

ISSUED BY  
RPP-WTP PDC



**24590-CM-HC4-HXYG-00240-02-00007**

**REV 00A**

**SUBCONTRACT SUBMITTAL  
REVIEW NOT REQUIRED**

AFS-13-0009



January 15, 2013

Mr. Gary Ellers  
Subcontract Administrator  
Bechtel National, Inc.  
2435 Stevens Center Place  
Richland, Washington 99354

Dear Mr. Ellers:

**BECHTEL NATIONAL, INC. CONTRACT NO. 24590-CM-HC4-HXYG-00240 IQRPE  
STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAW LFP ANCILLARY  
EQUIPMENT (IA-3008268-000)**

The integrity assessment of the subject 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 ancillary equipment are adequately designed and have sufficient structural strength, compatibility with the waste(s) to be processed/stored/treated, and corrosion protection to ensure that they will not collapse, rupture, or fail.

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

Sincerely,

A handwritten signature in black ink, appearing to read 'Elizabeth W. Smith'.

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

Enclosure (1)

LK

cc: D. C. Pfluger, MS5-I w/enclosure (2)

**AREVA Federal Services LLC** *24590-CM-HC4-HXYG-00240-02-00007, Rev. 00A*

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**IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT  
FOR  
LAW LFP 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 LFP ANICLLARY EQUIPMENT**

“I, Tarlok Singh Hundal have reviewed and certified a portion of the design of a new tank system or component located at the Hanford Waste Treatment Plant, owned/operated by Department of Energy, Office of River Protection, Richland, Washington. My duties were independent review of the current design for the LAW LFP 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).



T. Hundal  
Signature

1/15/13  
Date

<b>Scope</b>	<b>Scope of this Integrity Assessment</b>	<p>This Integrity Assessment addresses ancillary equipment associated with the LAW Melter Feed Process System (LFP) vessels (LFP-VSL-00001/2/3/4) and bulges (LFP-BULGE-00001/2), located in the LAW facility. The ancillary equipment such as pipelines, valves, and other items associated with these vessels and bulges are conspicuously delineated on the P&amp;ID drawings 24590-LAW-M6-LFP-00001001, thru -00001006, and 24590-LAW-M6-LFP-00003001 thru -00003006.</p> <p>The LFP vessels (LFP-VSL-00001/2) are located in Room L-0123, vessels (LFP-VSL-00003/4) are located in Room L-0124 at El. 3'-0" and Bulges (LFP-BULGES-00001/2) are located in Room L-0202 at El. 28'-0" of the LAW facility.</p> <p>Ancillary equipment located inside the LFP system vessels and bulges is addressed separately in the Integrity Assessments for these plant items.</p>
	<b>Summary of Assessment</b>	<p>For each item of "Information Assessed" (i.e., Criteria) on the following pages, the documents listed under "Source of Information" were reviewed and found to furnish adequate design requirements and controls to ensure that the design fully satisfies the requirements of Washington Administrative Code (WAC), Chapter 173-303 WAC, <i>Dangerous Waste Regulations</i>, WAC-173-303-640, <i>Tank Systems</i>.</p>

<b>References</b>	<p><b>Drawings and System Description</b></p> <p><b>Drawings:</b></p> <p>24590-LAW-P1-P01T-00002, Rev. 6, LAW Vitrification Building General Arrangement Plan at El. 3'- 0";                  24590-LAW-P1-P01T-00004, Rev. 4, LAW Vitrification Building General Arrangement Plan at El. 28'- 0";                  24590-LAW-P1-P01T-00007, Rev. 8, LAW Vitrification Building General Arrangement Sections A-A, B-B, C-C, and S-S;                  24590-LAW-P1-P01T-00010, Rev. 8, LAW Vitrification Building General Arrangement Sections K-K, L-L, and M-M;                  24590-LAW-M6-LFP-00001001, Rev. 0, P&amp;ID-LAW Melter Feed Process System, Melter 1 Feed Preparation LFP-VSL-00001;                  24590-LAW-M6-LFP-00001002, Rev. 0, P&amp;ID-LAW Melter Feed Process System, Melter 1 Feed Preparation LFP-VSL-00001;                  24590-LAW-M6-LFP-00001003, Rev. 0, P&amp;ID-LAW Melter Feed Process System, Melter 1 Feed Preparation LFP-VSL-00002;                  24590-LAW-M6-LFP-00001004, Rev. 0, P&amp;ID-LAW Melter Feed Process System, Melter 1 Feed Preparation LFP-VSL-00002;                  24590-LAW-M6-LFP-00001005, Rev. 0, P&amp;ID-LAW Melter Feed Process System, Melter 1 Feed Preparation and Feed LFP-BULGE-00001;                  24590-LAW-M6-LFP-00001006, Rev. 0, P&amp;ID-LAW Melter Feed Process System, Melter 1 Feed Preparation and Feed LFP-BULGE-00001;                  24590-LAW-M6-LFP-00003001, Rev. 0, P&amp;ID-LAW Melter Feed Process System, Melter 2 Feed Preparation LFP-VSL-00003;                  24590-LAW-M6-LFP-00003002, Rev. 0, P&amp;ID-LAW Melter Feed Process System, Melter 2 Feed Preparation LFP-VSL-00003;                  24590-LAW-M6-LFP-00003003, Rev. 0, P&amp;ID-LAW Melter Feed Process System, Melter 2 Feed Preparation LFP-VSL-00004;                  24590-LAW-M6-LFP-00003004, Rev. 0, P&amp;ID-LAW Melter Feed Process System, Melter 2 Feed Preparation LFP-VSL-00004;                  24590-LAW-M6-LFP-00003005, Rev. 0, P&amp;ID-LAW Melter Feed Process System, Melter 2 Feed Preparation and Feed LFP-BULGE-00002;                  24590-LAW-M6-LFP-00003006, Rev. 0, P&amp;ID-LAW Melter Feed Process System, Melter 2 Feed Preparation and Feed LFP-BULGE-00002;                  24590-LAW-M5-V17T-00001, Rev. 5, Process Flow Diagram LAW Concentrate Receipt &amp; Melter 1 Feed (System LCP, GFR, and LFP);                  24590-LAW-M5-V17T-00002, Rev. 5, Process Flow Diagram LAW Concentrate Receipt &amp; Melter 2 Feed (System LCP, GFR, and LFP);                  24590-LAW-P3-LFP-PB00026001, Rev. 1, LAW Vitrification Building Isometric (Line No. LFP-PB-00026-S12A-2);                  24590-LAW-P3-LFP-PB00031001, Rev. 0, LAW Vitrification Building Isometric (Line No. LFP-PB-00031-S12A-2);                  24590-LAW-P3-LFP-PB00031002, Rev. 0 (w/FC-P-09-0226), LAW Vitrification Building Isometric (Line No. LFP-PB-00031-S12A-2);                  24590-LAW-P3-LFP-PB00032001, Rev. 1, LAW Vitrification Building Isometric (Line No. LFP-PB-00032-S12A-2);                  24590-LAW-P3-LFP-PB00032002, Rev. 1, LAW Vitrification Building Isometric (Line No. LFP-PB-00032-S12A-2);                  24590-LAW-P3-LFP-PB00032003, Rev. 1, LAW Vitrification Building Isometric (Line No. LFP-PB-00032-S12A-2);                  24590-LAW-P3-LFP-PB00051001, Rev. 1, LAW Vitrification Building Isometric (Line No. LFP-PB-00051-S12A-4);                  24590-LAW-P3-LFP-PB03195001, Rev. 1, LAW Vitrification Building Isometric (Line No. LFP-PB-03195-S12A-4);                  24590-LAW-P3-LFP-PB02082001, Rev. 0, LAW Vitrification Building Isometric (Line No. LFP-PB-02082-S12A-2);                  24590-LAW-P3-LFP-PB02082002, Rev. 0 (w/FC-P-08-0363), LAW Vitrification Building Isometric (Line No. LFP-PB-02082-S12A-2);                  24590-LAW-P3-LFP-PB02116001, Rev. 1, LAW Vitrification Building Isometric (Line No. LFP-PB-02116-S12A-2);                  24590-LAW-P3-LFP-PB02116002, Rev. 1, LAW Vitrification Building Isometric (Line No. LFP-PB-02116-S12A-2);                  24590-LAW-P3-LFP-PB03227001, Rev. 0, LAW Vitrification Building Isometric (Line No. LFP-PB-03227-S12A-2);                  24590-LAW-P3-LFP-PB03227002, Rev. 0, LAW Vitrification Building Isometric (Line No. LFP-PB-03227-S12A-2);                  24590-LAW-P3-LMP-PB00025001, Rev. 1, LAW Vitrification Building Isometric (Line No. LMP-PB-00025-S12A-0.75);                  24590-LAW-P3-LVP-GV00012001, Rev. 1, LAW Vitrification Building Isometric (Line No. LVP-GV-00012-S11B-4);                  24590-LAW-P3-LVP-GV00012002, Rev. 1, LAW Vitrification Building Isometric (Line No. LVP-GV-00012-S11B-4);</p>
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References (cont'd)	Drawings and System Description	<p>24590-LAW-P3-LVP-GV00013001, Rev. 1, LAW Vitrification Building Isometric (Line No. LVP-GV-00013-S11B-4);                  24590-LAW-P3-LVP-GV00015001, Rev. 1, LAW Vitrification Building Isometric (Line No. LVP-GV-00015-S11B-4);                  24590-LAW-P3-LVP-GV00015002, Rev. 1, LAW Vitrification Building Isometric (Line No. LVP-GV-00015-S11B-4);                  24590-LAW-P3-LVP-GV00018001, Rev. 2, LAW Vitrification Building Isometric (Line No. LVP-GV-00018-S11B-4);                  24590-LAW-P3-LVP-GV00018002, Rev. 4, (w/FC-0014 &amp; 0745) LAW Vitrification Building Isometric (Line No. LVP-GV-00018-S11B-4);                  24590-LAW-P3-LVP-GV00018003, Rev. 0, (w/FC-0078, 0745 &amp; 0755) LAW Vitrification Building Isometric (Line No. LVP-GV-00018-S11B-4);                  24590-LAW-P3-RLD-PB01317001, Rev. 0, LAW Vitrification Building Isometric (Line No. RLD-PB-01317-S12A-2);                  24590-WTP-PH-50-00003001, Rev. 4, Standard Pipe Support Details Cantilever-Cantilever CC;                  24590-WTP-PH-50-00012001, Rev. 7, Standard Pipe Support Details Guide – U Bolts GU;                  24590-WTP-PH-50-00012003, Rev. 4, Standard Pipe Support Details Guide – U Strap GU;                  24590-WTP-PH-50-00015001, Rev. 2, Standard Pipe Support Details Rods – Trapeze RT;                  24590-WTP-PH-50-00015002, Rev. 2, Standard Pipe Support Details Rods – Trapeze RT;                  24590-WTP-PH-50-00024001, Rev. 2, Standard Pipe Support Details Struts-Sway WS;                  24590-LAW-LFP-H10105, Rev. 0, Pipe Support Drawing;                  24590-LAW-LFP-H10073, Rev. 0, Pipe Support Drawing;                  24590-LAW-LFP-H10131, Rev. 0, Pipe Support Drawing;                  24590-LAW-LFP-H10157, Rev. 0, Pipe Support Drawing;                  24590-LAW-LFP-H10227, Rev. 0, Pipe Support Drawing;                  24590-LAW-LFP-H10229, Rev. 0, Pipe Support Drawing;                  24590-LAW-LFP-H10233, Rev. 0, Pipe Support Drawing.</p> <p><u>System Description:</u></p> <p>24590-LAW-3YD-LFP-00001, Rev. 3, System Description for Low Activity Waste Melter Feed Process System (LFP), including SDCNs # 00006 and 00008.</p>
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Information Assessed		Source of Information	Assessment
<b>Design</b>	Ancillary equipment design standards are appropriate and adequate for the equipment's intended use.	<p>Drawings listed above under References;</p> <p>24590-WTP-DC-PS-01-001, Rev. 7C, 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-RPT-ST-01-001, Rev. 2, RPP-WTP Compliance With Uniform Building Code Seismic Design Requirements.</p>	<p>The Pipe Stress Design Criteria identifies ASME B31.3 as the design code for piping systems of the WTP. Drawings reviewed show that the ancillary equipment is of commercial quality level (CM) grade and is Seismic Category SC-IV. The Pipe Stress Design Criteria and RPP-WTP Compliant documents provide detailed requirements for the SC-IV ancillary equipment design per applicable codes and standards. The codes and standards used are acceptable and adequate for the design of the ancillary equipment for their intended service.</p>

Information Assessed	Source of Information	Assessment
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">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. 7C, 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-LFP-10038, Rev. B, Richland RPP-WTP LAW Plant LFP System (Stress Analysis for Pipeline No. LFP-PB-00026-S12A-2);</p> <p>24590-LAW-P6C-LFP-10004, Rev. C, Richland RPP-WTP/ LAW LFP System (Stress Analysis for Pipeline No. LFP-PB-00031-S12A-2);</p> <p>24590-LAW-P6C-LFP-10003, Rev. B, Richland RPP-WTP LAW Plant LFP System (Stress Analysis for Pipeline No. LFP-PB-00032-S12A-2);</p> <p>24590-LAW-P6C-LFP-10005, Rev. B, Richland RPP-WTP LAW LFP System (Stress Analysis for Pipeline No. LFP-PB-00036-S12A-2);</p> <p>24590-LAW-P6C-LFP-10042, Rev. B, Richland RPP-WTP LAW Plant LFP System (Stress Analysis for Pipeline No. LFP-PB-00282-S12A-2);</p> <p>24590-LAW-P6C-LFP-10018, Rev. B, Richland RPP-WTP LAW LFP System (Stress Analysis for Pipeline No. LFP-PB-02216-S12A-2);</p> <p>24590-LAW-P6C-LFP-10025, Rev. C, Richland RPP-WTP/ LAW LFP System (Stress Analysis for Pipeline No. LFP-PB-02138-S12A-2);</p> <p>24590-LAW-P6C-LFP-10037, Rev. A, Richland RPP-WTP LAW Plant LFP System (Stress Analysis for Pipeline No. LFP-PB-02143-S12A-2);</p> <p>24590-LAW-P6C-LFP-10007, Rev. B, (Deviation 1) Richland RPP-WTP LAW LFP System (Stress Analysis for Pipeline No. LFP-PB-03224-S12A-2);</p> <p>24590-LAW-P6C-LFP-10034, Rev. B, Richland RPP-WTP LFP System (Stress Analysis for Pipeline No. LFP-PB-03227-S12A-2);</p> <p>24590-LAW-PHC-LFP-10004, Rev. A, Pipe Support Calculation (for Support Nos. LAW-LFP-H10073 and -H10131);</p> <p>24590-LAW-PHC-LFP-10006, Rev. A, Pipe Support Calculation (for Support No. LAW-LFP-H10105);</p> <p>24590-LAW-PHC-LFP-10012, Rev. A, Pipe Support Calculation (for Support No. LAW-LFP-H10157);</p> <p>24590-LAW-PHC-LFP-10022, Rev. A, Pipe Support Calculation (for Support No. LAW-LFP-H10227);</p> <p>24590-LAW-PHC-LFP-10028, Rev. A, Pipe Support Calculation (for Support No. LAW-LFP-H10043);</p> <p>24590-LAW-PHC-LFP-10029, Rev. A, Pipe Support Calculation (for Support No. LAW-LFP-H10229);</p> <p>24590-LAW-PHC-LFP-10030, Rev. A, Pipe Support Calculation (for Support No. LAW-LFP-H10233);</p> <p>24590-WTP-3DP-G04T-00906, Rev. 8A, Isometric Drawings and Associated Calculations;</p> <p>24590-WTP-3DP-G04B-00037, Rev. 20, Engineering Calculations;</p> <p>24590-WTP-3PS-PH01-T0002, Rev. 6, 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 Analyses for Pipelines, Pipe Support Calculations, the design process and controls described in Isometric Drawings and Associated Calculations, Engineering Calculations, and Installation of Pipe Supports documents provide adequate assurance that LFP 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
<b>Design (cont'd)</b>	<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. 7C, 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. 3, Materials for Ancillary Equipment; 24590-WTP-GPG-ENG-004, Rev. 2B, 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-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. The aforementioned documents, including the Design Guide document provide assurance 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><b>Supports</b></p> <p>Ancillary equipment supports are adequately designed.</p>	<p>Drawings listed above under References;</p> <p>24590-WTP-DC-PS-01-002, Rev. 6, 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, 9<sup>th</sup> Edition, American Institute of Steel Construction;</p> <p>ASME Boiler and Pressure Vessel (B&amp;PV) Code, Section III, Division 1, Rules for Construction of Nuclear Power Plant Components, American Society of Mechanical Engineers, 1995;</p> <p>24590-WTP-PER-PS-02-001, Rev. 4, 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-LFP-10004, Rev. A, Pipe Support Calculation (for Support Nos. LAW-LFP-H10073 and -H10131);</p> <p>24590-LAW-PHC-LFP-10006, Rev. A, Pipe Support Calculation (for Support No. LAW-LFP-H10105);</p> <p>24590-LAW-PHC-LFP-10012, Rev. A, Pipe Support Calculation (for Support No. LAW-LFP-H10157);</p> <p>24590-LAW-PHC-LFP-10022, Rev. A, Pipe Support Calculation (for Support No. LAW-LFP-H10227);</p> <p>24590-WTP-GPG-ENG-005, Rev. 5, 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;</p> <p>24590-WTP-PHC-P50T-00001, Rev. 1, U-Bolt Load Capacity Calculation;</p> <p>24590-WTP-3DP-G04T-00906, Rev. 8A, Isometric Drawings and Associated Calculations;</p> <p>24590-WTP-3DP-G04B-00037, Rev. 20, Engineering Calculations, including ECCN # 00001 and 00003);</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 # 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&amp;PV Code, Section III, Division 1, and Appendix F, to supplement the requirements of ASME B31.3 for design of Seismic Category (SC-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. 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 concrete and steel, except for sleeve penetrations where the temperature may rise up to 200°F. 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 LFP 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
<b>Foundations</b>	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 LFP ancillary equipment system considered in this assessment is located inside the LAW facility. The LAW facility structural foundations are well below the grade elevation as shown on the general arrangement drawings, therefore, the LFP ancillary equipment is not subjected to any frost heave effects.
<b>Connections</b>	Seams and connections are adequately designed.	24590-WTP-DC-PS-01-001, Rev. 7C, 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 LFP System ancillary equipment.

Information Assessed		Source of Information	Assessment
<b>Waste Characteristics</b>	<p>Characteristics of the waste to be stored or treated have been identified (ignitable, reactive, toxic, specific gravity, vapor pressure, flash point, temperature)</p>	<p>System Description listed above under References;  24590-WTP-PER-PR-03-001, Rev. 1, Prevention of Hydrogen Accumulation in WTP Tank Systems and Miscellaneous Treatment Unit Systems; 24590-WTP-PER-PR-03-002, Rev. 3, Control of Toxic Vapors and Emissions from WTP Tank Systems and Miscellaneous Unit Systems.</p>	<p>The Prevention of Hydrogen Accumulation in WTP Tank Systems and Miscellaneous Treatment Unit System and System 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 LFP system.</p>
	<p>Ancillary equipment is designed to handle the wastes with the characteristics defined above and any treatment reagents.</p>	<p>24590-WTP-PER-M-02-002, Rev. 3, Materials for Ancillary Equipment.</p>	<p>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 LFP piping and equipment ensures that the ancillary equipment is appropriately designed to handle the waste.</p>

Information Assessed	Source of Information	Assessment
<p style="text-align: center;"><b>Compatibility</b></p> <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>24590-WTP-DB-ENG-01-001, Rev. 1Q, Basis of Design; 24590-WTP-PER-M-02-002, Rev. 3, Materials for Ancillary Equipment; 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. 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 will provide the expected design service life.</p>

Information Assessed		Source of Information	Assessment
<b>Corrosion Allowance</b>	Corrosion allowance is adequate for the intended service life of the ancillary equipment.	ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers; 24590-WTP-DC-PS-01-001, Rev. 7C, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria;" 24590-WTP-DB-ENG-01-001, Rev. 1Q, Basis of Design; 24590-WTP-PER-M-02-002, Rev. 3, Materials for Ancillary Equipment; 24950-WTP-PER-PL-02-001, Rev. 6, 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 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.
<b>Pressure Controls</b>	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. 7C, 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
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Pressure Controls (cont'd)</p> <p>Maximum flows and any unusual operating stresses are identified</p>	<p>Drawings listed above under References;</p> <p>24590-WTP-DC-PS-01-001, Rev. 7C, 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-3PS-P000-T0001, Rev. 6, Engineering Specification for Piping Material Classes General Description and Summary ;</p> <p>24590-WTP-PER-PL-02-001, Rev. 6, Piping Material Class Description;</p> <p>24590-WTP-3DP-G04T-00906, Rev. 8A, Isometric Drawings and Associated Calculations;</p> <p>24590-WTP-3DP-G04B-00037, Rev. 20, Engineering Calculations.</p>	<p>The expected flow paths for the ancillary equipment are identified on the P&amp;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&amp;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 Specification for Piping Material Classes and Piping Material Class Description documents. ASME B31.3 and the associated standards are appropriate and adequate for the design of the ancillary equipment. Furthermore, the fabrication of 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 provide 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
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Secondary Containment</b></p> <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;</p> <p>24590-LAW-PER-M-05-002, Rev. 2, Leak Detection Capability in the Low Activity Waste Facility.</p>	<p>The ancillary equipment considered in this assessment runs from LFP Bulges in Room L-0202 at El. 28'-0" to LFP vessels located in Rooms L-0123 &amp; L-0124 at El. 3'-0" which are directly below Room L-0202 within the LAW building. Rooms L-0123 and L-0124 are secondary containment concrete structures provided with stainless steel liner plates and have sumps (RLD-SUMP-00029/00030) and (RLD-SUMP-00031/00032) respectively, as shown on the general arrangement drawings and in the Leak Detection 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.</p>