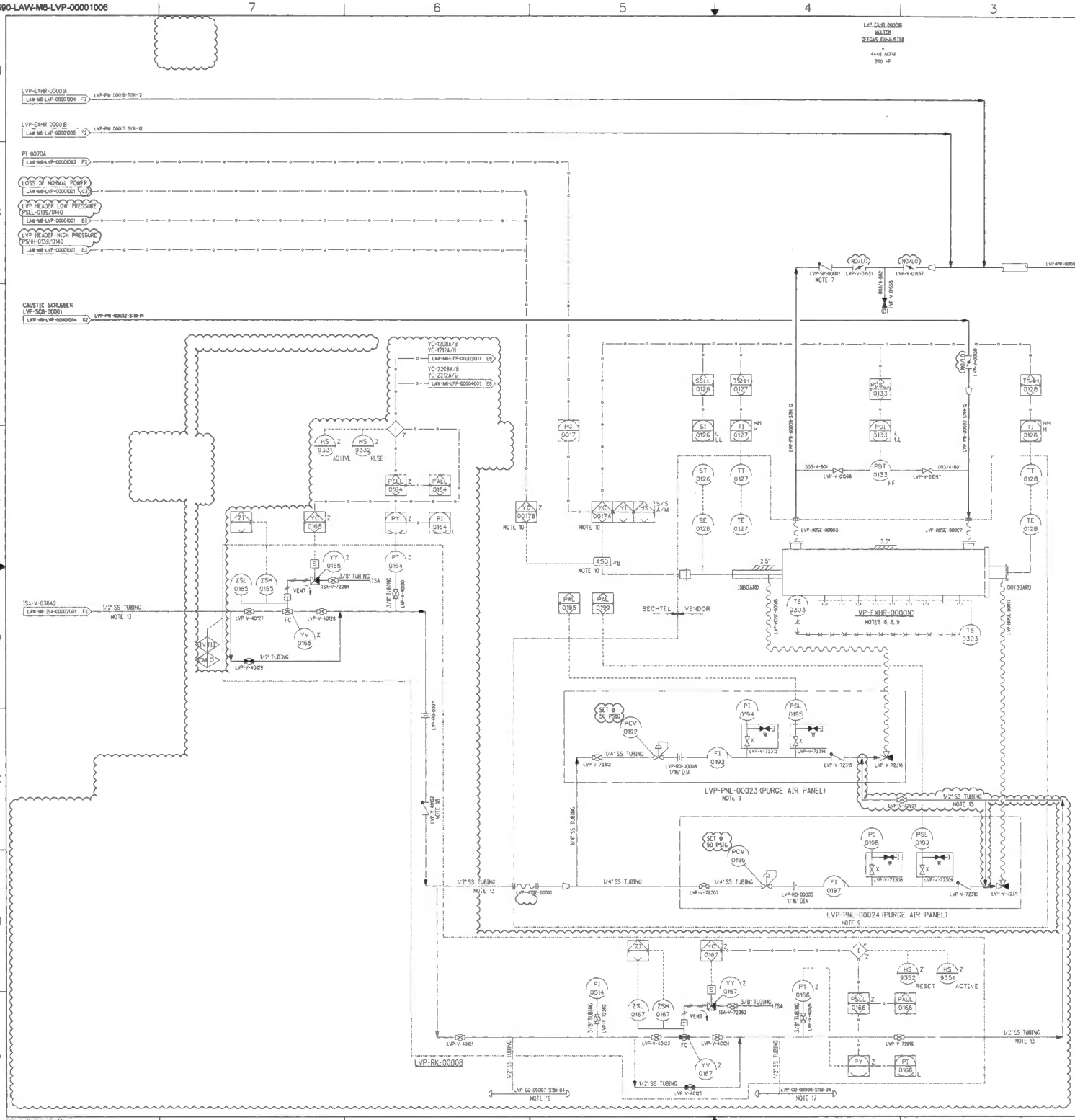
RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99354

CONTRACT No DE-AC27-01RV14136

P&ID - LAW
LAW SECONDARY OFFGAS/ VESSEL VENT PROCESS SYSTEM OFFGAS EXHAUSTERS LVP-EXHR-00001B

SHEET NOTE: 24590-LAW-M6-LVP-00001005 REV 2

F SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. ALL SSC'S ARE SC-III AND SHALL BE DESIGNED ACCORDING TO ENGINEERING SPECIFICATION 24590-WTP-3PS-F601-T0001.
6. EXHAUSTERS ARE FURNISHED WITH AIR PURGED MECHANICAL INBOARD AND OUTBOARD SHAFT SEALS TO PREVENT ESCAPE OF OFF GAS. EXHAUSTER VENDOR PROVIDES FLEXIBLE HOSES AT SUCTION, DISCHARGE AND FOR PURGE AIR USED IN MECHANICAL SHAFT SEALS. REQUIRED DRAIN PLUGS FOR EACH EXHAUSTER STAGE HOUSING ARE PROVIDED BY VENDOR. EXHAUSTERS HAVE HEAT TRACE TO PREVENT CONDENSATION.
7. SPECIALTY VALVE PROVIDED BY BNI MECHANICAL SYSTEMS
8. ACCESSIBLE AREAS OF EQUIPMENT SHALL HAVE 2.5 INCHES OF INSULATION FOR PERSONNEL PROTECTION OR HAVE GUARDS, BARRIERS AND OR SHIELDS WHERE INSULATION IS NOT FEASIBLE OR APPROPRIATE.
9. AIR DEMAND RATE FOR INBOARD AND OUTBOARD SHAFT SEALS IS 510 SCFH. CONTROLS FOR AIR FLOW AND PRESSURE ARE PROVIDED BY EXHAUSTER VENDOR DOWNSTREAM OF FLEXIBLE HOSE CONNECTION. EXHAUSTER VENDOR PROVIDES TWO PURGE PANELS, ONE FOR INBOARD SHAFT SEALS AND ONE FOR OUTBOARD SHAFT SEALS.
10. DURING NORMAL OPERATION ASD SPEED IS MODULATED BY ICN CONTROLLER LVP-PC-0017 UPON RECONFIGURATION (E.G. LOSS OF POWER) FROM PPJ (LVP-YC-0017B). THE ASD IS SET TO A FIXED SPEED. THE ASD HAS A SAFETY CLASS OF SS.
11. DELETED.
12. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-LAW-M6-LVP-00001 REV. 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LVP-00018, -00021, -00034, -00043, -00060, -00062, AND -00063. ADDED NORMAL AND BACKUP AIR PURGE CONTROLS FOR EXHAUSTER SHAFT SEALS.
13. CONSTRUCTION SHALL FIELD ROUTE TUBING. SEE DRAWING 24590-WTP-M0-50-00078 FOR ROUTING DETAILS.
14. DELETED.
15. REVISION 1: INCORPORATED 24590-LAW-M6N-LVP-00083. ADDED EXHAUSTER CONFIGURATION AND INTERFACE POINTS FOR CONNECTIONS TO THE ASSEMBLY (E.G. INBOARD/OUTBOARD SHAFT SEAL CONTROL PANELS WITH FLEX HOSE CONNECTIONS). DELETED NOTE 11. EXHAUSTER INSTRUMENTS VT 0152 AND VE 0153. REVISED PAL-0195/-0199 FROM CONTINUOUS SOFTWARE TO DISCRETE SOFTWARE. REVISED/ADDED BECHTEL/VENDOR BOUNDARIES, VALVES, INSTRUMENTS, INSTRUMENT RACK AND BOTTLE RACK/ DETAIL INCLUDING PCV'S, NOTES, OFFSHEET CONNECTOR, AND OTHER MISCELLANEOUS DETAILS.
16. VOLUME OF PIPE SHALL BE GREATER THAN OR EQUAL TO 7.4 CU. FT.
17. VOLUME OF PIPE SHALL BE GREATER THAN OR EQUAL TO 0.2 CU. FT.
18. VALVE IS Q/SC-III FOR PRESSURE BOUNDARY ONLY.
19. REVISION 2: INCORPORATED 24590-LAW-E1E-NS-I7-00001 (REV. 0) AND 24590-WTP-E1E-J-I7-0013 (REV. 0). DELETED LVP-RK-00011 AND ASSOCIATED CONTROLS. ADDED BACKUP SEAL PURGE AIR PIPES AND ASSOCIATED CONTROLS. NOTES 16, 17 AND 18. REVISED SHAFT SEAL PURGE DESIGN, PANEL PCV SET PRESSURE. REFERENCE 1. NOTES 9 AND 10. DELETED NOTE 14 AND NOTE CALLOUT IN LVP-HOSE-00010. UPDATED LVP-RK-00008 BOUNDARIES AND OFF SHEET CONNECTOR'S DESTINATION. CHANGED VALVES POSITION FROM "NO" TO "NO/LO".

HOLD OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-32D-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
2	REVISED PER NOTE 19					
1	REVISED PER NOTE 15	LR	MO	BSK	SP/BY/JR	8/4/18
C	ISSUED FOR CONSTRUCTION SEE NOTE 12	MO	SJ	SS	TH/DM	11-22-11

Q QUALITY DESIGNATOR

REVISION HISTORY

ISSUED BY RPP-WTP PDC	PROJECT No.	24590
	SITE	HANFORD
	AREA	200E
ISSUE STAMP	BUILDING No.	70
	BY	DATE
ORIGINATOR	O'NEILL, MICHAEL	11/8/11
CHECKER	JAIN, SATISH	11/8/11
APPROVER	HUGHES, CHARLEDON, C	11/22/11
REVIEWER	SCHMIDT, STEVEN	11/8/11

CONTENT APPLICABLE TO ALARAP [X] YES [ ] NO
ADR NO. 24590-LAW-ADR-M-17-0003 REV. 4

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

CONTRACT No. DE-AC27-01RV14136

P&ID - LAW
LAW SECONDARY OFFGAS/ VESSEL VENT PROCESS SYSTEM OFFGAS EXHAUSTERS LVP-EXHR-00001C

SCALE: NONE

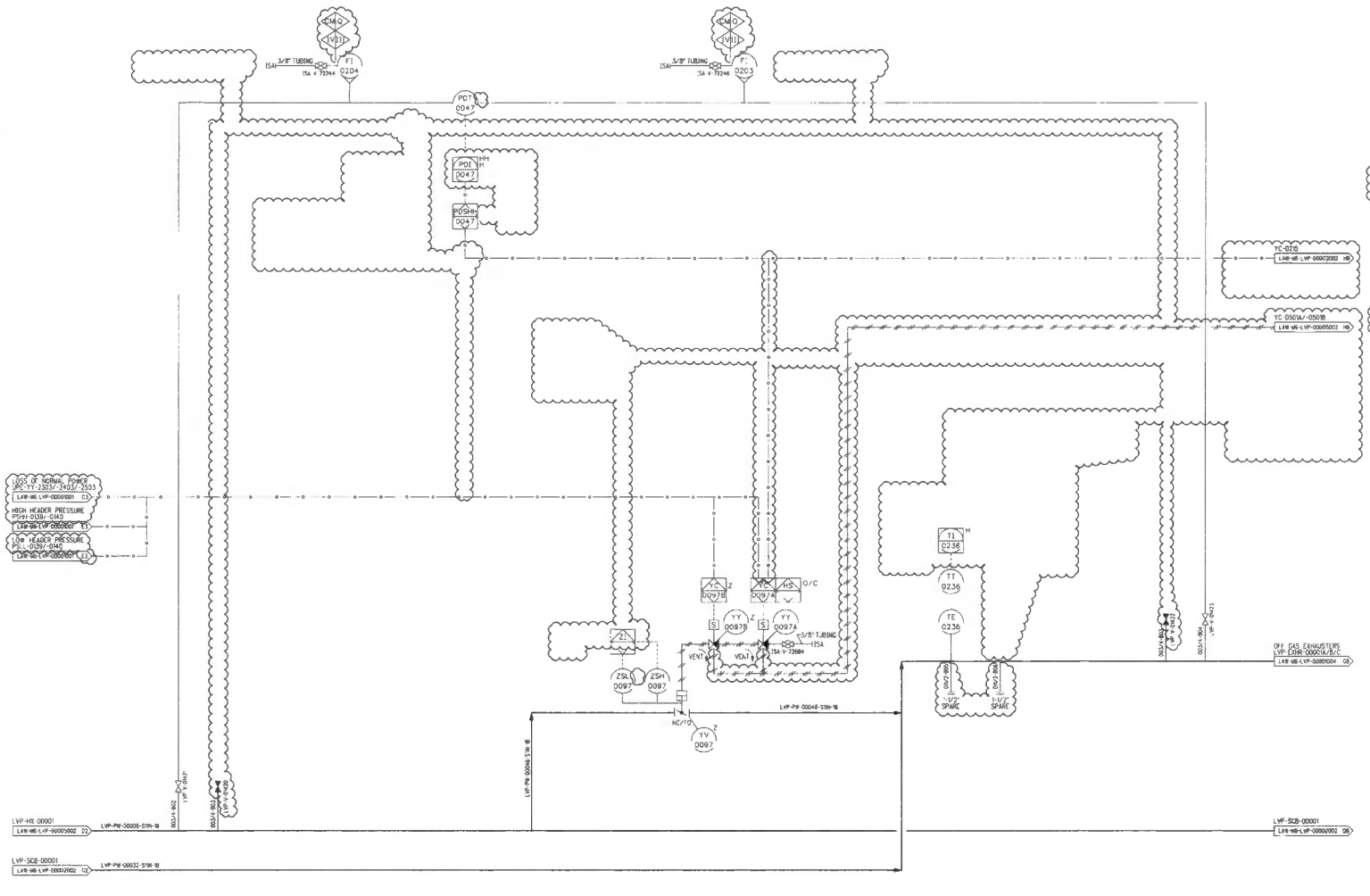
24590-LAW-M6-LVP-00001006

REV 2

8.5" X 22" - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

8/8/2017 3:10:16 PM

FORM 1_SDMJUN 02 2009



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART SUPERSEDES 24590-LAW-M6-LVP-00002 REV 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LVP-00018, AND -00064.
6. REVISION 1: INCORPORATED 24590-LAW-M6N-LVP-00118, -00140, 24590-LAW-M6N-M80T-00033, AND INFORMATION FROM 24590-LAW-EIE-NS-17-0001, REV 0. ADDED PNEUMATIC INSTRUMENT LINE, REVISED REFERENCES AND CONTROL STRATEGY.

HOLD OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3ZD-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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.

DRAWING INDEX

DWG NO	TITLE
24590-LAW-M6-LVP-00002001	LVP SYSTEM CAUSTIC SCRUBBER BYPASS
24590-LAW-M6-LVP-00002002	LVP SYSTEM CAUSTIC SCRUBBER
24590-LAW-M6-LVP-00002003	LVP SYSTEM CAUSTIC COLLECTION TANK
24590-LAW-M6-LVP-00002004	LVP SYSTEM RECIRCULATION LOOP
24590-LAW-M6-LVP-00002005	LVP SYSTEM TRANSFER PUMPS
24590-LAW-M6-LVP-00002006	LVP SYSTEM STACK MONITORING
24590-LAW-M6-LVP-00002007	LVP SYSTEM STACK DISCHARGE MONITORING SYSTEM

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 6	JLS	MRO	JR	WBS	
0	ISSUED FOR CONSTRUCTION, SEE NOTE 5	MG	JR	SS	MB/GM	1-30-18

Q QUALITY ENGINEERED

ISSUED BY RPP-WTP PDC

PROJECT No	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No	00	
	BY	DATE
ORIGINATOR	DWELL, MICHAEL	1-30-18
CHECKER	KHANDUJA, JAYANT	1-30-18
APPROVER	BROWN, W. J. MELDON, D.	1-30-18
REVIEWER	SCHAUER, STEVEN	1-30-18

CONTRACT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-CAW-ADR-M-02-023 REV. 4

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

CONTRACT No: DE-AC27-01RV14136

P&ID - LAW
LAW SECONDARY OFFGAS/ VESSEL VENT PROCESS SYSTEM CAUSTIC SCRUBBER BYPASS

SCALE: NONE

24590-LAW-M6-LVP-00002001

REV 1

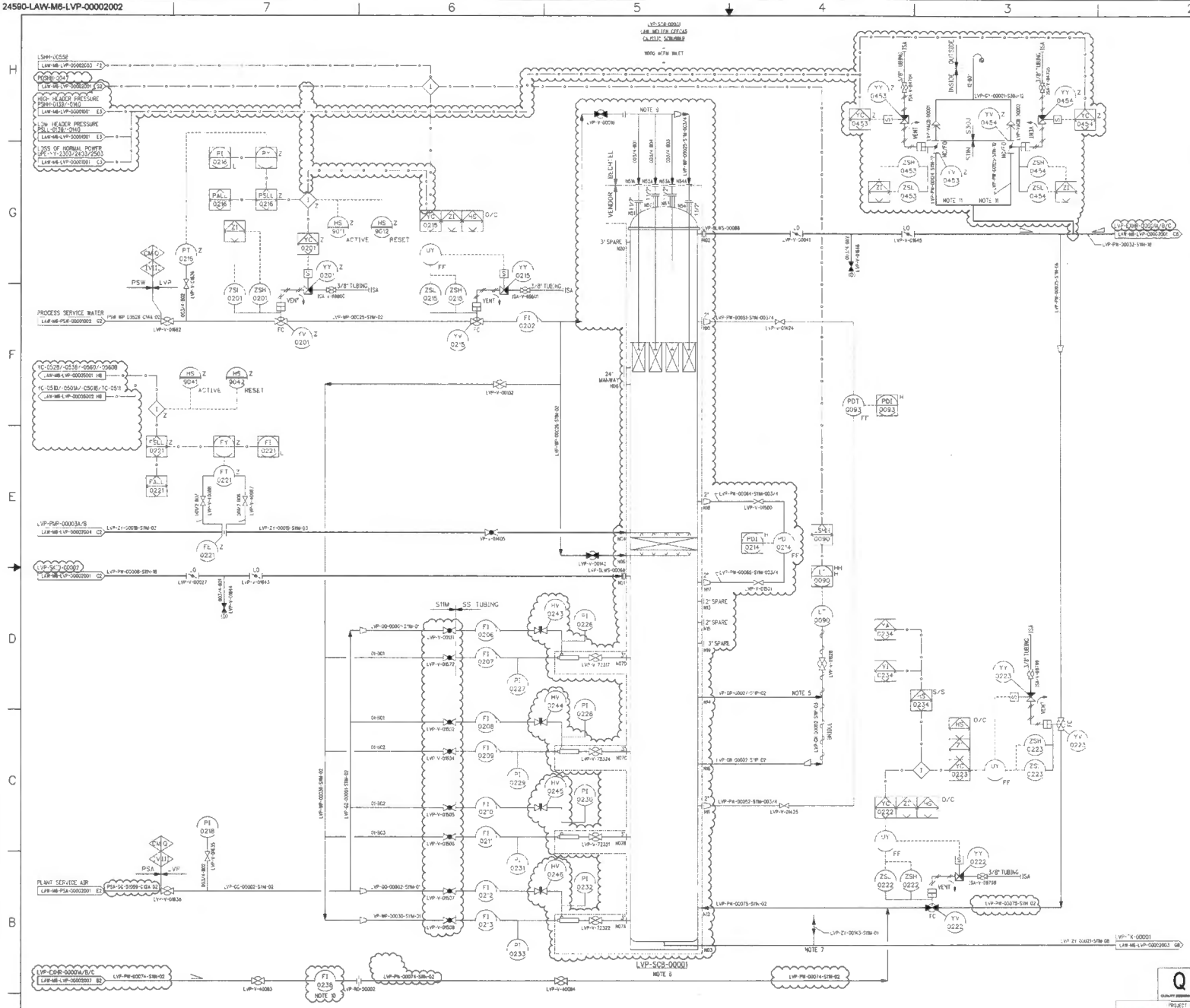
R1180538

E SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

FORM E-TEN-SGN-01/2008

17/08/2017 11:36:16 AM

24590-LAW-M6-LVP-00002002



NOTES:

1. SEE DRAWINGS 24590-WTP-M5-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. LIMIT BRIDLE ORIFICE CONNECTION TO 3/8 INCHES OD.
6. ACCESSIBLE AREAS OF EQUIPMENT SHALL HAVE 4 1/2 INCHES OF INSULATION FOR PERSONNEL PROTECTION OR HAVE GUARDS, BARRIERS, AND OR SHIELDS WHERE INSULATION IS NOT FEASIBLE OR APPROPRIATE.
7. ATTACHMENT BEFORE FIRST VERTICAL DROP OF LVP-ZY-00021-S1M-C8 AND DOWNSTREAM OF NOZZLE N03.
8. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-LAW-M6-LVP-00002 REV 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6H-LVP-00018, -00039, -00042, -00045, -00051, -00062, -00064, -00067, AND -00075. PLANT SERVICE AIR SAFETY INTERLOCKS DELETED.
9. REMOVABLE SPOOL TO ALLOW REMOVAL/REPLACEMENT OF VENDOR SUPPLIED DEMISTER SPRAY NOZZLES.
10. FLOW INSTRUMENT INDICATES FLOW/NO-FLOW.
11. PRESSURE DROP IS TO BE MINIMIZED.
12. REVISION 1 INCORPORATED 24590-LAW-M6N-LVP-00092, 00096, -00115, -00143, 24590-QL-MRA-MKA5-00003-T0011, 24590-WTP-FC-P-14-0037 AND 24590-LAW-ET-M5-17-030 (REV 0) ADDED VACUUM BREAKER DESIGN, OFF SHEET CONNECTORS AND NOTE 11. REVISED REFERENCE 1 AND SAFETY CONTROLS.

HOLD OPEN ITEMS:

1. DELETED

REFERENCES:

1. 24590-LAW-32D-LDP-00001 LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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.

REV	DESCRIPTION	CRD	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 12	JLS	PHO	JK	[illegible]	8/8/17
0	ISSUED FOR CONSTRUCTION, SEE NOTE 8	MO	JK	SS	[illegible]	9-30-11

REVISION HISTORY

ISSUED BY RPP-WTP PDC

PROJECT No.	24590	
SCALE	NONE	
AREA	200E	
FULL SIZE No.	29	

	BY	DATE
ORIGINATOR	ONEILL MICHAEL	7-30-11
CHECKER	KHANGHAR, JAYANT	7-30-11
APPROVER	BROWN, W. WILSON D.	9-30-11
REVIEWER	SCHNOR, STEVEN	9-30-11

CONTENT APPLICABLE TO ALARA? YES NO
ADR NO. 24590-LAW-ADR-M-00023 REV. 4

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

CONTRACT No. DE-AC27-01RV14136

P&ID - LAW
LAW SECONDARY OFFGAS/ VESSEL VENT PROCESS SYSTEM CAUSTIC SCRUBBER LVP-SCB-00001

24590-LAW-M6-LVP-00002002

REV 1

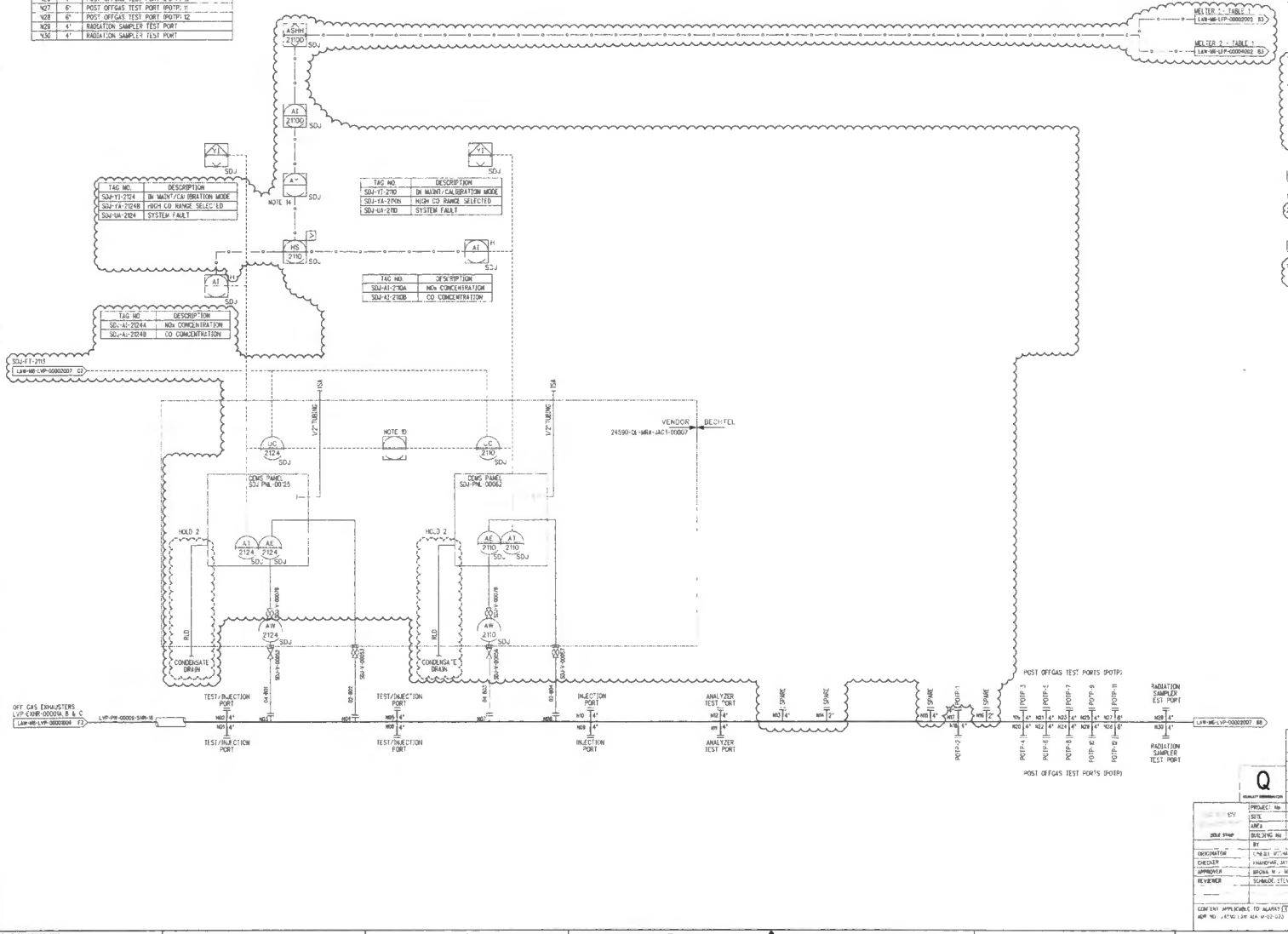
SCALE NONE

FULL SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

R11001084

8/8/2017 2:02:38 PM

NOZZLE SCHEDULE		
NOZZLE NUMBER	FLANGE SIZE	NOZZLE DESCRIPTION
N01	4"	TEST/INJECTION PORT
N02	4"	TEST/INJECTION PORT
N03	4"	NOX-CO CEMS SAMPLE PORT
N04	2"	NOX-CO CEMS RETURN PORT
N05	4"	TEST/INJECTION PORT
N06	4"	TEST/INJECTION PORT
N07	4"	NOX-CO CEMS SAMPLE PORT
N08	2"	NOX-CO CEMS RETURN PORT
N09	4"	SIMULANT INJECTION PORT
N10	4"	SIMULANT INJECTION PORT
N11	4"	ANALYZER TEST PORT
N12	4"	ANALYZER TEST PORT
N13	4"	SPARE
N14	2"	SPARE
N15	4"	SPARE
N16	2"	SPARE
N17	4"	POST OFFGAS TEST PORT (POTP) 1
N18	4"	POST OFFGAS TEST PORT (POTP) 2
N19	4"	POST OFFGAS TEST PORT (POTP) 3
N20	4"	POST OFFGAS TEST PORT (POTP) 4
N21	4"	POST OFFGAS TEST PORT (POTP) 5
N22	4"	POST OFFGAS TEST PORT (POTP) 6
N23	4"	POST OFFGAS TEST PORT (POTP) 7
N24	4"	POST OFFGAS TEST PORT (POTP) 8
N25	4"	POST OFFGAS TEST PORT (POTP) 9
N26	4"	POST OFFGAS TEST PORT (POTP) 10
N27	6"	POST OFFGAS TEST PORT (POTP) 11
N28	6"	POST OFFGAS TEST PORT (POTP) 12
N29	4"	RADIATION SAMPLER TEST PORT
N30	4"	RADIATION SAMPLER TEST PORT



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-II, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. DELETED.
6. DELETED.
7. DELETED.
8. DELETED.
9. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-LAW-M6-LVP-00002 REV 4. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LVP-00041, -00045, AND -00064.
10. 40 CFR PART 60 COMPLIANT DATA ACQUISITION AND HANDLING SYSTEM (DAHS).
11. DELETED.
12. DELETED.
13. REVISION 1: PORTIONS OF 24590-LAW-M6-LVP-00002006 REV 0 WERE TRANSFERRED TO DRAWING 24590-LAW-M6-LVP-00002007 REV 0. ADDED/REVISED/DELETED NOTES, HOLD, INSTRUMENT SERVICE AIR LINES, NOZZLES, NOZZLE NUMBERS, AND NOZZLE SCHEDULE. ADDED CO AND THC DWP CEMS SDJ-AE/AT-2124 AND SDJ-AE/AT-2125 RESPECTIVELY. INCORPORATED 24590-LAW-M6N-LVP-00082, -00090, AND -00098.
14. THE AUTOMATIC WASTE FEED CUTOFF (AWFCO) IS SET AT 100 PPM CO CALCULATED OVER AN HOURLY ROLLING AVERAGE AT THE STACK.
15. REVISION 2: INCORPORATED 24590-LAW-M6N-LVP-00125. ADDED ELECTRICAL LINE FROM SDJ-FT-2113 TO SDJ-UC-2110/2124, HIGH ALARM DESIGNATION TO CO/NOx INDICATORS, NOTE 14, COMM LINE AND COMPONENTS FROM SDJ-HS-2110 TO OFF-SHEET CONNECTORS REVISED VENDOR DESIGN PER LATEST VENDOR INFORMATION, NOTE 10 AND REFERENCE 1. DELETED NOTE 11 AND NOTE 12. ADDED/MODIFIED/DELETED TAG NO./DESCRIPTION TABLES. HOLD RLD CONDENSATE DRAINS PENDING VENDOR DESIGN (HOLD NOTE 2).

HOLD OPEN ITEMS:

1. DELETED
2. HOLD PENDING VENDOR DESIGN.

REFERENCES:

1. 24590-LAW-3ZO-LOP-00003, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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.

REV	DESCRIPTION	ORIG	CHKD	REVWD	APVD	DATE
2	REVISED PER NOTE 15					
1	REVISED PER NOTE 13	MD	PDP	BAJK	PDKJ	04/29/14
0	ISSUED FOR CONSTRUCTION, SEE NOTE 9	MD	JK	SS	MB/DM	11/30/11

REVISION HISTORY

TITLE STAMP		
PROJECT No	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No	20	
	BY	DATE
ORIGINATOR	CHABOT, MICHAEL	11/30/11
CHECKER	HANDFORD, JAY ANN	11/30/11
APPROVER	BROWN, M. J. MELISSA	11/30/11
REVIEWER	SCHMOE, STEVEN	11/30/11

CONTENT APPLICABLE TO ALARMS? [X] YES [ ] NO
ADP NO. (ATTACH LAW ADP W-02-22) REV. 4

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

CONTRACT No DE-AC27-01RV14136

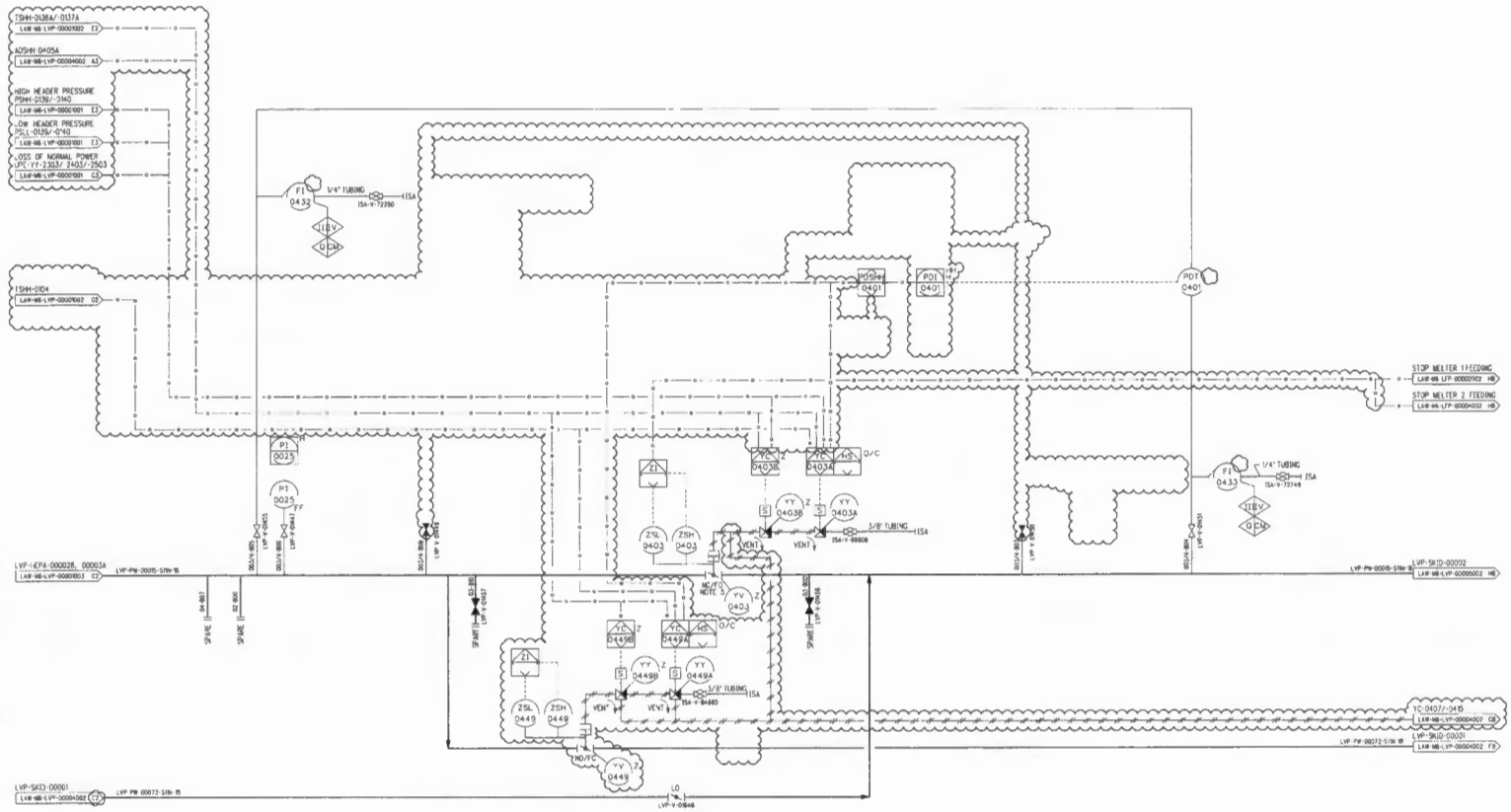
P&ID - LAW
LAW SECONDARY OFFGAS/ VESSEL VENT PROCESS SYSTEM STACK DISCHARGE MONITORING SYSTEM

SCALE: 1/2"=1"

24590-LAW-M6-LVP-00002006

REV 2

E SIZE - 44x34
COMPUTER GENERATED - MANUAL DRAWN CHANGES NOT PERMITTED



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. THE BYPASS VALVE YY-0403 SHALL OPEN FIRST BEFORE CLOSING THE INLET ISOLATION VALVES.
6. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-LAW-M6-LVP-00004 REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LVP-00018, AND -00063.
7. REVISION 1: INCORPORATED 24590-LAW-M6N-LVP-00084, -00089, -00115 AND -00125. ADDED/REVISED/DELETED NOTES, VALVES, TUBING SIZES, QUALITY BREAKS, AND INSTRUMENTS.
8. REVISION 2: INCORPORATED INFORMATION FROM 24590-LAW-ESE-NS-17 0001 REV. 0. REVISED REFERENCE 1, INTERLOCK CONTROL STRATEGY, AND NOTE 5. ADDED REDUNDANT INLET ISOLATION VALVE.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3ZD-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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.

DRAWING INDEX

DWG NO	TITLE
24590-LAW-M6-LVP-0000400*	LVP SYS Hg MITIGATION EQUIPMENT BYPASS
24590-LAW-M6-LVP-00004002	LVP SYS Hg MITIGATION EQUIP. LVP-SKID-00001
24590-LAW-M6-LVP-00004003	LVP SYS Hg MITIGATION EQIP. LVP-AOBR-00001A/B

REV.	DESCRIPTION	DWG	CHKD	RVWD	APVD	DATE
2	REVISED PER NOTE 8	JWS	AR	AR	[illegible]	7/21/17
1	REVISED PER NOTE 7	DMH	MRO	BAJR	SKJR	10/17/14
0	ISSUED FOR CONSTRUCTION, SEE NOTE 6	MD	SJ	SS	TN/DM	11-22-13

Q QUALITY DESIGNATION

REVISION HISTORY

ISSUED BY RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR	O'NEILL, MICHAEL	11-14-11
CHECKER	JAIN, SATISH	11-18-11
APPROVER	BROWN, M / WILSON, D	11-22-11
REVIEWER	SCHRADER, STEVEN	11-18-11

CONFIRM APPLICABLE TO ALARAT [X] YES [ ] NO
ADR NO. 24590-LAW-ADR-M-02 013 REV: 4

PROJECT No. 24590
FIL HANFORD
AR EA 200E
BLDING No. 20

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

CONTRACT No: DE-AC27-01RV14136

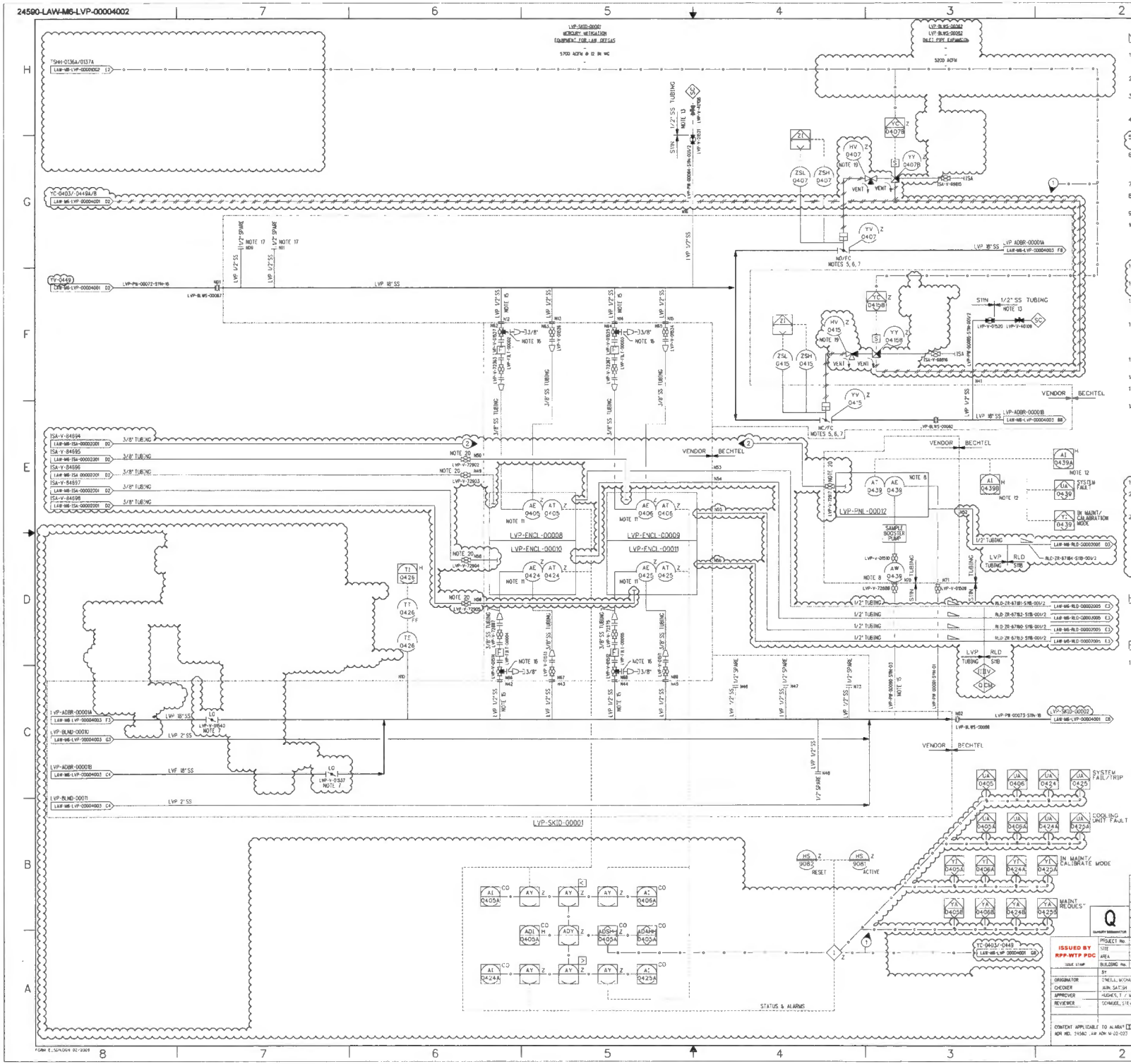
P&ID - LAW
LAW SECONDARY OFFGAS/VESSEL VENT PROCESS SYSTEM MERCURY MITIGATION EQUIPMENT BYPASS

SCALE: NONE

24590-LAW-M6-LVP-00004001 REV 2

"F" SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

7/3/2017 4:49:21 PM



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-0000' THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED
5. CARBON ADSORBER ISOLATION VALVES YV-0407 AND YV 0415, SHALL MEET LEAKAGE REQUIREMENTS AS STATED IN THE PDSA.
6. ADSORBERS ARE NORMALLY RUN IN LEAD/LAG MODE, BUTTERFLY VALVES ARE SHOWN NO/NC FOR LVP-ADBR-00001A IN LEAD MODE, VALVES WOULD BE REVERSED TO PUT LVP-ADBR-00001B INTO LEAD MODE.
7. SUPPLIED BY BECHTEL
8. THIS INSTRUMENT PERFORMS AN AIR PERMIT FUNCTION. INDICATION IS DISPLAYED AT PCJ.
9. DELETED.
10. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LVP-00004 REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LVP-000046, -00052, -00053, -00055, -00065, AND -00068. ADDED/REVISED/DELETED VALVES, INSTRUMENTS AND LINE NUMBERS.
11. INSTRUMENTS AE-0405, -0406, -0424, AND -0425 MEASURE CO LEVELS.
12. INSTRUMENT AI-0439A INDICATES HF LEVELS AND INSTRUMENT AI-0439B INDICATES HCL LEVELS.
13. CONSTRUCTION SHALL FIELD ROUTE TUBING FROM ISOLATION VALVE TO SAMPLE CONNECTION. SEE DRAWING 24590-WTP-MD-50-00072 (FUTURE) FOR ROUTING DETAILS.
14. REVISION 1: INCORPORATED 24590-LAW-M6N-LVP-00091, -0010', AND -00107. ADDED/REVISED/DELETED VALVES, INSTRUMENTS, EQUIPMENT, IN-LINE COMPONENTS, NOTES AND HOLD. THIS DRAWING ALSO INCLUDED CHANGES TO ALIGN THE BECHTEL P&IDS WITH THE VENDOR P&IDS.
15. SAMPLE EXTRACTION NOZZLES EXTEND INTO MAIN PROCESS LINE IN ORDER TO OBTAIN REPRESENTATIVE SAMPLE.
16. SIMULANT INJECTION PORT FLANGE ADAPTER.
17. LVP-TW-0404 AND LVP-TW-0434 ARE USED AS 1/2" SPARE AT NDS AND NTI RESPECTIVELY.
18. REVISION 2: INCORPORATED 24590-LAW-M6N-LVP-00136, 24590-WTP-SDDR-J-14-00112, AND 24590-WTP-SDDR-J-15-00068. DELETED TAGS FOR LVP-TW-0404, -0434 (TT-0404/0434, TE 0404/0434, TY/TT 0404/0434, TAHH 0404/0434, TSHH-0404/0434), NOZZLES N56, N57, 3/8" TUBING, NOTE 9 AND REMOVED HOLD NOTE ADDED NOTE CALLOUT TAGS FOR LVP-ENCL-00008, -00009, -00010, -00011, LVP-PNL-00012, VP-TW-0136, -0137 (TAHH-0136B/0137B AND TSHH-0136B/0137B). RELOCATED VENDOR/BECHTEL BOUNDARY FOR LVP-V-01509 AND FOR THE CONNECTION OF LVP-SKID-00001 TO LVP-PW-00090/-00091. THIS DRAWING REVISION SUPERSEDED VENDOR DRAWING, 24590-QL-POA-WWK0-00001-05-00070, REV 00R.
19. MANUAL 3-WAY BAL. VALVES ARE LOCKABLE.
20. SYSTEM BREAK FROM ISA "O LVP IS AT THE ISOLATION VALVE INLET; UPSTREAM OF THIS VALVE, THE LINES ARE CM AND SC IV. DOWNSTREAM THE LINES ARE Q AND SC III.
21. REVISION 3: REMOVED TSHH-0136B/0137B (PREHEATER OUTLET) AND THEIR INTERLOCK. REVISED YV-0407/-0415 CONTROLS, NOTES 5, 11 AND 12. ADDED NEW NOTES 19 AND 20. ISA AND RLD DRAIN LINES TO THE LVP ENCLOSURES AND PANELS. REMOVED YV-0449/0450 ON THE OUTLET OF LVP-SKID-00001 AND ADDED LOCKED-OPEN MANUAL ISOLATION VALVES IN THEIR PLACES. DELETED CO2 CONTROLS. REMOVED OFF-SHEET CONNECTORS TO STOP METER FEED AND DIW ADDITION. CHANGED CO PANEL INDICATORS INTERCONNECTION FROM ELECTRICAL TO INTERNAL SYSTEM LINKS. INCLUDES INFORMATION FROM 24590-LAW-EIE-NS-17-0001 (REV. C).

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-320-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
3	REVISED PER NOTE 21					7/20/17
2	REVISED PER NOTE 18	CTI	LAV	NK	PRV/DIY/JRF	08/22/16
1	REVISED PER NOTE 14	DMH	MRO	BA/JK	SK/JRI	11/17/14
0	ISSUED FOR CONSTRUCTION, SEE NOTE 10	MO	SJ	SS	TN/DM	12/22/11

REVISION HISTORY

ISSUED BY RPP-WTP PDC

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	70	
CONTRACT No.	DE-AC27-01RV14136	

	BY	DATE
ORIGINATOR	O'NEILL, MICHAEL	11/14/17
CHECKER	BURN, SATISH	11/16/17
APPROVER	HUGHES, T. / MCDONOUGH, D	11/22/17
REVIEWER	SCHMUDE, STEVEN	11/17/17

CONTENT APPLICABLE TO ALARA? ☐ YES ☐ NO
ADM MD. 24590 LAW ADM M-02-023 REV. 4

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

P&ID - LAW
LAW SECONDARY OFFGAS/VESSEL VENT PROCESS SYSTEM MERCURY MITIGATION EQUIPMENT LVP-SKID-00001

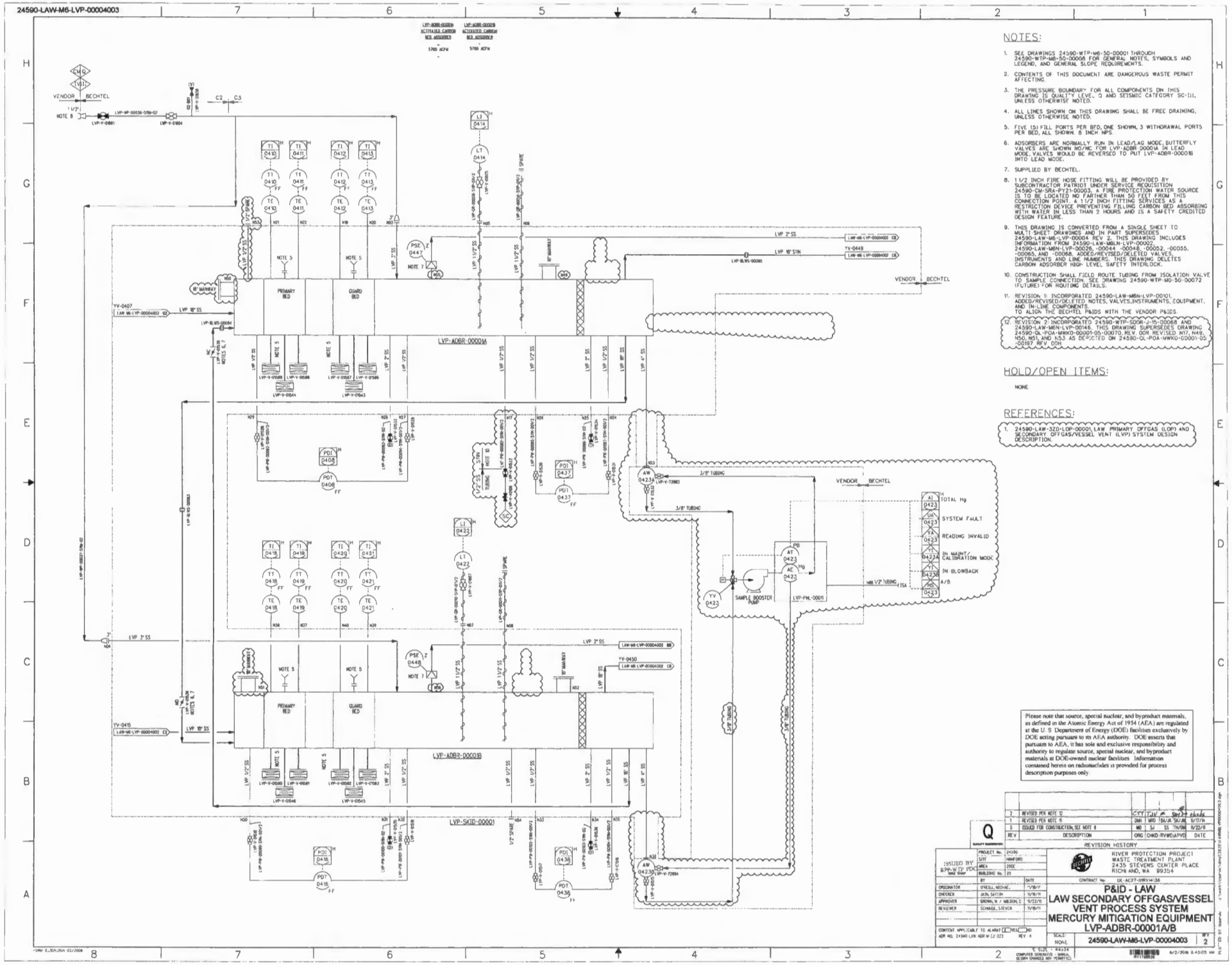
SCALE: NONE
24590-LAW-M6-LVP-00004002
REV 3

E SIZE: 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED
R11805341

7/20/2017 8:33:08 AM

FORM E_SANLOW 02/2009

24590-LAW-M6-LVP-00004003



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00006 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. FIVE (5) FILL PORTS PER BED, ONE SHOWN, 3 WITHDRAWAL PORTS PER BED, ALL SHOWN. 8 INCH NPS.
6. ADSORBERS ARE NORMALLY RUN IN LEAD/LAG MODE, BUTTERFLY VALVES ARE SHOWN NO/NC FOR LVP-ADBR-00001A IN LEAD MODE. VALVES WOULD BE REVERSED TO PUT LVP-ADBR-00001B INTO LEAD MODE.
7. SUPPLIED BY BECHTEL.
8. 1 1/2 INCH FIRE HOSE FITTING WILL BE PROVIDED BY SUBCONTRACTOR PATRIOT UNDER SERVICE REQUISITION 24590-CM-SRA-PY21-00003. A FIRE PROTECTION WATER SOURCE IS TO BE LOCATED NO FARTHER THAN 50 FEET FROM THIS CONNECTION POINT. A 1 1/2 INCH FITTING SERVICES AS A RESTRICTION DEVICE PREVENTING FILLING CARBON BED ABSORBING WITH WATER IN LESS THAN 2 HOURS AND IS A SAFETY CREDITED DESIGN FEATURE.
9. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-LAW-M6-LVP-00004 REV 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6LN-LVP-00002, 24590-LAW-M6N-LVP-00026, -00044 -00048, -00052, -00055, -00065, AND -00068. ADDED/REVISED/DELETED VALVES, INSTRUMENTS AND LINE NUMBERS. THIS DRAWING DELETES CARBON ADSORBER HIGH LEVEL SAFETY INTERLOCK.
10. CONSTRUCTION: SHALL FIELD ROUTE TUBING FROM ISOLATION VALVE TO SAMPLE CONNECTION. SEE DRAWING 24590-WTP-M0-50-00072 (FUTURE) FOR ROUTING DETAILS.
11. REVISION 1: INCORPORATED 24590-LAW-M6N-LVP-00101. ADDED/REVISED/DELETED NOTES, VALVES, INSTRUMENTS, EQUIPMENT, AND IN-LINE COMPONENTS TO ALIGN THE BECHTEL P&IDS WITH THE VENDOR P&IDS.
12. REVISION 2: INCORPORATED 24590-WTP-SD0R-J-15-00068 AND 24590-LAW-M6N-LVP-00146. THIS DRAWING SUPERSEDES DRAWING 24590-OL-POA-MWKO-00001-05-00070, REV. 00H. REVISED M17, N49, N50, N51, AND N53 AS DEPICTED ON 24590-OL-POA-MWKO-00001-05-00167 REV. 00H.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3ZD-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
2	REVISED PER NOTE 12	CTT	TJV	JW	DRB	8/2/08
1	REVISED PER NOTE 11	DMH	MRD	BVA	SKJM	5/17/11
0	ISSUED FOR CONSTRUCTION, SEE NOTE 9	MD	SJ	SS	TNVBM	10/22/10

REVISION HISTORY

ISSUED BY: BNFL-WTP PDC

PROJECT No. 24590
SITE HANFORD
AREA 200E
BUILDING No. 20

	BY	DATE
ORIGINATOR	O'NEILL, MICHAEL	11/18/17
CHECKER	JAIN, SATISH	11/18/17
APPROVER	BROWN, W / WILDON, D	11/23/11
REVIEWER	SCHMUCK, STEVEN	11/18/11

CONTENT APPLICABLE TO ALARA? YES NO
ADR NO. 24590-LAW-ADR-M-12-023 REV 4

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

CONTRACT No. DE-AC27-01RV14136

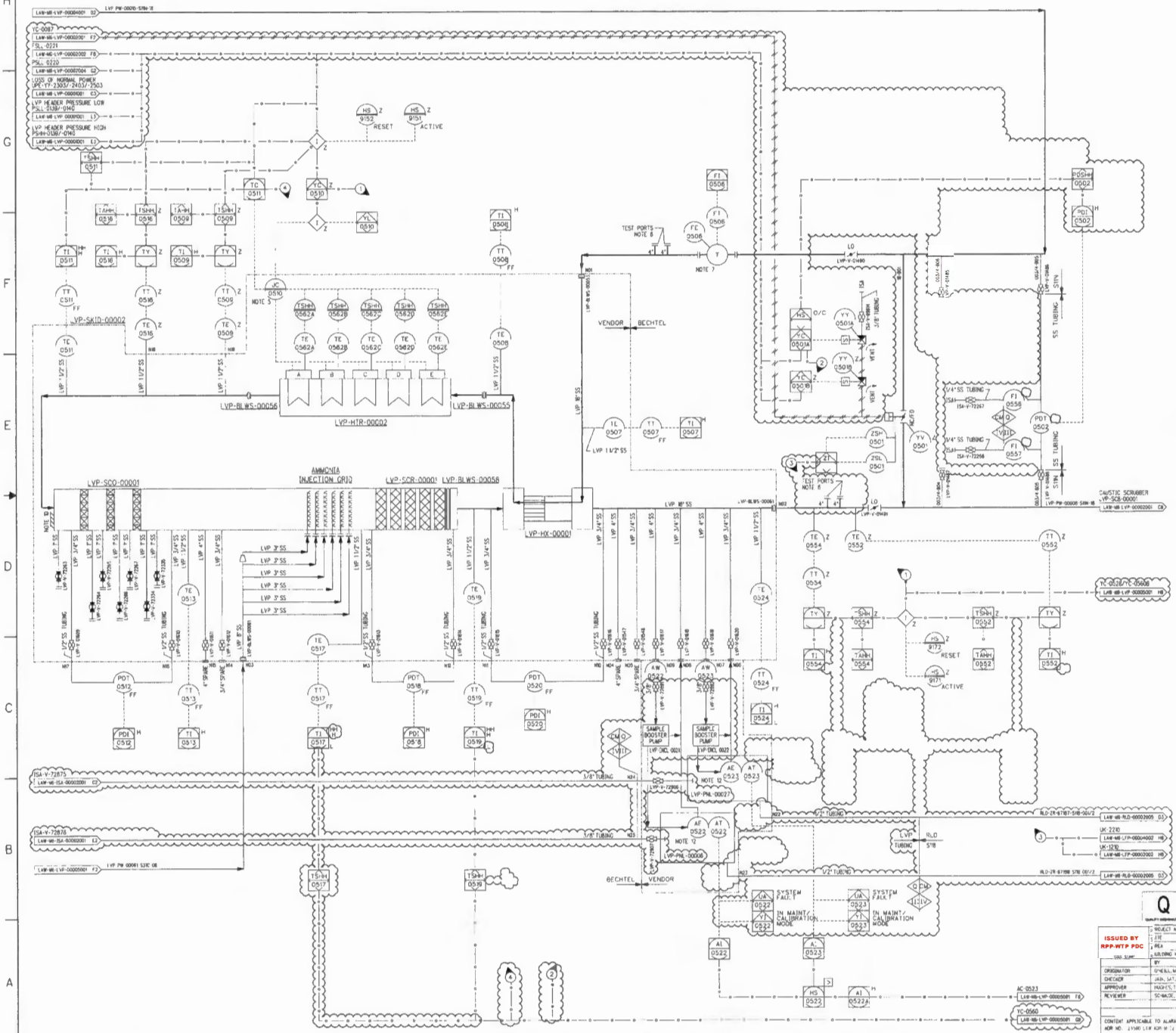
P&ID - LAW
LAW SECONDARY OFFGAS/VESSEL VENT PROCESS SYSTEM MERCURY MITIGATION EQUIPMENT LVP-ADBR-00001A/B

SCALE: NONE

24590-LAW-M6-LVP-00004003

REV 2

8/2/2008 8:40:05 AM



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-II, UNLESS OTHERWISE NOTED.
4. DELETED
5. FIVE HEATER BANKS ARE CONTROLLED FROM ICN VIA VENDOR CONTROL PANEL LVP-PNL-00003.
6. TEST PORTS ARE TO BE INSTALLED AT THE SAME AXIAL POSITION. ONE PORT SHOULD BE AS CLOSE TO VERTICAL (TOP) AS POSSIBLE. THE OTHER SHOULD BE 90° OPPOSED. TEST PORTS SHALL BE PLACED A MINIMUM OF TWO (2) INSIDE PIPE DIAMETERS FROM UPSTREAM FLOW DISTURBANCES AND A MINIMUM OF ONE-HALF (1/2) INSIDE PIPE DIAMETER FROM DOWNSTREAM DISTURBANCES. WHERE PRACTICAL, THESE STRAIGHT RUN DISTANCES SHOULD BE DOUBLED.
7. FLOW ELEMENT SHALL BE LOCATED A MINIMUM OF TEN INSIDE PIPE DIAMETERS FROM UPSTREAM AND DOWNSTREAM FLOW DISTURBANCES TO ENSURE STRAIGHT PIPE FLOW DISTRIBUTION THROUGH THE DEVICE. TEST PORTS ARE NOT REGARDED TO CREATE FLOW DISTURBANCES.
8. JUNCTION BOX LVP-JB-00012 (NON-SAFETY) TO BE INSTALLED ON TCO SKID.
9. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-LAW-M6-LVP-00005 REV. 2. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LVP-00054, -00057, -00060, -00066, -00069, AND 24590-QL-MRA-MBTC-00007-T0003.
10. INSULATION PER 24590-WTP-SDDR-MS-14-00002.
11. REVISION 1: INCORPORATED 24590-LAW-M6N-LVP-00083, -00088, AND -00091. REVISED/ADDED VALVES, BELLOWS, NOZZLES, NOTES, AND INSTRUMENTATION.
12. INSTRUMENTS AE-0522 AND AE-0523 MEASURE NH3 LEVELS.
13. REVISION 2: INCORPORATED 24590-LAW-M6N-LVP-00074. REVISED/DELETED/ADDED NOTES, HOSES, CAP, VALVES, BELLOWS, LINE MATERIALS, VENDOR/BECHTEL BOUNDARY, FLANGES, AND INSTRUMENTATION.
14. REVISION 3: INCORPORATED 24590-LAW-M6N-LVP-00128 AND 24590-LAW-M6N-MBOT-00033. DELETED INSTRUMENTS LVP-HS-0510, LVP-HA-0510, HIGH ALARM DESIGNATION ON LVP-AI-0522, LVP-AI-0523; PIPELINES LVP-PW-00006, -00008, -00010, -00012, VALVES LVP-V-72340 AND -72341; ADDED INSTRUMENTS LVP-AI-0522A AND BELLOW LVP-BLWS-00081 TO PIPELINE LVP-PW-00061; REVISED BELLOWS LVP-BLWS-00055, -00056 AND -00058 FROM IN-LINE FITTINGS TO EQUIPMENT; INSTRUMENT LINE BETWEEN LVP-YC-0510 AND INTERLOCK FROM ELECTRICAL SIGNAL TO DATA LINK EQUIPMENT; DESCRIPTION FOR LVP-HX-00001 FROM "HEAT RECOVERY UNIT TO HEAT RECOVERY EXCHANGER AND VENDOR BOUNDARY FOR ANALYZER ENCLOSURES; UPDATED ZONE LOCATION ON CONTINUATION ARROWS TO LAW-M6-LVP-C00050; FROM H8 TO F8 AND LAW-M6-LVP-0000100' FROM C3 TO B3.
15. REVISION 4: INCORPORATED AND FURTHER REVISED 24590-LAW-M6N-LVP-00144, -00146, AND INFORMATION FROM 24590-LAW-ESE-NS-17-0001, REV 0. REVISED REFERENCE 1, CONTROL STRATEGY PER NEW PDSA, AND NOTE 14. MOVED TEST PORTS. ADDED LVP-ENCL-0021 AND LVP-ENCL-0022. ADDED CONNECTING LINE WITH FLOW DIRECTION ON BOTH SAMPLE BOOSTER PUMPS. ADDED YC-0560A AND YC-0560B LABEL TO OFF SHEET CONNECTOR AND QUALITY/SEISMIC BREAK REMOVED L FROM TI-0554 AND TI-0552. UPDATED LOSS OF POWER OFF SHEET CONNECTOR WITH INSTRUMENT TAG NUMBERS. CORRECTED REVISION 3 NOTE. MISCELLANEOUS CHANGES PER ICN COMMENTS.

HOLD OPEN ITEMS:

1. NONE

REFERENCES:

1. 24590-LAW-SZD-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
4	REVISED PER NOTE 15	TP	WMO	JK	WMO	7/16/17
3	REVISED PER NOTE 14	LV	MRO	JS	DV/PD/JW	05/15/15
2	REVISED PER NOTE 13	DMH	MRO	BA/SS	JM/DC	08/22/14
1	REVISED PER NOTE 11	RP	RM	SA/SS	RM/PD	06/26/13
0	ISSUED FOR CONSTRUCTION, SEE NOTE 9	MD	SJ	SS	TM/DM	11-22-11

REVISION HISTORY

ISSUED BY RPP-WTP PDC

PROJECT No. 24590 · SITE HANFORD · AREA 200E · BUILDING No. 70

	BY	DATE
ORIGINATOR	O'NEILL, MICHAEL	11-18-11
CHECKER	JAIN, SATISH	11-18-11
APPROVER	HUGHES, T. / MELTON, B.	11-22-11
REVIEWER	SCHMADE, STEVEN	11-18-11

CONTENT APPLICABLE TO ALARAT ☐ YES ☐ NO

ADR NO. 24590 LAW ADR-M-14-023 REV. 4

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

CONTRACT No. DE-AC27-01RV14136

P&ID - LAW LAW SECONDARY OFFGAS/VESSEL VENT PROCESS SYSTEM SCO/SCR SKID

SCALE: NONE

24590-LAW-M6-LVP-00005002 REV 4

D SIZE 44x34

COMPUTER GENERATED - MANUAL REVISIONS NOT PERMITTED

7/18/2017 7:37:51 AM

Form E_SDN DCN 02/2004

CORROSION EVALUATION

R11802678

LVP-HTR-00001A/B & LVP-HTR-00003A/B
Melters Offgas HEPA Preheaters

ISSUED BY
RPP-WTP PDC

Contents of this document are Dangerous Waste Permit affecting

Results

Materials Considered:

Material (UNS No.)	Acceptable Material
Carbon Steel	
Type 304L (S30403)	
Type 316L (S31603)	X (housing only)
AL-6XN® 6% Mo (N08367)	X (housing only)
Incoloy® 800 (N08800)	X (heating element sheath)
Hastelloy® C-22® (N06022)	X
Ti-2 (R50400)	

Recommended Material Types: **Housing/Flange – Type 316 stainless steel (max 0.030% C; dual certified)**
The preheater housing is offgas piping. Pipe Class N11F (N08367) is specified and is acceptable.
Heating element sheath – Incoloy 800

Minimum Corrosion Allowance: **Housing – Pipe Class N11F (0.0425 inch)**
Heater Element Sheath – 0.0 inch

Inputs and References:

- Operating Inlet Temperature (°F) (max/norm) 126/124 (24590-LAW-M4C-LOP-00001)
- Operating Outlet Temperature (°F) (max/norm). 162/160 (24590-LAW-M4C-LOP-00001)
- Location Room L-304H, out cell (24590-LAW-P1-P01T-00005)
- Operating conditions are as stated in the applicable sections of the Process Corrosion Data report (24590-WTP-RPT-PR-04-0001-04)

Assumptions and Justification (refer to Section 20– References)

- The electric heaters increase the nominal gas temperature to avoid condensation in the melter offgas HEPA filters [3]
- Offgas is received from the Wet Electrostatic Precipitators (WESP) at 124 °F (126 °F max) [3]
- LCP, LFP, and RLD vessel ventilation streams are combined with the WESP offgas stream [3]
- The combined melter offgas and vessel vents is heated to increase the temperature sufficiently to avoid condensation and is transferred to the HEPA filters [3]
- Conditions shown for LVP-HTR-00001A/B in 24590-WTP-RPT-PR-04-0001-04 can be taken as being applicable to LVP-HTR-00003A/B

Operating Restrictions:

- Develop a procedure to control decontamination of component
- Develop procedure to control lay-up and storage, includes both before operation and during operation
- Procedures are to be reviewed and accepted by MET prior to use

Some information on all pages may appear to be illegible, however, the information necessary for assuring adequate design is legible.

Concurrence KG
Operations

REV	DATE	REASON FOR REVISION	ORIGINATE	CHECK	REVIEW	APPROVE
3	11/7/16	Extensive revision -- no rev bars shown Update to new format Update references Modify text to provide additional justification	Originator By: Debbie Adler - dladler Org Name: MET Placed: Oct 27 2016	Checked By: A. Rangus - arangus Org Name: S-Keller Placed: Oct 27 2016 4:12 pm APRangus	RBDavis	TErwin

CORROSION EVALUATION

REVISION HISTORY

2	1/21/15	Complete re-write; no rev bars shown New format Update references Incorporate revised PCDS	DLAdler	RBDavis	APRangus	TErwin
1	7/18/12	Update design temperature Incorporate revised PCDS Revise mat'l for heater elements; text modified accordingly Recommend Corrosion Allowance New section q-Oxidation Minor edit & format changes Include AEA notice	DLAdler	RBDavis	APR	DJWilsey
0	10/27/05	Initial Issue	DLAdler	JRDivine	APR	APRangus
REV	**DATE**	**REASON FOR REVISION**	**PREPARER**	**CHECKER**	**MET**	**APPROVER**

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

This bound document contains a total of 13 sheets.

CORROSION EVALUATION

Corrosion/Erosion Detailed Discussion

The combined offgas stream is split and each stream is passed through one of two parallel process offgas heaters (LVP-HTR-00001A or LVP-HTR-00003A). These offgas heaters utilize electric heating elements to increase the temperature of the combined off gas stream at least 18 °F in order to decrease the relative humidity of the offgas and prevent condensation in downstream components, particularly the HEPA filters. Sizing of these heaters is such that if one of them fails, the other unit can maintain the required combined stream offgas temperature increase on its own. In addition to these normal process heaters, there are Safety heaters (LVP-HTR-00001B and LVP-HTR-00003B) that are installed in series, one with each of the process heaters.

The LAW HEPA Preheater uses standard heater element technology: electric element with ceramic oxide packing surrounded by a metallic sheath. The "Commercial Off-The-Shelf" (COTS) heaters are attached to an ASME B16.5 flange, seal welded, and pressure tested. The offgas stream is passed through the HEPA preheaters in order to increase the gas temperature to avoid condensation in the melter offgas HEPA filters. These COTS heaters are maintainable and replaceable.

1 General/Uniform Corrosion Analysis

a Background

General corrosion or uniform corrosion is corrosion that is distributed more-or-less uniformly over the surface of a material without appreciable localization This leads to relatively uniform thinning on sheet and plate materials and general thinning on one side or the other (or both) for pipe and tubing It is recognized by a roughening of the surface and usually by the presence of corrosion products The mechanism of the attack typically is an electrochemical process that takes place at the surface of the material Differences in composition or orientation between small areas on the metal surface create anodes and cathodes that facilitate the corrosion process

b Component-Specific Discussion

The anticipated dry-air conditions are not conducive to general corrosion and none is expected because of the low humidity conditions (approximately 14% RH) due to heating of the offgas Unless there is sustained 65 % relative humidity, corrosion cannot be sustained The "housing" is the off-gas piping Type 316L stainless steel is satisfactory for the housing The offgas piping upstream of the heaters is pipe class N11F (N08367) with a 0 0425 inch corrosion allowance, which is also considered satisfactory Incoloy® 800 is recommended for the heating elements and sheath because of its oxidation resistance

2 Pitting Corrosion Analysis

Pitting is localized corrosion of a metal surface that is confined to a point or small area and takes the form of cavities. Pitting corrosion will only be a concern if sufficient moisture is present during normal operation Shut-down and heat-up thermal transients may allow vapors to condense on the cold surfaces Locations at crevices, at dead-legs, at low points, and under deposits may host conditions that support corrosion The constituents in the off-gas vapor phase can be aggressive in oxidizing environments when mixed with moisture Therefore, a material with a higher pitting corrosion resistance than Type 304L is necessary Type 316L stainless steel, or better, is recommended for this application

At the stated operating conditions, localized corrosion is not a concern, corrosion will not proceed without an electrolyte present Type 316L is recommended

3 Crevice Corrosion Analysis

Crevice corrosion is a form of localized corrosion of a metal or alloy surface at, or immediately adjacent to, an area that is shielded from full exposure to the environment because of close proximity of the metal or alloy to the surface of another material or an adjacent surface of the same metal or alloy Crevice corrosion is similar to pitting in mechanism Crevice corrosion will only be a concern if sufficient moisture is present The offgas humidity is controlled so that there will be no condensation during normal operations

This is an air handling unit operating at elevated temperatures, above the dew point Corrosion will not initiate without sufficient electrolyte present

4 Stress Corrosion Cracking Analysis

Stress corrosion cracking (SCC) is the cracking of a material produced by the combined action of environment, susceptible materials, and sustained tensile stress (residual or applied). Stainless steels and nickel alloys are susceptible to SCC and intergranular SCC due to the presence of halogens in aqueous solutions at temperatures greater than 140 °F These conditions are not present in the preheater due to the absence of water during normal operations Susceptibility of these alloys increases with carbide precipitation at the grain boundary adjacent to welds Sensitization of the grain boundaries is prevented with the materials recommended Either "L" grade, low carbon, stainless steel or niobium-stabilized stainless steel are specified to negate sensitization from becoming a corrosion issue. It is assumed that there will be no condensation in the unit, therefore, the HEPA preheater will not undergo stress corrosion cracking because insufficient moisture will be present

The temperature of the gas during operation will be greater than the dew point Corrosion will not initiate without sufficient electrolyte present

CORROSION EVALUATION

5 End Grain Corrosion Analysis

End grain corrosion is preferential aqueous corrosion that occurs along the worked direction of wrought stainless steels exposed to highly oxidizing acid conditions End grain corrosion typically is not a major concern, it propagates along the rolling direction of the plate, not necessarily through the cross sectional thickness In addition, end grain corrosion is exclusive to metallic product forms with exposed end grains from shearing or mechanical cutting This component does not have any pressure boundary cut ends exposed to the offgas Also, end grain corrosion will not take place in the component because of the absence of sufficient moisture

End grain corrosion is not expected to occur in the HEPA preheater because the temperature of the gas will be greater than the dew point of the gas therefore corrosion will not occur in the absence of an electrolyte

6 Weld Corrosion Analysis

The welds used in the fabrication will follow the WTP specifications and standards for quality workmanship The materials selected for this fabrication are compatible with the weld filler metals and ASME/AWS practice Using the welding practices specified for the project there should not be gross micro-segregation, precipitation of secondary phases, formation of unmixed zones, or volatilization of the alloying elements that could lead to localized corrosion of the weld

This position is justified because the operating temperature and dry air conditions will not corrode because of the lack of the electrolyte for corrosion. Assuming that correct weld procedures are followed, no preferential corrosion of weld beads or heat-affected zones occurs in nitric acid or alkaline-based stream

7 Microbiologically Influenced Corrosion Analysis

Microbiologically Influenced Corrosion (MIC) refers to corrosion affected by the presence or activity, or both, of microorganisms Typically, with the exception of cooling water systems and stagnant water, MIC is not observed in operating systems The HEPA preheater will operate at elevated temperatures and the offgas is dry In this system, the stated operating conditions are not suitable for microbial growth

8 Fatigue/Corrosion Fatigue Analysis

Corrosion-fatigue is the result of the combined action of cyclic stresses and a corrosive environment. The fatigue process is thought to cause rupture of the protective passive film, upon which stainless steel can actively corrode in the localized area of the film rupture The corrosive environment may also act to reduce the stress necessary for film rupture The result is that a metal exposed to a corrosive environment and cyclic mechanical load may initiate cracking at conditions at stress levels less than the endurance limit for the material

The HEPA preheater is not cyclically operated, offgas flow is constant, steady and dry Thermal cycles and therefore thermal stress is also low and associated with the start-up and shut down of the offgas system. Corrosion fatigue will not be observed in the HEPA preheater.

The conclusion that corrosion fatigue will not be a problem is based on the low mechanical and thermal cycling, as well as the lack of an electrolyte for corrosion.

9 Vapor Phase Corrosion Analysis

Vapor phase corrosion considers the gas and vapor constituents that form acid condensate Acid gases are generated from the melter feed decomposing into CO_2, NOx, SOx, NH_3, etc The corresponding acids can form when water is present, HCl, HF, HNO_3 Normally water is not present When the heaters are operating, the temperature is raised to ensure that there is no water condensation and, therefore, no formation of acid droplets The heaters are always operating when gas is flowing through the system During system shutdown, start-up, or melter idling, moisture laden air could possibly flow through the HEPA preheaters The duration of these conditions is very short, and any acid droplets formed by the deliquescence of water will not affect the life of this component

Vapor phase corrosion will not occur in the HEPA preheater conditions because the maximum operation conditions for this component preclude the presence of sufficient moisture and concentrations of acid gas forming components

10 Erosion Analysis

Erosion is the progressive loss of material from a surface resulting from mechanical interaction between a particle and that surface Solid particle erosion can occur in air, steam, and water fluid systems When the fluid propels the solid particles at a sufficient velocity and the particle mass is sufficient, the surface can be damaged by the combined effect of millions of individual erosion "scars" The offgas that enters the preheater flows through a mist eliminator section to remove liquid droplets and filter any large particulates The volume fraction of particulates is low and insufficient to accelerate erosion Also, gas velocities are not high enough to independently cause erosion

The solids content and gas velocity in this components are sufficiently low that erosion is not a concern

CORROSION EVALUATION

11 Galling of Moving Surfaces Analysis

Galling is a form of wear caused by a combination of friction and adhesion between moving surfaces Under high compressive forces and movement, the friction temperatures cold-weld the two surfaces together at the surface asperities As the adhesively bonded surface moves some of the bonded material breaks away Microscopic examination of the galled surface shows some material stuck or even friction welded to the adjacent surface, while the softer of the two surfaces appears gouged with balled-up or torn lumps of material stuck to its surface

Galling is most commonly found in metal surfaces that are in sliding contact with each other It is especially common where there is inadequate lubrication between the surfaces Softer metals will generally be more prone to galling, austenitic stainless steel is relatively soft and ductile and is known to gall easily Martensitic stainless steel or precipitation hardened stainless steel or nitrogen strengthened austenitic stainless steels have higher surface hardness and therefore are resistant to galling

The HEPA preheater does not have any moving surfaces

12 Fretting/Wear Analysis

Fretting corrosion refers to corrosion damage caused by a slight oscillatory slip between two surfaces Similar to galling but a much smaller movement, the corrosion products and metal debris break off and act as an abrasive between the surfaces, classic 3-body wear problem This damage is induced under load and repeated relative surface motion, as induced for example by vibration Pits or grooves and oxide debris characterize this damage, typically found in machinery, bolted assemblies and ball or roller bearings Contact surfaces exposed to vibration during transportation are exposed to the risk of fretting corrosion Movement of the metal sheath against a spacer plate, ring clip, or support plate is negligible.

The HEPA preheater does not have moving parts Fretting corrosion is not expected in this component

13 Galvanic Corrosion Analysis

Galvanic corrosion is an electrochemical process in which one metal corrodes preferentially to another when both metals are in electrical contact, in the presence of an electrolyte Dissimilar metals and alloys have different electrode potentials, and when two are in contact in an electrolyte, one metal acts as anode and the other as cathode The electropotential difference between the dissimilar metals is the driving force for an accelerated attack. A potential difference of more than 200 mV is needed for sufficient driving force to make a difference Galvanic compatibility is one of the attributes used to select the WTP alloys. Austenitic stainless steels in contact with other austenitic stainless steels do not have sufficient electropotential difference to significantly influence the metal loss

The HEPA preheater plates, frame, and support materials are all fabricated from austenitic stainless steel and 6% Mo alloy, materials are not dissimilar enough to experience significant potential difference In addition, the gas is dry and contains insufficient moisture to act as an electrolyte Galvanic corrosion is not expected to be a corrosion issue under these conditions

14 Cavitation Analysis

Cavitation corrosion is defined as another synergistic process, the combined influence of mechanical disruption of the metal surface and the corrosion of the active metal Cavitation occurs when the local fluid pressure drops below the vapor pressure of the fluid resulting in a liquid vapor interface or bubbles to form Their collapse on the metal surface has sufficient energy to rupture the oxide film and depending on alloy, may be capable of removing metal Depending on the pressures, this phenomenon can produce steam at the pump suction leg creating what is called a "vapor lock" The fluid chemistry and alloy define corrosion characteristics of the oxide film, however localization of the cavitation produces a condition where the bubble collapse rate is greater than the ability to passivate, the normally passive alloy can experience accelerated loss This is most likely to occur in pumps, valves (flow control), orifices, ejectors/eductors, and nozzles

Cavitation is not expected in an offgas system

15 Creep Analysis

Creep is defined as a time-dependent deformation at elevated temperature and constant stress, creep is a thermally activated process The temperature at which creep begins depends on the alloy composition Creep failures and stress rupture failures follow the same mechanism and are influenced by similar variables like temperature Stress rupture is defined as bi-axial creep restricted to pipe like geometries Creep is found in components subjected to heat for long periods and the creep rate generally increases as the temperature nears the melting point The actual creep strain rate is defined by three regions depending on the temperature, stress and mechanism The characterized "creep strain rate" typically refers to the rate in stage II creep The creep temperature is different for each alloy, the Nickel Development Institute has cataloged the creep properties of the recommended alloys for this component (*High-Temperature Characteristics of Stainless Steels*, NIDI No 9004, Nickel Development Institute) Creep temperature for these alloys are greater than 800 °F

The HEPA preheater is operated at elevated temperatures, both creep and oxidation are considered as part of this corrosion evaluation The HEPA preheater heating element design conditions are conducive to creep Commercial-off-the-shelf Incoloy 800 sheaths provide high creep resistance for the heating elements The other materials are not exposed to high temperatures

16 Inadvertent Nitric Acid Addition

Addition of nitric acid to the offgas lines is not a plausible scenario

CORROSION EVALUATION

17 Oxidation

Oxidation is the formation of an oxide scale and is dependent upon alloy, oxygen availability in the atmosphere, and temperature Oxidation resistance of stainless steels and high nickel corrosion resistant alloys is due to the formation of chromium rich oxides (Cr_2O_3) on the surface Once formed, the oxide scale slows further oxidation

The heating elements are sheathed inside an Incoloy 800 tube This alloy and design are oxidation resistant for long life and optimum heat transfer needed for heating the offgas The temperature of the housing and other components is low, and oxidation will be insignificant

18 Conclusion and Justification

At the stated operating conditions, uniform and localized corrosion are not a concern providing the reported dry-air conditions are maintained Conditions which lead to end grain corrosion, weld corrosion, MIC, creep, and inadvertent nitric acid addition are not present in this system Conditions which lead to fatigue or corrosion fatigue, vapor phase corrosion, galling, fretting, galvanic corrosion, and cavitation are not present in this component The recommended corrosion allowance provides sufficient protection for erosion of the housing wall and internal members

The conclusion of this evaluation is that LVP-HTR-00001A/B and LVP-HTR-00003A/B can be fabricated from Type 316L stainless steel or UNS N08367, both of which are sufficiently resistant to uniform corrosion and are suitable for the housing and flange At the stated operating conditions, localized corrosion is not a major concern because the offgas is normally dry Type 316L is recommended for its improved resistance to pitting corrosion UNS N08367 would also be sufficiently resistant to localized corrosion Incoloy® 800 is recommended for the COTS heating element sheath.

19 Margin

Per 24590-WTP-SRD-ESH-01-001-02, Appendix H "When erosion and corrosion effects can be shown to be negligible or entirely absent, a design corrosion allowance need not be specified " In the reported dry-air conditions, there is insufficient electrolyte for corrosion to proceed The system is designed with a uniform corrosion allowance of 0 010 inch based on the range of inputs, system knowledge, and engineering judgment/experience The service conditions used for materials selection have been described above and result in negligible uniform loss The specified minimum corrosion allowance exceeds the minimum required corrosion allowance which provides margin

In the HEPA preheaters, the solids content and gas velocity are sufficiently low that localized erosion is not a concern Since localized erosion effects are not present, additional localized corrosion protection is not required

This component contains no fluids or electrolyte to promote localized corrosion While not quantifiable, the largest contributor to the total localized corrosion design margin is the absence of sufficient moisture to form a corrosive electrolyte During inactive periods of plant operations and prior to initial plant startup, layup and storage procedures will monitor and control condensation

CORROSION EVALUATION

20 References

1 24590-LAW-M4C-LOP-00001, *LAW Melter Offgas System Design Basis Flowsheets*
2 24590-LAW-P1-P01T-00005, *LAW Vitrification Building General Arrangement Plan at El 48 Feet - 0 Inches*
3 24590-WTP-RPT-PR-04-0001-04 – *WTP Process Corrosion Data-Volume 4.*
4 24590-WTP-SRD-ESH-01-001-02, *Safety Requirements Document Volume II*
5 NIDI *High-Temperature Characteristics of Stainless Steels.* Publication No 9004, Nickel Development Institute Toronto, Ontario, Canada

Additional Reading

- 24590-LAW-MED-LVP-00006 – *Mechanical Data Sheet*
- 24590-WTP-GPG-M-047, *Preparation of Corrosion Evaluations*
- 24590-WTP-RPT-M-01-001, *Materials Selection Report.*

CORROSION EVALUATION

PROCESS CORROSION DATA SHEET (extract)

Component(s) (Name/ID #) Melters Offgas HEPA Preheater (LVP-HTR-00001A&B & LVP-HTR-00003A/B)

Facility LAW

In Black Cell? NO

Chemicals	Unit	Stream ID LVP04 GASEOUS
Ar	ppmV	8265
CO	ppmV	431
CO2	ppmV	26052
HCl	ppmV	291
HF	ppmV	162
NH3	ppmV	22
NO2	ppmV	10
P2O5(s)	mg/m3	1
SO2	ppmV	10
SO3(s)	mg/m3	1
RH	%	13.91
Suspended Solids	wt%	0
Temperature	°F	162

CORROSION EVALUATION

Figure C- 16 LVP-HTR-00001A/B Gaseous PCDS

	Stream ID	
	LVP03a	LVP04
Properties		
Suspended Solids [wt %]	0	0
Total Salts [wt %]	0 01	0.03
Sodium Molarity [M]	n/a	n/a
Relative Humidity [%]	70.10	13.91
pH	n/a	n/a
Anti-Foam Agent [ppm]	2.11E-03	5.19E-03
TOC [kg/h]	5 75E-02	4 25E-01
Pressure [bar]	0 96	0.95
Temperature [C]	52.22	72.22
Temperature [F]	126 00	162.00
Water Flow Rate [kg/hr]	303.79	303.79
Total Aqueous Flow Rate [kg/hr]	303 84	303.89
Total Flow Rate [kg/hr]	5.20E+03	5 20E+03
UserNote	VIT VAPOR LAW Vapor to LVP-HTR-00001A/B	VIT VAPOR Primary HEPA Electric Heater Offgas Discharge
GASEOUS [ppmV or mg/m³]		
Ar	8185	8265
CH3I	0	0
Cl2	0	0
CO	257	431
CO2	15673	26052
F2	0	0
H2	0	0
HCl	291	291
HCN	0	0
HF	162	162
I2	0	0
N2	694077	699630
NaCl(s)	22	20
NaCN(s)	0	0
NaF(s)	9	8
NaI(s)	0	0
NH3	21	22
NO	2040	2110
NO2	9	10
O2	187694	188771
P2O5(s)	1	1
PO2	0	0
SO2	0	10
SO3(s)	1	1

LVP03a LVP_HTR_1AB LVP04

Note: Concentrations for constituents representing particulates (as denoted by suffix "(s)" in their name) are reported in units of mg/m3; all others are reported in units of ppmV

GENERAL NOTE FOR USE OF PCDS:

- *The information provided by the PCDS report is intended solely for use in support of the vessel material selection process and Corrosion Evaluations. The inputs, assumptions, and computational/engineering models used in generating the results presented herein are specific to this effort. Use of the information presented herein for any other purpose will require separate consideration and analysis to support justification of its use for the desired, alternative purpose.*
- *The process descriptions in this report cover routine process operations and non-routine (infrequent) process operations, when such exist, that could impact corrosion or erosion of process equipment.*
- *The data in the non-shaded columns of the PCDSs has NOT been adjusted to comply with the highest expected, vessel-specific operational conditions.*
- *The process descriptions provided in this report are for general information and reflective of the corrosion engineer's analysis for transparency, the information is current only at the time this document is issued. These process descriptions should not be referenced for design*

6.6.1 Description of Vessel/Equipment

The LAW Secondary Offgas/Vessel Vent Process (LVP) System is designed to treat the offgas from the LAW Primary Offgas Process (LOP) System and the LAW Facility vessel vents. The purpose of the LVP System is to remove almost all remaining particulates, miscellaneous acid gases, nitrogen oxides, VOCs, and mercury from the LAW Facility offgas that have not been removed by the LOP system.

Figure 10 is a sketch of the input and output arrangement of streams for all equipment within the LVP System. Streams that are not primary routes (infrequent transfers) are represented with dashed lines.

Figure 10 LVP System Sketch

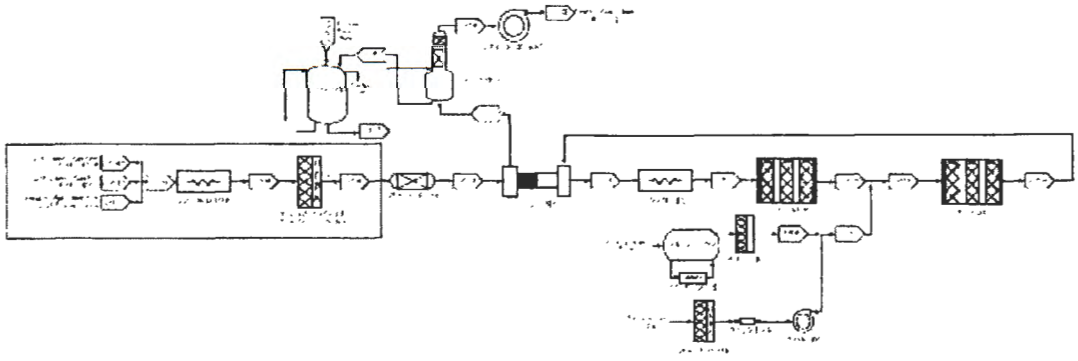
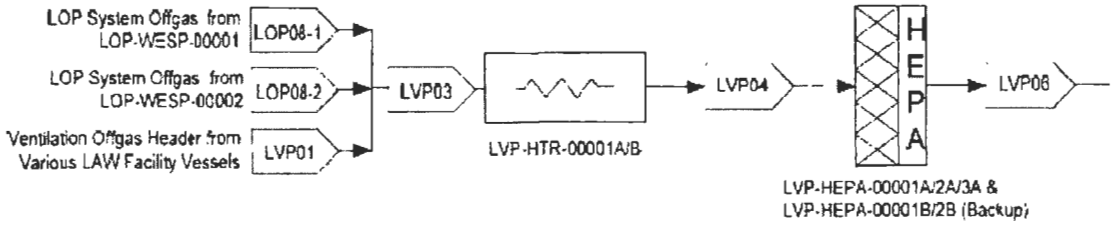


Figure 10a LVP System Sketch (detail of pertinent portion of system)



6.6.2 System Functions

The process functions of this system are as follows.

- Receive LAW Offgas from LOP System and LAW Facility Vessel Ventilation Streams
- Receive Reagents Streams Such as Ammonia or Dilution Air to Ensure Offgas Component Destruction
- Treat Offgas to Ensure Requirements are Met Before Emitting to Atmosphere
- Transfer Offgas to Stack
- Transfer Liquid Effluents to RLD-VSL-00017A/B

These vessels perform additional system functions beyond the process functions, but these are outside the scope of this document. The non-process functions are not discussed any further in this document. However, they are listed below for completeness:

- Confine Hazardous Materials
- Flush System Components
- Report System Data

6.6.3 Description of Process Functions

All process streams have been taken from Process Flow Diagrams 24590-LAW-M5-V17T-00010 and 24590-LAW-M5-V17T-00011 and associated drawing change notices (DCNs) 24590-LAW-M5N-V17T-00012/15/17/29 and 24590-LAW-M5N-V17T-00012/19/23/29, respectively. The P&IDs have also been looked at to obtain the most accurate flow diagram. These are as follows: 24590-LAW-M6-LVP-00001001 / 1002 / 1003 / 1004 / 1005 / 1006 / 2001 / 2002 / 2003 / 2004 / 2005 / 2006 / 3001 / 4001 / 4002 / 4003 / 5001 / 5002 and 24590-BOF-M6-AMR-00002001 / 2002 / 3001 / 3002 / 5001. See Section 7.1.3 for corresponding references in this section. A description of the process function of each piece of equipment is listed as follows:

Equipment	Process Function
LVP-HTR-00001A/B	The electric heater increases the nominal gas temperature to avoid condensation in the melter offgas HEPA filters.
LVP-HEPA-00001A/2A/3A (1B/2B as Backup)	HEPA filters provide final removal of radioactive particulates to protect downstream equipment from contamination.

6.6.3.1 Receipt Streams

The LVP system primarily receives LAW offgas from the LOP system and LAW Facility vessel ventilation streams. Other LVP system equipment receives various streams to help process the offgas. The receipt streams for each piece of equipment are listed as follows, by vessel, in order of process flow:

LVP-HTR-00001A/B

- LVP03 - WESP offgas from LOP-WESP-00001/2 and vent header from various LAW facility vessels

LVP-HEPA-00001A/2A/3A and LVP-HEPA-00001B/2B (Back-Up)

- LVP04 - Offgas from LVP-HTR-00001A/B

6.6.3.1.1 LVP03 - WESP Offgas from LOP-WESP-00001/2 and Vent Header from Various LAW Facility Vessels

Stream LVP03 is the combination of the vessel ventilation streams from LCP-VSL-00001/2, LFP-VSL-00001/3, LFP-VSL-00002/4, RLD-VSL-00003, RLD-VSL-00004, and RLD-VSL-00005. Stream LVP03 also combines the vessel vent stream with WESP offgas from LOP-WESP-00001/2.

Molarity
N/A

Temperature
The temperature of stream LVP03 will normally be 124°F (24590-LAW-M4C-LOP-00001, pg. 37, Cell Q26, Ref. 7.1.4(12)). The maximum temperature is 126°F (24590-LAW-M4C-LOP-00001, pg. 41, Cell Q26, Ref. 7.1.4(12)).

Solids Concentration
The solids concentration for stream LVP03 will normally be near zero or trace solids.

Vapor Density
The vapor density of stream LVP04 will normally be 5.36E-2 lb/ft^3 to 5.23E-2 lb/ft^3 (24590-LAW-M4C-LOP-00001, pg. 37, Cell AI26; pg. 41, Cell AI26, Ref. 7.1.4(12)).

Liquid pH
N/A

6.6.3.1.2 LVP04 - Offgas from LVP-HTR-00001A/B

Stream LVP04 is the combined melter offgas and vessel vents that have been heated by LVP-HTR-00001A/B.

Molarity
N/A

Temperature
The temperature of stream LVP04 will normally be 160°F (24590-LAW-M4C-LOP-00001, pg. 37, Cell Q28, Ref. 7.1.4(12)). The maximum temperature is 162°F (24590-LAW-M4C-LOP-00001, pg. 41, Cell Q28, Ref. 7.1.4(12)).

Solids Concentration
The solids concentration for stream LVP04 will normally be near zero or trace solids.

Vapor Density
The vapor density of stream LVP04 will normally be 4.95E-2 lb/ft^3 to 4.79E-2 lb/ft^3 (24590-LAW-M4C-LOP-00001, pg. 37, Cell AI28, pg. 41, Cell AI28, Ref. 7.1.4(12)).

Liquid pH
N/A

Quarter Ending June 30, 2018 24590-LAW-PCN-ENV-17-008

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 the Piping and Instrumentation Diagrams (P&IDs) for the following Low-Activity Waste (LAW) Secondary Offgas/Vessel Vent Process System (LFP) equipment in Appendix 9.2 of the Dangerous Waste Permit (DWP):

- Melter 1 Feed Process System Feed Vessel LFP-VSL-00002
- Melter 1 Feed Process System Feed Preparation and Feed LFP-BULGE-00001
- Melter 2 Feed Process System Feed Vessel LFP-VSL-00004
- Melter 2 Feed Process System Feed Preparation and Feed LFP-BULGE-00002

Submitted by Co-Operator:

Roger J. Landon 4/19/18
Roger J. Landon Date

Reviewed by ORP Program Office:

Joanne Schopp 5/8/18
J. F. Grindstaff Date

Quarter Ending June 30, 2018 24590-LAW-PCN-ENV-17-008

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 replace the following P&IDs in Appendix 9.2 of the DWP:

Appendix 9.2			
Replace:	24590-LAW-M6-LFP-00001004, Rev. 0	With:	24590-LAW-M6-LFP-00001004, Rev. 1
	24590-LAW-M6-LFP-00001006, Rev. 0	With:	24590-LAW-M6-LFP-00001006, Rev. 1
	24590-LAW-M6-LFP-00003004, Rev. 0	With:	24590-LAW-M6-LFP-00003004, Rev. 1
	24590-LAW-M6-LFP-00003006, Rev. 0	With:	24590-LAW-M6-LFP-00003006, Rev. 1

Changes to the P&ID (24590-LAW-M6-LFP-00001004, Rev.1) for the Melter 1 Feed Process System Feed Vessel LFP-VSL-00002 are summarized below:

- Added or modified notes in the Notes section. Revised the References section.
- Added Valves, Pipe/Tubing Breaks, Blind Flange to N15, and a new Line Section (Grid4).
- Revised Quality Designator of this drawing from Q to CM.
- Updated Note 9 to read: JCN Interlock on LFP-VSL-00002 LVL HI HI Will Close Valves Associated with Controllers Listed in Table 1.
- Removed Safety Radar (Note 13).
- Changed electrical signal to a data link between FQI-1168 and FQSH-1168.
- Added reducers and ¼" Tubing.
- Moved Off-Sheet Connector from G8 to D8.

Changes to the P&ID (24590-LAW-M6-LFP-00001006, Rev.1) for the Melter 1 Feed Process System Feed Preparation and Feed LFP-BULGE-00001 are summarized below:

- Added or modified notes in the Notes section. Revised the References section.
- Added Quality/Seismic Flags.
- Revised Quality Designator of this drawing from CM to Q.
- Revised Note 6 to read: ICN Interlock on LFP-VSL-00001 Level HI HI Will Close Valves LFP-YV-1115, -1161, and Stop Pumps. Stopping Pumps LFP-PMP-00001A/B Isolates Discharge Valves YV-1107/-1108.
- Deleted and updated Off Sheet Connector.

Changes to the P&ID (24590-LAW-M6-LFP-00003004, Rev.1) for the Melter 2 Feed Process System Feed Vessel LFP-VSL-00004 are summarized below:

- Added or modified notes in the Notes section. Revised the References section.
- Added Valves, Pipe/Tubing Breaks, Blind Flange to N15, and a new Line Section (Grid4).
- Revised Quality Designator of this drawing from Q to CM.
- Updated Note 9 to read: JCN Interlock on VSL-00004 LVL HI HI Will Close Valves Associated with Controllers Listed in Table 1.
- Removed Safety Radar (Note 13).
- Moved vendor Boundary Data Link to connect directly into LI-2146 & FSLL-2168 to connect between FI-2168 & FQI-2168.
- Added reducers and ¼" Tubing.
- Moved Off-Sheet Connector from G8 to D8.

Quarter Ending June 30, 2018 24590-LAW-PCN-ENV-17-008

Changes to the P&ID (24590-LAW-M6-LFP-00003006, Rev.1) for the Melter 2 Feed Process System Feed Preparation and Feed LFP-BULGE-00002:

- Added or modified notes in the Notes section. Revised the References section.
- Added Quality/Seismic Flags.
- Revised Quality Designator of this drawing from CM to Q.
- Updated Note 6 to read: ICN Interlock on LFP-VSL-00003 Level HI HI will close valves YV-2161, YV-2115, and Stop Pumps. Stopping Pumps LFP-PMP-00003A/B Isolates Discharge Valves YV-2107/-2108
- Updated Note 7 to read: ICN Interlock on LFP-VSL-00004 Level HI HI will close valves YV-2162, YV-2110, and YV-2115.
- Updated Off Sheet Connector.

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

The following outstanding change documents have been submitted to Ecology pursuant to Permit Condition III.10.C.9.h and are maintained in the WTP Operating Record:

24590-LAW-M6-LFP-00001004, Rev. 1:
- CCN 302266: 24590-LAW-M6N-20-00027/P&ID Revisions to Add Bubbler Instrument Isolation Valves
- CCN 302266: 24590-LAW-M6N-LFP-00063/LCP and LFP Vessel/Coaxial SS/SC-III Reclassification

24590-LAW-M6-LFP-00001006, Rev. 1:
- CCN 302266: 24590-LAW-M6N-LFP-00063/LCP and LFP Vessel/Coaxial SS/SC-III Reclassification

24590-LAW-M6-LFP-00003004, Rev. 1
- CCN 302266: 24590-LAW-M6N-20-00027/P&ID Revisions to Add Bubbler Instrument Isolation Valves
- CCN 302266: 24590-LAW-M6N-LFP-00063/LCP and LFP Vessel/Coaxial SS/SC-III Reclassification

24590-LAW-M6-LFP-00003006, Rev. 1
- CCN 302266: 24590-LAW-M6N-LFP-00063/LCP and LFP Vessel/Coaxial SS/SC-III Reclassification

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

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

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

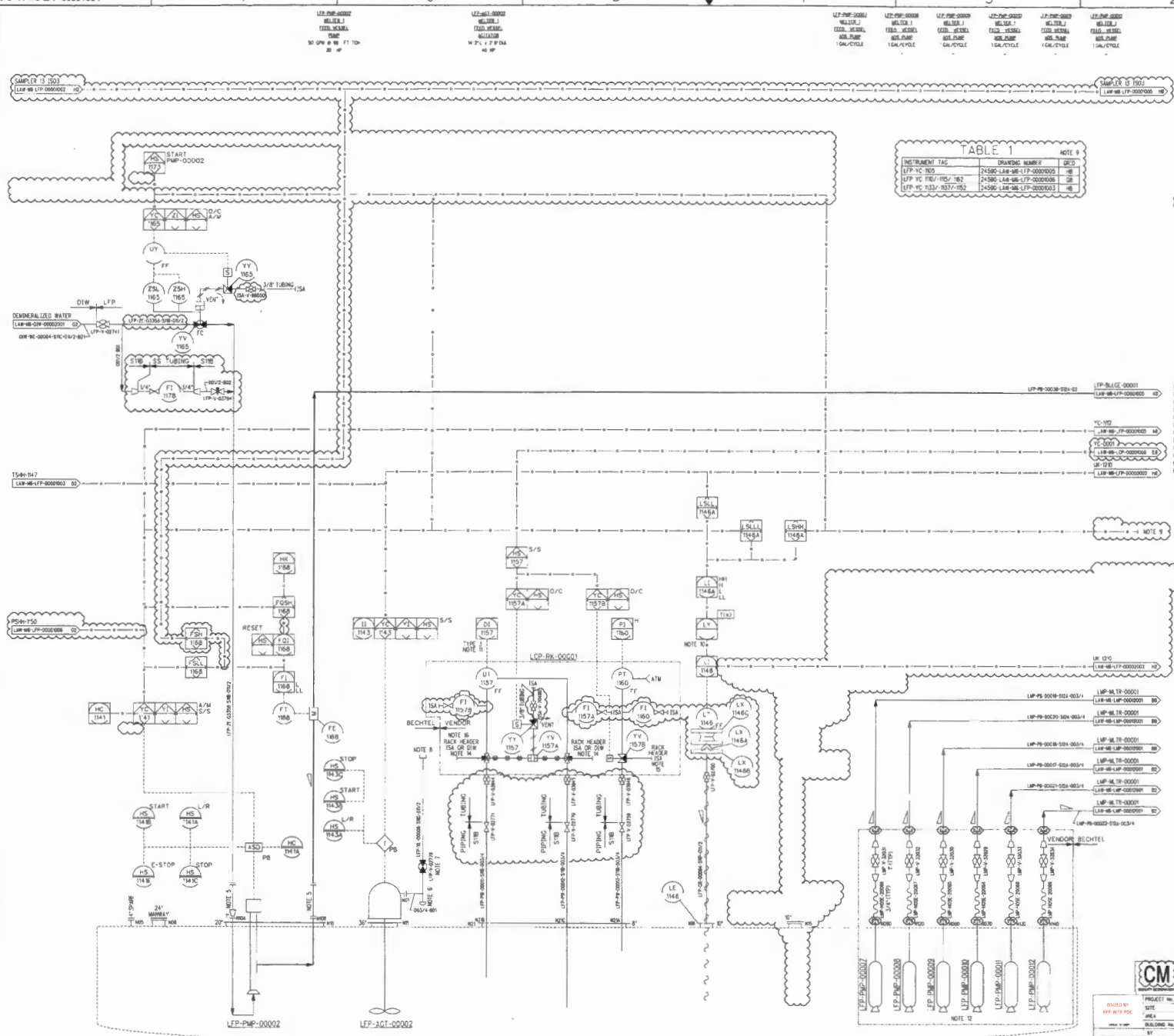
In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class [1]1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its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

Quarter Ending June 30, 2018

24590-LAW-PCN-ENV-17-008

Modification Approved/Concur: [X] Yes [ ] Denied (state reason below) Reason for denial:	Reviewed by Ecology: S. Dahl for — Date 6/12/18

24590-LAW-M6-LFP-00001004



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. REMOVABLE SPOOL TO FACILITATE PUMP REMOVAL.
6. OIL COLLECTION LEG EXTENDS MIN 3 IN BELOW DRAIN/REFILL NOZZLE.
7. LOCATE VALVE, FOR ACCESS, ABOVE ELEVATION 28'-0".
8. THIS CONNECTION ALLOWS MAINTENANCE ACCESS FROM 28 FT FLOOR ELEVATION FOR AGITATOR OIL CHANGE.
9. ICN INTERLOCK ON LFP-VSL-00002 LVL HIHI WILL CLOSE VALVES ASSOCIATED WITH CONTROLLERS LISTED IN TABLE 1.
10. FUNCTION CONVERTS TANK LEVEL IN INCHES TO GALLONS.
11. DENSITY TRANSMITTER SENDS A DIFFERENTIAL PRESSURE VALUE. A CALCULATION IS USED TO DETERMINE DENSITY.
12. FOR ADS PUMP CONTROLS AND ADDITIONAL VESSEL INSTRUMENTATION, SEE DRAWINGS 24590-LAW-M6-LFP-00002002, -00002003, -00002004, -00002005, -00002006, AND -00002007.
13. DELETED.
14. FOR ISA AND DIW SUPPLY SEE 24590-LAW-M6-LCP-00001006 COORDINATE C8.
15. FOR ISA SUPPLY SEE 24590-LAW-M6-LCP-00001006 COORDINATE D7.
16. ROUTING OF VENDOR SUPPLIED TUBING WILL BE IDENTIFIED BY C&I PER 24590-WTP-GPG-ENG-0142.
17. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LFP-00001, REV 5. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-20-00001, 24590-LAW-M6N-LFP-00023, -00033 AND 24590-LAW-M6PR-LFP-00001.
18. REVISION 9 INCORPORATED AND FURTHER REVISED 24590-LAW-M6N-20-00024, 24590-LAW-M6N-LFP-00042, -00044, 24590-LAW-M6N-M80T-00016, -00085, 24590-WTP-M6N-50-00073, 24590-WTP-EIE-J-M6-0001 (REV 0), -00008 (REV 0), AND 24590-LAW-EIE-NS-17-0001 (REV 0) ADDED VALVES, PIPE/TUBING BREAKS, BLIND FLANGE TO N15, AND NEW LINE SECTION. REVISED QUALITY DESIGNATOR OF THIS DRAWING FROM Q TO CM. REFERENCE 1, AND ADR REVISION NUMBER ON THE TITLE BLOCK. REMOVED SAFETY RADAR. UPDATED NOTES 9 AND 13. HOSE CONNECTIONS TO HOSE COUPLERS, OFF SHEET CONNECTORS, AND TABLE 1 CHANGED ELECTRICAL SIGNAL TO A DATA LINK BETWEEN FQI-1168 AND FQSH-1168. ADDED REDUCERS AND 1/4" TUBING. MOVED OFF SHEET CONNECTOR FROM C8 TO D8. UPDATED DATA LINK ROUTES.

TABLE 1

NOTE 9

INSTRUMENT TAG	DRAWING NUMBER	GRID
LFP-YC-1105	24590-LAW-M6-LFP-00001005	H8
LFP-YC-1165/-1165/-1162	24590-LAW-M6-LFP-00001006	D8
LFP-YC-1133/-1137/-1152	24590-LAW-M6-LFP-00001003	H8

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-32D-LFP-00001 LAW MELTER FEED PROCESS (LFP) AND CONCENTRATE RECEIPT PROCESS (LCP) SYSTEM DESIGN DESCRIPTION.

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

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 18	TH	TV	JK	[illegible]	7/25/18
0	ISSUED FOR CONSTRUCTION, SEE NOTE 17	RJR	APP	SK/SS	RS/TH	2/15/18

REVISION HISTORY

ISSUED BY RPP-WTP PDC

PROJECT No.	24590-	
SITE	HANFORD	
AREA	200E	
BUILDING No.	20	
	BY	DATE
ORIGINATOR	RIDER, ROBERT	2/15/18
CHECKER	PINTO, KAT	2/15/18
APPROVER	STEVENS/MAGNUSST	2/15/18
REVIEWER	KRETZ/CHARKS/SMITHKS	2/14/18

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-LAW-ADR-M-0100 REV 4

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

CONTRACT No. DE-AC27-01RV14136

P&ID - LAW
LAW MELTER FEED PROCESS SYSTEM
MELTER 1 FEED VESSEL
LFP-VSL-00002

SCALE: NONE

24590-LAW-M6-LFP-00001004 REV 1

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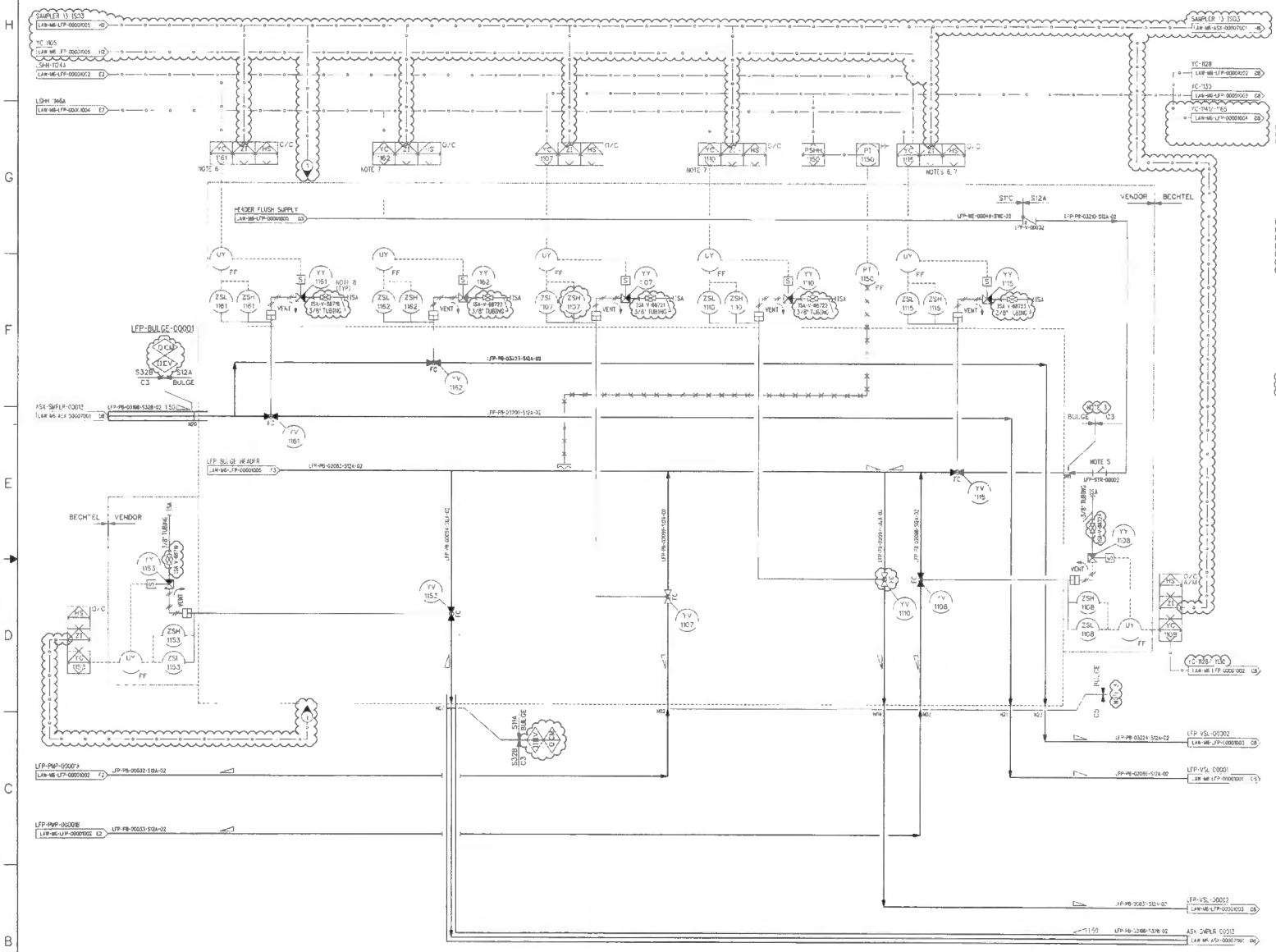

NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. POSITION STRAINER (WITHOUT STRAINER INTERNALS) WITH THE PORT IN THE UP POSITION TO ALLOW FOR LINE CLEANING.
6. ICN INTERLOCK ON LFP-VSL-00001 LEVEL HI HI WILL CLOSE VALVES LFP-TV-1115, -1161, AND STOP PUMPS, STOPPING PUMPS LFP-PMP-00001A/B ISOLATES DISCHARGE VALVES TV 0072-1108.
7. ICN INTERLOCK ON LFP-VSL-00002 LEVEL HI HI WILL CLOSE VALVES LFP-TV-1160, -1162.
8. SEE 24590-LAW-M6-LFP-00001005 FOR ISA SUPPLY.
9. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LFP-00001, REV. 5. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-MRN-LFP-00033.
10. REVISION 1 INCORPORATED AND FURTHER REVISED 24590-LAW-M6A-LFP-00044, -00050, -00055, 24590-LAW-MRA-MRCT-00016, AND -00085. INCORPORATED 24590-LAW-EIE-NS-17-0001 (REV 0) ADDED QAM 11 / USE SMCC FLAGS. UPDATED ADR REVISION NUMBER ON THE TITLE BLOCK. OFF SHEET CONNECTORS, AND REFERENCE 1. REVISED NOTE 9 AND QUALITY DESIGNATOR OF THIS DRAWING FROM CM TO Q. DELETED AND UPDATED OFF SHEET CONNECTOR.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-320-LFP-00001, LAW MELTER FEED PROCESS (LFP) AND CONCENTRATE RECEIPT PROCESS (LCP) SYSTEM DESIGN DESCRIPTION.

Please note that source, special nuclear, and by-product 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 an AEA authority. DOE asserts that pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear and by-product materials at DOE-owned nuclear facilities. Information contained herein or endorsed/cited as part and/or for process description purposes only.

REV	DESCRIPTION	ORG	CHKD	DWN	DATE
1	REVISED PER NOTE 10				
0	ISSUED FOR CONSTRUCTION, SEE ADR 1-9	RJM	APP	SKCC	12/8/19

REVISION HISTORY

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	2C	
BY		DATE
ORIGINATOR	RIDER, ROBERT	2/18/19
CHECKER	PINTO, PAT	2/18/19
APPROVER	HUGHES, HUGH	2/18/19
REVIEWER	MILTEER, MARY	2/18/19

CONTENT APPLICABLE TO NEAR? ☐ YES ☒ NO
ADR NO. 24590-LAW-ADR-M-0001-A REV 0

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

CONTRACT No. DE-AC27-01RV14136

P&ID - LAW
LAW MELTER FEED PROCESS SYSTEM MELTER 1 FEED PREPARATION AND FEED
LFP-BULGE-00001

SCALE NONE

24590-LAW-M6-LFP-00001008 REV 1

E-SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

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24590-LAW-M6-LFP-00003004

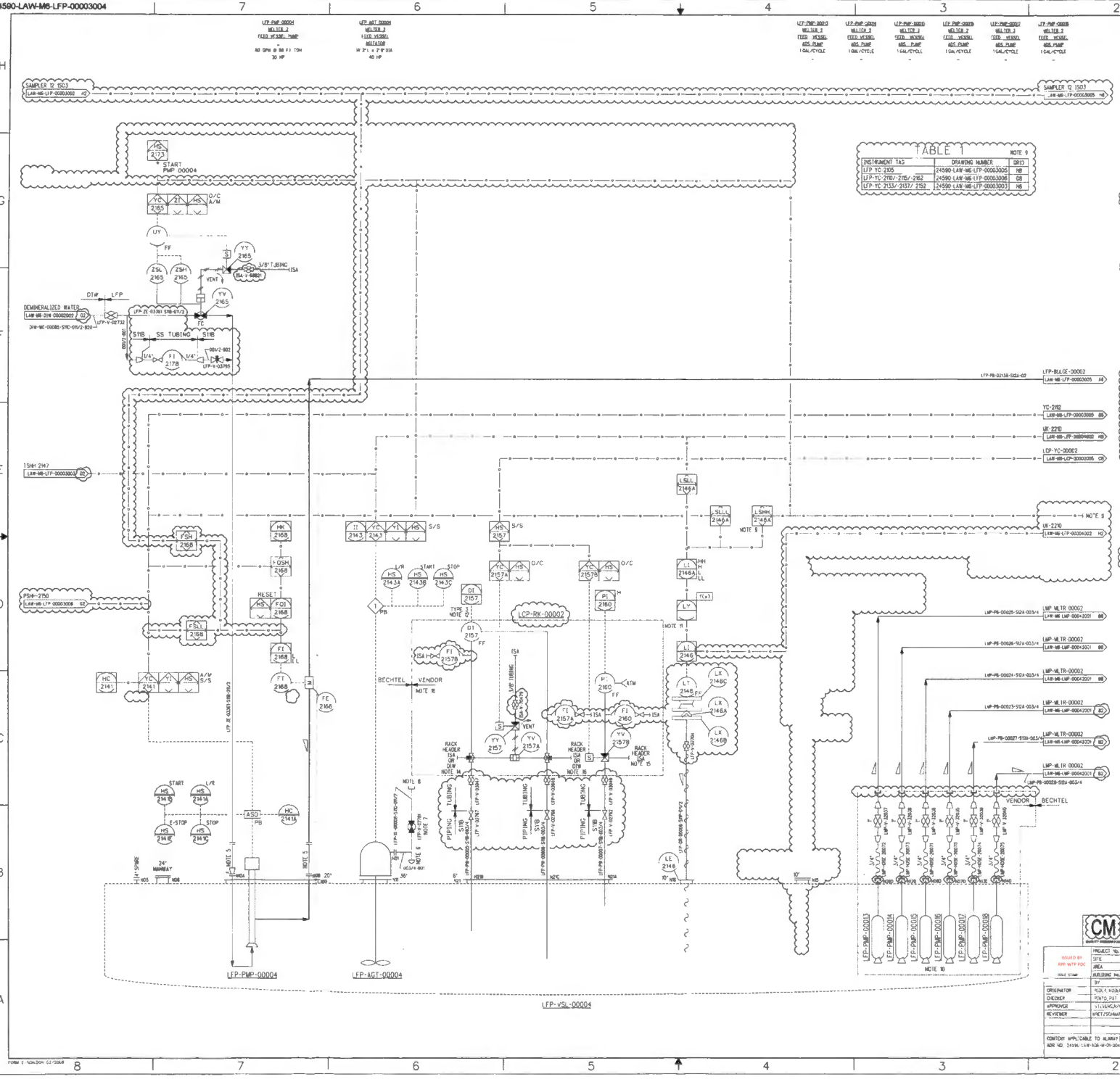


TABLE 1

NOTE 9

INSTRUMENT TAG	DRAWING NUMBER	GRID
LFP YC-2105	24590-LAW-M6-LFP-00003005	H8
LFP-YC-2150/-2165/-2162	24590-LAW-M6-LFP-00003006	C8
LFP-YC-2133/-2137/-2152	24590-LAW-M6-LFP-00003003	H8

NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CW AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. REMOVABLE SPOOL PIECE TO FACILITATE PUMP REMOVAL.
6. OIL COLLECTION LEG EXTENDS MIN 3 IN BELOW DRAIN/REFILL NOZZLE.
7. LOCATE VALVE, FOR ACCESS, ABOVE ELEVATION 28'-0".
8. THIS CONNECTION ALLOWS MAINTENANCE ACCESS FROM 28 FT FLOOR ELEVATION FOR AGITATOR OIL CHANGE.
9. ICN INTERLOCK ON VSL-00004 LVL H/H WILL CLOSE VALVES ASSOCIATED WITH CONTROLLERS LISTED IN TABLE 1.
10. FOR ADS PUMP CONTROLS AND ADDITIONAL VESSEL INSTRUMENTATION, SEE DRAWINGS 24590-LAW-M6-LFP-00004002, -00004003, -00004004, -00004005, -00004006, AND -00004007.
11. FUNCTION CONVERTS TANK LEVEL IN INCHES TO GALLONS.
12. DENSITY TRANSMITTER SENDS A DIFFERENTIAL PRESSURE VALUE. A CALCULATION IS USED TO DETERMINE DENSITY.
13. DELETED.
14. FOR ISA AND DIW SUPPLY SEE 24590-LAW-M6-I CP-00002005 COORDINATE B8.
15. FOR ISA SUPPLY SEE 24590-LAW-M6-LCP-00002005 COORDINATE B7.
16. ROUTING OF VENDOR SUPPLIED TUBING WILL BE IDENTIFIED BY C&I PER 24590-WTP-GPG-ENG-0142.
17. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LFP-00003, REV 5. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-20-00001, 24590-LAW-M6N-LFP-00023, -00035, AND 24590-LAW-M6PR-LFP-0000.
18. REVISION 1: INCORPORATED AND FURTHER REVISED 24590-LAW-M6N-20-00018, -00024, 24590-LAW-M6N-LFP-00042, -00044, 24590-LAW-M6N-M8GT-00016, -00085, 24590-WTP-EIE-J-16-0001 (REV. 01, -0008 (REV. 0), 24590-WTP-M6N-50-00073, AND 24590-LAW-EIE-NS-17-0001 (REV. C). ADDED VALVES AND PIPE/TUBING BREAKS. REVISED REFERENCE 1. ADR REVISION NUMBER ON THE TITLE BLOCK, AND QUALITY DESIGNATOR OF THE DRAWING FROM Q TO CW. REMOVED SAFETY RADAR. UPDATED OFF SHEET CONNECTORS, TABLE 1, HOSE CONNECTIONS TO HOSE COUPLERS, NOTE 9 AND 13. MOVED VENDOR BOUNDARY. DATA LINK TO CONNECT DIRECTLY INTO LI-2146, AND DATA LINK CONNECTION FOR FSLL-2168 TO CONNECT BETWEEN FI 2168 AND FQI-2168. ADDED REDUCERS AND 1/4" TUBING. MOVED OFF SHEET CONNECTOR FROM G8 TO D8. UPDATED DATA LINK ROUTES.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-SZD-LFP-00001, LAW MELTER FEED PROCESS (LFP) AND CONCENTRATE RECEIPT PROCESS (LCP) SYSTEM DESIGN DESCRIPTION.

Please note that source, special nuclear and byproduct materials as defined in the Atomic Energy Act of 1954 (AEA) are regulated in 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.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 18	TH	TTV	JC	[illegible]	[illegible]
0	ISSUED FOR CONSTRUCTION SEE NOTE 17	RJR	APP	SK/SS	RS/TH	2/8/11

REVISION HISTORY

ISSUED BY RPP-WTP POC

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	20	

	BY	DATE
ORIGINATOR	RICK R. MORRIS	2/8/11
CHECKER	TONY D. PAT	2/8/11
APPROVER	STEVEN S. MCMICHAEL	2/8/11
REVIEWER	BRET ZSCHAUER, SHARON S.	2/14/11

CONTENT APPLICABLE TO ALARA? YES NO
ADR NO. 24590-LAW-ADR-M-20-004 REV 4

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

CONTRACT No: DE-AC27-01RV14136

P&ID - LAW
LAW MELTER FEED PROCESS SYSTEM
MELTER 2 FEED VESSEL
LFP-VSL-00004

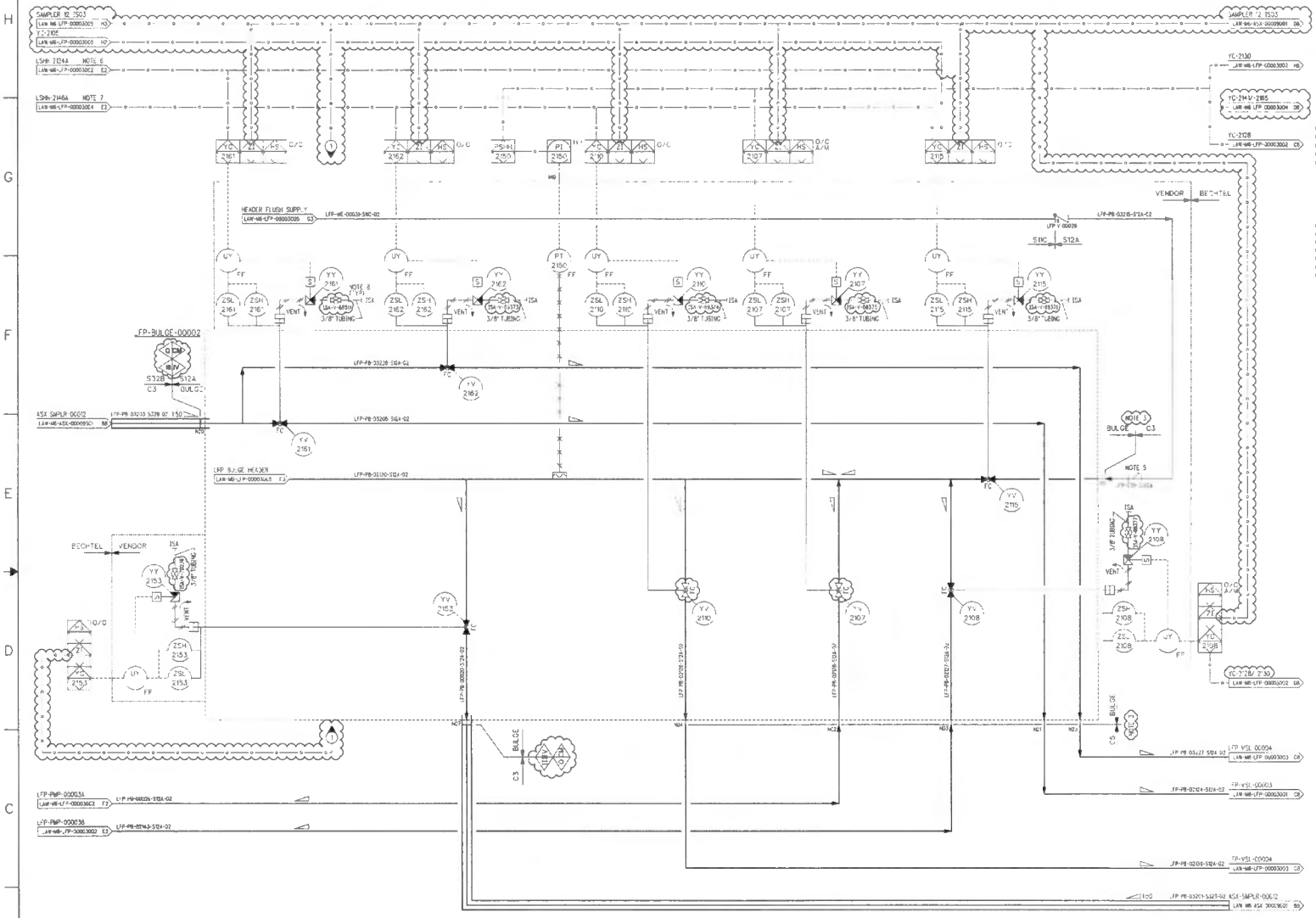
SCALE: NONE

24590-LAW-M6-LFP-00003004

REV 1

K SIZE 44X34
COMPUTER GENERATED MANUAL DESIGN CHANGES NOT PERMITTED

7/25/2017 1:30:21 PM



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES ON SHOWN THIS DRAWING SHALL BE THREE DRAINING, UNLESS OTHERWISE NOTED.
5. POSITION STRAINER (WITHOUT STRAINER INTERNALS) WITH THE STRAINER PORT IN THE UP POSITION TO ALLOW FOR LINE CLEANING.
6. ICN INTERLOCK ON LFP-VSL-00003 LEVEL HI HI WILL CLOSE VALVES YV-2161, YV-2115, AND STOP PUMPS STOPPING PUMPS LFP-PMP-00003A/B (ISOLATES DISCHARGE VALVES YV-2107/-2108.
7. ICN INTERLOCK ON LFP VSL 00004 LEVEL HI HI WILL CLOSE VALVES YV-2162, YV-2110, AND YV-2115.
8. SEE 24590-LAW-M6-LFP-00003C05 FOR ISA SUPPLY.
9. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND IN PART SUPERSEDES 24590-LAW-M6-LFP-00003, REV 5. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LFP-00035.
10. REVISION 1 INCORPORATED AND FURTHER REVISED 24590-LAW-M6N-LFP-00044, -00050, 24590-LAW-M6N-M8U1-00016, AND 00085 INCORPORATED 24590-LAW-EIE-NS-T-0001 REV 01 UPDATED OFF SHEET CONNECTOR, ADR REVISION NUMBER ON THE TITLE BLOCK AND REFERENCE. ADDED QUALITY/SEISMIC FACS. REVISED QUALITY DESIGNATOR OF THIS DRAWING FROM CM TO Q. NO ES 6 AND 7 ADDED NOTE CALLOUTS UPDATED OFF SHEET CONNECTOR.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3ZD-LFP-00001 LAW MELTER FEED PROCESS (LFP) AND CONCENTRATE RECEIPT PROCESS (LCP) SYSTEM DESIGN DESCRIPTION.

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.

REV	DESCRIPTION	ORG	CHKD	REVWD	APVD	DATE
1	REVISED PER NOTE 10					
0	ISSUED FOR CONSTRUCTION SEE NOTE 9	RJH	NTS		KS/JH	7/18/12

REVISION HISTORY

ADR STAMP	PROJECT No.	24590	
	SITE	HANFORD	
	AREA	200E	
	BUILDING No.	00	
	BY		DATE
ORIGINATOR	RODE K PEARL		2/8/11
CHECKER	J.DAWSON, NGH		2/8/11
APPROVER	STEVENS, R/PEARL		2/8/
REVIEWER	PRETTI, CHAR, J/SWENSON		2/8/11

CONTENT APPLICABLE TO ALWAYS [X] YES [ ] NO
ADR NO. 24590-LAW-ALL-M-21004 REV 1

BECHTEL

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

CONTRACT NO DE-AC27-01RV14136

P&ID - LAW
LAW MELTER FEED
PROCESS SYSTEM MELTER 2
FEED PREPARATION AND FEED
LFP-BULGE-00002

SCALE NONE

24590-LAW-M6-LFP-00003006

REV 1

E-SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

R1 0013 BY

Table III.10.E.B – LAW Vitrification Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
LAW Concentrate Receipt Process System LCP-VSL-00001 (LAW Melter 1 Concentrate Receipt Vessel) LCP-VSL-00002 (LAW Melter 2 Concentrate Receipt Vessel)	LCP	**24590-LAW** -M5-V17T-00001, Rev 6 -M5-V17T-00002, Rev 6 -M6-LCP-00001002, Rev 0 -M6-LCP-00001003, Rev 0 -M6-LCP-00002003, Rev 0 -M6-LCP-00002004, Rev 0 -MV-LCP-P0001, Rev 0 -MV-LCP-P0002, Rev 0 -MVD-LCP-P0004, Rev 1 -MVD-LCP-P0005, Rev 1 -N1D-LCP-P0001, Rev 1 -P1-P01T-00002, Rev 7	Section 4E.2.1; Tables 4E-1 and 4E-3; and Figures 4A-1 and 4A-3 of Operating Unit Group 10, Chapter 4 of this Permit.	LCP-VSL-00001 = 18,130 LCP-VSL-00002 = 18,130
LAW Melter Feed Process System LFP-VSL-00001 (Melter 1 Feed Preparation Vessel) LFP-VSL-00002 (Melter 1 Feed Vessel) LFP-VSL-00003 (Melter 2 Feed Preparation Vessel)	LFP	**24590-LAW** -M5-V17T-00001, Rev 6 -M5-V17T-00002, Rev 6 -M6-LFP-00001001, Rev 0 -M6-LFP-00001002, Rev 0 -M6-LFP-00001003, Rev 0 -M6-LFP-00001004~~, Rev 0~~ -M6-LFP-00001005, Rev 0 -M6-LFP-00001006~~, Rev 0~~ -M6-LFP-00003001, Rev 0 -M6-LFP-00003002, Rev 0	Section 4E.2.1; Tables 4E-1 and 4E-3; and Figures 4A-1 and 4A-3of Operating Unit Group 10, Chapter 4 of this Permit.	LFP-VSL-00001 = 9,123 LFP-VSL-00002 = 9,123 LFP-VSL-00003 = 9,123 LFP-VSL-00004 = 9,123

Table III.10.E.B – LAW Vitrification Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
LFP-VSL-00004 (Melter 2 Feed Vessel)		-M6-LFP-00003003, Rev 0 -M6-LFP-00003004~~, Rev 0~~ -M6-LFP-00003005, Rev 0 -M6-LFP-00003006~~, Rev 0~~ -MV-LFP-P0001, Rev 0 -MV-LFP-P0002, Rev 0 -MV-LFP-P0004, Rev 0 -MV-LFP-P0005, Rev 0 -MVD-LFP-P0007, Rev 1 -MVD-LFP-P0008, Rev 1 -MVD-LFP-P0010, Rev 1 -MVD-LFP-P0011, Rev 1 -P1-P01T-00002, Rev 7 -N1D-LFP-00004, Rev 2 -N1D-LFP-00006, Rev 0		
LAW Secondary Off-gas/Vessel Vent Process System LVP-TK-00001 (LAW Caustic Collection Tank)	LVP	**24590-LAW** -M5-V17T-00011, Rev 6 -P1-P01T-00004, Rev 6 -VDCN-M-13-00001 -MTD-LVP-00001, Rev 1 -N1D-LVP-00002, Rev 2	Section 4E.4.2.2; Tables 4E-1 and 4E-3; and Figures 4A-1 and 4A-3 of Operating Unit Group 10, Chapter 4 of this Permit.	LVP-TK-00001 = 14,232
LAW Primary Off-gas Process System	LOP	**24590-LAW** -M5-V17T-P0007, Rev 0 -M5-V17T-P0008, Rev 0	Section 4E.4.2.1; Tables 4E-1 and 4E-3; and Figures 4A-1 and 4A-3 of Operating Unit Group 10, Chapter 4 of this Permit.	LOP-VSL-00001 = 9,056 LOP-VSL-00002 = 9,056

Quarter Ending March 2018 24590-LAW-PCN-ENV-17-010

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

This Integrity Assessment addresses ancillary equipment associated with the Low Activity Waste (LAW) Concentrate Receipt Process System (LCP) vessels (LCP-VSL-00001 and LCP-VSL-00002).

This ancillary system is primarily located in the Process Cell Melter Rooms L-0123 and L-0124 at Elevation 2'-0" and in Room L-0202 which is located at Elevation 28'-0" directly above Rooms L-0123 and L-0124.

Submitted by Co-Operator:

Roger J. Landon 3/20/18
Roger J. Landon Date

Reviewed by ORP Program Office:

Joanne Grindstaff 4/23/18
J. F. Grindstaff Date

Quarter Ending March 2018 24590-LAW-PCN-ENV-17-010

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

Description of Modification:

This Class 1[1] modification requests Ecology approval and incorporation into the permit the below referenced structural integrity assessment report. The report has been updated by the Independent Qualified Registered Professional Engineer (IQRPE).

Appendix 9.11			
Replace	24590-CM-HC4-HXYG-00211 (IA-3001932-000) – *IQRPE Structural Integrity Assessment Report for LAW LCP Ancillary Equipment*	With	24590-CM-HC4-HXYG-00240-02-00027 (IA-3001932-001) – *IQRPE Structural Integrity Assessment Report for LAW LCP Ancillary Equipment*

Updates to the integrity assessment report for ancillary equipment associated with the Low Activity Waste (LAW) Concentrate Receipt Process System (LCP) vessels (LCP-VSL-00001 and LCP-VSL-00002) are summarized below:

The documents listed in the "References" row and under the "Source of Information" column were updated. These documents were reviewed to assess the design of the ancillary equipment associated with the Low Activity Waste (LAW) Concentrate Receipt Process System (LCP) vessels (LCP-VSL-00001 and LCP-VSL-00002)

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

This PCN updates information in Appendix 9.11 to reflect current design. This DWP component may be re-evaluated to confirm design adequacy. If the re-evaluation results in future design changes, the changes will be reviewed by Ecology in subsequent permit modifications.

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

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:

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."

Quarter Ending March 2018

24590-LAW-PCN-ENV-17-010

Modification Approved/Concur: [X] Yes [ ] Denied (state reason below) Reason for denial:	Reviewed by Ecology: for 6/12/18 S. Dahl Date

24590-CM-HC4-HXYG-00240-02-00027
Rev. 00A

R11881945

orano

FS-18-0046

ISSUED BY
RPP-WTP PDC

26 February 2018

Ms. Andrea Dorsey
Subcontractor Administrator
Bechtel National, Inc.
2435 Stevens Center Place
Richland, WA 99354

Orano Federal
Services LLC

2101 Horn Rapids Rd
Richland, WA 99354

Tel +1 509 371 1893

Dear Ms. Dorsey,

BECHTEL NATIONAL, INC. CONTRACT NO. 24590-CM-HC4-HXYG-00240 IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAW LCP ANCILLARY EQUIPMENT (IA-3001932-001)

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

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

Sincerely,

Tess Klatt
Contract Administrator
Orano Federal Services LLC
Richland Office

lap
cc: J.S. Evans, w/Enclosure (1)

orano

IA-3001932-001

IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAW LCP ANCILLARY EQUIPMENT

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

orano

IA-3001932-001

IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAW LCP ANCILLARY EQUIPMENT

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

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

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

The attached review is thirteen (13) pages numbered one (1) through thirteen (13).

TARLOK SINGH HUNDAL
STATE OF WASHINGTON
20213
REGISTERED
PROFESSIONAL ENGINEER

Signature

2/26/2018
Date

Scope	Scope of this Integrity Assessment	This Integrity Assessment addresses ancillary equipment associated with the Low Activity Waste (LAW) Concentrate Receipt Process System (LCP) vessels (LCP-VSL-00001 and LCP-VSL-00002) and other plant items located in the LAW facility. The ancillary equipment such as pipelines, valves, and other items associated with these vessels are shown on the P&ID drawings listed below under References. This ancillary system is primarily located in the Rooms L-0123 and L-0124 @ Elevation 2'-0" and in Room L-0202 which is located @ Elevation 28'-0" directly above Rooms L-0123 and L-0124. Ancillary equipment located inside the LCP system vessels and other plant items are addressed separately in the Integrity Assessment for these vessels and plant items. **Note:** **This report (IA-3001932-001) is a revision of the previous report (IA-3001932-000, BNI CCN: 200246).**
Summary of Assessment		For each item of "Information Assessed" (i.e., Criteria) on the following pages, the items listed under "Source of Information" were reviewed and found to furnish adequate design requirements and controls to ensure that the design fully satisfies the requirements of Washington Administrative Code (WAC), Chapter 173-303 WAC, *Dangerous Waste Regulations,* WAC-173-303-640, *Tank Systems.*

References	Drawings and System Design Description	Drawings: 24590-LAW-P1-P01T-00002, Rev. 7, LAW Vitrification Building General Arrangement Plan at El. 3'- 0"; 24590-LAW-P1-P01T-00004, Rev. 6, LAW Vitrification Building General Arrangement Plan at El. 28'- 0"; 24590-LAW-M6-LCP-00001001, Rev. 0, P&ID –LAW Concentrate Receipt Process System LCP-BULBE-00001; 24590-LAW-M6-LCP-00001002, Rev. 0, P&ID –LAW Concentrate Receipt Process System Concentrate Receipt Vessel LCP-VSL-00001; 24590-LAW-M6-LCP-00001003, Rev. 0, P&ID –LAW Concentrate Receipt Process System Concentrate Receipt Vessel LCP-VSL-00001; 24590-LAW-M6-LCP-00001004, Rev. 0, P&ID –LAW Concentrate Receipt Process System LCP-BULBE-00002 (Sheet 1 of 2); 24590-LAW-M6-LCP-00001005, Rev. 0, P&ID –LAW Concentrate Receipt Process System LCP-BULBE-00002 (Sheet 2 of 2); 24590-LAW-M6-LCP-00001006, Rev. 0, P&ID –LAW Concentrate Receipt Process System Expansion Vessel, LCP-VSL-00005; 24590-LAW-M6-LCP-00002001, Rev. 0, P&ID –LAW Concentrate Receipt Process System LCP-BULBE-00003 (Sheet 1 of 2); 24590-LAW-M6-LCP-00002002, Rev. 0, P&ID –LAW Concentrate Receipt Process System LCP-BULGE-00003 (Sheet 2 of 2); 24590-LAW-M6-LCP-00002003, Rev. 0, P&ID –LAW Concentrate Receipt Process System Concentrate Receipt Vessel LCP-VSL-00002; 24590-LAW-M6-LCP-00002004, Rev. 0, P&ID –LAW Concentrate Receipt Process System Concentrate Receipt Vessel LCP-VSL-00002; 24590-LAW-M6-LCP-00002005, Rev. 0, P&ID –LAW Concentrate Receipt Process System Expansion Vessel LCP-VSL-00006; 24590-LAW-M5-V17T-00001, Rev. 6, Process Flow Diagram LAW Concentrate Receipt and Melter 1 Feed (System LCP, GFR, and LFP); 24590-LAW-M5-V17T-00002, Rev. 6, Process Flow Diagram LAW Concentrate Receipt and Melter 2 Feed (System LCP, GFR, and LFP); 24590-LAW-P3-LCP-PB00058001, Rev. 0, LAW Vitrification Isometric (Line No. LCP-PB-00058-S12A-6); 24590-LAW-P3-LCP-PB01390001, Rev. 1, LAW Vitrification Isometric (Line No. LCP-PB-01390-N11F-2); 24590-LAW-P3-LCP-PB01390002, Rev. 0, LAW Vitrification Isometric (Line No. LCP-PB-01390-N11F-2); 24590-LAW-P3-LCP-PB01390003, Rev. 1, LAW Vitrification Isometric (Line No. LCP-PB-01390-N11F-2); 24590-LAW-P3-LCP-PB01370001, Rev. 2, LAW Vitrification Isometric (Line No. LCP-PB-01370-S32B-3); 24590-LAW-P3-LCP-PB01370002, Rev. 4, LAW Vitrification Isometric (Line No. LCP-PB-01370-S32B-6); 24590-WTP-PH-50-00012001, Rev. 7, Standard Pipe Support Details Guide – U Bolts GU; 24590-WTP-PH-50-00012002, Rev. 6, Standard Pipe Support Details Guide – U Strap GU; 24590-LAW-LCP-H00010, Rev. 2, Pipe Support Drawing, including DCN # 24590-LAW-PHN-PCL-00001; 24590-LAW-LCP-HI0029, Rev. 0, Pipe Support Drawing, including DCN # 24590-LAW-PHN-PCL-00001; 24590-LAW-PH-P33T-00001, Rev. 3, Pipe Support and Fabrication Details. System Design Description: 24590-LAW-3ZD-LFP-00001, Rev. 1, LAW Melter Feed Process (LFP) and Concentrate Receipt Process (LCP) System Design Description.

	Information Assessed	Source of Information	Assessment
Design	Ancillary equipment design standards are appropriate and adequate for the equipment's intended use.	Drawings and System Design Description listed above under References; 24590-WTP-DC-PS-01-001, Rev. 9, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria;" ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers; 24590-WTP-3DP-G04T-00905, Rev. 14, Determination of Quality Levels.	The Pipe Stress Design Criteria identifies ASME B31.3 as the design code for piping systems of the WTP. The System Design Description document classifies the LCP system as Risk Reduction Class (RRC) to provide primary containment of radioactive liquids. The Drawings and System Design Description documents show that the ancillary equipment is of commercial quality level (CM) grade or quality level Q and are Seismic Category SC-III/IV. Determination of Quality Levels document and Pipe Stress Design Criteria document provide detailed discussion of quality grades and seismic categories, respectively. The codes and standards used are acceptable and adequate for the design of the ancillary piping for the intended service.

	Information Assessed	Source of Information	Assessment
Design (cont'd)	If the ancillary equipment to be used is not built to a design standard, the design calculations demonstrate sound engineering principles of construction.	Drawings and listed above under References; 24590-WTP-DC-PS-01-001, Rev. 9, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria"; ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers; 24590-LAW-P6C-LCP-10001, Rev. C, Pipe Stress Analysis -LAW LCP System, including Minor Deviation # 1 & 2; 24590-LAW-P6C-LCP-10010, Rev. C, Richland RPP-WTP- LAW Plant LCP System (Pipe Stress Analysis), including Minor Deviation # 1 thru 3; 24590-LAW-PHC-P33T-00001, Rev. 0, Pipe Support Calculation (for various type of supports listed on drawing 24590-LAW-PH-P33T-00001); including ECCN #s 00001 and 00002; 24590-LAW-PHC-LCP-10019, Rev. A, Pipe Support Calculation (for support LAW-LCP-H10029); 24590-WTP-3DP-G04T-00906, Rev. 10, Isometric Drawings and Associated Calculations; 24590-WTP-3DP-G04B-00037, Rev. 30, Engineering Calculations; 24590-WTP-3PS-PH01-T0002, Rev. 6, Installation of Pipe Supports; 24590-LAW-MXD-LCP-00001, Rev. 4, Mechanical System Data Sheet (MSDS) for Process Bulge (LCP-BULGE-00001); 24590-LAW-MXD-LCP-00002, Rev. 3, Mechanical System Data Sheet (MSDS) for Process Bulge (LCP-BULGE-00002).	The ancillary equipment is built to design standards. The Pipe Stress Design Criteria specifies that piping is to be designed in accordance with ASME B31.3 Code. The review of the sample isometric and pipe support drawings listed in the References, Pipe Stress Analyses, Pipe Support Calculations, Mechanical System Data Sheets, and of the design process and controls described in Isometric Drawings and Associated Calculations, Engineering Calculations, and Installation of Pipe Supports documents provides adequate assurance that LCP ancillary equipment are properly designed and will be installed and verified to meet the requirements of the applicable design criteria established for the project. Review of the aforementioned documents also demonstrates that sound design engineering principles are used for the design and construction of the ancillary equipment.

	Information Assessed	Source of Information	Assessment
Design (cont'd)	Ancillary equipment has adequate strength at the end of its design life to withstand the operating pressure, operating temperature, thermal expansion, and seismic loads. Equipment is protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction.	24590-WTP-DC-PS-01-001, Rev. 9, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria;" ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers; ASME Boiler and Pressure Vessel Code, Section III, Division 1, Rules for Construction of Nuclear Power Plant Components, American Society of Mechanical Engineers, 1995; Uniform Building Code (UBC), 1997; 24590-WTP-PER-M-02-002, Rev. 4, Materials for Ancillary Equipment; 24590-WTP-GPG-ENG-004, Rev. 3, Design Guide Pipe Stress, Pipe Layout, and Support Spacing; 24590-WTP-SE-ENS-03-704, Rev. 0, Seismic Evaluation for Design (Seismic Design of Piping and Pipe Supports).	The Pipe Stress Design Criteria requires the use of the ASME B31.3 Code for process piping design. ASME B31.3 requires explicit consideration of operating pressure, operating temperature, thermal expansion/contraction, settlement, vibration, and corrosion allowance in the design of piping. For the seismic design of Seismic Category (SC-III/IV) ancillary equipment, applicable sections of ASME Section III, Division 1, Appendix F, and sections of Uniform Building Code (UBC) are used to supplement the requirements of ASME B31.3. Details of the seismic design methods are discussed in the Pipe Stress Design Criteria and Seismic Evaluation documents. These are appropriate and adequate codes and standards including the Design Guide document, to ensure that the ancillary equipment has adequate strength at the end of its design life to withstand all anticipated loads.

	Information Assessed	Source of Information	Assessment
Supports	Ancillary equipment supports are adequately designed.	Drawings listed above under References; 24590-WTP-DC-PS-01-002, Rev. 8, Pipe Support Design Criteria; ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers; MSS-SP-58, Pipe Hangers and Supports-Materials, Design, and Manufacture, Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; AISC Manual of Steel Construction, ASD, 9th Edition, American Institute of Steel Construction; ASME Boiler and Pressure Vessel Code, Section III, Division 1, Rules for Construction of Nuclear Power Plant Components, American Society of Mechanical Engineers, 1995; Uniform Building Code (UBC), 1997; 24590-WTP-PER-PS-02-001, Rev. 6, Ancillary Equipment Pipe Support Design; 24590-WTP-PL-PS-01-001, Rev. 2, Verification and Validation Test Plan for Bechtel's ME150 Pipe Support Family of Programs (PCFAPPS); 24590-LAW-PHC-LCP-10019, Rev. A, Pipe Support Calculation (for Support No. LAW-LCP-H10029); 24590-LAW-PHC-P33T-00001, Rev. 0, Pipe Support Calculation (for various type of supports listed on drawing 24590-LAW-PH-P33T-00001); including ECCN #s 00001 and 00002; 24590-WTP-GPG-ENG-005, Rev. 8, Engineering Design Guide for Pipe Supports; 24590-WTP-PHC-P50T-00002, Rev. 1, Justification for the use of Standard Supports for RPP-WTP-Project, including ECCN # 00001; 24590-WTP-PHC-P50T-00001, Rev. 1, U-Bolt Load Capacity Calculation, including ECCN #s 00001 and 00003; 24590-WTP-3DP-G04T-00906, Rev. 10, Isometric Drawings and Associated Calculations; 24590-WTP-3DP-G04B-00037, Rev. 30, Engineering Calculations; 24590-WTP-PHC-P50-00001, Rev. 1, RPP/WTP Support Standards, including ECCN # 00001. 24590-WTP-PHC-P50T-00004, Rev. 0, Qualification of Pipe Straps; including ECCN #s 00001 and 00004; 24590-WTP-SE-ENS-03-704, Rev. 0, Seismic Evaluation for Design (Seismic Design of Piping and Pipe Supports).	The Pipe Support Design Criteria document considers all loadings identified in ASME B31.3 including MSS-SP-58 and AISC Manual and also utilizes ASME B&PV Code, Section III, Division 1, Appendix F, to supplement the requirements of ASME B31.3 for seismic design of Seismic Category (SC-III/IV) pipe supports. Bounding load cases are passed to the pipe support designers from the results of the ancillary equipment piping stress analyses. Details of the seismic design methodology are discussed in the Pipe Support Design Criteria document. Examples of typical ancillary equipment supports are shown in the Ancillary Equipment Pipe Support Design document. Analysis is by manual calculation or approved computer programs that have been verified and validated. These are appropriate codes and standards are adequate for the design of ancillary equipment supports for the LCP system. Ancillary equipment supports are designed to allow a minimum of heat to be transferred to the building structures such that the temperature of the building structures does not exceed 150°F for the concrete structure and 200°F for the steel structure. The review of the sample isometric drawings, pipe support drawings, Pipe Support Calculations, and that of the design process and controls described in Isometric Drawings and Associated Calculations, Engineering Calculation and other supports associated documents, provides sufficient assurance that LCP ancillary equipment supports are adequately designed to meet the requirements of the applicable design criteria established for the project.

	Information Assessed	Source of Information	Assessment
Foundations	The system will withstand the effects of frost heave.	Drawings listed above under References; 24590-WTP-DC-ST-01-001, Rev. 13, Structural Design Criteria.	The Structural Design Criteria requires that all outdoor equipment structural foundations shall extend into the surrounding soil below the 30" frost line to preclude frost heave. The LCP ancillary equipment system considered in this assessment is located inside the LAW facility. The LAW facility structural foundations are well below the grade elevation, therefore, the LCP system is not subjected to any frost heave effects.
Connections	Seams and connections are adequately designed.	24590-WTP-DC-PS-01-001, Rev. 9, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria;" ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers; ASME B16.5, Piping Flanges and Flanged Fittings, American Society of Mechanical Engineers; ASME Boiler and Pressure Vessel Code (B&PV), Section IX, Welding and Brazing Qualifications, American Society of Mechanical Engineers.	The Pipe Stress Design Criteria specifies the ASME B31.3 Process Piping design code for the piping systems. Welding is to be performed in accordance with the requirements of ASME B31.3 and the ASME B&PV Code, Section IX. ASME B16.5 is specified for flange designs. These are appropriate codes and standards for design and fabrication of the LCP System ancillary equipment.

	Information Assessed	Source of Information	Assessment
Waste Characteristics	Characteristics of the waste to be stored or treated have been identified (dangerous waste characteristics, specific gravity, vapor pressure, flash point, temperature).	System Design Description listed above under References; 24590-WTP-PER-PR-03-001, Rev. 2, Prevention of Hydrogen Accumulation in WTP Tank Systems and Miscellaneous Treatment Unit Systems; 24590-WTP-PER-PR-03-002, Rev. 3, Control of Toxic Vapors and Emissions from WTP Tank and Miscellaneous Unit Systems. 24590-LAW-MXD-LCP-00001, Rev. 4, Mechanical System Data Sheet (MSDS) for Process Bulge (LCP-BULGE-00001); 24590-LAW-MXD-LCP-00002, Rev. 3, Mechanical System Data Sheet (MSDS) for Process Bulge (LCP-BULGE-00002); 24590-LAW-MPD-LCP-00001, Rev. 7, Mechanical System Data Sheet for Pumps (LCP-PMP-00001A/B); 24590-LAW-MPD-LCP-00001, Rev. 6, Mechanical System Data Sheet for Pumps (LCP-PMP-00003A/B).	System Design Description document indicates that flammable or explosive concentrations of hydrogen are not expected in the LAW facility systems ancillary equipment. The Prevention of Hydrogen Accumulation in WTP Tank Systems and Miscellaneous Treatment Unit System and the Control of Toxic Vapors and Emissions from WTP Tank and Miscellaneous Unit Systems document indicates that there is no dangerous waste material characteristics associated with this ancillary equipment. The System Design Description and MSDS documents provide other pertinent characteristics of the LCP waste stream.

	Information Assessed	Source of Information	Assessment
Waste Characteristics (cont'd)	Ancillary equipment is designed to handle the wastes with the characteristics defined above and any treatment reagents.	Drawings listed above under References; 24590-WTP-PER-M-02-002, Rev. 4, Materials for Ancillary Equipment; 24590-WTP-PER-PL-02-001, Rev. 8, Piping Material Class Description.	The Materials for Ancillary Equipment document specifies that ancillary equipment materials that contact the waste are to be equal to or better than those of the upstream source vessels. Selection of proper material for the LCP piping and equipment as shown on the drawings and Piping Material Class Description document ensures that the ancillary equipment is appropriately designed to handle the waste.

	Information Assessed	Source of Information	Assessment
Compatibility	The pH range of the waste, waste temperature and the corrosion behavior of the structural materials are adequately addressed. Ancillary equipment material and protective coatings ensure the ancillary equipment structure is adequately protected from the corrosive effects of the waste stream and external environments. The protection is sufficient to ensure the equipment will not leak or fail for the design life of the system.	Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 4, Basis of Design; 24590-WTP-PER-M-02-002, Rev. 4, Materials for Ancillary Equipment; 24590-WTP-PER-PL-02-001, Rev. 8, Piping Material Class Description; 24590-WTP-3PS-NN00-T0001, Rev. 2, Engineering Specification for Thermal Insulation for Mechanical Systems; ASTM Annual Book of ASTM Standards, American Society of Testing and Materials.	The Basis of Design document identifies a service design life of 40 years for the ancillary equipment. Detailed materials selection (corrosion) evaluations are conducted for each vessel in the LAW facility during process design to assure a 40-year service life. The Materials for Ancillary Equipment document requires that the material selection and corrosion/erosion allowances for ancillary equipment in contact with the waste will be equal to or better than the material and corrosion allowance of the waste source vessel. Sample review of the ancillary equipment material specified in the drawings and/or other related documents show that it meets the requirements as described in the Materials for Ancillary Equipment document. The Thermal Insulation specification requires that all insulating materials used on the outside of ancillary equipment be pre-approved for use on austenitic stainless steel in accordance with applicable ASTM standards and tests to preclude external corrosion of ancillary equipment. Therefore, the ancillary equipment is expected to provide the expected design service life.

	Information Assessed	Source of Information	Assessment
Corrosion Allowance	Corrosion allowance is adequate for the intended service life of the ancillary equipment.	System Design Description listed above under References; ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers; 24590-WTP-DC-PS-01-001, Rev. 9, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria;" 24590-WTP-DB-ENG-01-001, Rev. 4, Basis of Design; 24590-WTP-PER-M-02-002, Rev. 4, Materials for Ancillary Equipment; 24590-WTP-PER-PL-02-001, Rev. 8, Piping Material Class Description. 24590-LAW-P6C-LCP-10001, Rev. C, Pipe Stress Analysis -LAW LCP System, including Minor Deviation # 1 & 2; 24590-LAW-P6C-LCP-10010, Rev. C, Richland RPP-WTP- LAW Plant LCP System (Pipe Stress Analysis), including Minor Deviation # 1 thru 3.	ASME B31.3 is the design code for the WTP piping. Consideration of corrosion, including corrosion allowance, is a mandatory requirement of ASME B31.3 and is appropriately supplemented in the Pipe Stress Design Criteria document. A required service life of 40 years is identified in the Basis of Design for ancillary equipment. Detailed materials selection (corrosion) evaluations are conducted for each vessel in the LAW facility during process design to ensure a 40-year service life. The Materials for Ancillary Equipment document requires that downstream ancillary equipment is to be constructed of equal or better materials, and with the same corrosion allowance as the source vessel. Corrosion/Erosion allowances are listed for the ancillary equipment (each piping class and associated valves, fittings, etc.) in the Piping Material Class Description document. Sample review of the Pipe Stress Analysis calculations shows that the corrosion allowance has been appropriately used in the design process.
Pressure Controls	Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the vessels are exceeded.	24590-WTP-DC-PS-01-001, Rev. 9, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria;" ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers.	The Pipe Stress Design Criteria document specifies ASME B31.3 as the design code for the WTP piping. ASME B31.3 requires provision be made to safely contain or relieve any pressure to which the piping may be subjected. ASME B31.3 also requires that piping not protected by a pressure relieving device, or that can be isolated from a pressure reliving device must be designed for at least the highest pressure that can be developed.

	Information Assessed	Source of Information	Assessment
Pressure Controls (cont'd)	Maximum flows and any unusual operating stresses are identified.	Drawings listed above under References; 24590-WTP-DC-PS-01-001, Rev. 9, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria;" ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers; 24590-WTP-3PS-P000-T0001, Rev. 6, Engineering Specification for Piping Material Classes General Description and Summary; 24590-WTP-PER-PL-02-001, Rev. 8, Piping Material Class Description; 24590-WTP-3DP-G04T-00906, Rev. 10, Isometric Drawings and Associated Calculations; 24590-WTP-3DP-G04B-00037, Rev. 30, Engineering Calculations.	The expected flow paths for the ancillary equipment are identified on the P&ID drawings. The Pipe Stress Design Criteria specifies the ASME B31.3 code for piping design. This code requires piping to be designed to the highest pressure that can be developed in a piping system assuring that maximum operating stresses remain within code allowables. Piping material classes are shown on the P&ID drawings, embedded in the item numbers for each ancillary equipment component. The ancillary equipment is designed for the highest anticipated temperature and pressure values which are also within the bounding maximum design temperature and pressure values listed for each piping material class in the Piping Material Class General Description document. Furthermore, the fabrication of isometric drawings released for construction by Bechtel National, Inc. (BNI), the design process and controls described in the Isometric Drawings and Associated Calculations, and Engineering Calculations documents provides adequate assurance that subject ancillary equipment are properly designed, will be installed and verified to meet the requirements identified in the applicable design criteria established for the project.

	Information Assessed	Source of Information	Assessment
Secondary Containment	Ancillary equipment is designed with secondary containment that is constructed of materials compatible with the waste and of sufficient strength to prevent failure (pressure gradients, waste, climatic conditions, daily operations), provided with a leak-detection system, and designed to drain and remove liquids.	Drawings listed above under References; 24590-LAW-PER-M-02-001, Rev. 5, LAW Facility Sump Data.	The ancillary equipment considered in this assessment is located in and between areas R5/C5 (Room L-0123), R5/C5 (Room L-0124), and R3/C3 (Room L-0202) within the LAW building. These LAW facility rooms are secondary containment concrete structures; Rooms L-0123 and L-1024 are provided with stainless steel liner plates and sumps (RLD-SUMP-00029 and RLD-SUMP-00030) and (RLD-SUMP-00031 and RLD-SUMP-00032) respectively, as shown on the general arrangement drawings and in Sump Data document, which are outside the scope of this integrity assessment. The assessment of the secondary containment structures is conducted in a separate document.

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Part III, Operating Unit 10
Waste Treatment and Immobilization Plant

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Replace the Piping and Instrumentation Diagrams (P&IDs) for the following Low-Activity Waste (LAW) Primary Offgas Process System (LOP) equipment in Appendix 9.2 of the Dangerous Waste Permit (DWP):

- Melter 1 Submerged Bed Scrubber (LOP-SCB-00001)
- Melter 1 Submerged Bed Scrubber (SBS) Condensate Vessel (LOP-VSL-00001)
- Melter 1 Wet Electrostatic Precipitator (LOP-WESP-00001)
- Melter 1 Film Cooler Offgas
- Melter 2 Submerged Bed Scrubber (LOP-SCB-00002)
- Melter 2 Submerged Bed Scrubber (SBS) Condensate Vessel (LOP-VSL-00002)
- Melter 2 Wet Electrostatic Precipitator (LOP-WESP-00002)
- Melter 2 Film Cooler Offgas
- Melter 1 Standby Film Cooler (LOP-FCLR-00002)
- Melter 1 Primary Film Cooler (LOP-FCLR-00001)
- Melter 2 Standby Film Cooler (LOP-FCLR-00004)
- Melter 2 Primary Film Cooler (LOP-FCLR-00003)

Submitted by Co-Operator:		Reviewed by ORP Program Office:	
Roger J. Landon	3/6/18		4/16/18
Roger J. Landon	Date	J. F. Grindstaff	Date

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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 replace the following P&IDs in Appendix 9.2 of the DWP:

Appendix 9.2			
Replace:	24590-LAW-M6-LOP-00001001, Rev. 0	With:	24590-LAW-M6-LOP-00001001, Rev. 1
	24590-LAW-M6-LOP-00001002, Rev. 0	With:	24590-LAW-M6-LOP-00001002, Rev. 1
	24590-LAW-M6-LOP-00001004, Rev. 1	With:	24590-LAW-M6-LOP-00001004, Rev. 2
	24590-LAW-M6-LOP-00001005, Rev. 0	With:	24590-LAW-M6-LOP-00001005, Rev. 1
	24590-LAW-M6-LOP-00002001, Rev. 0	With:	24590-LAW-M6-LOP-00002001, Rev. 1
	24590-LAW-M6-LOP-00002002, Rev. 0	With:	24590-LAW-M6-LOP-00002002, Rev. 1
	24590-LAW-M6-LOP-00002004, Rev. 1	With:	24590-LAW-M6-LOP-00002004, Rev. 2
	24590-LAW-M6-LOP-00002005, Rev. 0	With:	24590-LAW-M6-LOP-00002005, Rev. 1
	24590-LAW-M6-LOP-00004001, Rev. 0	With:	24590-LAW-M6-LOP-00004001, Rev. 1
	24590-LAW-M6-LOP-00004002, Rev. 0	With:	24590-LAW-M6-LOP-00004002, Rev. 1
	24590-LAW-M6-LOP-00005001, Rev. 0	With:	24590-LAW-M6-LOP-00005001, Rev. 1
	24590-LAW-M6-LOP-00005002, Rev. 0	With:	24590-LAW-M6-LOP-00005002, Rev. 1

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

Changes to the P&ID (24590-LAW-M6-LOP-00001001, Rev. 1) for the Melter 1 Submerged Bed Scrubber (LOP-SCB-00001) are summarized below:

- Added or modified notes in the Notes section. Revised the References section.
- Revised graphical representation/depiction to correctly show the chilled water foundation fieldbus actuated valve YV-2005 (Grids D2 to D3 and E2 to E3).
- Revised graphical representation/depiction for remote radar level instrumentation LT-1011 and LT-1063 (Grid C6).
- Added tag number to purge air flow rate indicator (rotameter) FI-1065 (Grid D7).
- Enhanced the instrumentation and control presentation of level indicator LI-1011 (Grid E4) and added instrument line connecting level switch (high-high) LSHH-1063 and level switch (low-low) LSLL-1063 (Grid E3).
- Changed valve symbol from gate valve to ball valve for ISA-V-68950, ISA-V-68959, ISA-V-69750 and ISA-V-69751 (Grids B3, D3 and F7).
- Changed diameter size of valve LOP-V-34050 from ¾" to ½" (Grid D7).
- Added nozzle N23A (Grid B5).
- Added, revised or deleted off-sheet connectors (multiple grids).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LOP-00001002, Rev. 1) for the Melter 1 Submerged Bed Scrubber (SBS) Condensate Vessel (LOP-VSL-00001) are summarized below:

- Added or modified notes in the Notes section. Revised the References section.
- Added LOP-HS-1154 and LOP-HS-1155 to automatically start pumps LOP-PMP-00001 and LOP-PMP-00002 and automatically open valves LOP-YV-1090 and LOP-YV-1091 (Grids F7 and H7).

- Added the label "A/M" (auto/manual selector switch on operator display faceplate) for hand (manual) switches (Grids D5, D6, F7 and H7).
- Deleted instrumentation LOP-LSL-1018A (Grid E6).
- Moved off-sheet connector for level switch (high-high) LSHH-1011 and changed instrumentation control strategy by the addition, modification or deletion of instrumentation, lines, and valves (multiple grids).
- Revised graphical representation/depiction for remote radar level instrumentation LT-1018 (Grid C7).
- Changed valve symbol from gate valve to ball valve for ISA-V-68956, ISA-V-68957, ISA-V-69752, ISA-V-72509 and ISA-V-72510 (Grids B3, F6 to F7 and G6 to G7).
- Added seismic and quality flags for valves YV-1156 and YV-1157 (Grids F6 and G6).
- Updated the maximum operating volume for vessel LOP-VSL-00001 (Grid H5).
- Moved blind flanges closer to the nozzles (Grids B4 to B7).
- Added or moved piping labels closer to the nozzles (Grids B4 to B5 and C5 to C6).
- Changed valve symbol from 3-way ball valve to 3-way plug ball valve for ISA-V-34120 (Grid C3).
- Revised or moved off-sheet connectors (multiple grids).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LOP-00001004, Rev. 2) for the Melter 1 Wet Electrostatic Precipitator (LOP-WESP-00001) are summarized below:

- Added or modified notes in the Notes section. Revised the References section.
- Revised graphical representation/depiction for remote radar level instrumentation LT-1059 and LT-1060 (Grid E3).
- Deleted seismic and quality flags near valves ISA-V-68969 and ISA-V-68970 (Grids D7 and E5).
- Added nozzle N32 (Grid E4).
- Added "locked open (LO)" label for valve LVP-V-09495 (Grid B4).
- Revised instrumentation control strategy by the addition of instrumentation, lines, and valves (multiple grids).
- Changed valve symbol from ball valve to globe valve for LOP-V-10760 (Grid C5).
- Added or revised off-sheet connectors (multiple grids).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LOP-00001005, Rev. 1) for the Melter 1 Film Cooler Offgas are summarized below:

- Added notes in the Notes section. Revised the References section.
- Added equipment identification labels (Grids H2 to H8).
- Changed valve symbol from gate valve to ball valve for ISA-V-68947 and ISA-V-68948 (Grids E4 and G6).
- Deleted seismic and quality flags near valve ISA-V-68948 (Grid E4).
- Deleted temperature indicators TI-1152 and TI-1153 and associated instrumentation and lines (Grids B6 to B8, C6 to C8 and D2 to D8).
- Added, revised or deleted off-sheet connectors (multiple grids).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LOP-00002001, Rev. 1) for the Melter 2 Submerged Bed Scrubber (LOP-SCB-00002) are summarized below:

- Added or modified notes in the Notes section. Revised the References section.
- Revised graphical representation/depiction to correctly show the chilled water foundation fieldbus actuated valve YV-2006 (Grids D2 to D3 and E2 to E3).
- Revised graphical representation/depiction for remote radar level instrumentation LT-2011 and LT-2063 (Grid C6).
- Added tag number to purge air flow rate indicator (rotameter) FI-2065 (Grid D7).
- Enhanced the instrumentation and control presentation of level indicator LI-2011 (Grid E4) and added instrument line connecting level switch (high-high) LSHH-2063 and level switch (low-low) LSLL-2063 (Grid E3).

- Changed valve symbol from gate valve to ball valve for ISA-V-69421, ISA-V-69422, ISA-V-69757 and ISA-V-69758 (Grids B3, D3 and F7).
- Changed diameter size of valve LOP-V-34051 from ¾" to ½" (Grid D7).
- Added nozzle N23A (Grid B5).
- Changed line number (DIW-WE-00085-S11C-02-B10) (Grid B8).
- Added, revised or deleted off-sheet connectors (multiple grids).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LOP-00002002, Rev. 1) for the Melter 2 Submerged Bed Scrubber (SBS) Condensate Vessel (LOP-VSL-00002) are summarized below:

- Added or modified notes in the Notes section. Revised the References section.
- Added LOP-HS-2154 and LOP-HS-2155 to automatically start pumps LOP-PMP-00004 and LOP-PMP-00005 and automatically open valves LOP-YV-2090 and LOP-YV-2091 (Grids F7 and H7).
- Added the label "A/M" (auto/manual selector switch on operator display faceplate) for hand (manual) switches (Grids D5, D6, F7 and H7).
- Deleted instrumentation LOP-LSL-2018A (Grid E6).
- Moved off-sheet connector for level switch (high-high) LSHH-2011 and changed instrumentation control strategy by the addition, modification or deletion of instrumentation, lines, and valves (multiple grids).
- Revised graphical representation/depiction for remote radar level instrumentation LT-2018 (Grid C7).
- Changed valve symbol from gate valve to ball valve for ISA-V-69428, ISA-V-69650, ISA-V-69759, ISA-V-72511 and ISA-V-72512 (Grids B3, D3, F6 to F7 and G6 to G7).
- Added seismic and quality flags for valves YV-2156 and YV-2157 (Grids F6 and G6).
- Updated the maximum operating volume for vessel LOP-VSL-00002 (Grid H5).
- Moved blind flanges closer to the nozzles (Grids B4 to B7).
- Added or moved piping labels closer to the nozzles (Grids B4 to B5 and C5 to C6).
- Changed valve symbol from 3-way ball valve to 3-way plug ball valve for ISA-V-34122 (Grid C3).
- Revised the diameter size from ½" to 1½" for piping LOP-GR-00005-S11P-011/2 (Grid C6).
- Revised or moved off-sheet connectors (multiple grids).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LOP-00002004, Rev. 2) for the Melter 2 Wet Electrostatic Precipitator (LOP-WESP-00002) are summarized below:

- Added or modified notes in the Notes section. Revised the References section.
- Revised graphical representation/depiction for remote radar level instrumentation LT-2059 and LT-2060 (Grid D3).
- Deleted seismic and quality flags near valves ISA-V-69437 and ISA-V-69439 (Grids D7 and E5).
- Added nozzle N32 (Grid E4).
- Added "locked open (LO)" label for valve LVP-V-11979 (Grid B4).
- Revised instrumentation control strategy by the addition of instrumentation, lines, and valves (multiple grids).
- Changed valve symbol from ball valve to globe valve for LOP-V-10575 (Grid C5).
- Added or revised off-sheet connectors (multiple grids).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LOP-00002005, Rev. 1) for the Melter 2 Film Cooler Offgas are summarized below:

- Added notes in the Notes section. Revised the References section.
- Added equipment identification labels (Grids H2 to H8).
- Changed valve symbol from gate valve to ball valve for ISA-V-69440 (Grid E4).
- Deleted seismic and quality flags near valve ISA-V-69440 (Grid E4).
- Deleted temperature indicators TI-2152 and TI-2153 and associated instrumentation and lines (Grids B6 to B8, C6 to C8 and D2 to D8).

- Added, revised or deleted off-sheet connectors (multiple grids).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LOP-00004001, Rev. 1) for the Melter 1 Standby Offgas Film Cooler (LOP-FCLR-00002) are summarized below:

- Added notes in the Notes section. Revised the References section.
- Added new Table 1 (Grid H3).
- Added 1" reducers upstream and downstream of flow rate transmitter FT-1218 (Grids E6 and F6).
- Added Foundation Fieldbus converter FY-1218 and revised FT-1218 (Grid F6).
- Revised instrumentation control strategy by the addition of instrumentation, lines, and valves (multiple grids).
- Changed valve symbol from gate valve to ball valve for ISA-V-68798 through ISA-V-68806 (Grids B7, C3 to C5, E6 to E7, F7 and G7).
- Deleted seismic and quality flags near film cooler LOP-FCLR-00002 and LOP valves ISA-V-68798, ISA-V-68799 and ISA-V-68802 (Grids A4, B7 and G7).
- Added valve YV-1406 and associated instrumentation and lines (Grids A6 to A8, B6 to B8 and C6 to C8).
- Revised the diameter size from 2" to 3" for air injection piping LOP-GQ-01502-S11C-03 upstream of film cooler LOP-FCLR-00002 (Grid A4).
- Added, revised or deleted off-sheet connectors (multiple grids).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LOP-00004002, Rev. 1) for the Melter 1 Primary Offgas Film Cooler (LOP-FCLR-00001) are summarized below:

- Added or modified notes in the Notes section. Revised the References section.
- Added new Table 1 (Grid F2).
- Changed valve symbol from gate valve to ball valve for ISA-V-69699, ISA-V-69700 and ISA-V-68793 through ISA-V-68797 (Grids D4 to D8, F3 and F5).
- Revised instrumentation control strategy by the addition of instrumentation, lines, and valves (multiple grids).
- Added 1½" reducers upstream and downstream of flow rate transmitter FT-1113 and new piping LOP-GQ-33408-S11C-011/2. Replaced LOP-GQ-33408-S11C-003/4-B05 with LOP-GQ-33408-S11C-003/4-B01 (Grids F3 and G3).
- Deleted seismic and quality flags near film cooler LOP-FCLR-00001 and LOP valve ISA-V-68797 (Grids A5 and D4).
- Added valve YV-1407 and associated instrumentation and lines (Grids B3 to B4, C2 to C4, D2 to D4 and E4 to E8).
- Added label for piping LOP-GQ-33408-S11C-03 (Grid C3).
- Added, revised or deleted off-sheet connectors (multiple grids).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LOP-00005001, Rev. 1) for the Melter 2 Standby Offgas Film Cooler (LOP-FCLR-00004) are summarized below:

- Added notes in the Notes section. Revised the References section.
- Added new Table 1 (Grid H3).
- Added 1" reducers upstream and downstream of flow rate transmitter FT-2218 (Grids E6 and F6).
- Added Foundation Fieldbus converter FY-2218 (Grid F6).
- Revised instrumentation control strategy by the addition of instrumentation, lines, and valves (multiple grids).
- Changed valve symbol from gate valve to ball valve for ISA-V-68784 through ISA-V-68792 (Grids B7, C3 to C5, E6 to E7, G7 and H7).
- Deleted seismic and quality flags near film cooler LOP-FCLR-00004 and LOP valves ISA-V-68784, ISA-V-68785 and ISA-V-68788 (Grids A4, B7, G7 and H7).

- Added valve YV-2406 and associated instrumentation and lines (Grids A6 to A7, B6 to B8 and C6 to C8).
- Revised the diameter size from 2" to 3" for air injection piping LOP-GQ-33421-S11C-03 upstream of film cooler LOP-FCLR-00004 (Grid A4).
- Added, revised or deleted off-sheet connectors (multiple grids).
- Incorporated changes from change documentation identified in the Notes section.

Changes to the P&ID (24590-LAW-M6-LOP-00005002, Rev. 1) for the Melter 2 Primary Offgas Film Cooler (LOP-FCLR-00003) are summarized below:

- Added or modified notes in the Notes section. Revised the References section.
- Added new Table 1 (Grid G3).
- Changed valve symbol from gate valve to ball valve for ISA-V-69476, ISA-V-69477 and ISA-V-68779 through ISA-V-68783 (Grids C4, D5 to D8 and E3 to E4).
- Revised instrumentation control strategy by the addition of instrumentation, lines, and valves (multiple grids).
- Added 1½" reducers upstream and downstream of flow rate transmitter FT-2113 and new piping LOP-GQ-03316-S11C-011/2. Replaced LOP-GQ-03316-S11C-003/4-B04 with LOP-GQ-03316-S11C-003/4-B01 (Grid F3).
- Deleted seismic and quality flags near film cooler LOP-FCLR-00003 and LOP valve ISA-V-68782 (Grids A5 and C4).
- Added valve YV-2407 and associated instrumentation and lines (Grids B4, C2 to C4, D2 to D4 and E5 to E8).
- Added label for piping LOP-GQ-03316-S11C-03 (Grid C3).
- Relocated reducer further downstream of LOP-V-10833 and flow rate transmitter FT-2140 (Grids F4 and G4).
- Added, revised or deleted off-sheet connectors (multiple grids).
- Incorporated changes from change documentation identified in the Notes section.

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

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

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

Quarter Ending March 2018 24590-LAW-PCN-ENV-17-012

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

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

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

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

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

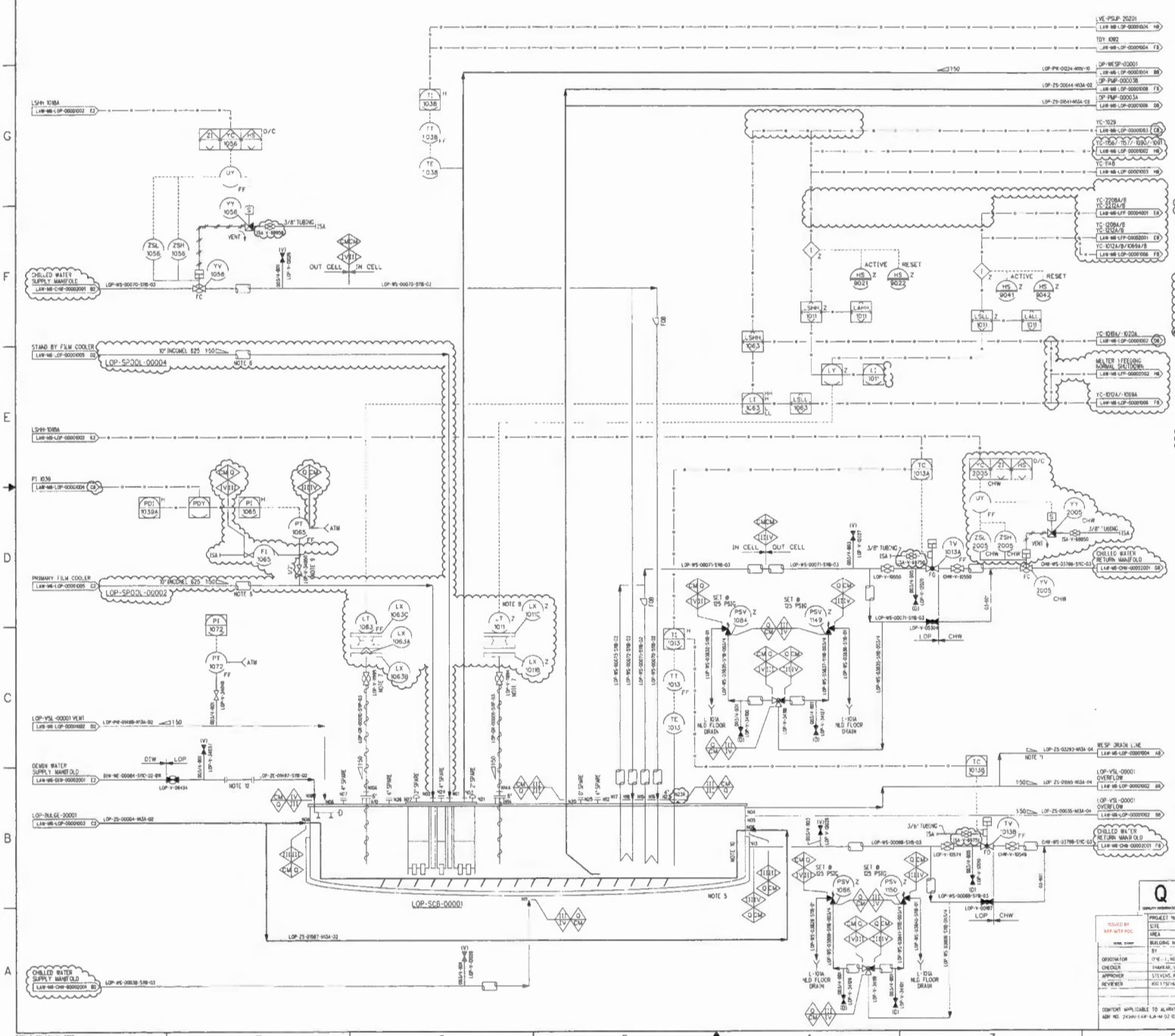
Reason for denial:

Reviewed by Ecology:

S. Dahl 5/18/18

S. Dahl Date

24590-LAW-M6-LOP-00001001



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. HALF PIPE JACKET.
6. INSULATION BY VENDOR.
7. RADAR GUIDE TUBE TO BE ROUTED TO TRANSMITTER LOCATED ON THE FLOOR ABOVE.
8. INSTRUMENT PERFORMS AN AIR PERMIT FUNCTION. INDICATION DISPLAYED AT PCJ.
9. LOCATE TAP FOR PT-1065 AS CLOSE TO LOP-SCB-00001 AS POSSIBLE. PT-1065 IS BY VENDOR.
10. LINE INSIDE VESSEL SHALL HAVE A MINIMUM OF 3/8 INCH HOLE ABOVE THE TOP OF THE OVERFLOW POINT NOZZLES N04 AND N05 TO PREVENT BACK SIPHON.
11. EMERGENCY OVERFLOW PIPE SHALL ATTACH TO TOP SIDE OF SBS OVERFLOW LINE APEX NOT TO EXCEED 10 INCHES ABOVE OVERFLOW LINE CENTER-TO-CENTER AFTER APEX. LINE SHALL SLOPE TO WESP DRAIN LINE.
12. REMOVABLE SPOOL PIECE REMOVED WHEN MELTER IS PROCESSING WASTE. BLIND FLANGES ARE TO BE INSTALLED WHEN SPOOL PIECE IS REMOVED.
13. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LOP-00001 REV 5. CLOUDS DEPICT MAJOR CHANGES MADE FROM SUPERSEDED DRAWING. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-20-00001, 24590-LAW-M6N-LOP-00034, -00035, -00037, -00040, -00043, -00052, -00060, AND 24590-LAW-M6PR-LOP-00014.
14. REVISION 1 INCORPORATED 24590-WTP-ETF-J-16-0001 (REV 0), -0008 (REV. 0), 24590-LAW-EIE-NS-17-0001 (REV. 0), 24590-LAW-M6LN-LOP-00002, 24590-WTP-M6N-50-00073, 24590-LAW-M6N-20-00024, 24590-LAW-M6N-LOP-00013, -00066, -00067, 24590-LAW-M6H-MBOT-00006, AND -00038. ADDED/REVISED CONTROL SYSTEMS, SPOOL NUMBERS, HOLDS, REFERENCE 1, ADR REVISION NUMBER ON THE TITLE BLOCK, AND OFF SHEET CONNECTORS. PROVIDED QUALITY BREAK FOR LOP-PT-1065 PURGE AIR SUPPLY AS REQUESTED BY WTP-EC-IN-0038.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3D-LOP-00001 LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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

DRAWING INDEX

DWG NO	TITLE
24590-LAW-M6-LOP-00001001	PRIMARY OFFGAS MELTER 1 LOP-SCB-00001
24590-LAW-M6-LOP-00001002	PRIMARY OFFGAS MELTER 1 LOP-VSL-00001
24590-LAW-M6-LOP-00001003	PRIMARY OFFGAS MELTER 1 LOP-BULGE-00001
24590-LAW-M6-LOP-00001004	PRIMARY OFFGAS MELTER 1 LOP-WESP-00001
24590-LAW-M6-LOP-00001005	PRIMARY OFFGAS MELTER 1 FILM COOLERS
24590-LAW-M6-LOP-00001006	PRIMARY OFFGAS MELTER 1 LOP-PMP-00003A/B

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 14	WAS	WRG	AK	[illegible]	7/6/17
0	ISSUED FOR CONSTRUCTION, SEE NOTE 13	WRG	ST	SR/SS	RS/JG	5/4/16

Q

ISSUED BY RPP-WTP POC

PROJECT No	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	2C	
	BY	DATE
ORIGINATOR	CHAN-L, MELVIN	2/26/10
CHECKER	THAKKAR, NARENDRA	2/26/10
APPROVER	STEVENS, ROBERT	5/4/10
REVIEWER	KOLITSCHKAR, CLIFF	5/4/10

CONTENT APPLICABLE TO ALARMS? [X] YES [ ] NO
ADR NO. 24590-LAW-ALR-M-02-022 REV 0

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

CONTRACT No DE-AC27-01RV14136

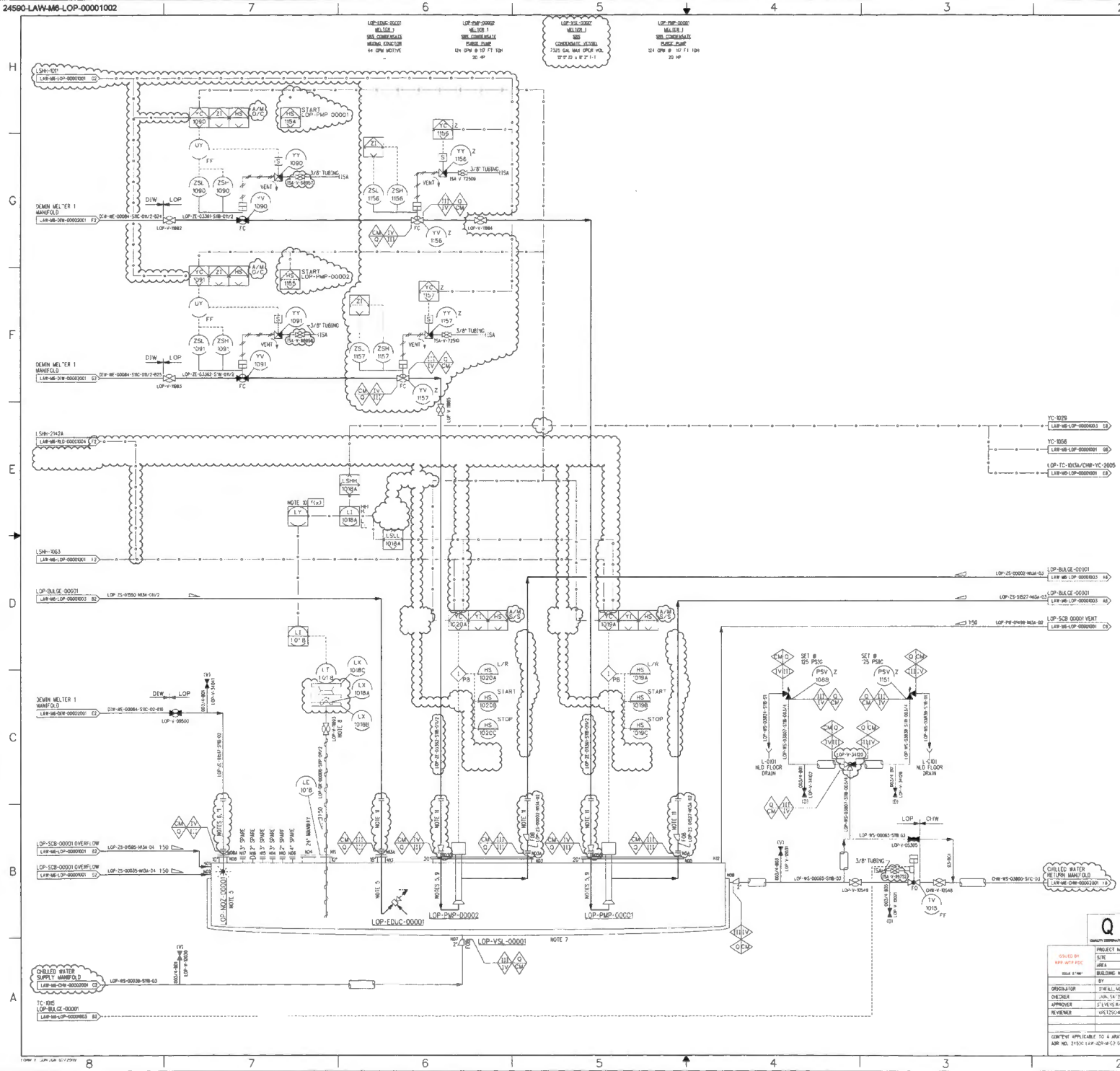
P&ID - LAW PRIMARY OFFGAS PROCESS SYSTEM MELTER 1 LOP-SCB-00001

SCALE: NONE
24590-LAW-M6-LOP-00001001
REV 1

W SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

7/6/2017 9:02:53 AM

24590-LAW-M6-LOP-00001002



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. EQUIPMENT COMPONENTS INSIDE VESSEL ARE QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III.
6. REMOVABLE SPOOL PIECE SHALL BE REMOVED AND BLIND FLANGES INSTALLED WHEN PROCESSING WASTE.
7. HALF PIPE JACKET.
8. RADAR GUIDE TUBE TO BE ROUTED TO TRANSMITTER LOCATED ON THE FLOOR ABOVE.
9. VESSEL INTERNAL PUMP PRIMING AND DISCHARGE PIPING SUPPLIED WITH PUMP BY VENDOR.
10. FUNCTION CONVERTS TANK LEVEL IN INCHES TO GALLONS.
11. REMOVABLE PIPING SPOOL FACILITATES PUMP, MIXING EDUCTOR, OR SPRAY NOZZLE REMOVAL.
12. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LOP-00001 REV 5. CLOUDS DEPICT MAJOR CHANGES MADE FROM SUPERSEDED DRAWING. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-20-00001, 24590-LAW-M6N-LOP-00015, -00035, -00037, -00040, -00047, -00052, AND 24590-LAW-M6PR-LOP-00013.
13. REVISION 1 INCORPORATED 24590-LAW-M6N-LOP-00065, -00067, -00070, 24590-WTP-M6N-50-00073, 24590-LAW-M6H-M801-00016, AND -00038. ALSO INCLUDES INFORMATION FROM 24590-LAW-EIE-VS-17-0001 (REV 0) AND 24590-WTP-EIE-J-16-0001 (REV 0). REMOVED PUMP SAFETY CONTROLS. UPDATED RADAR SYMBOL. REVISED REFERENCE LAOR REVISION NUMBER ON THE TITLE BLOCK AND DATA LINK ROUTING.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-32D-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

Please note that source, special nuclear and by-product 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 by-product materials at DOE-owned nuclear facilities. Information contained here or on subsidiaries is provided for process description purposes only.

REV	DESCRIPTION	DRC	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 13	JWS	JRC	MJB	RSF	7/28/17
0	ISSUED FOR CONSTRUCTION, SEE NOTE 12	MRO	SJ	SK/SS	RS/JS	3/4/10

Q — QUALITY LEVEL CM/SC-III

REVISION HISTORY

ISSUED BY RPP-WTP PDC	PROJECT No.	24590
	SITE	HANFORD
	AREA	200E
ISSUE STATUS	BUILDING No.	735

	BY	DATE
ORIGINATOR	O'NEILL, MICHAEL	3/26/10
CHECKER	JUN, YA TSH	3/26/10
APPROVER	STEVENS/SCHNEIDER	3/4/10
REVIEWER	KRETZSCHMAR/SMITH	3/4/10

CONTENT APPLICABLE TO A AREA? [L] YES [ ] NO
AOR NO. 24590-LAW-ADP-M-09-022 REV 2

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

CONTRACT No. DE-AC27-01RV14136

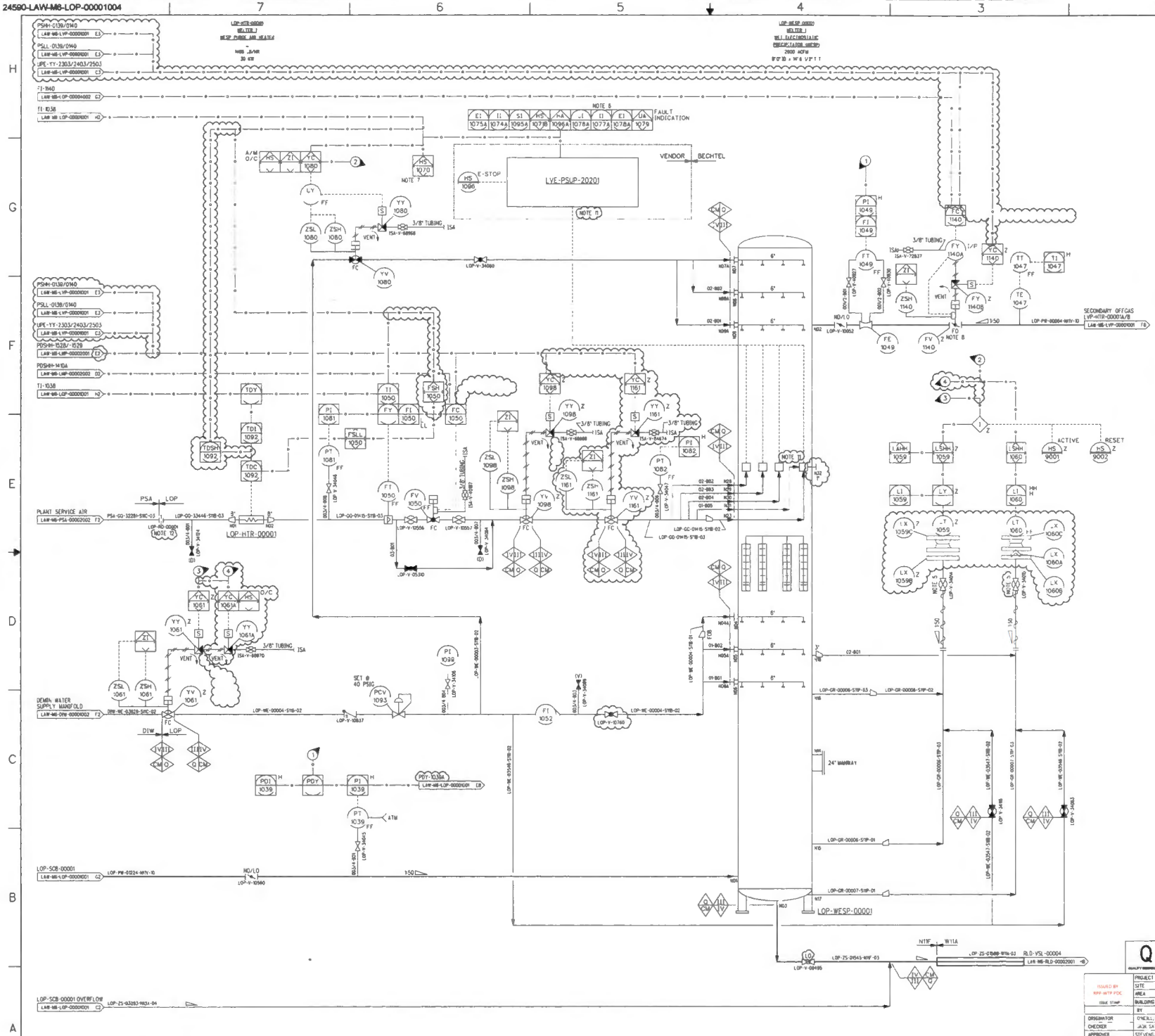
P&ID - LAW
LAW PRIMARY OFFGAS PROCESS SYSTEM
MELTER 1
LOP-VSL-00001

SCALE: NONE

24590-LAW-M6-LOP-00001002 — REV 1

"E" SIZE 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED
A1180074

7/28/2017 8:12:41 AM



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. RADAR GUIDE TUBE TO BE ROUTED TO TRANSMITTER LOCATED ON THE FLOOR ABOVE.
6. INSTRUMENT PERFORMS AN AIR PERMIT FUNCTION INDICATION DISPLAYED AT PCJ.
7. LOP-WESP-00001 WASH SEQUENCE HAND SWITCH.
8. VALVE/ACTUATOR ASSEMBLY SUPPLIED WITH ADJUSTABLE STOP TO PREVENT FULL CLOSURE.
9. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LOP-00001 REV 5. CLOUDS DEPICT MAJOR CHANGES MADE FROM SUPERSEDED DRAWING. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-20-00001, 24590-LAW-M6N-LOP-00008, -00033, -00037, -00040, -00051, -00052, -00060, 24590-LAW-M6PN-00004, -00013, -00015, 24590-LAW-M6PR-LOP-00003, AND -00009. PCV-1093 SET PRESSURE HAS BEEN REVISED FROM 60 PSIG TO 40 PSIG.
10. REVISION 1: INCORPORATED 24590-LAW-M6LN-LOP-00005, 24590-LAW-M6N-LOP-00013, -00063, -00068, -00069, -00070, -00071, -00075, AND 24590-LAW-M6N-M8D1-00016. REVISED OFF SHEET CONNECTOR. ADDED ROOT VALVES AND BRANCH NUMBERS, CHANGED VALVE POSITION FROM "NO" TO "NO/LO", NOZZLE N31, AND CONNECTING PIPE SIZE FROM 2" TO 4". THIS P&ID HAS BEEN REVIEWED BY E&NS FOR ALL LIMITED AND PHYSICALIZATION CHANGE DOCUMENTS "HA" WERE PREVIOUSLY ISSUED (SEE CCN 251622).
11. THE WESP INTERNAL SUBCOMPONENTS INCLUDING THE ELECTRODES, INSULATORS, COLLECTOR TUBE BUNDLE, AND ELECTRODE POWER SUPPLY, LVE-PSUP-20201, ARE CONFIRMED AS CM WITH QUALITY LEVEL DETERMINATION. ODF'S (24590-LAW-QDF-MS-15-0001, 24590-LAW-QDF-MS-14-0002, AND -0003).
12. RESTRICTION ORIFICE (RO) EXISTS TO PROVIDE FLEXIBILITY FOR FUTURE DESIGN. NO PRESSURE DROP ACROSS THE RO IS REQUIRED IN CURRENT DESIGN. THE RO DOES NOT PROVIDE FLOW RESTRICTION (i.e.,β-1) AND NO SIZING BASIS IS THEREFORE REQUIRED.
13. REVISION 2: INCORPORATED 24590-WTP-EIE-J-16-0001 (REV. 0), 24590-LAW-EIE-NS-17-0001 (REV 0), 24590-WTP-M6N-50-00073, 24590-LAW-M6N-M8D1-00033, 24590-LAW-M6N-LOP-00099, -00102, -00104, AND -00106. REVISED REFERENCE 1 LOP-V-10760 BALL VALVE TO GLOBE VALVE, ADR REVISION NUMBER ON THE TITLE BLOCK, OFF SHEET CONNECTOR, ADDED NOTES 11 AND 12, LINE NUMBERS, AND CONTROL SYSTEMS PER PDSA UPDATE. ADDED TDSH-1092 AND FSH-1050.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3ZD-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

Please note that source, special nuclear, and by-product materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated in 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 by-product materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
2	REVISED PER NOTE 13	ARG	MRB	JJC	[illegible]	7/11/17
1	REVISED PER NOTE 10	MRG	RST	BA/JK	SK/JW	10/13/14
0	ISSUED FOR CONSTRUCTION, SEE NOTE 9	MRG	SJ	SK/MG	RS/JS	3/4/10

REVISION HISTORY

ISSUED BY: RPP-WTP PDC
ISSUE STAMP:

PROJECT No:	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	20	
	BY	DATE
ORIGINATOR	O'NEILL, MICHAEL	3/4/10
CHECKER	JAIN, SATISH	3/4/10
APPROVER	STEVENS-SCHNEIDER	3/4/10
REVIEWER	KRETZSCHMAR/VANDERHEIJ	3/4/10

CONTENT APPLICABLE TO MLWAY? [X] YES [ ] NO
ADR NO 24940-LAW-ADR-M-0L-022 REV 2

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

CONTRACT No: DE-AC27-01RV14136

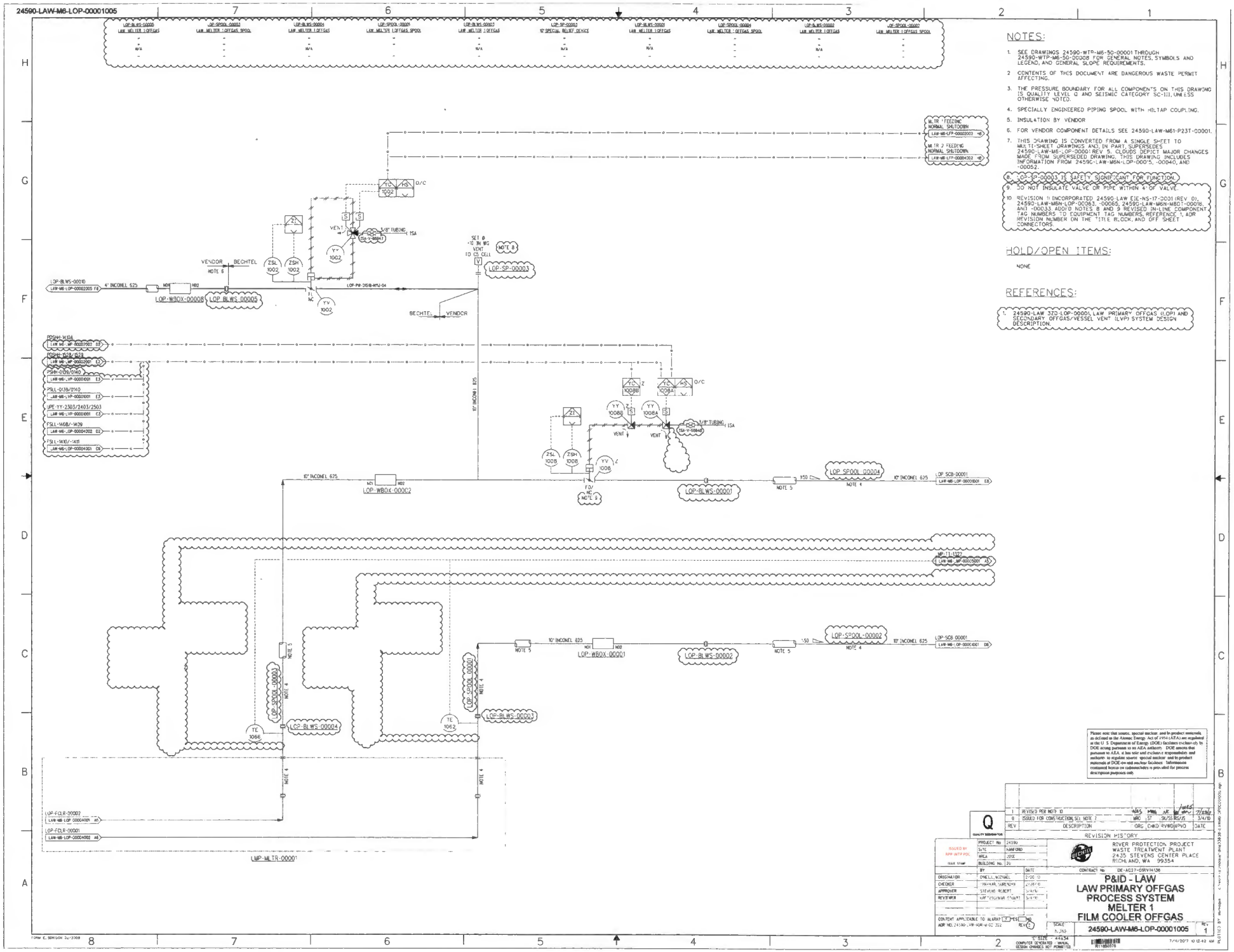
P&ID - LAW
LAW PRIMARY OFFGAS PROCESS SYSTEM
MELTER 1
LOP-WESP-00001

SCALE: NONE
24590-LAW-M6-LOP-00001004
REV 2

1" SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

R1080019

7/11/2017 9:56:54 AM



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. SPECIALLY ENGINEERED PIPING SPOOL WITH HILTAP COUPLING.
5. INSULATION BY VENDOR
6. FOR VENDOR COMPONENT DETAILS SEE 24590-LAW-M61-P23T-00001.
7. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LOP-00001 REV 5. CLOUDS DEPICT MAJOR CHANGES MADE FROM SUPERSEDED DRAWING. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LOP-00005, -00040, AND -00052.
8. LOP-SP-00003 IS SAFETY SIGNIFICANT FOR FUNCTION.
9. DO NOT INSULATE VALVE OR PIPE WITHIN 4" OF VALVE.
10. REVISION 1) INCORPORATED 24590-LAW-EIE-NS-17-0001 (REV. 0), 24590-LAW-M6N-LOP-00063, -00065, 24590-LAW-M6N-M80T-00016, AND -00033. ADDED NOTES 8 AND 9. REVISED IN-LINE COMPONENT TAG NUMBERS TO EQUIPMENT TAG NUMBERS, REFERENCE 1. ADD REVISION NUMBER ON THE TITLE BLOCK, AND OFF SHEET CONNECTORS.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3ZD-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

Please note that source, special nuclear, and by-product 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 assents that pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and by-product materials at DOE-owned nuclear facilities. Information contained herein or submitted is provided for process description purposes only.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 10	WAS	MRG	AK		7/7/17
0	ISSUED FOR CONSTRUCTION, SEE NOTE 7	MRG	ST	SNJ	RSJ	3/4/10

REVISION HISTORY

ISSUED BY RPP-WTP PDC

PROJECT No	24590
SITE	HANFORD
AREA	200E
BUILDING No.	26

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

CONTRACT No. DE-AC27-01RV14136

	BY	DATE
DESIGNATOR	O'NEILL, MICHAEL	3/04/10
CHECKER	HAWKINS, SUBRENA	2/26/10
APPROVER	STEVENS, ROBERT	3/4/10
REVIEWER	KAPTOSWAR, SHANT	3/4/10

CONTENT APPLICABLE TO ALARA? YES NO

ADR NO. 24590-LAW-ADR-M-02-222 REV 0

P&ID - LAW
LAW PRIMARY OFFGAS PROCESS SYSTEM
MELTER 1
FILM COOLER OFFGAS

SCALE: NONE

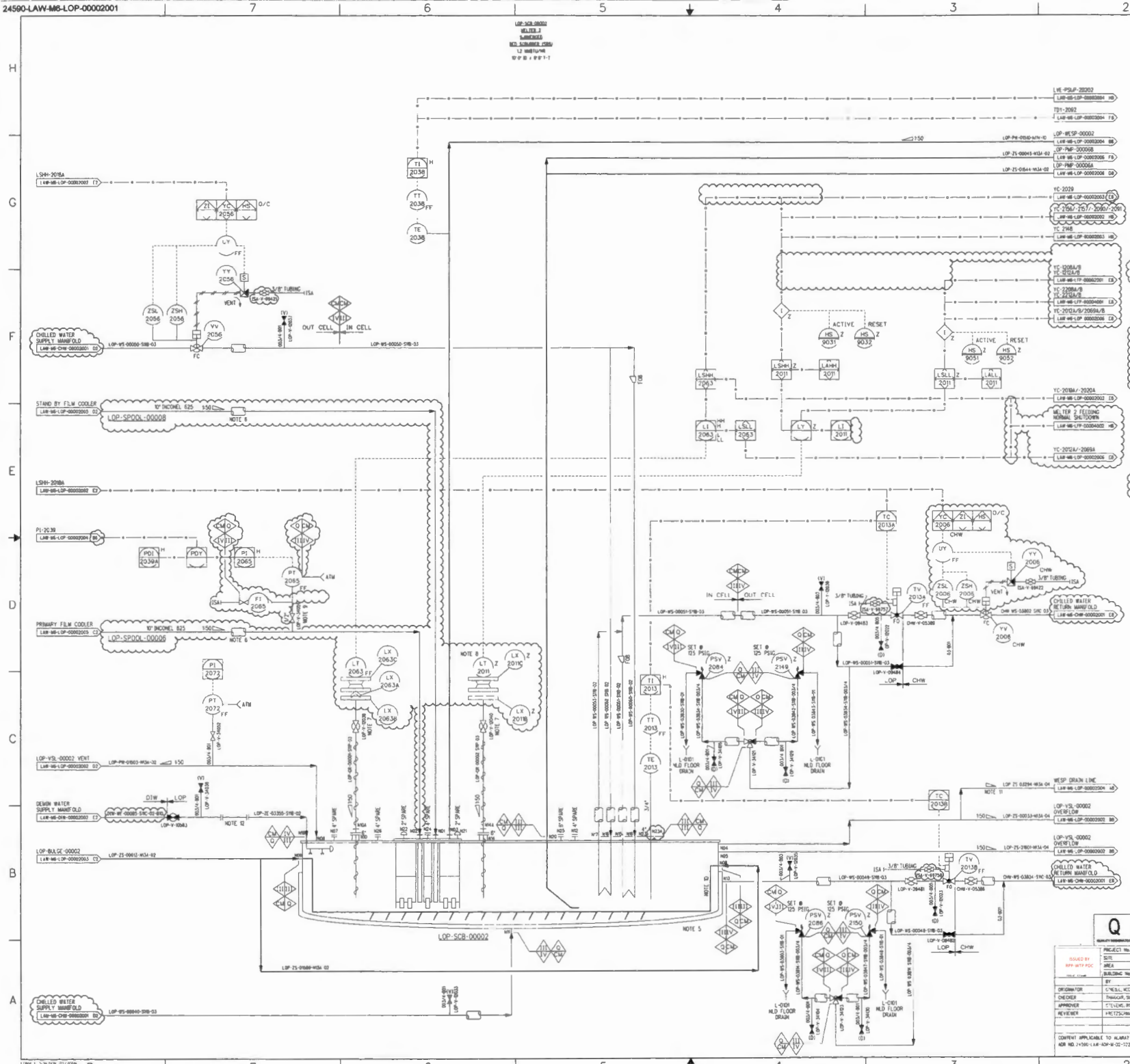
24590-LAW-M6-LOP-00001005

REV 1

SIZE: 44x34

COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

7/10/2017 10:12:42 AM



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL 0 AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. HALF PIPE JACKET.
6. INSULATION BY VENDOR.
7. RADAR GUIDE TUBE TO BE ROUTED TO TRANSMITTER LOCATED ON THE FLOOR ABOVE.
8. INSTRUMENT PERFORMS AN AIR PERMIT FUNCTION. INDICATION DISPLAYED AT PCJ.
9. LOCATE TAP FOR PT-2065 AS CLOSE TO LOP-SCB-00002 AS POSSIBLE. PT-2065 IS BY VENDOR.
10. LINE INSIDE VESSEL SHALL HAVE A MINIMUM OF 3/8 INCH HOLE ABOVE THE TOP OF THE OVERFLOW PORT NOZZLES N04 AND N05 TO PREVENT BACK SIPHON.
11. EMERGENCY OVERFLOW PIPE SHALL ATTACH TO TOP SIDE OF SBS OVERFLOW LINE APEX NOT TO EXCEED 10 INCHES ABOVE OVERFLOW LINE CENTER-TO CENTER AFTER APEX. LINE SHALL SLOPE TO WESP DRAIN LINE.
12. REMOVABLE SPOOL PIECE REMOVED WHEN MELTER IS PROCESSING WASTE. BLIND FLANGES ARE TO BE INSTALLED WHEN SPOOL PIECE IS REMOVED.
13. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LOP-00002 REV 5. CLOUDS DEPICT MAJOR CHANGES MADE FROM SUPERSEDED DRAWING. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-20-00001, 24590-LAW-M6N-LOP-00034, -00035, -00043, AND -00053.
14. REVISION 1: INCORPORATED 24590-WTP-EIE-J-16-0001 (REV. 01, -0008 (REV. 01), 24590-LAW-EIE-NS-17-0001 (REV. 01), 24590-LAW-M6LN-LOP-00002, 24590-WTP-M6N-50-00073, 24590-LAW-M6N-20-00024, 24590-LAW-M6N-LOP-00013, -00066, -00067, 24590-LAW-M6N-M6DT-00018, AND -00038. ADDED/REVISED CONTROL SYSTEMS, SPOOL NUMBERS, HOLDS, OFF SHEET CONNECTORS, ADR REVISION NUMBER ON THE TITLE BLOCK, BRANCH LINE AND REFERENCE 1. PROVIDED QUALITY BREAK. FOR LOP-PT-2065 PURGE AIR SUPPLY AS REQUESTED BY WTP-FC-IN-17-0038.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3D3-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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 is radioactivities as provided for process descriptive purposes only.

DRAWING INDEX

DWG NO	TITLE
24590-LAW-M6-LOP-00002001	PRIMARY OFFGAS MELTER 2 LOP-SCB-00002
24590-LAW-M6-LOP-00002002	PRIMARY OFFGAS MELTER 2 LOP-VSL-00002
24590-LAW-M6-LOP-00002003	PRIMARY OFFGAS MELTER 2 LOP-BULGE-00002
24590-LAW-M6-LOP-00002004	PRIMARY OFFGAS MELTER 2 LOP-WESP-00002
24590-LAW-M6-LOP-00002005	PRIMARY OFFGAS MELTER 2 FILM COOLERS
24590-LAW-M6-LOP-00002006	PRIMARY OFFGAS MELTER 2 LOP-PMP-00006A/B

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 14	WRS	PMG	AE	BM	7/5/17
0	ISSUED FOR CONSTRUCTION, SEE NOTE 13	MRD	ST	SM/SS	RS/JS	3/4/10

Q

ISSUED BY RPP-WTP PDC

PROJECT No.	24590	
SITE	HANFORD	
AREA	200E	
BUILDING No.	22	

	BY	DATE
ORIGINATOR	O'NEILL, MICHAEL	2/26/10
CHECKER	THAKKAR, SURENDRA	2/26/10
APPROVER	STEVENS, ROBERT	3/4/10
REVIEWER	WEITZSMANN, STUART	3/4/10

CONTENT APPLICABLE TO ALARM? [X] YES [ ] NO
ADR NO. 24590-LAW-ADR-M-02-022 REV 0

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

CONTRACT No. DE-AC27-01RV14136

P&ID - LAW
LAW PRIMARY OFFGAS PROCESS SYSTEM MELTER 2 LOP-SCB-00002

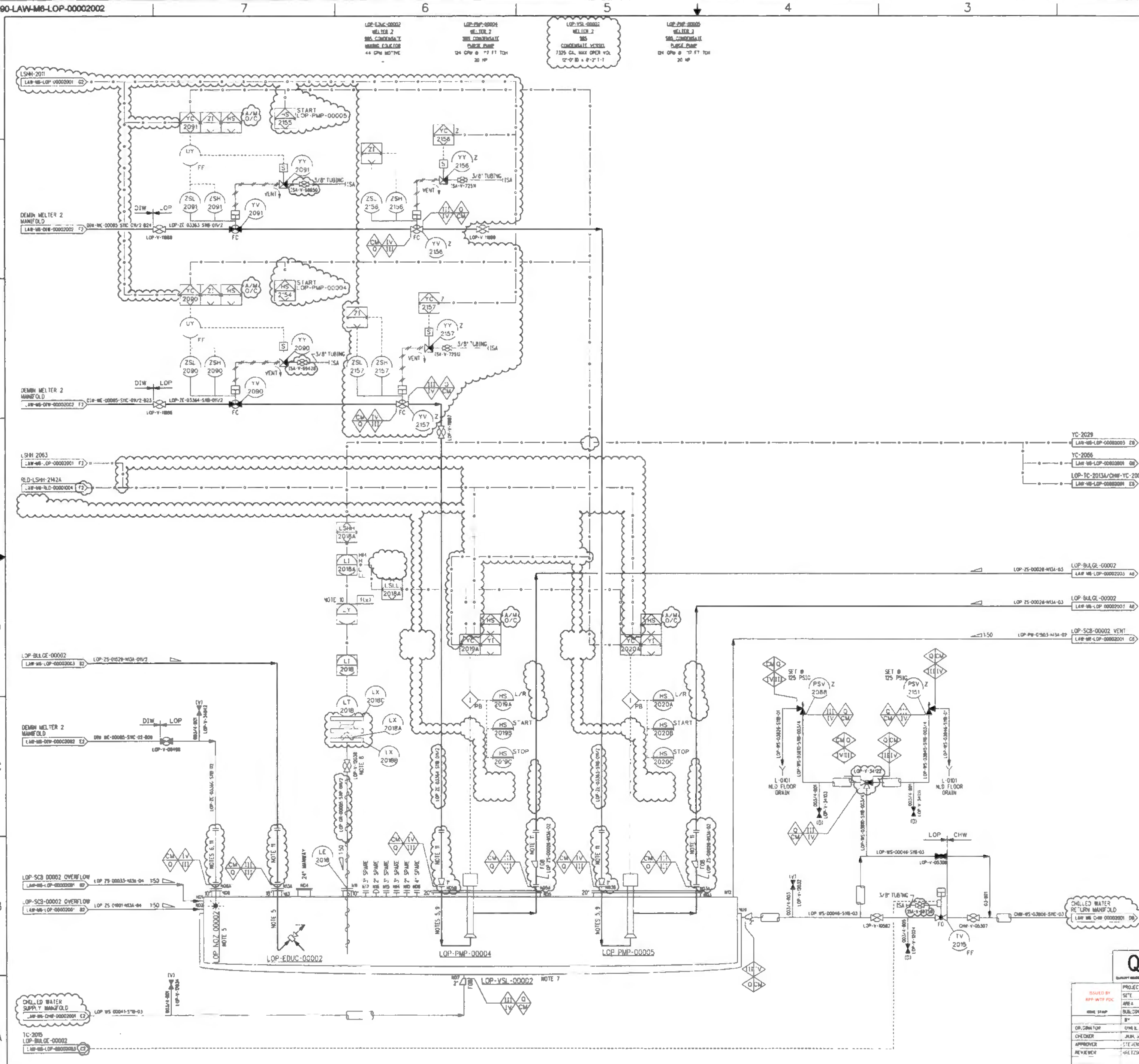
SCALE: NONE

24590-LAW-M6-LOP-00002001 REV 1

R11000277

"E" SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

7/10/2017 11:06:58 AM



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. EQUIPMENT COMPONENTS INSIDE VESSEL ARE QUALITY LEVEL CM AND SEISMIC CATEGORY SC-III.
6. REMOVABLE SPOOL PIECE SHALL BE REMOVED AND BLIND FLANGES INSTALLED WHEN PROCESSING WASTE.
7. HALF PIPE JACKET.
8. RADAR GUIDE TUBE TO BE ROUTED TO TRANSMITTER LOCATED ON THE FLOOR ABOVE.
9. VESSEL INTERNAL PUMP PRIMING AND DISCHARGE PIPING SUPPLIED WITH PUMP BY VENDOR.
10. FUNCTION CONVERTS TANK LEVEL IN INCHES TO GALLONS.
11. REMOVABLE PIPING SPOOL FACILITATES PUMP, MIXING EDUCTOR, OR SPRAY NOZZLE REMOVAL.
12. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LOP-00002 REV 5. CLOUDS DEPICT MAJOR CHANGES MADE FROM SUPERSEDED DRAWING. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-20-00001, 24590-LAW-M6N-LOP-00015, -00034, -00035, 00047, 00053, AND 24590-LAW-M5PR-LOP-00013.
13. REVISION 1: INCORPORATED 24590-LAW-M6N-LOP-00065, -00067, -00070, -00074, 24590-LAW-M6N-MBOT-00016, -00038 AND 24590-WTP-M6N-50-00073. ALSO INCLUDES INFORMATION FROM 24590-LAW-EIE-NS-17-0001 (REV 0) AND 24590-WTP-EIE-J-16-0001 (REV 0). REVISED REFERENCE 1, AND ADR REVISION NUMBER ON THE TITLE BLOCK. REMOVED PUMP SAFETY CONTROLS. UPDATED RADAR SYMBOL.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3ZD-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD APVD	DATE
1	REVISED PER NOTE 13	JWS			
0	ISSUED FOR CONSTRUCTION, SEE NOTE 12	MRO	SJ	SK/SS/RS/JS	3/4/10

Q

ISSUED BY RPP-WTP PDC

PROJECT No.	24590
SITE	HANFORD
AREA	
BUILDING No.	20

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

CONTRACT No. DE-AC27-01RV14136

	BY	DATE
ORIGINATOR	[illegible]	2/26/10
CHECKER	JAIN, SATISH	2/26/10
APPROVER	STEVENS,R/SCHNEIDER,J	3/4/10
REVIEWER	KRETZSCHMAR,S/SMET,D	3/4/10

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO 24590-LAW-ADR-M-02-022 REV 2

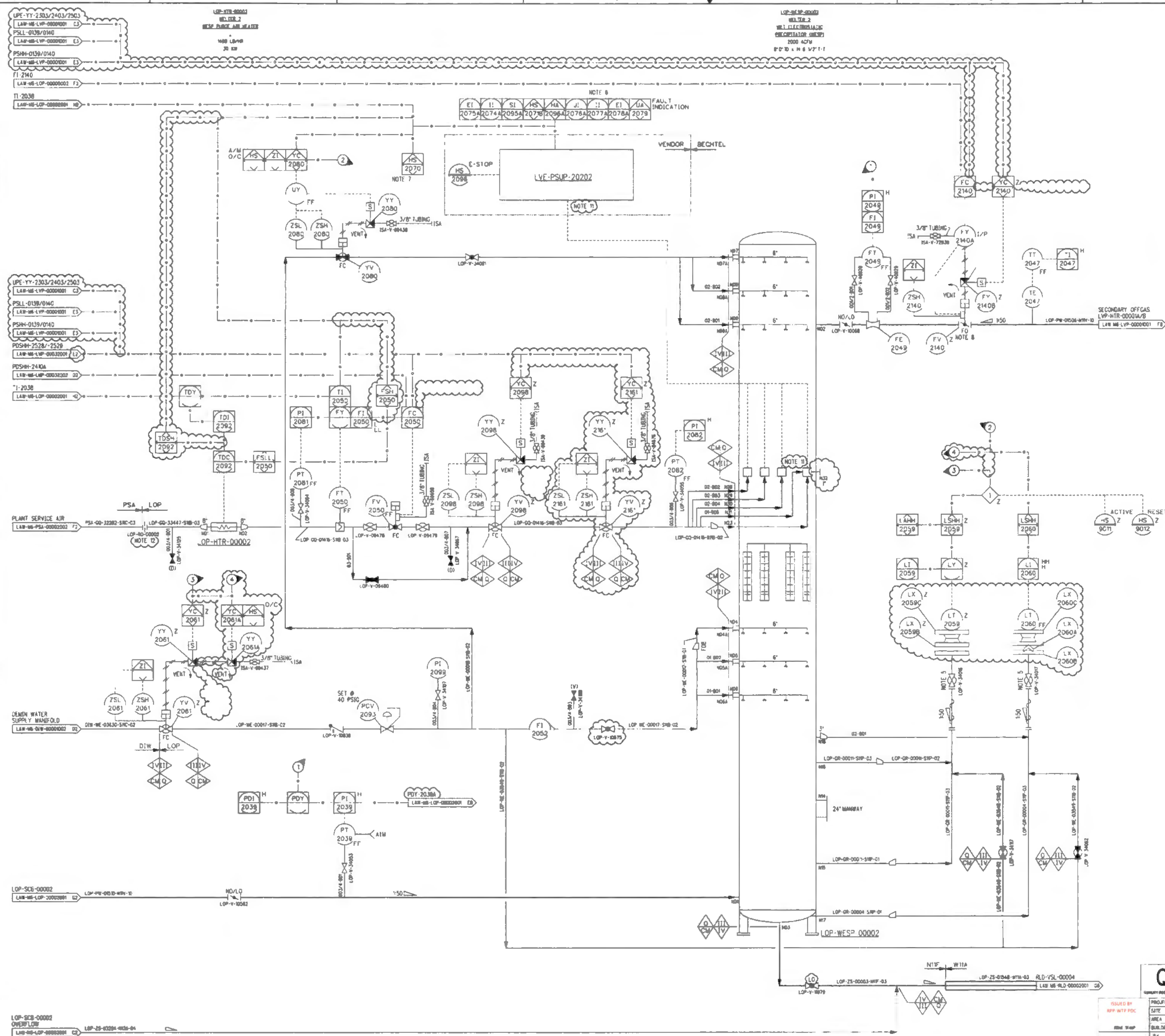
P&ID - LAW
LAW PRIMARY OFFGAS PROCESS SYSTEM
MELTER 2
LOP-VSL-00002

SCALE: NONE

24590-LAW-M6-LOP-00002002 REV 1

"E" SIZE 44x34
COMPUTER GENERATED MANUAL DESIGN CHANGES NOT PERMITTED

7/26/2017 8:40:18 AM



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. RADAR GUIDE TUBE TO BE ROUTED TO TRANSMITTER LOCATED ON THE FLOOR ABOVE.
6. INSTRUMENT PERFORMS AN AIR PERMIT FUNCTION. INDICATION DISPLAYED AT PCJ.
7. LOP-WESP-00002 WASH SEQUENCE HAND SWITCH.
8. VALVE/ACTUATOR ASSEMBLY SUPPLIED WITH ADJUSTABLE STOP TO PREVENT FULL CLOSURE.
9. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LOP-00002 REV 5. CLOUDS DEPICT MAJOR CHANGES MADE FROM SUPERSEDED DRAWING. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-20-00001, 24590-LAW-M6N-LOP-00008, -00033, -00037, -00040, -00051, -00053, -00060, 24590-LAW-M6PR-LOP-00004, -00009, 24590-LAW-M6PN-LOP-00005, -00013, AND -00015. PCV-2093 SET PRESSURE HAS BEEN REVISED FROM 60 PSIG TO 40 PSIG.
10. REVISION 1 INCORPORATED 24590-LAW-M6LN-LOP-00005, 24590-LAW-M6N-LOP-00013, -00063, -00066, -00069, -00070, -00071, -00075, 24590-LAW-M6N-M80T-00016. REVISED OFF SHEET CONNECTOR, ADDED ROOT VALVE AND BRANCH NUMBERS, CHANGED VALVE POSITION FROM "NO" TO "NO/LO", NOZZLE N31, AND CONNECTING PIPE SIZE FROM 2" TO 1". THIS P&ID HAS BEEN REVIEWED BY E&NS FOR ALL LIMITED AND PHYSICALIZATION CHANGE DOCUMENTS THAT WERE PREVIOUSLY ISSUED (SEE CCN 251622)
11. THE WESP INTERNAL SUBCOMPONENTS, INCLUDING THE ELECTRODES, INSULATORS, COLLECTOR TUBE BUNDLE, AND ELECTRODE POWER SUPPLY, LVE-PSUP-20202, ARE CONFIRMED AS CM WITH QUALITY LEVEL DETERMINATION, QDF's (24590-LAW-QDF-MS-15-0001, 24590-LAW-QDF-MS-14-0002, AND -0003).
12. RESTRICTION ORIFICE (RO) EXISTS TO PROVIDE FLEXIBILITY FOR FUTURE DESIGN. NO PRESSURE DROP ACROSS THE RO IS REQUIRED IN CURRENT DESIGN. THE RO DOES NOT PROVIDE FLOW RESTRICTION (i.e. β=1) AND NO SIZING BASIS IS THEREFORE REQUIRED.
13. REVISION 2 INCORPORATED 24590-WTP-EIE-J-16-0001 (REV. 0), 24590-LAW-EIE-NS-17-0001 (REV. 0) 24590-WTP-M6N-50-00073, 24590-LAW-M6N-M80T-00033, 24590-LAW-M6N-LOP-00099, -00102, -00104, AND -00106. REVISED REFERENCE 1, LOP-V-10760 BALL VALVE TO GLOBE VALVE, ADR REVISION NUMBER ON THE TITLE BLOCK, OFF SHEET CONNECTOR, ADDED NOTES 11 AND 12, LINE NUMBERS, CONTROL SYSTEMS PER PDSA UPDATE. ADDED TDSH 2092 AND FSH-2050.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3ZD-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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.

REV	DESCRIPTION	DRG	CHKD	RVWD	APVD	DATE
2	REVISED PER NOTE 13	WAS				7/27/17
1	REVISED PER NOTE 10	MC	RT	BA/JK	SK/JM	10/13/14
0	ISSUED FOR CONSTRUCTION, SEE NOTE 9	MRO	ST	SK/SS	RS/JS	03/4/10

REVISION HISTORY

Q

ISSUED BY RPP-WTP PDC

PROJECT No	24590
SITE	HANFORD
AREA	200E
BUILDING No.	20

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

CONTRACT No DE-AC27-01RV14136

	BY	DATE
ORIGINATOR	O'NEILL, MICHAEL	2/26/10
CHECKER	THAKKAR, SURENDRA	2/26/10
APPROVER	STEVENS, ROBERT	3/4/10
REVIEWER	KRETZSCHMAR, STUART	3/4/10

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-LAW-ADR-M-02-022 REV 7

P&ID - LAW
LAW PRIMARY OFFGAS PROCESS SYSTEM MELTER 2
LOP-WESP-00002

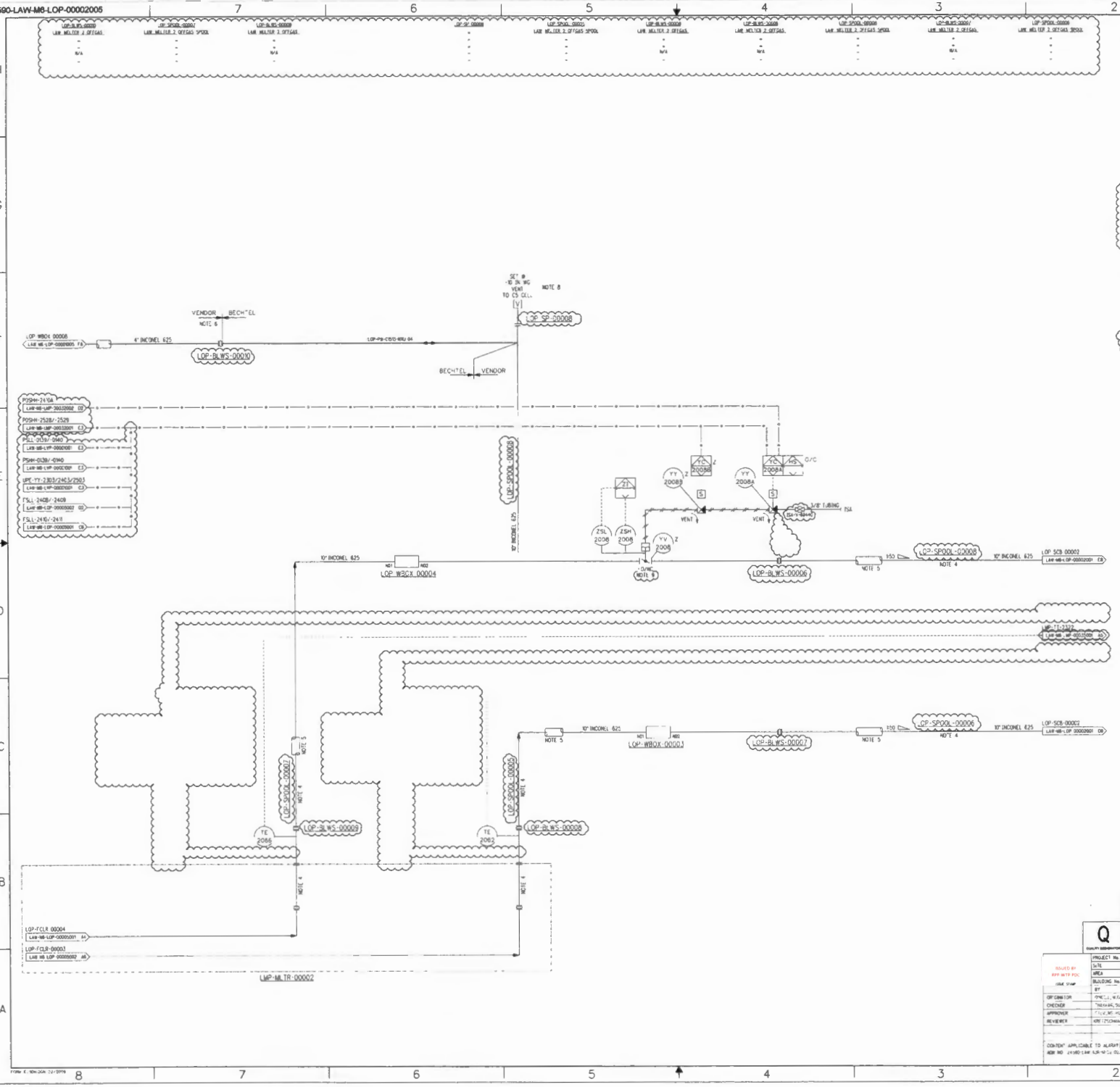
SCALE NONE

24590-LAW-M6-LOP-00002004 REV 2

E SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

7/31/2017 11:18:23 AM

24590-LAW-M6-LOP-00002005



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SCOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL Q AND SEISMIC CATEGORY SC-III, UNLESS OTHERWISE NOTED.
4. SPECIALLY ENGINEERED PIPING SPOOL WITH HILTAP COUPLING.
5. INSULATION BY VENDOR.
6. FOR VENDOR COMPONENT DETAILS SEE 24590-LAW-M61-P23T-00001.
7. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LOP-00002 REV 5. CLOUDS DEPICT MAJOR CHANGES MADE FROM SUPERSEDED DRAWING. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LOP-00015, -00040, AND -00053.
8. LOP-SP-00008 IS SAFETY SIGNIFICANT FOR FUCTION.
9. DO NOT INSULATE VALVE OR PIPE WITHIN 4" OF VALVE.
10. REVISION 1: INCORPORATED 24590-LAW-EIE-NS-17-0001 (REV 0), 24590-LAW-M6N-LOP-00005, 24590-LAW-M6N-MBOT-00016 AND 00033. ADDED NOTE 8. REVISED IN-LINE COMPONENT TAG NUMBERS TO EQUIPMENT TAG NUMBERS. REFERENCE 1 FROM SYSTEM DESCRIPTION TO SYSTEM DESIGN DESCRIPTION. ADR REVISION NUMBER ON THE TITLE BLOCK UPDATED. OFF SHEET CONNECTORS.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3ZD-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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 flow sketch purposes only.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 10					
0	ISSUED FOR CONSTRUCTION, SEE NOTE 7	MRD	SI			5/25/05

REVISION HISTORY

Q
QUALITY DESIGNATION

ISSUED BY RPP-WTP PDC

ISSUE STAMP

	BY	DATE
ORIGINATOR		2/26/10
CHECKER		2/26/10
APPROVER		
REVIEWER		

CONTENT APPLICABLE TO ALARA? YES NO

ADR NO 24590-LAW-ADR-NF-00002

PROJECT No. 24590
SITE HANFORD
AREA 200E
BUILDING No. 20

CONTRACT No. DE-AC27-01RV14136

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

P&ID - LAW
LAW PRIMARY OFFGAS PROCESS SYSTEM
MELTER 2
FILM COOLER OFFGAS

SCALE NONE

24590-LAW-M6-LOP-00002005

REV 1

8" SIZE - 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

FORM E.SDN.20A 12/2009

2/26/2010 7:12:33 AM

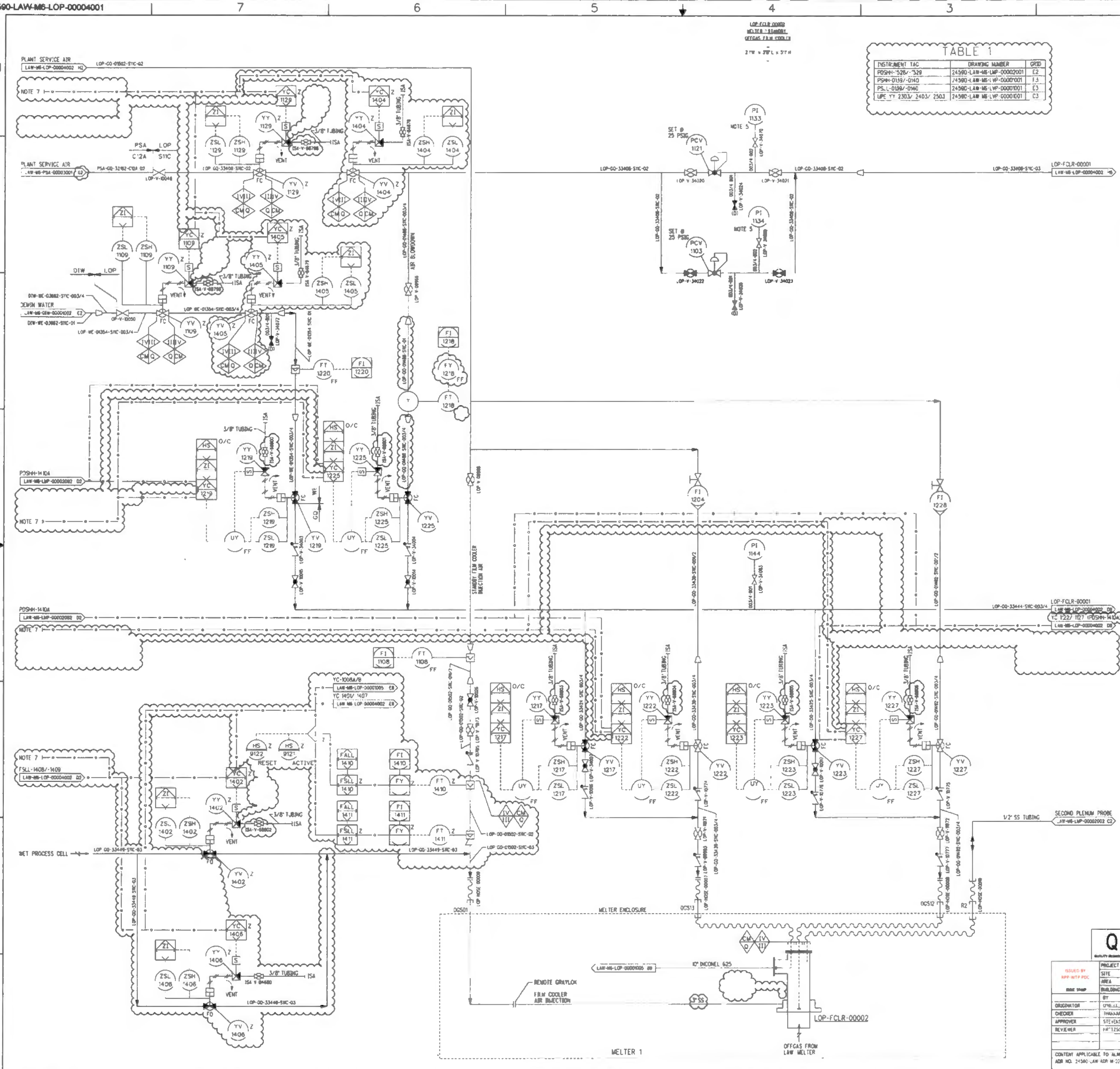


TABLE 1

INSTRUMENT TAG	DRAWING NUMBER	GRID
PDSHH-1328/-1329	24590-LAW-M6-LMP-00002001	E2
PSHH-0139/-0140	24590-LAW-M6-LVP-00001001	F3
PSLL-0139/-0140	24590-LAW-M6-LVP-00001001	E3
UPE YY 2303/ 2403/ 2503	24590-LAW-M6-LVP-00001001	C3

NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. PI TO BE VISIBLE FROM ASSOCIATED PRESSURE REGULATOR
6. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LOP-00004 REV 5. CLOUDS DEPICT MAJOR CHANGES MADE FROM SUPERSEDED DRAWING. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LOP-00009, -00015, -00023, -00032, -00036, -00039, -00041, 00042, 00054, -00056, -00058, 24590-LAW-M6N-M80T-00001, AND 24590-LAW-M6PN-LOP-00016.
7. INTERLOCKS LISTED IN TABLE 1.
8. REVISION 1: INCORPORATED 24590-LAW-EIE-NS-17-0001 (REV 0), 24590-WTP-EIE-MS-18-0021 (REV 0), 24590-LAW-M6LN-LOP-00011, 24590-LAW-M6N-LOP-00066, AND 24590-LAW-M6N-M80T-00016. ADDED TABLE 1, NOTE 7, CONTROL SYSTEMS AND UPDATED DATA LINK ROUTES PER PDSA UPDATE. REVISED ADR REVISION NUMBER ON THE TITLE BLOCK AND REFERENCE 1. REMOVED AND UPDATED OFF SHEET CONNECTORS. QUALITY/SEISMIC FLAGS FROM YV-1402, YV-1109, YV-1129 AND FROM LOP-FCLR-00002 PER PDSA UPDATES. ADDED YV 1406 AS A REDUNDANT SOURCE OF WET PROCESS CELL AIR INBLEED. ADDED FILM COOLER COOLING AIR FLOW INDICATION AND ALARM. INCREASES FILM COOLER INJECTION AIR LINE SIZE.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3ZD-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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.

DRAWING INDEX

DWG NO	TITLE
24590-LAW-M6-LOP-00004001	PRIM OFFGAS PROC SYS MELTER 1 LOP-FCLR-00002
24590-LAW-M6-LOP-00004002	PRIM OFFGAS PROC SYS MELTER 1 LOP-FCLR-00001

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 8	WAS	JC			7/27/17
0	ISSUED FOR CONSTRUCTION, SEE NOTE 6	MRO	ST	SK/SS	RS/JS	3/4/10

Q QUALITY DESIGNATION

ISSUED BY RPP-WTP PDC

PROJECT No	24590
SITE	HANFORD
AREA	200E
BUILDING No.	20

	BY	DATE
ORIGINATOR	O'NEILL, MICHAEL	2/26/10
CHECKER	THAKKAR, SURENDRA	2/26/10
APPROVER	STEVENS, ROBERT	3/4/10
REVIEWER	FRITZSCHMAR, STUART	3/4/10

CONTENT APPLICABLE TO ALARA? [X] YES [ ] NO
ADR NO. 24590-LAW-ADR-M-02-022 REV 2

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

CONTRACT No DE-AC27-01RV14136

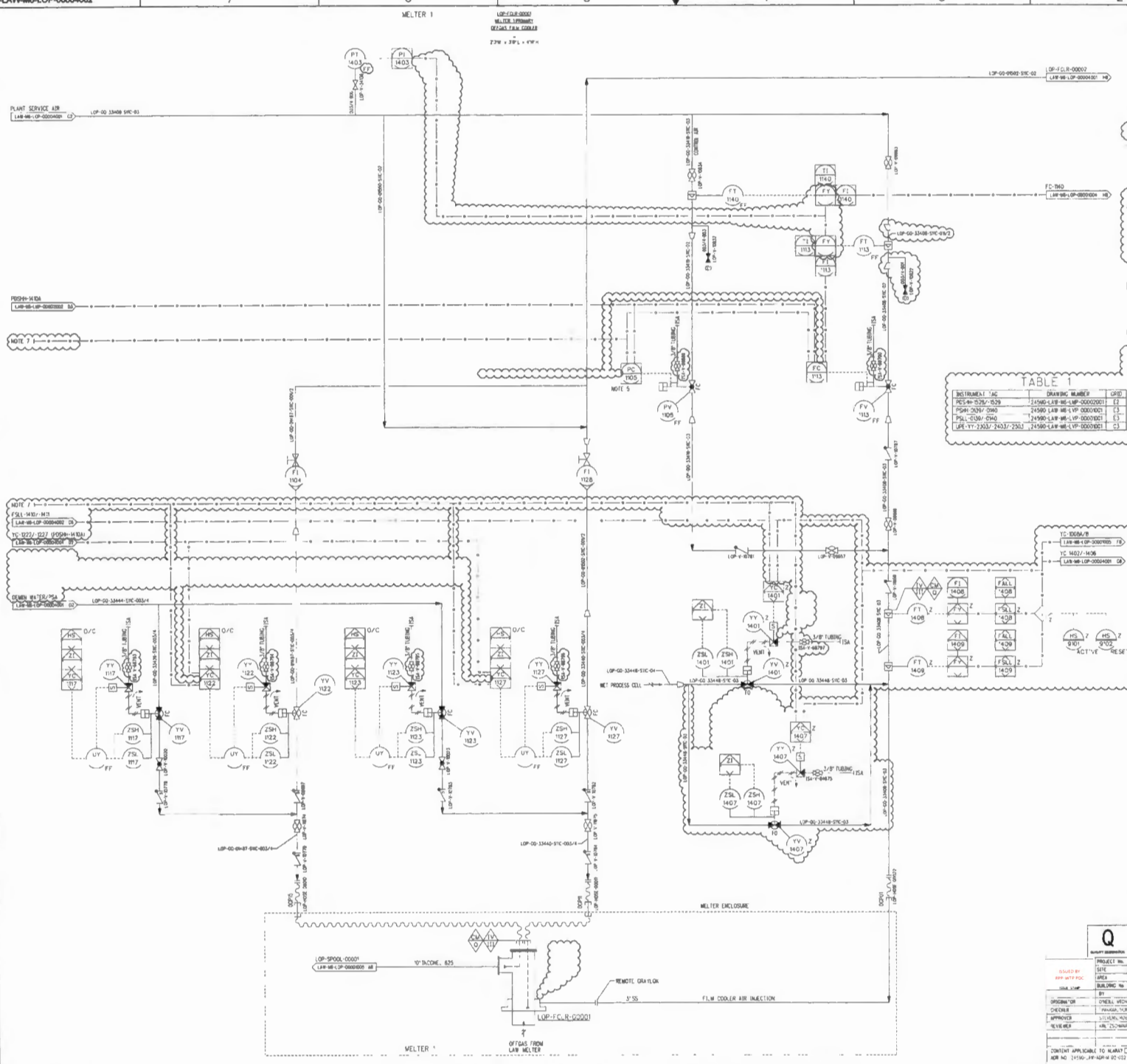
P&ID - LAW
LAW PRIMARY OFFGAS PROCESS SYSTEM MELTER 1 LOP-FCLR-00002

SCALE: NONE

24590-LAW-M6-LOP-00004001 REV 1

"E" SIZE 44x34
COMPUTER GENERATED - MANUAL DESIGN CHANGES NOT PERMITTED

7/27/2017 10:23:08 AM



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. MELTER PRESSURE CONTROL AIR LOOP IS BASED ON INPUT FROM LMP-PDI-1410A AS SHOWN ON P&ID 24590-LAW-M6-LMP-00002002.
6. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LOP-00004 REV 5. CLOUDS DEPICT MAJOR CHANGES MADE FROM SUPERSEDED DRAWING. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LOP-00009, -00015, -00023, -00032, -00036, -00039, -00041, -00054, -00056, -00058, 24590-LAW-M6N-M6GT-00001, AND 24590-LAW-M6PN-00009
7. INTERLOCKS LISTED IN TABLE 1.
8. REVISION 1: INCORPORATED 24590-LAW-EIE-NS-17-0001 (REV 0), 24590-LAW-M6N-M6GT-00016, 24590-LAW-M6N-LOP-00063, AND -00098. ADDED CONTROL SYSTEMS PER POSA UPDATE. REVISED REFERENCE 1 NOTE 5 AND ADR REVISION NUMBER ON THE TITLE BLOCK. REMOVED QUALITY/SEISMIC FLAGS FROM YY-1401 AND FROM LOP-FCLR-00001 PER POSA UPDATE. ADDED YY-1407 AS A REDUNTANT SOURCE OF WET PROCESS CELL AIR INBLEED. ADDED FILM COOLER COOLING AIR FLOW INDICATION AND ALARM. ADDED "ABLE" AND NOTE 7. REVISED OFF SHEET CONNECTION.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-3ZD-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEMS DESIGN DESCRIPTION.

TABLE 1

INSTRUMENT TAG	DRAWING NUMBER	GRID
PDSHH-1526/-1529	24590-LAW-M6-LMP-00002001	C2
PSHH-0939/-0940	24590-LAW-M6-LVP-00001001	C3
PSLL-0938/-0940	24590-LAW-M6-LVP-00001001	C3
LPF-YY-2503/-2403/-2503	24590-LAW-M6LVP-00001001	C3

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

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 8					
0	ISSUED FOR CONSTRUCTION, SEE NOTE 6	MRO	SJ	10/25	15/16	3/4/10

Q QUALITY DESIGNATION

REVISION HISTORY

ISSUED BY: RPP-WTP POC
PROJECT No. 24590
SITE HANFORD
AREA 200W
BUILDING No. 26
ISSUE STAMP

	BY	DATE
ORIGINATOR	O'NEILL, MICHAEL	2/26/10
CHECKER	HAMADA, NORIHIRO	2/26/10
APPROVED	STILLMAN, RENEE	3/4/10
REVIEWER	MILTENBURGER, STUART	3/4/10

CONTENT APPLICABLE TO NUMAT? YES NO
ADR NO. 24590-WTP-ADR-M-02-002 REV 2

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

CONTRACT No. DE-AC27-01RV14136

P&ID - LAW
LAW PRIMARY OFFGAS PROCESS SYSTEM MELTER 1
LOP-FCLR-00001

SIZE: NONE
24590-LAW-M6-LOP-00004002
REV 1

E 5125 44434
COMPUTER GENERATED - ORIGINAL DESIGN CHANGES NOT PERMITTED

24590-LAW-M6-LOP-00005001

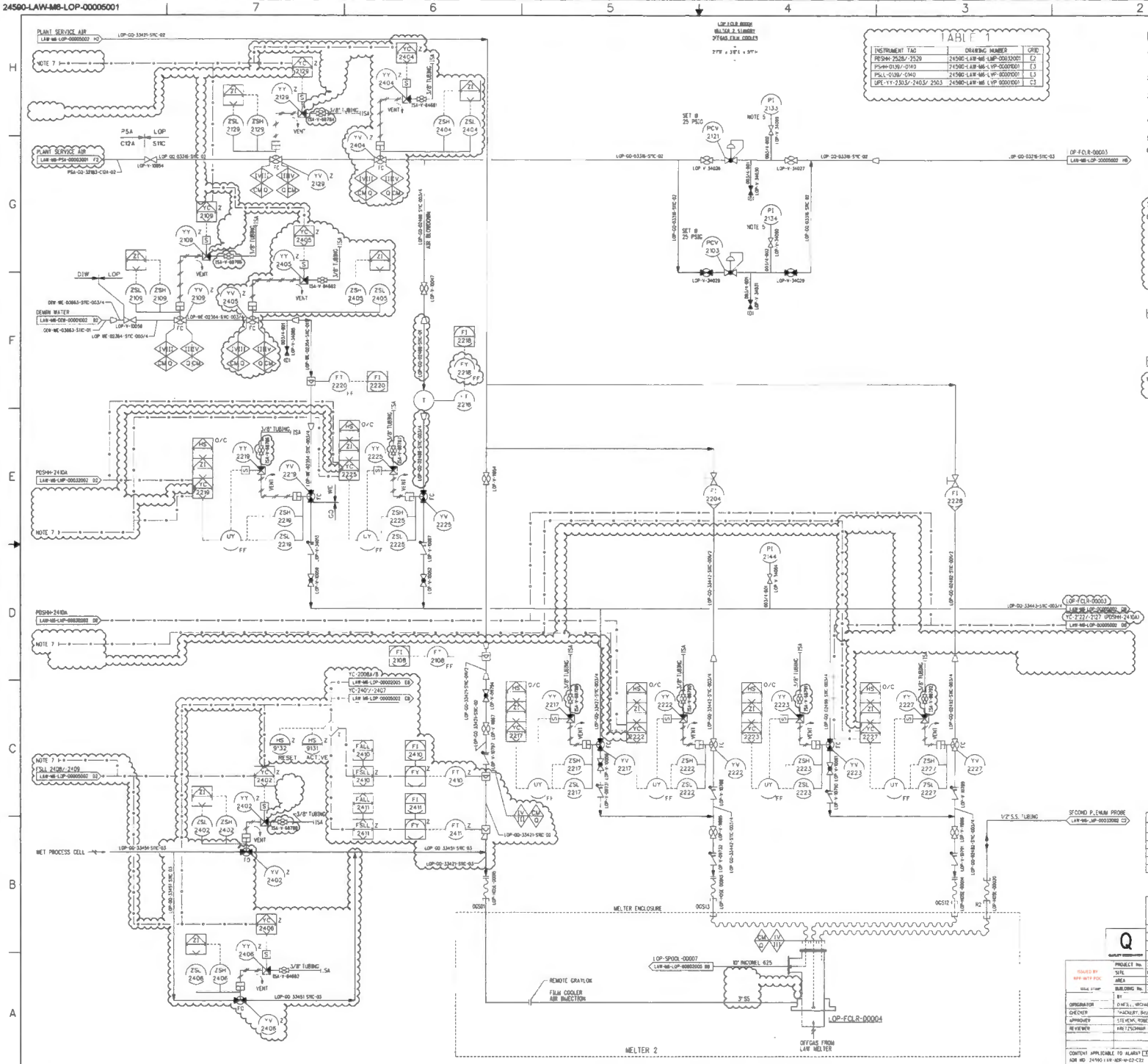


TABLE 1

INSTRUMENT TAG	DRAWING NUMBER	GRID
PDSH4-2528/-2529	24590-LAW-M6-LMP-00032001	E2
PSH4-0139/-0140	24590-LAW-M6-LVP-00001001	C3
PSLL-0139/-0140	24590-LAW-M6-LVP-00001001	C3
UPE-YY-2303/-2403/-2503	24590-LAW-M6-LVP-00001001	C3

NOTES:

1. SEE DRAWINGS 24590-WTP-M6-50-00001 THROUGH 24590-WTP-M6-50-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. PI TO BE VISIBLE FROM ASSOCIATED PRESSURE REGULATOR.
6. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI-SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LOP-00005 REV. 5. CLOUDS DEPICT MAJOR CHANGES MADE FROM SUPERSEDED DRAWING. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LOP-00010, 00015, -00024, -00032, -00036, -00038, -00041, -00042, -00055, -00056, -00058, 24590-LAW-M6N-MB01-00001, AND 24590-LAW-M6PN-LOP-00016.
7. INTERLOCK LISTED IN TABLE 1.
8. REVISION 1 INCORPORATED 24590-LAW-EIE-NS-17-0001 (REV 0), 24590-WTP-EIE-MS-16-0021 (REV 0), 24590-LAW-M6LN-LOP-00011, 24590-LAW-M6N-LOP-00066, AND 24590-LAW-M6N-MB01-00016. ADDED CONTROL SYSTEMS PER PDSA UPDATE. REVISED ADR REVISION NUMBER ON THE TITLE BLOCK, OFF SHEET CONNECTORS, AND REFERENCE 1. REMOVED QUALITY/SEISMIC FLAGS FROM YY-2402, YY-2109, YY-2129, AND FROM LOP-FCLR-00004 PER PDSA UPDATE. ADDED YY-2406 AS A REDUNDANT SOURCE OF WET PROCESS CELL AIR INBLEED. ADDED REDUNDANT PSA AND DIW ISOLATION VALVES. ADDED TABLE 1. NOTE 7. FILM COOLER COOLING AIR FLOW INDICATION AND ALARM INCREASES FILM COOLER INJECTION AIR LINE SIZE.

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-5ZD-LOP-00001, LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEM DESIGN DESCRIPTION.

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

DRAWING INDEX	
DWG NO	TITLE
24590-LAW-M6-LOP-00005001	PRIM OFFGAS PROC SYS MELTER 2 LOP FCLR-00004
24590-LAW-M6-LOP-00005002	PRIM OFFGAS PROC SYS MELTER 2 LOP-FCLR-00003

REV	DESCRIPTION	ORG	CHKD	REVWD	APVD	DATE
1	REVISED PER NOTE 8					7/27/17
0	ISSUED FOR CONSTRUCTION, SEE NOTE 8	MRD	ST			06/05/15 03/04/16

REVISION HISTORY

Q QUALITY DESIGNATION

ISSUED BY RPP-WTP PDC

SEAL STAMP

	BY	DATE
ORIGINATOR	DIETZ, MICHAEL	2/2/2016
CHECKER	MACKLEY, BRUCE	3/28/16
APPROVER	STEVENS, ROBERT	3/04/16
REVIEWER	ARRITSCHMAN, STUART	3/4/16

CONTENT APPLICABLE TO ALARA? [ ] YES [X] NO

ADR MID: 24590-LAW-ADR-M-02-C22 REV 2

PROJECT No. 24590
SITE HANFORD
AREA 200E
BUILDING No. 20

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

CONTRACT No. DE-AC27-01RV14136

P&ID - LAW
LAW PRIMARY OFFGAS PROCESS SYSTEM MELTER 2
LOP-FCLR-00004

SCALE NONE

24590-LAW-M6-LOP-00005001

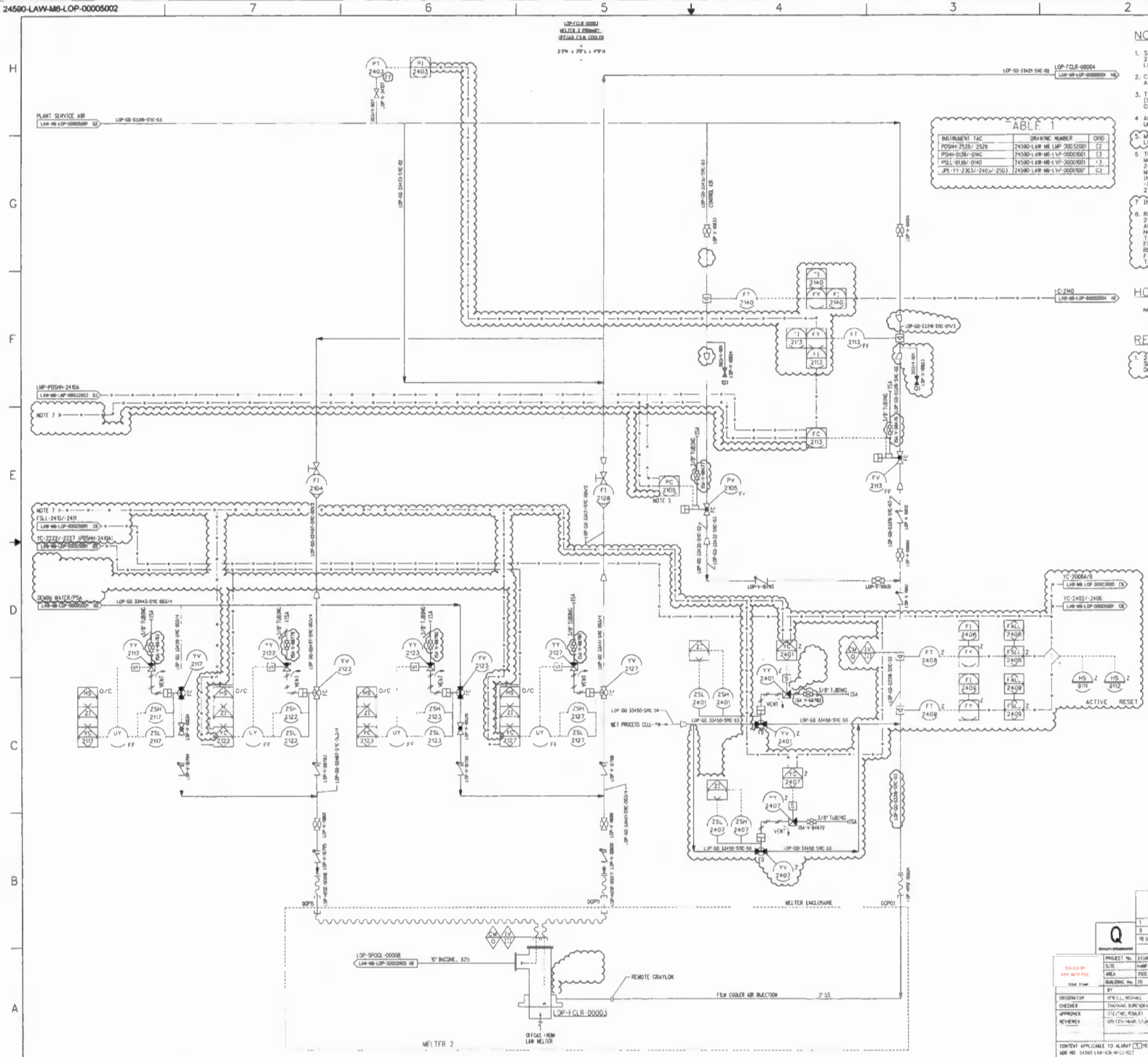
REV 1

8" SITE : 44x34
COMPUTER GENERATED - MANUAL ALTERATION CHANGES NOT PERMITTED

7/27/2017 10:30:36 AM

FORM E_SONLOCK 02/2008

PLOTTED BY: CLARKMRE



NOTES:

1. SEE DRAWINGS 24590-WTP-M6-S0-00001 THROUGH 24590-WTP-M6-S0-00008 FOR GENERAL NOTES, SYMBOLS AND LEGEND, AND GENERAL SLOPE REQUIREMENTS.
2. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
3. THE PRESSURE BOUNDARY FOR ALL COMPONENTS ON THIS DRAWING IS QUALITY LEVEL CM AND SEISMIC CATEGORY SC-IV, UNLESS OTHERWISE NOTED.
4. ALL LINES SHOWN ON THIS DRAWING SHALL BE FREE DRAINING, UNLESS OTHERWISE NOTED.
5. MELTER PRESSURE CONTROL AIR LOP IS BASED ON INPUT FROM LMP-PDI 24104 AS SHOWN ON P&ID 24590-LAW-M6-LMP-00032002.
6. THIS DRAWING IS CONVERTED FROM A SINGLE SHEET TO MULTI SHEET DRAWINGS AND, IN PART, SUPERSEDES 24590-LAW-M6-LOP-00005 REV 5. GLOBAL DEPICT MAJOR CHANGES MADE FROM SUPERSEDED DRAWING. THIS DRAWING INCLUDES INFORMATION FROM 24590-LAW-M6N-LOP-00010, -00015, -00024, -00032, -00038, -00039, -00041, -00055, -00056, -00058 24590-LAW-M6N-M8OT-00001, AND 24590-LAW-M6PN-LOP-00008.
7. INTERLOCKS LISTED IN TABLE 1.
8. REVISION 1 INCORPORATED 24590-LAW-EIE-NS-17-0001 (REV. 0), 24590-LAW-M6N-M8OT-00016, 24590-LAW-M6N-LOP-00063, AND -00098 ADDED CONTROL SYSTEMS PER PDSA UPDATE, REVISED REFERENCE 1, NOTE 5, OFF SHEET CONNECTOR, AND ADR REVISION NUMBER ON THE TITLE BLOCK, REMOVED QUALITY/SEISMIC FLAGS FROM YV 2401 AND FROM LOP-FCLR-00003 PER PDSA UPDATE, ADDED YV-2407 AS A REDUNDANT SOURCE OF WET PROCESS CELL AIR INBLEED ADDED FILM COOLER COOLING AIR FLOW INDICATION AND ALARM ADDED TABLE 1 AND NOTE 7.

TABLE 1

INSTRUMENT TAG	DRAWING NUMBER	GRID
PDSHH-2526/-2529	24590-LAW-M6-LMP-00032001	C2
PSHH-0138/-0140	24590-LAW-M6-LVP-0000001	C3
PSLL-0138/-0140	24590-LAW-M6-LVP-0000001	C3
JPL-YT-2303/-2403/-2503	24590-LAW-M6-LVP-0000100	C3

HOLD/OPEN ITEMS:

NONE

REFERENCES:

1. 24590-LAW-S20-LOP-00001 LAW PRIMARY OFFGAS (LOP) AND SECONDARY OFFGAS/VESSEL VENT (LVP) SYSTEMS DESIGN DESCRIPTION.

Please note that source, special nuclear and byproduct materials as defined in the Atomic Energy Act of 1954 (AEA) are regulated as the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts that pursuant to AEA, a firm 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.

REV	DESCRIPTION	ORG	CHKD	RVWD	APVD	DATE
1	REVISED PER NOTE 8					
0	ISSUED FOR CONSTRUCTION, SEE NOTE 8	MRD	ST	SK/SS	BS/JS	3/4/10

REVISION HISTORY

PROJECT No.	24590
SITE	HANFORD
AREA	XXXX
BUILDING No.	20
ISSUE STAMP	

ISSUED BY RPP-WTP PDC

	BY	DATE
ORIGINATOR	O'NEILL, MICHAEL	2/5/10
CHECKER	THAYANA, SURENDRA	2/18/10
APPROVER	STEVENS, ROBERT	3/4/10
REVIEWER	ROBERTSON-HAAR, STUART	3/4/10

CONTENT APPLICABLE TO ALARA? YES NO

ADR NO. 24590-LAW-ADR-M-13-0022 REV 1

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

CONTRACT NO. DE-AC27-01RV14136

P&ID - LAW
LAW PRIMARY OFFGAS PROCESS SYSTEM MELTER 2
LOP-FCLR-00003

SCALE: NONE

24590-LAW-M6-LOP-00005002

REV 1

A SIZE - 44x34
COMPUTER GENERATED DRAWING
DESIGN CHANGES NOT PERMITTED

7/27/2017 10:33:32 AM

Table III.10.E.B – LAW Vitrification Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
LFP-VSL-00004 (Melter 2 Feed Vessel)		-M6-LFP-00003003, Rev 0 -M6-LFP-00003004, Rev 0 -M6-LFP-00003005, Rev 0 -M6-LFP-00003006, Rev 0 -MV-LFP-P0001, Rev 0 -MV-LFP-P0002, Rev 0 -MV-LFP-P0004, Rev 0 -MV-LFP-P0005, Rev 0 -MVD-LFP-P0007, Rev 1 -MVD-LFP-P0008, Rev 1 -MVD-LFP-P0010, Rev 1 -MVD-LFP-P0011, Rev 1 -P1-P01T-00002, Rev 7 -N1D-LFP-00004, Rev 2 -N1D-LFP-00006, Rev 0		
LAW Secondary Off-gas/Vessel Vent Process System LVP-TK-00001 (LAW Caustic Collection Tank)	LVP	**24590-LAW** -M5-V17T-00011, Rev 6 -P1-P01T-00004, Rev 6 -VDCN-M-13-00001 -MTD-LVP-00001, Rev 1 -N1D-LVP-00002, Rev 2	Section 4E.4.2.2; Tables 4E-1 and 4E-3; and Figures 4A-1 and 4A-3 of Operating Unit Group 10, Chapter 4 of this Permit.	LVP-TK-00001 = 14,232
LAW Primary Off-gas Process System	LOP	**24590-LAW** -M5-V17T-P0007, Rev 0 -M5-V17T-P0008, Rev 0	Section 4E.4.2.1; Tables 4E-1 and 4E-3; and Figures 4A-1 and 4A-3of Operating Unit Group 10, Chapter 4 of this Permit.	LOP-VSL-00001 = 9,056 LOP-VSL-00002 = 9,056

Table III.10.E.B – LAW Vitrification Plant Tank Systems Description

Dangerous and/or Mixed Waste Tank Systems Name	Unit Designation	Engineering Description (Drawing Nos, Specification Nos, etc.)	Narrative Description, Tables & Figures	Maximum Capacity (gallons)
LOP-VSL-00001 (LAW Melter 1 SBS Condensate Vessel) LOP-VSL-00002 (LAW Melter 2 SBS Condensate Vessel)		-M6-LOP-00001002, Rev 1 -M6-LOP-00002002, Rev 1 ~~-M6-LOP-00001001, Rev 0~~ ~~-M6-LOP-000010022, Rev 0~~ -MV-LOP-P0001, Rev 0 -MV-LOP-P0002, Rev 0 -MVD-LOP-00004, Rev 6 -MVD-LOP-00005, Rev 6 -N1D-LOP-P0002, Rev 1 -P1-P01T-00002, Rev 7		
<u>LAW Vitrification Plant Radioactive Liquid Waste Disposal System</u> RLD-VSL-00003 (Plant Wash Vessel) RLD-VSL-00004 (C3/C5 Drains/Sump Collection Vessel) RLD-VSL-00005 (SBS Condensate Collection Vessel)	RLD	**<u>24590-LAW</u>** -M5-V17T-00014, Rev 6 -M6-RLD-00001001, Rev 0 -M6-RLD-00001002, Rev 0 -M6-RLD-00001003, Rev 0 -M6-RLD-00001004, Rev 0 -M6-RLD-00001005, Rev 0 -M6-RLD-00001006, Rev 0 -M6-RLD-00002001, Rev 0 -M6-RLD-00002002, Rev 0 -M6-RLD-00002003, Rev 0 -M6-RLD-00002004, Rev 0 -M6-RLD-00002005, Rev 0	Section 4E.2.3; Tables 4E-1 and 4E-3; and Figures 4A-1 and 4A-3 of Operating Unit Group 10, Chapter 4 of this Permit.	RLD-VSL-00003 = 25,780 RLD-VSL-00004 = 7696 RLD-VSL-00005 = 25,780

Table III.10.H.A - LAW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables and Figures
LAW Melter Process System LMP-MLTR-00001 (LAW Melter 1) LMP-MLTR-00002 (LAW Melter 2)	LMP	**24590-LAW** -CM-HC4-HXYG-00240-02-00014. Rev/ - -M0D-LMP-00001, Rev. 3 -M0D-LMP-00002, Rev. 3 -M6-LMP-00001001, Rev 0 -M6-LMP-00002001, Rev 0 -M6-LMP-00002002, Rev 0 -M6-LMP-00031001, Rev 0 -M6-LMP-00032001, Rev 0 -M6-LMP-00032002, Rev 0 -MF-LMP-00001, Rev. 0 -MF-LMP-00002, Rev. 0 -MF-LMP-00003, Rev. 0 -MF-LMP-00004, Rev. 0 -3PS-AE00-T0001, Rev. 6 -3PN-LMP-00002 -N1D-LMP-00001, Rev. 1 -P1-P01T-00002, Rev 7	Section 4E.2.2, Table 4E-2, and Figures 4A-1, 4A-3 and 4A-21 in Operating Unit Group 10, Chapter 4 of this Permit.
LAW Primary Offgas Process System LOP-FCLR-00001 (Melter 1 Primary Film Cooler) LOP-FCLR-00002 (Melter 1 Standby Film Cooler No. 2) LOP-FCLR-00003 (Melter 2 Primary Film Cooler)	LOP	**24590-LAW** -P1-P01T-00002, Rev 7 -M6-LOP-00004001, Rev ~~0~~1 -M6-LOP-00004002, Rev ~~0~~1 -M6-LOP-00005001, Rev ~~0~~1 -M6-LOP-00005002, Rev ~~0~~1	Section 4E.4.2.1, Table 4E-2, and Figures 4A-1, 4A-3 and 4A-21 in Operating Unit Group 10, Chapter 4 of this Permit.

Table III.10.H.A - LAW Plant Miscellaneous Unit System Description

Sub-system Description	Sub-system Designation	Engineering Description (Drawing Nos., Specification Nos., etc.)	Narrative Description, Tables and Figures
LOP-FCLR-00004 (Melter 2 Standby Film Cooler)			
LAW Primary Offgas Process System (Cont.) LOP-SCB-00001 (Melter 1 Submerged Bed Scrubber) LOP-SCB-00002 (Melter 2 Submergered Bed Scrubber)	LOP	**24590-LAW** -M5-V17T-P0007, Rev 0 -M5-V17T-P0008, Rev 0 -M6-LOP-00001001, Rev ~~0~~1 -M6-LOP-00002001, Rev ~~0~~1 -MK-LOP-P0001001, Rev 0 -MK-LOP-P0001002, Rev 0 -MK-LOP-P0001003, Rev 0 -MKD-LOP-P0008, Rev 0 -NID-LOP-P0001, Rev 1 -P1-P01T-00002, Rev 7	Section 4E.4.2.1, Table 4E-2, and Figures 4A-1 and 4A-3 in Operating Unit Group 10, Chapter 4 of this Permit.
LAW Primary Offgas Process System (Cont.) LOP-WESP-00001 (Melter 1 Wet Electrostatic Precipitator - WESP) LOP-WESP-00002 (Melter 2 Wet Electrostatic Precipitator -WESP)	LOP	**24590-LAW** -M5-V17T-P0007, Rev 0 -M5-V17T-P0008, Rev 0 -M6-LOP-00001004, Rev ~~1~~2 -M6-LOP-00002004, Rev ~~1~~2 -NID-LOP-00003, Rev 3 -P1-P01T-00002, Rev 7 **24590-WTP** -3PS-MKE0-T0001, Rev 5	Section 4E.4.2.1, Table 4E-2, and Figures 4A-1 and 4A-3 in Operating Unit Group 10, Chapter 4 of this Permit.
LAW Secondary Offgas/Vessel Vent Process System	LVP	**24590-LAW** -M5-V17T-00010, Rev 4	Section 4E.4.2.2, Table 4E-2, Figures 4A-1 and 4A-3 in Operating Unit Group 10, Chapter 4 of this Permit.

Quarter Ending March 30, 2018 24590-WTP-PCN-ENV-18-002

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
Remove Revision numbers from tables in the Permit Conditions.

Submitted by Co-Operator:

Roger J. Landon 3/20/18
Roger J. Landon Date

Reviewed by ORP Program Office:

for 5/2/18
J. F. Grindstaff Date

Quarter Ending March 30, 2018 24590-WTP-PCN-ENV-18-002

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]1 modification is to remove the Revision numbers from tables in the Permit Conditions (attached).

The following is an example of the type of modification made:

Replace:	24590-HLW-M6-RLD-00001001, Rev 1	With:	24590-HLW-M6-RLD-00001001

This modification requests Ecology approval and incorporation into the permit the changes in the following tables that have the revision numbers removed:

III.10.D.B	III.10.E.P
III.10.E.A	III.10.G.A
III.10.E.B	III.10.G.A.i
III.10.E.C	III.10.G.B
III.10.E.D	III.10.H.A
III.10.E.J	III.10.H.B
III.10.E.L	III.10.J.A
III.10.E.N	III.10.J.C

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

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

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

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

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

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

Reason for denial:

Reviewed by Ecology:

for S. Dahl 6/7/18 Date

Quarter Ending June 30, 2018 24590-WTP-PCN-ENV-18-005

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
Correct error in completion item PTF-19 Appendix 1.2

Page 3 of 3 Appendix 1.2.2 with the redlined change to the PTF-19 compliance date

Submitted by Co-Operator:

Roger J. Landon 3/20/18
Roger J. Landon Date

Reviewed by ORP Program Office:

J. F. Grindstaff 4/23/18
J. F. Grindstaff Date

Quarter Ending June 30, 2018

24590-WTP-PCN-ENV-18-005

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 Appendix 1.2, Pretreatment Interim Compliance Schedule, to correct a typographical error.

This modification requests Ecology approval and incorporation into the permit of the updated compliance date of June 30, 2031 for Interim Compliance Item PTF-19 in Appendix 1.2. The proposed change reflects the compliance date submitted in 24590-WTP-PCN-ENV-16-005.

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

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

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

Enter wording of WAC 173-303-830, Appendix I Modification citation: Correction of typographical error.

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

Reason for denial:

Reviewed by Ecology:

S. Dahl 5/10/18

Date

Pretreatment Interim Compliance Schedule		
	Compliance Schedule Submittal	**Interim Compliance Date[1]**
	CONTAINMENT BUILDINGS III.10.F.7	
PTF-17	Update and submit descriptions of containment building management practices (Appendix 4D) to Ecology for review and approval.	6/30/2031
	PRETREATMENT PLANT MISCELLANEOUS UNITS SYSTEMS III.10.G.9	
PTF-19	Update and submit engineering information for Pretreatment Facility Miscellaneous Unit Systems (Appendix 4D) to Ecology for review and approval.	~~6/30/2017~~6/30/2031
PTF-20	Update and submit engineering information for Pretreatment Facility Miscellaneous Treatment Unit Systems equipment (Appendix 4D) to Ecology for review and approval.	6/30/2031
PTF-21	Update and submit descriptions of management practices for Pretreatment Miscellaneous Treatment System (Appendix 4D) to Ecology for review and approval.	6/30/2031
	REPORT OF PROGRESS	
PTF-45	Update and submit Process Information (Chapter 4) to Ecology for review and approval.	6/30/2031
	FINAL COMPLIANCE DATE	
PTF-32	Final Compliance Date (Hot Commissioning Complete)	12/31/2033

1

[1]The PTF compliance dates for construction completion (PTF-1) and final compliance (PTF-32) have been revised to reflect dates established in the Amended Consent Decree, *State of Washington v. Dept. of Energy,* (Case 2:08-CV-08-5085-RMP (E.D. WA March 11, 2016)

Hanford Facility RCRA Permit Modification Notification Forms

Part V, Closure Unit CUG-03

1324-N SURFACE IMPOUNDMENT & 1324-NA PERCOLATION POND

Index

Page 2 of 6:	Parts I & II, Standard and General Conditions (List of Attachments, Page 9)
Page 3 of 6	Parts I & II, Standard and General Conditions (Pages 14, 48, and 49)
Page 4 of 6	Attachment 9 Permit Applicability Matrix
Page 5 of 6	1324-N Surface Impoundment and 1324-NA Percolation Pond Unit Specific Conditions and Chapters
Page 6 of 6	Revision instructions

Submitted by Co-Operator: 02-15-2018

Co-Operator Name — Date

Reviewed by DOE Program Office: 2-14-18

DOE Program Office Name — Date

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

Description of Modification:

List of Attachments- revision to Attachment 9 Permit Applicability Matrix date to convey change history information.

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

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

Modification Concurrence: [X] Yes [ ] No (state reason for denial)
Reason for non-concurrence:

Reviewed by Ecology:
S. L. Dahl-Crumpler for 6/14/18
S. L. Dahl-Crumpler Date

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

Description of Modification:

Changes are needed to convey the removal of Closure Unit Group 3 (CUG-3) requirements from the permit. Revisions are made to pages 14, 48, and 49 to show 1324-N Surface Impoundment and 1324-NA Percolation Pond (1324-N & 1324-NA), CUG-3 requirements are being retired from the permit Revision 8C and to identify the date of closure (April 25, 2017, 17-NWP-049).

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: (4) (d)

Other Modifications:

The permittees request that this modification be reviewed and approved as a Class 1-prime.

The permittees have completed closure activities following the Approved Closure Activities (Chapter 4) for CUG-3. Ecology accepted the certification of clean closure and supplemental information on April 25, 2017. (17-NWP-049)

This modification is the final step in removing requirements for the 1324-N &1324-NA CUG-3 from the permit.

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

Reason for denial:

Reviewed by Ecology:

S. L. Dahl Crumpler 6/14/18

S. L. Dahl Crumpler Date

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

Description of Modification:

Changes are needed to convey the removal of Closure Unite Group 3 (CUG-3) requirements from the permit. Revisions are made to page 11 to show 1324-N & 1324-NA, CUG-3 requirements are being retired from the permit Revision 8C.

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 (4) (d)

Other Modifications:

The permittees request that this modification be reviewed and approved as a Class 1-prime.

The permittees have completed closure activities following the Approved Closure Activities (Chapter 4) for CUG-3. Ecology accepted the certification of clean closure and supplemental information on April 25, 2017. (17-NWP-049)

This modification is the final step in removing requirements for the 1324-N &1324-NA CUG-3 from the permit.

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

Reason for denial:

Reviewed by Ecology:

S. L. Dahl-Crumpler 6/14/18

S. L. Dahl-Crumpler Date

Hanford Facility RCRA Permit Modification Form	
Unit: **1324-N Surface Impoundment**	Permit Part **Part V, Closure Unit Group CUG-03**

Description of Modification:

Changes are needed to retire permit requirements for the Closure Unit Group 3 (CUG-3). The following CUG-3 documents/chapters are being removed from the permit:

- Unit Specific Conditions
- Chapter 1.0: Part A Form(s)
- Chapter 2.0: Unit Description
- Chapter 3.0: Groundwater Monitoring
- Chapter 4.0: Closure Activities
- Chapter 5.0: Postclosure Plan

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 (4) (d)

Other Modifications:

The permittees request that this modification be reviewed and approved as a Class 1-prime.

The permittees have completed closure activities following the Approved Closure Activities (Chapter 4) for CUG-3. Ecology accepted the certification of clean closure and supplemental information on April 25, 2017. (17-NWP-049)

This modification is the final step in removing requirements for the 1324-N &1324-NA CUG-3 from the permit.

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

Reason for denial:

Reviewed by Ecology:

S. L. Dahl-Crumpler for 6/19/18

S. L. Dahl-Crumpler Date

Revise the Following Pages:

Revise the Parts I & II (Standard & General Conditions) as shown herein.
Revise Attachment 9 (Permit Applicability Matrix) as shown herein.
Remove 1324-N & 1324-NA CUG 3 Unit Specific Conditions
Remove Chapter 1.0: Part A Form
Remove Chapter 2.0: Unit Description
Remove Chapter 3.0: Groundwater Monitoring
Remove Chapter 4.0: Closure Activities
Remove Chapter 5.0: Postclosure Plan

Hanford Facility
Resource Conservation and Recovery Act Permit, Dangerous Waste Portion

Revision 8C

For the Treatment, Storage, and Disposal of Dangerous Waste

Washington State Department of Ecology
Nuclear Waste Program

UNIT	Permit Revision		Comments/History
	Incorporated	Retired	
Waste Treatment and Immobilization Plant	Rev. 7		Permitted unit under construction
Integrated Disposal Facility	Rev. 8A		
331-C Storage Unit	Rev. 8B	Rev. 8C	Closed, 7/22/11
400 Area Waste Management Unit	Rev. 8C		
PART IV, CORRECTIVE ACTION			
100-NR-1 Operable Unit	Rev. 6		
100-NR-2 Operable Unit	Rev. 6	Rev. 8C	Retired, 9/30/09
PART V, UNDERGOING CLOSURE UNITS			
100-D Ponds	Rev. 5	Rev. 6	Closed, 8/9/99
105 DR Large Sodium Fire Facility	Rev. 2	Rev. 6	Closed, 7/1/04
1301-N Liquid Waste Disposal Facility	Rev. 5		
1324-N Surface Impoundment	Rev. 5	Rev. 8C	Closed 4/25/17
1324-NA Percolation Pond	Rev. 5	Rev. 8C	Closed 4/25/17
1325-N Liquid Waste Disposal Facility	Rev. 5		
200 West Area Ash Pit Demo Site	Rev. 1	Rev. 6	Closed, 11/28/95
2101-M Pond	Rev. 1	Rev. 6	Closed, 11/28/95
216-B-3 Expansion Ponds	Rev. 1	Rev. 6	Closed, 7/31/95
218-E-8 Borrow Demolition Site	Rev. 1	Rev. 6	Closed, 11/28/95
2727-S Storage Facility	Rev. 0	Rev. 6	Closed, 7/31/95
300 Area Solvent Evaporator	Rev. 0	Rev. 6	Closed, 7/31/95
300 Area Waste Acid Treatment System	Rev. 6	Rev. 8B	Closed, 1/21/05
303-K Storage Facility	Rev. 4	Rev. 6	Closed, 7/22/02
304 Concretion Facility	Rev. 2	Rev. 6	Closed, 1/21/96
311 Tanks (includes 300 Area WATS)	Rev. 6	Rev. 7	Closed, 5/20/02
3718-F Alkali Metal Treatment /Storage	Rev. 3	Rev. 6	Closed, 8/4/98
4843 Alkali Metal Storage Facility	Rev. 3	Rev. 6	Closed, 4/14/97
Hanford Patrol Academy Demo Site	Rev. 2	Rev. 6	Closed, 11/28/95
Simulated High Level Waste Slurry	Rev. 1	Rev. 6	Closed, 9/6/95
PFP Treatment Unit (HA-20MB)	Rev. 8B	Rev. 8B	Closed, 2/8/05
241-Z Treatment and Storage Tanks	Rev. 8B	Rev. 8B	Closed, 2/22/07
303-M Oxide Facility	Rev. 8B	Rev. 8B	Closed, 6/15/06

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

II.AA Air Emission Standards for Process Vents

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

II.BB Air Emission Standards for Equipment Leaks

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

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PART III UNIT-SPECIFIC CONDITIONS FOR FINAL STATUS OPERATIONS

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

PART IV UNIT SPECIFIC CONDITIONS FOR CORRECTIVE ACTION

Corrective Action Unit 1, 100-NR-1

PART V UNIT-SPECIFIC CONDITIONS FOR UNITS UNDERGOING CLOSURE

Closure Unit 1, 1325-N Liquid Waste Disposal Facility
Closure Unit 2, 1301-N Liquid Waste Disposal Facility
~~Closure Unit 3, 1324-N Surface Impoundment and 1324-NA Percolation Pond~~
Closure Unit 6, Waste Encapsulation and Storage Facility Hot Cells A through F
Closure Unit 14, 1706 KE Waste Treatment System
Closure Unit 15, 600 Area Purgewater Storage and Treatment Facility

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

Post Closure Unit 1, 300 Area Process Trenches

Post Closure Unit 2, 183-H Solar Evaporation Basins

UNITS RETIRED FROM THE PERMIT

100 D Ponds (Closed 8/9/99)

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

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

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

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

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

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

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

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

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

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

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

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

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

304 Concretion Facility (Closed 1/21/96)

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

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

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

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

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

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

FS-1 Outdoor Container Storage Area (Closed 10/25/2016)

616 Non-Radioactive Dangerous Waste Storage Facility (Closed 9/5/01)

331-C Storage Unit (Closed 7/22/11)

207-A South Retention Basin (Closed 5/18/17)

1324-N Surface Impoundment and 1324-NA Percolation Pond Closed (4/25/2017)

PERMIT ATTACHMENT 9
PERMIT APPLICABILITY MATRIX

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
11/01/2017	8C.2017.Q3
04/26/2017	8C.2017.Q1
03/01/2017	8C.2016.Q4
10/06/2016	8C.2016.6F

PART III									
CONDITION		CATEGORY							QUALIFIERS
PART	TITLE	A	B	C	D	E	F	G	
III.	**UNIT SPECIFIC CONDITIONS FOR FINAL STATUS OPERATIONS**								
III.2	PUREX Storage Tunnels						*		
III.3	Liquid Effluent Retention Facility & 200 Area Effluent Treatment Facility						*		
III.4	242-A Evaporator						*		
III.5	325 Hazardous Waste Treatment Units						*		
III.10	Waste Treatment and Immobilization Plant						*		
III.11	Integrated Disposal Facility						*		
III.16	400 Area Waste Management Unit						*		
PART IV									
IV.	**UNIT SPECIFIC CONDITIONS FOR CORRECTIVE ACTION**								
IV.1	100-NR-1				*	*			
PART V									
V.	**UNIT SPECIFIC CONDITIONS FOR UNITS UNDERGOING CLOSURE**								
V.1	1325-N Liquid Waste Disposal Facility					*			
V.2	1301-N Liquid Waste Disposal Facility					*			
~~V.3~~	~~1324-N Surface Impoundment & 1324-NA Surface Impoundment~~					~~*~~			
V.6	Waste Encapsulation and Storage Facility Hot Cells A through F					*			
V.14	1706 KE Waste Treatment System					*			
V.15	600 Area Purgewater Storage and Treatment Facility					*			
PART VI									
VI.	**UNIT SPECIFIC CONDITIONS FOR UNITS IN POST CLOSURE**								
VI.1	300 Area Process Trenches							*	
VI.2	183-H Solar Evaporation Basins							*	

CATEGORIES ARE DEFINED AS FOLLOWS:

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

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

1 – For Category B, Part I Conditions only apply if future TSD activities are begun on the North Slope or ALE.
2 – For Category C, all Part I Conditions apply to activities subject to Conditions II.U. and II.V.
3 – For Category D, Part I Conditions only apply to activities subject to Conditions II.A., II.C., II.D.4., II.G., II.I., II.L.2.e, II.O., II.Q., II.S., II.T., II.X., and II.Y.

Hanford Facility RCRA Permit Modification Notification Forms

Part V, Closure Unit CUG-14

1706-KE WASTE TREATMENT SYSTEM

RECEIVED
FEB 26 2018
Department of Ecology
NWP - Richland

Index

Page 2 of 6:	Parts I & II, Standard and General Conditions (List of Attachments, Page 7)
Page 3 of 6	Parts I & II, Standard and General Conditions (Pages 13, 45, and 46)
Page 4 of 6	Attachment 9 Permit Applicability Matrix (Page 11)
Page 5 of 6	1706-KE Waste Treatment System Unit Specific Conditions and Addenda
Page 6 of 6	Revision Instructions

Submitted by Co-Operator:		Reviewed by DOE Program Office:	
	2-26-2018		2-22-18
Co-Operator Name	Date	DOE Program Office Name	Date

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

Description of Modification:

List of Attachments (page 7) – Revisions are needed to convey change history information for Attachment 9 Permit Applicability Matrix.

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

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

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

Reason for non-concurrence:

Reviewed by Ecology:

S. L. Dahl-Crumpler 6/14/18

Date

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

Description of Modification:

Changes are needed to convey the removal of 1706-KE Waste Treatment System Closure Unit Group 14 (CUG-14) requirements from the permit. Revisions are made to pages 13, 45, and 46 to show this unit is being retired from the permit Revision 8C and to identify the date of closure (18-NWP-004, 1/11/18).

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

The permittees request that proposed changes be reviewed and approved as a Class 1-prime modification pursuant to WAC 173-303-830(4)(d)

The permittees have completed closure activities following the approved Closure Plan Addenda H for CUG-14. DOE submitted a closure/post-closure plan along w/ a closure certification (09-AMRC-0210) 9/30/09. Ecology issued a letter accepting the clean closure certification on 1/11/18 (18-NWP-004).

This modification is the final step in removing requirements for the 1706-KE Waste Treatment System CUG-14 from the permit.

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

Reason for denial:

Reviewed by Ecology:

S. L. Dahl-Crumpler for 6/14/18

S. L. Dahl-Crumpler Date

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

Description of Modification:

Changes are needed to convey the removal of 1706-KE Waste Treatment System Closure Unit Group 14 (CUG-14) requirements from the permit. Revisions are made to page 11 to show this unit is being retired from the permit Revision 8C (18-NWP-004, 1/11/18).

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

The permittees request that proposed changes be reviewed and approved as a Class 1-prime modification pursuant to WAC 173-303-830(4)(d)

The permittees have completed closure activities following the approved Closure Plan Addenda H for CUG-14. DOE submitted a closure/post-closure plan along w/ a closure certification (09-AMRC-0210) 9/30/09. Ecology issued a letter accepting the clean closure certification on 1/11/18 (18-NWP-004).

This modification is the final step in removing requirements for the 1706-KE Waste Treatment System CUG-14 from the permit.

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

Reason for denial:

Reviewed by Ecology:

S. L. Dahl-Crumpler for 6/14/18

S. L. Dahl-Crumpler Date

Hanford Facility RCRA Permit Modification Form	
Unit: **1706-KE Waste Treatment System**	Permit Part **Part V, Closure Unit Group CUG-14**

Description of Modification:

Changes are needed to retire permit requirements for the 1706-KE Waste Treatment System, Closure Unit Group 14. The following CUG-14 Addenda are being removed from the permit:

- Unit Specific Conditions
- A: Part A Form
- H: Closure Plan

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

The permittees request that proposed changes be reviewed and approved as a Class 1-prime modification pursuant to WAC 173-303-830(4)(d)

The permittees have completed closure activities following the approved Closure Plan Addenda H for CUG-14. DOE submitted a closure/post-closure plan along w/ a closure certification (09-AMRC-0210) 9/30/09. Ecology issued a letter accepting the clean closure certification on 1/11/18 (18-NWP-004).

This modification is the final step in removing requirements for the 1706-KE Waste Treatment System CUG-14 from the permit.

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

Reason for denial:

Reviewed by Ecology:

S. L. Dahl-Crumpler for 6/14/18

S. L. Dahl-Crumpler Date

Revise the Following Pages:

Revise the Parts I & II (Standard & General Conditions) as shown herein.
Revise Attachment 9 (Permit Applicability Matrix) as shown herein.
Remove 1706-KE Waste Treatment System Unit Specific Conditions
Remove Addenda A: Part A Form
Remove Addenda H: Closure Plan

LIST OF ATTACHMENTS

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

Attachment 1	Hanford Federal Facility Agreement and Consent Order, (as amended) http://www.hanford.gov/tpa/coverpg.htm
Attachment 2	Hanford Facility Legal Description, from Class 1 modification, dated January 7, 1999
Attachment 3	Security, dated September 30, 2010
Attachment 4	*Hanford Emergency Management Plan*, DOE/RL-94-02 Revision 6, as amended and approved modifications
Attachment 5	Hanford Facility Personnel Training Program, dated September 30, 2015
Attachment 6	Reports and Records, dated September 30, 2015
Attachment 7	Policy on Remediation of Existing Wells and Acceptance Criteria for RCRA and CERCLA, June 1990
Attachment 8	Hanford Well Maintenance and Inspection Plan, HNF-56398, Revision 2, September 30, 2016
Attachment 9	Permit Applicability Matrix, dated March 31, 20187
Attachment 10	Purgewater Management Plan, July 1990

UNIT	Permit Revision		Comments/History
	Incorporated	Retired	
224-T Transuranic Waste Storage and Assay Facility	Rev. 8C	Rev. 8C	Closed, 11/12/08
FS-1 Outdoor Container Storage Area Closure	Rev. 8C	Rev.8C	Closed, 10/25/16
Waste Encapsulation and Storage Facility Hot Cells A through F	Rev. 8C		
207-A South Retention Basins	Rev. 8C		
1706 KE Waste Treatment System	Rev. 8C	Rev. 8C	Closed 1/11/18
600 Area Purgewater Storage and Treatment Facility	Rev. 8C		
PART VI, POSTCLOSURE UNITS			
183-H Solar Evaporation Basin	Rev. 4		
300 Area Process Trenches	Rev. 3		
PROCEDURALLY CLOSED			
216-U-12 Crib	N/A	N/A	Closed, 7/19/07
221-T Test Facility	N/A	N/A	Closed, 2/22/99
2727-WA SRE Sodium Storage Bldg	N/A	N/A	Closed, 2/22/99
324 Pilot Plant	N/A	N/A	Closed, 6/9/97
332 Storage Facility	N/A	N/A	Closed, 4/21/97
437 Maintenance and Storage Facility	N/A	N/A	Closed, 9/11/03
Biological Treatment Test Facilities	N/A	N/A	Closed, 12/10/96
Physical/Chemical Treatment Test Facilities	N/A	N/A	Closed, 5/13/96
Sodium Storage/Sodium Reaction	N/A	N/A	Closed, 9/17/03
Thermal Treatment Test Facilities	N/A	N/A	Closed, 5/13/96
TO BE INCORPORATED			
216-A-29 Ditch			
216-A-36B Crib			
216-A-37-1 Crib			
216-B-3 Main Pond			
216-B-63 Trench			
216-S-10 Pond & Ditch			
222-S Dangerous & Mixed Waste TSD Unit			
241-CX Tank System			

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

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Operating Unit 5, 325 Hazardous Waste Treatment Units
Operating Unit 10, Waste Treatment and Immobilization Plant
Operating Unit 11, Integrated Disposal Facility
Operating Unit 16, 400 Area Waste Management Unit

PART IV UNIT SPECIFIC CONDITIONS FOR CORRECTIVE ACTION

Corrective Action Unit 1, 100-NR-1

PART V UNIT-SPECIFIC CONDITIONS FOR UNITS UNDERGOING CLOSURE

Closure Unit 1, 1325-N Liquid Waste Disposal Facility
Closure Unit 2, 1301-N Liquid Waste Disposal Facility
Closure Unit 3, 1324-N Surface Impoundment and 1324-NA Percolation Pond
Closure Unit 5, 207-A South Retention Basins
Closure Unit 6, Waste Encapsulation and Storage Facility Hot Cells A through F
~~Closure Unit 14, 1706 KE Waste Treatment System~~
Closure Unit 15, 600 Area Purgewater Storage and Treatment Facility

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

Post Closure Unit 1, 300 Area Process Trenches

Post Closure Unit 2, 183-H Solar Evaporation Basins

UNITS RETIRED FROM THE PERMIT

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

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

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331-C Storage Unit (Closed 7/22/11)

Closure Unit 14, 1706-KE Waste Treatment Facility (Closed 1/11/18)

PART III									
CONDITION		CATEGORY							QUALIFIERS
PART	TITLE	A	B	C	D	E	F	G	
III.	**UNIT SPECIFIC CONDITIONS FOR FINAL STATUS OPERATIONS**								
III.2	PUREX Storage Tunnels						*		
III.3	Liquid Effluent Retention Facility & 200 Area Effluent Treatment Facility						*		
III.4	242-A Evaporator						*		
III.5	325 Hazardous Waste Treatment Units						*		
III.10	Waste Treatment and Immobilization Plant						*		
III.11	Integrated Disposal Facility						*		
III.16	400 Area Waste Management Unit						*		
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PART V									
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V.1	1325-N Liquid Waste Disposal Facility					*			
V.2	1301-N Liquid Waste Disposal Facility					*			
V.3	1324-N Surface Impoundment &1324-NA Surface Impoundment					*			
V.5	207-A South Retention Basins					*			
V.6	Waste Encapsulation and Storage Facility Hot Cells A through F					*			
~~V.14~~	~~1706 KE Waste Treatment System~~					~~*~~			
V.15	600 Area Purgewater Storage and Treatment Facility					*			
PART VI									
VI.	**UNIT SPECIFIC CONDITIONS FOR UNITS IN POST CLOSURE**								
VI.1	300 Area Process Trenches							*	
VI.2	183-H Solar Evaporation Basins							*	

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

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