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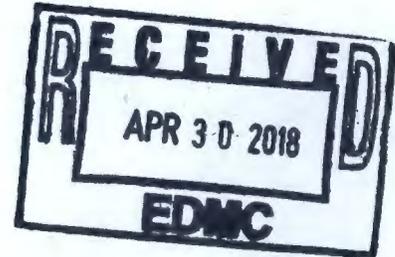
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OFFICE OF RIVER PROTECTIONP.O. Box 450, MSIN H6-60
Richland, Washington 99352

APR 24 2018

18-ECD-0029

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



Ms. Smith:

SUBMITTAL OF HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY ACT PERMIT MODIFICATION NOTIFICATION FORMS 24590-LAW-PCN-ENV-17-002, 24590-LAW-PCN-ENV-17-009, AND 24590-LAW-PCN-ENV-17-010

- References:
1. WA7890008967, "Dangerous Waste Portion of the Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste, Part III, Operating Unit 10, 'Waste Treatment and Immobilization Plant.'"
 2. BNI letter from B.P. Reilly to B.T. Vance, ORP, "Submittal of Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Forms 24590-LAW-PCN-ENV-17-002, 24590-LAW-PCN-ENV-17-009, and 24590-LAW-PCN-ENV-17-010," CCN: 303844, dated April 9, 2018.

This letter transmits Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Forms 24590-LAW-PCN-ENV-17-002, 24590-LAW-PCN-ENV-17-009, and 24590-LAW-PCN-ENV-17-010, for the Washington State Department of Ecology review and approval. The forms describe Class 1 modifications to Reference 1.

The following are being submitted:

- 24590-LAW-PCN-ENV-17-002 (Attachment 1) replaces 24590-CM-HC4-HXYG-00138-01-05 (COGEMA-IA-005), *IQRPE Structural Integrity Assessment Report of the Low Activity Waste Below Grade RLD System Tank (RLD-VSL-00004)*, with 24590-CMHC4-HXYG-00240-02-00029 (IA-3020952-000), *IQRPE Structural Integrity Assessment Report for LAW RLD C3/C5 Drains/Sumps Collection Vessel (RLD-VSL-00004)*, in Appendix 9.11 of Reference 1.
- 24590 LAW-PCN-ENV-17-009 (Attachment 2) replaces 24590-CM-HC4-HXYG-00211 (IA-3001885-000), *IQRPE Structural Integrity Assessment for LAW RLD Ancillary Equipment*, with 24590-CM-HC4-HXYG-00240-02-00028 (IA-3001885-001), *IQRPE*

Structural Integrity Assessment Report for LAW RLD Ancillary Equipment, in Appendix 9.11 of Reference 1.

- 24590-LAW-PCN-ENV-17-010 (Attachment 3) replaces 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*, in Appendix 9.11 of Reference 1.

Washington State Department of Ecology comments resulting from review of this modification notification form and the associated information have been dispositioned.

If you have any questions, please contact me, or your staff may contact Gae M. Neath, Environmental Compliance Division, (509) 376-7828.



Robert G. Hastings, Assistant Manager
Technical and Regulatory Support

ECD:GMN

Attachments: (3)

cc w/attachs:

B.L. Curn, BNI
B.G. Erlandson, BNI
S. Greagor, BNI
R.J. Landon, BNI
S.K. Murdock, BNI
B.P. Reilly, BNI
D.C. Robertson, BNI
J. Cantu, Ecology (7 hard copies)
A.S. Carlson, Ecology
T.Z. Gao, Ecology
M.E. Jones, Ecology
J.K. Perry, MSA
A.C. McKarns, RL
P.M. Pak, RL (Acting)
D. Rowland, YN

Administrative Record (WTP H-0-8)

BNI Correspondence
Environmental Portal

cc w/o attachs:

M. Johnson, CTUIR
S.L. Dahl, Ecology
D. McDonald, Ecology
J. Bell, NPT (Acting)
G.P. Bohnee, NPT
K. Niles, Oregon Energy
R. Longoria, YN (Acting)

**Attachment 1
18-ECD-0029
(15 Pages Excluding Cover Sheet)**

**Hanford Facility RCRA Permit Modification Notification
Form 24590-LAW-PCN-ENV-17-002**

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:

Reviewed by ORP Program Office:

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

J. F. Grindstaff 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: Waste Treatment and Immobilization Plant	Permit Part: Part III, Operating Unit 10
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Description of Modification:

This Class 1¹ 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), <i>Structural Integrity Assessment Report of the Low Activity Waste Below Grade RLD System Tank (RLD-VSL-00004)</i>	With	24590-CM-HC4-HXYG-00240-02-00029 (IA-3020952-000) <i>Structural Integrity Assessment Report for LAW RLD C3/C5 Drains/Sumps Collection Vessel (RLD-VSL-00004)</i>
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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: <input type="checkbox"/> Yes <input type="checkbox"/> Denied (state reason below) <u>Reason for denial:</u> 	Reviewed by Ecology:
	_____ S. Dahl Date



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



FS-18-0048

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 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)

**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.

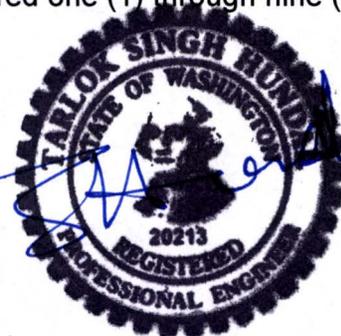
**IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT
FOR
LAW RLD C3/C5 DRAINS/SUMPS
COLLECTION VESSEL (RLD-VSL-00004)**

"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).



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, <i>Dangerous Waste Regulations</i> , WAC-173-303-640, <i>Tank Systems</i> .	

References	<p><u>Material Requisitions:</u></p> <p>24590-CM-MRA-MVA0-00004, Rev. 3, Pressure Vessels-Medium, High Alloy, Shop Fabricated, 60"-167" Dia. (VXNM).</p> <p><u>Specifications:</u></p> <p>The following Specifications with their respective revision and Specification Change Notices (SCNs) are listed in the above listed Material Requisitions:</p> <p>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.</p> <p><u>Mechanical Data Sheet:</u></p> <p>24590-LAW-MVD-RLD-00001, Rev. 3, C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004).</p> <p><u>System Design Description:</u></p> <p>24590-LAW-3ZD-RLD-00001, Rev. 2, LAW Facility Radioactive Liquid Waste Disposal (RLD) System Design Description.</p> <p><u>Corrosion Evaluations:</u></p> <p>24590-LAW-N1D-RLD-00001, Rev. 6, C3/C5 Drains/Sump Collection Vessel (RLD-VSL-00004).</p>
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References (cont'd)	Drawings	<p><u>Plant Drawings:</u></p> <p>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.</p> <p><u>Vendor Fabrication Drawings (Bechtel Status Code 1 Drawings*):</u></p> <p>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).</p> <p>* <u>Bechtel Status Code 1 Drawing</u> is an "as fabricated vendor drawing" approved/accepted by Bechtel.</p>
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	Information Assessed	Source of Information	Assessment
Design	<p>Vessel design standards are appropriate and adequate for the vessel's intended use.</p>	<p>Mechanical Data Sheet, Specifications and Drawings and listed above under References.</p> <p>ASME Boiler and Pressure Vessel Code (BPV), Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers.</p>	<p>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.</p>

	Information Assessed	Source of Information	Assessment
Design (cont'd)	<p>If a non-standard vessel is to be used, the design calculations demonstrate sound engineering principles of construction.</p>	<p>Mechanical Data Sheet, Specifications, Material Requisition, Drawings, and listed above under References;</p> <p>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).</p>	<p>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.</p>

	Information Assessed	Source of Information	Assessment
Design (cont'd)	<p>Vessel has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.</p>	<p>Mechanical Data Sheet, Specifications, Material Requisition, and Drawings, listed above under References;</p> <p>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;</p> <p>24590-CM-POA-MVA0-00004-02-11, Rev. 00B, Compress Pressure Vessel Design Calculations for C3/C5 Drains/Sump Collection Tank (RLD-VSL-00004);</p> <p>24590-LAW-MVC-RLD-00010, Rev. 0, Supplemental Calculation for LAW-MV-RLD-VSL-00004 Vessel;</p> <p>24590-CM-POA-MVA0-00004-04-02, Rev. 00C, Compress Nozzle FEA Design Calculations for C3/C5 Drains/Sump Collection Tank (RLD-VSL-00004);</p> <p>24590-CM-POA-MVA0-00004-08-01, Fatigue Assessment Report for C3/C5 Drains/Sump Collection Tank (RLD-VSL-00004).</p>	<p>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.</p>

	Information Assessed	Source of Information	Assessment
Foundation	<p>Vessel foundation will maintain the load of a full vessel.</p>	<p>Specifications listed above under References;</p> <p>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).</p>	<p>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.</p>
	<p>If in an area subject to flooding, the vessel is anchored.</p>	<p>Specifications, Material Data Sheet, and Drawings listed above under References;</p> <p>24590-LAW-DDC-S13T-00003, Rev. 3, C3/C5 Drain Tank Embedment Analysis (Design Calculation).</p>	<p>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.</p>
	<p>Vessel system will withstand the effects of frost heave.</p>	<p>24590-WTP-DB-ENG-01-001, Rev. 6, Basis of Design.</p>	<p>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.</p>

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.

**Attachment 2
18-ECD-0029
(17 Pages Excluding Cover Sheet)**

**Hanford Facility RCRA Permit Modification Notification
Form 24590-LAW-PCN-ENV-17-009**

Quarter Ending March 2018

24590-LAW-PCN-ENV-17-009

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

Index

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

This Integrity Assessment addresses Radioactive Liquid Waste Disposal System (RLD) ancillary equipment associated with the Low Activity Waste (LAW) RLD Vessels (RLD-VSL-00003, RLD-VSL-00004, and RLD-VSL-00005).

Vessels RLD-VSL-00003 and RLD-VSL-00005 are located at Elev. 2'-0" in R5/C5 Cell, Room L-0126, and RLD VSL-00004 is located at Elev. (-) 21'-0" in R3/C5 Drain Collection Cell, Room L-B001B.

Submitted by Co-Operator:

Reviewed by ORP Program Office:

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

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

Quarter Ending March 2018

24590-LAW-PCN-ENV-17-009

Hanford Facility RCRA Permit Modification Notification Form

Unit: Waste Treatment and Immobilization Plant	Permit Part: Part III, Operating Unit 10
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Description of Modification:

This Class 1¹ 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-3001885-000), <i>IQRPE Structural Integrity Assessment for LAW RLD Ancillary Equipment</i>	With	24590-CM-HC4-HXYG-00240-02-00028 (IA-3001885-001), <i>IQRPE Structural Integrity Assessment for LAW RLD Ancillary Equipment</i>
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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: 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 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

Date



24590-CM-HC4-HXYG-00240-D2-00028
Rev. 00A



ISSUED BY
RPP-WTP PDC

FS-18-0047

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
ANCILLARY EQUIPMENT (IA-3001885-001)**

The integrity assessment of the subject LAW RLD 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 RLD 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)

**IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT
FOR
LAW RLD 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.

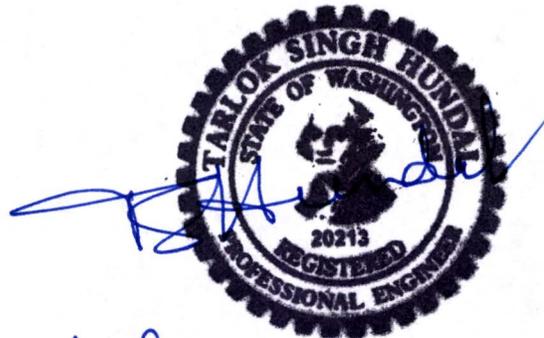
**IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT
FOR
LAW RLD ANCILLARY EQUIPMENT**

"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 RLD 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 twelve (12) pages numbered one (1) through twelve (12).





Signature



Date

Scope	Scope of this Integrity Assessment	<p>This Integrity Assessment addresses ancillary equipment associated with the Low Activity Waste (LAW) Radioactive Liquid Waste Disposal System (RLD) vessels (RLD-VSL-00003, RLD-VSL-00004, and RLD-VSL-00005) located in the LAW facility. The ancillary equipment such as pipelines, valves, and other items associated with these vessels are conspicuously delineated on the P&ID drawings listed below under References.</p> <p>The RLD vessels (RLD-VSL-00003 and RLD-VSL-00005) are located at Elev. 2'-0" in R5/C5 Cell, Room L-0126 and RLD-VSL-00004 is located at Elev. (-) 21'-0" in R3/C5 Drain Collection Cell, Room L-B001B of the LAW facility as shown on the General Arrangement Plan drawings 24590-LAW-P1-P01T-00002 and -00001, respectively.</p> <p>Note: This report (IA-3001885-001) is a revision of the previous report (IA-3001885-000; BNI CCN # 200242).</p>
	Summary of Assessment	<p>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, <i>Dangerous Waste Regulations</i>, WAC-173-303-640, <i>Tank Systems</i>.</p>

References	Drawings	<p>Drawings:</p> <p>24590-LAW-P1-P01T-00001, Rev. 4, LAW Vitrification Building General Arrangement Plan at El. (-) 21'- 0";</p> <p>24590-LAW-P1-P01T-00002, Rev. 7, LAW Vitrification Building General Arrangement Plan at El. 3'- 0";</p> <p>24590-LAW-M6-RLD-00001001, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System Plant Wash Vessel RLD-VSL-00003;</p> <p>24590-LAW-M6-RLD-00001002, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System Plant Wash Vessel RLD-VSL-00003;</p> <p>24590-LAW-M6-RLD-00001003, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System SBS Condensate Collection RLD-VSL-00005;</p> <p>24590-LAW-M6-RLD-00001004, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System SBS Condensate Collection RLD-VSL-00005;</p> <p>24590-LAW-M6-RLD-00001005, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System Plant Wash & SBS Condensate Collection RLD-BULGE-00004;</p> <p>24590-LAW-M6-RLD-00001006, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System Plant Wash & SBS Condensate Collection RLD-BULGE-00004;</p> <p>24590-LAW-M6-RLD-00002001, Rev. 1, P&ID –LAW Radioactive Liquid Waste Disposal System C3/C5 Drains/Sump Collection RLD-VSL-00004;</p> <p>24590-LAW-M6-RLD-00002002, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System C3/C5 Drains/Sump Collection RLD-VSL-00004;</p> <p>24590-LAW-M6-RLD-00002003, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System C3/C5 Drains/Sump Collection RLD-BULGE-00001;</p> <p>24590-LAW-M6-RLD-00002004, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System C3/C5 Drains/Sump Collection RLD-BULGE-00001;</p> <p>24590-LAW-M6-RLD-00002005, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System C3/C5 Sumps RLD-SUMP-00010/11/28;</p> <p>24590-LAW-M6-RLD-00003001, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System C3/C5 Floor Drains Collection;</p> <p>24590-LAW-M6-RLD-00003002, Rev. 2, P&ID –LAW Radioactive Liquid Waste Disposal System Process Cell Sumps at El. 2 ft.;</p> <p>24590-LAW-M6-RLD-00003003, Rev. 2, P&ID –LAW Radioactive Liquid Waste Disposal System Process and Effluent Cell Sumps at El. 2 ft.;</p> <p>24590-LAW-M6-RLD-00003003, Rev. 2, P&ID –LAW Radioactive Liquid Waste Disposal System Process and Effluent Cell Sumps at El. 2 ft.;</p>
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References (cont'd)	Drawings and System Design Description	<p>Drawings (cont'd):</p> <p>24590-LAW-M6-RLD-00004001, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System NLD HVAC Condensate Pumps;</p> <p>24590-LAW-M6-RLD-00004002, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System RLD HVAC Condensate Pumps;</p> <p>24590-LAW-M6-RLD-00004003, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System RLD HVAC Condensate Pumps;</p> <p>24590-LAW-M6-RLD-00005001, Rev. 0, P&ID –LAW Radioactive Liquid Waste Disposal System C3/C5 HVAC Pump & Drains;</p> <p>24590-LAW-M5-V17T-00014, Rev. 6, Process Flow Diagram LAW Liquid Effluent (System RLD);</p> <p>24590-LAW-P3-RLD-ZF33829001, Rev. 1, LAW Vitrification Isometric (Line No. RLD-ZF-33829-N11F-3);</p> <p>24590-LAW-P3-RLD-GR00024001, Rev. 4, LAW Vitrification Isometric (Line No. RLD-GR-00024-S11P-1.5);</p> <p>24590-LAW-P3-RLD-WS20033002, Rev. 0, LAW Vitrification Isometric (Line No. RLD-WS-20033-S11B-1);</p> <p>24590-LAW-P3-RLD-WU02184001, Rev. 1, LAW Vitrification Isometric (Line No. RLD-WU-02184-S11B-4);</p> <p>24590-LAW-P3-RLD-ZR04244001, Rev. 0, LAW Vitrification Isometric (Line No. RLD-ZR-04244-C14A-2);</p> <p>24590-LAW-P3-RLD-ZF03440001, Rev. 3, LAW Vitrification Isometric (Line No. RLD-ZF-03440-N11F-2);</p> <p>24590-LAW-P3-RLD-ZF00095001, Rev. 2, LAW Vitrification Isometric (Line No. RLD-ZF-00095-S11B-4);</p> <p>24590-LAW-P3-RLD-ZF64617001, Rev. 0, LAW Vitrification Isometric (Line No. RLD-ZF-64617-S11E-1.5);</p> <p>24590-WTP-PH-50-00003001, Rev. 4, Standard Pipe Support Details Cantilever-Cantilever CC;</p> <p>24590-WTP-PH-50-00004001, Rev. 4, Standard Pipe Support Details Frame - L Shape FL;</p> <p>24590-WTP-PH-50-00012001, Rev. 7, Standard Pipe Support Details Guide - U Bolts GU;</p> <p>24590-WTP-PH-50-00012002, Rev. 6, Standard Pipe Support Details Guide - U Strap GU;</p> <p>24590-WTP-PH-50-00012003, Rev. 4, Standard Pipe Support Details Guide - U Strap GU;</p> <p>24590-WTP-PH-50-00014001, Rev. 1, Standard Pipe Support Details Rod - Hangers RH;</p> <p>24590-WTP-PH-50-00014002, Rev. 1, Standard Pipe Support Details Rod - Hangers RH;</p> <p>24590-WTP-PH-50-00014003, Rev. 1, Standard Pipe Support Details Rod - Hangers RH;</p> <p>24590-LAW-RLD-H10472, Rev. 0, Pipe Support Drawing;</p> <p>24590-LAW-RLD-H20244, Rev. 0, Pipe Support Drawing.</p> <p>System Design Description:</p> <p>24590-LAW-3ZD-RLD-00001, Rev. 2, LAW Facility Radioactive Liquid Waste Disposal (RLD) System Design Description.</p>
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	Information Assessed	Source of Information	Assessment
Design	Ancillary equipment design standards are appropriate and adequate for the equipment's intended use.	<p>Drawings and System Design Description listed above under References;</p> <p>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;</p> <p>24590-WTP-3DP-G04T-00905, Rev. 14, Determination of Quality Levels.</p>	<p>The Pipe Stress Design Criteria identifies ASME B31.3 as the design code for piping systems of the WTP. The System Design Description document states that the RLD system does not have any important to safety function. Drawings show that the ancillary equipment is of commercial quality level (CM) grade and is 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.</p>

	Information Assessed	Source of Information	Assessment
<p>Design (cont'd)</p>	<p>If the ancillary equipment to be used is not built to a design standard, the design calculations demonstrate sound engineering principles of construction.</p>	<p>Drawings listed above under References;</p> <p>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;</p> <p>24590-LAW-P6C-RLD-00020, Rev. 0, Pipe Stress Analysis LAW RLD System;</p> <p>24590-LAW-PHC-RLD-10095, Rev. 0, RPP-WTP Engineered Support Calculation for LAW-RLD-H10470, H10472, H10474, and H10476;</p> <p>24590-LAW-PHC-RLD-10097, Rev. 0, RPP-WTP Engineered Support Calculation for LAW-RLD-H20244 & LAW-RLD-H20246;</p> <p>24590-WTP-3PS-MX00-T0001, Rev. 6, Engineering Specification for Process Bulge Design and Fabrication;</p> <p>24590-LAW-MXD-RLD-00002, Rev. 6, Mechanical Data Sheet for Process Bulge (RLD-BULGE-00004);</p> <p>24590-CM-POA-PY33-00001-10-06, Rev. 00B, Containment Layout Drawing (RLD-BULBE-00001): Vendor Submittal;</p> <p>24590-CM-POA-PY33-00001-09-01, Rev. 00B, Design Worksheet for Bulge (RLD-BULGE-00001): Vendor Submittal;</p> <p>24590-CM-POA-MPH0-00001-05-01, Instructions for Pump Casing Hydrostatic Test: Vendor Submittal;</p> <p>24590-WTP-3DP-G04T-00906, Rev. 10, Isometric Drawings and Associated Calculations;</p> <p>24590-WTP-3DP-G04B-00037, Rev. 30, Engineering Calculations;</p> <p>24590-WTP-3PS-PH01-T0002, Rev. 7, Installation of Pipe Supports.</p>	<p>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 Analysis, Pipe Support Calculations, Mechanical Data Sheet, Engineering Specification, Vendor Submittals approved by Bechtel National Inc. (BNI), 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 RLD ancillary equipment are properly designed, installed, and verified to meet the requirements of the applicable design criteria established for the project. The review of the aforementioned documents also demonstrates that sound design engineering principles are used for the design and construction of the ancillary equipment.</p>

	Information Assessed	Source of Information	Assessment
Design (cont'd)	<p>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.</p>	<p>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; UBC 1997, Uniform Building Code; 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).</p>	<p>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 UBC 1997 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 of 40 years, to withstand all anticipated loads.</p>

	Information Assessed	Source of Information	Assessment
<p>Supports</p>	<p>Ancillary equipment supports are adequately designed.</p>	<p>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;" 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; UBC 1997, Uniform Building Code; 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-WTP-GPG-ENG-005, Rev. 8, Engineering Design Guide for Pipe Supports; 24590-LAW-PHC-RLD-10095, Rev. 0, RPP-WTP Engineered Support Calculation for LAW-RLD-H10470, H10472, H10474, and H10476; 24590-LAW-PHC-RLD-10097, Rev. 0, RPP-WTP Engineered Support Calculation for LAW-RLD-H20244 & LAW-RLD-H20246; 24590-WTP-PHC-P50T-00002, Rev. 1, Justification for the use of Standard Supports for RPP-WTP-Project; 24590-WTP-PHC-P50T-00001, Rev. 1, U-Bolt Load Capacity Calculation; 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; 24590-WTP-PHC-P50T-00004, Rev. 0, Qualification of Pipe Straps; 24590-WTP-SE-ENS-03-704, Rev. 0, Seismic Evaluation for Design (Seismic Design of Piping and Pipe Supports). 24590-LAW-RPT-ENG-17-006, Rev. 0, Piping Confirmation Report for the LAW RLD System.</p>	<p>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. The Piping Confirmation Report for the LAW RLD System identifies critical and non-critical piping. Pipe supports for non-critical piping are designated as standard design using the Span Method Criteria. For critical piping support design, bounding load cases are passed on to pipe support designers from results of the ancillary equipment piping stress analysis. 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. Ancillary equipment supports are to be 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 RLD ancillary equipment supports are adequately designed, installed, and verified to meet the requirements of the applicable design criteria established for the project.</p>

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 RLD 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 RLD 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 RLD System ancillary equipment.
Waste Characteristics	Characteristics of the waste to be stored or treated have been identified (ignitable, reactive, toxic, 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. 4, Control of Toxic Vapors and Emissions from WTP Tank and Miscellaneous Unit Systems.	The Prevention of Hydrogen Accumulation in WTP Tank Systems and Miscellaneous Treatment Unit System and System Design Description documents indicate that flammable or explosive concentrations of hydrogen are not expected in the LAW facility systems ancillary equipment. Similarly, the Control of Toxic Vapors and Emissions from WTP Tank Systems and Miscellaneous Unit Systems document provides a summary of the LAW facility ancillary equipment design features that provide for confinement and treatment of chronically toxic vapors and emissions during normal operations, abnormal operations, and during and after a Design Basis seismic event. The above mentioned documents appropriately identify the characteristic of the waste to be handled by the RLD system.

	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.	24590-WTP-PER-M-02-002, Rev. 4, Materials for Ancillary Equipment.	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 RLD piping and equipment ensures that the ancillary equipment is appropriately designed to handle the waste.
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.	24590-WTP-DB-ENG-01-001, Rev. 6, Basis of Design; 24590-WTP-PER-M-02-002, Rev. 4, Materials for Ancillary Equipment.	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. Therefore, the ancillary equipment like the source vessel; will provide the expected design service for the life of the system, without any leak or failure.

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. 6, 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.	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 document for the 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.
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 piping not protected by a pressure relieving device, or that can be isolated from a pressure relieving device must be designed for at least the highest pressure that can be developed.

	Information Assessed	Source of Information	Assessment
Pressure Controls (cont'd)	<p>Maximum flows and any unusual operating stresses are identified.</p>	<p>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.</p>	<p>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. Each 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. ASME B31.3 and the associated standards are appropriate and adequate for the design of the ancillary equipment. Furthermore, the fabrication or isometric drawings released for construction by Bechtel National, Inc. (BNI), and 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, installed, and verified to meet the requirements identified in the applicable design criteria established for the project.</p>

	Information Assessed	Source of Information	Assessment
Secondary Containment	<p>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.</p>	<p>Drawings listed above under References; 24590-LAW-PER-M-02-001, Rev. 5, LAW Facility Sump Data; WAC 173-303, Washington Administrative Code, Chapter 173-303, <i>Dangerous Waste Regulations</i>.</p>	<p>The ancillary equipment considered in this assessment is located in and between areas R3/C5 (Room L-B001B) and R5/C5 (Room L-0126), within the LAW building. These LAW rooms are secondary containment concrete structures provided with stainless steel liner plates and sumps (RLD-SUMP-00028, RLD-SUMP-00035, and RLD-SUMP-00036), as shown on the general arrangement drawings and in Sump Data document. The structural integrity assessment of the above mentioned secondary containment structures is outside the scope of this assessment, however, it is conducted in a separate document. It should also be noted that the drawings show that various welded piping spools of the RLD ancillary system route through numerous C2/C3 corridors and rooms before entering the above listed rooms where the RLD vessels are located. These corridors and rooms are not equipped with secondary containment features. Therefore, ancillary equipment located in these rooms and corridors will require daily visual inspections for leaks, as delineated in WAC-173-303-640(4)(f)(ii).</p>

**Attachment 3
18-ECD-0029
(19 Pages Excluding Cover Sheet)**

**Hanford Facility RCRA Permit Modification Notification
Form 24590-LAW-PCN-ENV-17-010**

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:

Reviewed by ORP Program Office:

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

J. F. 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
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Description of Modification:

This Class 1¹ 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) – <i>IQRPE Structural Integrity Assessment Report for LAW LCP Ancillary Equipment</i>	With	24590-CM-HC4-HXYG-00240-02-00027 (IA-3001932-001) – <i>IQRPE Structural Integrity Assessment Report for LAW LCP Ancillary Equipment</i>
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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 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."

Quarter Ending March 2018

24590-LAW-PCN-ENV-17-010

<p>Modification Approved/Concur: <input type="checkbox"/> Yes <input type="checkbox"/> Denied (state reason below)</p> <p><u>Reason for denial:</u></p>	<p>Reviewed by Ecology:</p>
	<p>S. Dahl _____ Date _____</p>



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



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)

**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.

**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).




Signature


Date

<p style="text-align: center;">Scope</p>	<p style="text-align: center;">Scope of this Integrity Assessment</p>	<p>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.</p> <p>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.</p> <p>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.</p> <p>Note: This report (IA-3001932-001) is a revision of the previous report (IA-3001932-000, BNI CCN: 200246).</p>
<p style="text-align: center;">Summary of Assessment</p>		<p>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, <i>Dangerous Waste Regulations</i>, WAC-173-303-640, <i>Tank Systems</i>.</p>

References	<p>Drawings and System Design Description</p> <p><u>Drawings:</u></p> <p>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-H10029, Rev. 0, Pipe Support Drawing, including DCN # 24590-LAW-PHN-PCL-00001; 24590-LAW-PH-P33T-00001, Rev. 3, Pipe Support and Fabrication Details.</p> <p><u>System Design Description:</u></p> <p>24590-LAW-3ZD-LFP-00001, Rev. 1, LAW Melter Feed Process (LFP) and Concentrate Receipt Process (LCP) System Design Description.</p>
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	Information Assessed	Source of Information	Assessment
Design	Ancillary equipment design standards are appropriate and adequate for the equipment's intended use.	<p>Drawings and System Design Description listed above under References;</p> <p>24590-WTP-DC-PS-01-001, Rev. 9, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria;"</p> <p>ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers;</p> <p>24590-WTP-3DP-G04T-00905, Rev. 14, Determination of Quality Levels.</p>	<p>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.</p>

	Information Assessed	Source of Information	Assessment
<p>Design (cont'd)</p>	<p>If the ancillary equipment to be used is not built to a design standard, the design calculations demonstrate sound engineering principles of construction.</p>	<p>Drawings and listed above under References;</p> <p>24590-WTP-DC-PS-01-001, Rev. 9, Pipe Stress Design Criteria including “Pipe Stress Criteria” and “Span Method Criteria”;</p> <p>ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers;</p> <p>24590-LAW-P6C-LCP-10001, Rev. C, Pipe Stress Analysis -LAW LCP System, including Minor Deviation # 1 & 2;</p> <p>24590-LAW-P6C-LCP-10010, Rev. C, Richland RPP-WTP- LAW Plant LCP System (Pipe Stress Analysis), including Minor Deviation # 1 thru 3;</p> <p>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;</p> <p>24590-LAW-PHC-LCP-10019, Rev. A, Pipe Support Calculation (for support LAW-LCP-H10029);</p> <p>24590-WTP-3DP-G04T-00906, Rev. 10, Isometric Drawings and Associated Calculations;</p> <p>24590-WTP-3DP-G04B-00037, Rev. 30, Engineering Calculations;</p> <p>24590-WTP-3PS-PH01-T0002, Rev. 6, Installation of Pipe Supports;</p> <p>24590-LAW-MXD-LCP-00001, Rev. 4, Mechanical System Data Sheet (MSDS) for Process Bulge (LCP-BULGE-00001);</p> <p>24590-LAW-MXD-LCP-00002, Rev. 3, Mechanical System Data Sheet (MSDS) for Process Bulge (LCP-BULGE-00002).</p>	<p>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.</p>

	Information Assessed	Source of Information	Assessment
Design (cont'd)	<p>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.</p>	<p>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).</p>	<p>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.</p>

Information Assessed	Source of Information	Assessment
<p style="text-align: center;">Supports</p> <p>Ancillary equipment supports are adequately designed.</p>	<p>Drawings listed above under References;</p> <p>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;</p> <p>MSS-SP-58, Pipe Hangers and Supports-Materials, Design, and Manufacture, Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.;</p> <p>AISC Manual of Steel Construction, ASD, 9th Edition, American Institute of Steel Construction;</p> <p>ASME Boiler and Pressure Vessel Code, Section III, Division 1, Rules for Construction of Nuclear Power Plant Components, American Society of Mechanical Engineers, 1995;</p> <p>Uniform Building Code (UBC), 1997;</p> <p>24590-WTP-PER-PS-02-001, Rev. 6, Ancillary Equipment Pipe Support Design;</p> <p>24590-WTP-PL-PS-01-001, Rev. 2, Verification and Validation Test Plan for Bechtel's ME150 Pipe Support Family of Programs (PCFAPPS);</p> <p>24590-LAW-PHC-LCP-10019, Rev. A, Pipe Support Calculation (for Support No. LAW-LCP-H10029);</p> <p>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;</p> <p>24590-WTP-GPG-ENG-005, Rev. 8, Engineering Design Guide for Pipe Supports;</p> <p>24590-WTP-PHC-P50T-00002, Rev. 1, Justification for the use of Standard Supports for RPP-WTP-Project, including ECCN # 00001;</p> <p>24590-WTP-PHC-P50T-00001, Rev. 1, U-Bolt Load Capacity Calculation, including ECCN #s 00001 and 00003;</p> <p>24590-WTP-3DP-G04T-00906, Rev. 10, Isometric Drawings and Associated Calculations;</p> <p>24590-WTP-3DP-G04B-00037, Rev. 30, Engineering Calculations;</p> <p>24590-WTP-PHC-P50-00001, Rev. 1, RPP/WTP Support Standards, including ECCN # 00001.</p> <p>24590-WTP-PHC-P50T-00004, Rev. 0, Qualification of Pipe Straps; including ECCN #s 00001 and 00004;</p> <p>24590-WTP-SE-ENS-03-704, Rev. 0, Seismic Evaluation for Design (Seismic Design of Piping and Pipe Supports).</p>	<p>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.</p>

	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	<p>Characteristics of the waste to be stored or treated have been identified (dangerous waste characteristics, specific gravity, vapor pressure, flash point, temperature).</p>	<p>System Design Description listed above under References;</p> <p>24590-WTP-PER-PR-03-001, Rev. 2, Prevention of Hydrogen Accumulation in WTP Tank Systems and Miscellaneous Treatment Unit Systems;</p> <p>24590-WTP-PER-PR-03-002, Rev. 3, Control of Toxic Vapors and Emissions from WTP Tank and Miscellaneous Unit Systems.</p> <p>24590-LAW-MXD-LCP-00001, Rev. 4, Mechanical System Data Sheet (MSDS) for Process Bulge (LCP-BULGE-00001);</p> <p>24590-LAW-MXD-LCP-00002, Rev. 3, Mechanical System Data Sheet (MSDS) for Process Bulge (LCP-BULGE-00002);</p> <p>24590-LAW-MPD-LCP-00001, Rev. 7, Mechanical System Data Sheet for Pumps (LCP-PMP-00001A/B);</p> <p>24590-LAW-MPD-LCP-00001, Rev. 6, Mechanical System Data Sheet for Pumps (LCP-PMP-00003A/B).</p>	<p>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.</p>

	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	<p>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.</p>	<p>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.</p>	<p>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.</p>

Information Assessed		Source of Information	Assessment
Corrosion Allowance	Corrosion allowance is adequate for the intended service life of the ancillary equipment.	<p>System Design Description listed above under References;</p> <p>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.</p>	<p>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.</p>
Pressure Controls	Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the vessels are exceeded.	<p>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.</p>	<p>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 relieving device must be designed for at least the highest pressure that can be developed.</p>

	Information Assessed	Source of Information	Assessment
<p>Pressure Controls (cont'd)</p>	<p>Maximum flows and any unusual operating stresses are identified.</p>	<p>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.</p>	<p>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.</p>

	Information Assessed	Source of Information	Assessment
Secondary Containment	<p>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.</p>	<p>Drawings listed above under References; 24590-LAW-PER-M-02-001, Rev. 5, LAW Facility Sump Data.</p>	<p>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.</p>