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AREVA

CCN: 169561 ✓

AFS-09-0404

**RPP-WTP
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December 2, 2009

DEC 04 2009

BY PDC

ISSUED BY
RPP-WTP PDC

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

Dear Ms. Broadbent:

**BECHTEL NATIONAL, INC. CONTRACT NO. 24590-CM-HC4-HXYG-00211
IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAW
LOP ANCILLARY EQUIPMENT (IA-3002314-000)**

The structural 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 is adequately designed and has sufficient structural strength, compatibility with the waste(s) to be processed/stored/treated, and corrosion protection to ensure that it will not collapse, rupture, or fail.

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

Sincerely,

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

llm

Enclosure (1)

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

AREVA Federal Services LLC

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

"I, Tarlok Hundal have reviewed, and certified a portion of the design of a new tank system or component located at the Hanford Waste Treatment Plant, owned/operated by Department of Energy, Office of River Protection, Richland, Washington. My duties were independent review of the current design for the LAW LOP 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 fourteen (14) pages numbered one (1) through fourteen (14).



T. Hundal
Signature

12/2/09
Date

Scope	Scope of this Integrity Assessment	<p>This Integrity Assessment addresses the tank system ancillary equipment and miscellaneous unit sub-system equipment associated with plant items (LOP-VSL-00001, LOP-VSL-00002, LOP-SCB-00001, LOP-SCB-00002, LOP-WESP-00001, and LOP-WESP-00002) within the LAW Facility system LOP. Also included in this assessment are the miscellaneous unit sub-system equipment (spools and bellows) located between film coolers and the submerged bed scrubber miscellaneous units associated with LAW Melters 1 and 2 offgas system. The ancillary equipment and sub-system equipment hereinafter called the ancillary equipment is shown on the P&ID drawings 24590-LAW-M6-LOP-00001 and -00002.</p> <p>The ancillary equipment is typically defined as piping, pumps, valves, and other in-line components such as reducers, flanges, strainers, bellows, spools, union, mixing tee, drains, and overflows, as appropriate.</p> <p>The General Arrangement drawings listed below under References show that the LOP plant items (LOP-VSL-00001, LOP-SCB-00001, LOP-WESP-00001) are located at Elevation 2'-0" in Cell, Room L-0123 and (LOP-VSL-00002, LOP-SCB-00002, LOP-WESP-00002) are located at Elevation 2'-0" in Cell, Room L-0124 of the LAW facility.</p> <p>Ancillary equipment located inside the above listed LOP system vessels, such as pumps, eductors, agitators, or reverse flow diverters, as appropriate, is addressed separately in the Integrity Assessments for these plant items.</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-00002, Rev. 5, LAW Vitrification Building General Arrangement Plan at El. 3'- 0";</p> <p>24590-LAW-P1-P01T-00007, Rev. 8, LAW Vitrification Building General Arrangement Sections A-A, B-B, C-C, and S-S;</p> <p>24590-LAW-P1-P01T-00010, Rev. 8, LAW Vitrification Building General Arrangement Section K-K, L-L, and M-M;</p> <p>24590-LAW-M6-LOP-00001, Rev. 4, P&ID –LAW Primary Offgas Process System Melter 1;</p> <p>24590-LAW-M6-LOP-00002, Rev. 4, P&ID –LAW Primary Offgas Process System Melter 2;</p> <p>24590-LAW-M5-V17T-00007, Rev. 4, Process Flow Diagram-Melter 1 Primary Offgas Treatment System (System LOP);</p> <p>24590-LAW-M5-V17T-00008, Rev. 4, Process Flow Diagram-Melter 2 Primary Offgas Treatment System (System LOP);</p> <p>24590-LAW-M61-P23T-00001, Rev. 0, 10" Main & Standby Off Gas Piping Layout/Penetration Locations, LOP-SPOOL-00001 thru 00004;</p> <p>24590-LAW-P3-LOP-PW01519001, Rev. 2, LAW Vitrification Isometric (Line No. LOP-PW-01519-N11J-4);</p> <p>24590-LAW-P3-LOP-PW01513001, Rev. 0, LAW Vitrification Isometric (Line No. LOP-PW-01513-N11J-4);</p> <p>24590-LAW-P3-LOP-PW01499001, Rev. 2, LAW Vitrification Isometric (Line No. LOP-PW-01499-N13A-2);</p> <p>24590-LAW-P3-LOP-PW01224001, Rev. 0, LAW Vitrification Isometric (Line No. LOP-PW-01224-N11V-10);</p> <p>24590-LAW-P3-LOP-PW01224002, Rev. 0, LAW Vitrification Isometric (Line No. LOP-PW-01224-N11V-10);</p> <p>24590-LAW-P3-LOP-ZR01505001, Rev. 0, LAW Vitrification Isometric (Line No. LOP-ZR-01505-N11F-2);</p> <p>24590-LAW-P3-LOP-ZR01505002, Rev. 1, LAW Vitrification Isometric (Line No. LOP-ZR-01505-N11F-2);</p> <p>24590-LAW-P3-LOP-ZS00005002, Rev. 2, LAW Vitrification Isometric (Line No. LOP-ZS-00005-N13A-2);</p> <p>24590-LAW-P3-LOP-ZS00005003, Rev. 0, LAW Vitrification Isometric (Line No. LOP-ZS-00005-N13A-2);</p> <p>24590-LAW-P3-LOP-ZS00028001, Rev. 0, LAW Vitrification Isometric (Line No. LOP-ZS-00028-N13A-3);</p> <p>24590-LAW-P3-LOP-ZS00028002, Rev. 0, LAW Vitrification Isometric (Line No. LOP-ZS-00028-N13A-3);</p> <p>24590-LAW-P3-LOP-GR00011001, Rev. 0, LAW Vitrification Isometric (Line No. LOP-GR-00011-S11P-3);</p> <p>24590-LAW-P3-LOP-GR00011002, Rev. 0, LAW Vitrification Isometric (Line No. LOP-GR-00011-S11P-3);</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-50-00005001, Rev. 3, Standard Pipe Support Details Frame - Post FP;</p> <p>24590-WTP-PH-50-00005002, Rev. 1, Standard Pipe Support Details Frame - Post FP;</p> <p>24590-WTP-PH-50-00012001, Rev. 6, Standard Pipe Support Details Guide - U Bolts GU;</p> <p>24590-LAW-LOP-H10001, Rev. 0, Pipe Support Drawing;</p> <p>24590-LAW-LOP-H10091, Rev. 0, Pipe Support Drawing;</p> <p>24590-LAW-LOP-H10111, Rev. 0, Pipe Support Drawing;</p> <p>24590-LAW-LOP-H10124, Rev. 0, Pipe Support Drawing;</p> <p>24590-LAW-LOP-H10179, Rev. 0, Pipe Support Drawing;</p> <p>24590-LAW-LOP-H10311, Rev. 0, Pipe Support Drawing;</p> <p>24590-LAW-LOP-H10378, Rev. 0, Pipe Support Drawing;</p> <p>24590-LAW-LOP-H10380, Rev. 0, Pipe Support Drawing.</p>
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References (cont'd)	Drawings and System Description	<p>Vendor Drawings (Bechtel Code 1 Drawings*):</p> <p>24590-QL-POA-PF00-00006-08-00006, Rev. 00I, LAW 10" Removable Main Off Gas Spool w/Downcomer LOP-SPOOL-00004; 24590-QL-POA-PF00-00006-08-00007, Rev. 00I, LAW 10" Removable Main Off Gas Spool LOP-SPOOL-00001; 24590-QL-POA-PF00-00006-08-00020, Rev. 00G, LAW 10" Removable Main Off Gas Weld in Spool LOP-SPOOL-00006; 24590-QL-POA-PF00-00006-08-00023, Rev. 00J, LAW 10" Removable Main Off Gas Spool w/Downcomer LOP-SPOOL-00006;</p> <p>* Bechtel Code 1 Drawing is an "as fabricated vendor drawing" approved/accepted by Bechtel.</p> <p>System Description:</p> <p>24590-LAW-3YD-LOP-00001, Rev. 2, System Description for the LAW Primary Offgas (LOP) and Secondary Offgas/Vessel Vent (LVP) Systems.</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 Description listed above under References;</p> <p>24590-WTP-DC-PS-01-001, Rev. 6A, 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. 10A, 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 Process System Description document states that the LOP system does not have any important to safety function. Drawings show that the ancillary equipment is of commercial quality level (CM) grade or quality level Q 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.</p>	<p>Drawings and listed above under References;</p> <p>24590-WTP-DC-PS-01-001, Rev. 6A, 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-VV-PS-01-001, Rev. 6, Verification and Validation Test Plan/Test Report for ME101, Linear Elastic Analysis of Piping;</p> <p>24590-LAW-P61C-LOP-00002, Rev. B, LAW Main/Standby Offgas Piping (Pipe Stress Analysis);</p> <p>24590-LAW-P6C-LOP-10001, Rev. C, Pipe Stress Analysis for LAW Primary Offgas (LOP) System;</p> <p>24590-LAW-P6C-LOP-10002, Rev. D, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis);</p> <p>24590-LAW-P6C-LOP-10011, Rev. B, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis);</p> <p>24590-LAW-P6C-LOP-10019, Rev. B, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis);</p> <p>24590-LAW-P6C-LOP-10022, Rev. C, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis);</p> <p>24590-LAW-P6C-LOP-10024, Rev. C, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis);</p> <p>24590-LAW-PHC-LOP-10016, Rev. B, Pipe Support Calculation (for Support No. 24590-LAW-LOP-H10091);</p> <p>24590-LAW-PHC-LOP-10026, Rev. B, Pipe Support Calculation (for Support No. 24590-LAW-LOP-H10001);</p> <p>24590-LAW-PHC-LOP-10071, Rev. A, Pipe Support Calculation (for Support No. 24590-LAW-LOP-H10179);</p> <p>24590-LAW-PHC-LOP-10074, Rev. A, Pipe Support Calculation (for Support No. 24590-LAW-LOP-H10124);</p> <p>24590-LAW-PHC-LOP-10069, Rev. 0, RPP-WTP Engineered Support Calculation (for LAW-LOP-H10311, -H10378, -H10379 & -H10380);</p> <p>24590-LAW-PHC-LOP-10077, Rev. A, Pipe Support Calculation (for Support No. 24590-LAW-LOP-H10111 and -H10382);</p> <p>24590-WTP-3DP-G04T-00906, Rev. 7B, Isometric Drawings and Associated Calculations;</p> <p>24590-WTP-3DP-G04B-00037, Rev. 15B, Engineering Calculations;</p> <p>24590-WTP-3PS-PH01-T0002, Rev. 4, Engineering Specification for Installation of Pipe Supports.</p>	<p>The ancillary equipment is to be built to the 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 Calculation, Engineering Specification, 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 LOP ancillary equipment are properly designed 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 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. 6A, 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. 2, Materials for Ancillary Equipment; 24590-WTP-GPG-ENG-004, Rev. 2A, 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>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. 4, 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 (B&PV) 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. 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-LOP-10016, Rev. B, Pipe Support Calculation (for Support No. 24590-LAW-LOP-H10091);</p> <p>24590-LAW-PHC-LOP-10026, Rev. B, Pipe Support Calculation (for Support No. 24590-LAW-LOP-H10001);</p> <p>24590-LAW-PHC-LOP-10071, Rev. A, Pipe Support Calculation (for Support No. 24590-LAW-LOP-H10179);</p> <p>24590-LAW-PHC-LOP-10074, Rev. A, Pipe Support Calculation (for Support No. 24590-LAW-LOP-H10124);</p> <p>24590-LAW-PHC-LOP-10069, Rev. 0, RPP-WTP Engineered Support Calculation (for LAW-LOP-H10311, -H10378, -H10379 & -H10380);</p> <p>24590-LAW-PHC-LOP-10077, Rev. A, Pipe Support Calculation (for Support No. 24590-LAW-LOP-H10111 and -H10382);</p> <p>24590-WTP-GPG-ENG-005, Rev. 4B, 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. 7B, Isometric Drawings and Associated Calculations;</p> <p>24590-WTP-3DP-G04B-00037, Rev. 15B, Engineering Calculations;</p> <p>24590-WTP-PHC-P50-00001, Rev. 1, RPP/WTP Support Standards;</p> <p>24590-WTP-PHC-P50T-00004, Rev. 0, Qualification of Pipe Straps;</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 for design of ancillary equipment supports for the LOP system. 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 LOP 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. 12, 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 LOP 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 LOP system is not subjected to any frost heave effects.
Connections	Seams and connections are adequately designed.	Drawings listed above under References; 24590-WTP-DC-PS-01-001, Rev. 6A, 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. 24590-LAW-P61C-LOP-00002, Rev. B, LAW Main/Standby Offgas Piping (Pipe Stress Analysis); 24590-LAW-P6C-LOP-10001, Rev. C, Pipe Stress Analysis for LAW Primary Offgas (LOP) System; 24590-LAW-P6C-LOP-10002, Rev. D, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis); 24590-LAW-P6C-LOP-10011, Rev. B, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis); 24590-LAW-P6C-LOP-10019, Rev. B, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis); 24590-LAW-P6C-LOP-10022, Rev. C, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis); 24590-LAW-P6C-LOP-10024, Rev. C, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis).	The Pipe Stress Design Criteria specifies the ASME B31.3 Code as the design code for the piping systems. Welding is to be performed in accordance with the requirements of ASME B31.3 Code and the ASME B&PV Code, Section IX. ASME B16.5 Code is specified for pipe flanges and equipment flanges where flanges are used for connections. The aforementioned documents provide appropriate requirements and guidelines to adequately design the seams and connections to sustain the applicable loads. Review of sample ancillary equipment calculations/analyses and drawings indicates that they are adequately designed meeting the requirements of the aforementioned applicable code and standards.

Information Assessed		Source of Information	Assessment
Waste Characteristics	Characteristics of the waste to be stored or treated have been identified (dangerous waste characteristics, specific gravity, vapor pressure, flash point, temperature)	System 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 and Miscellaneous Unit Systems.	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 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.
	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. 2, Materials for Ancillary Equipment; 24590-WTP-PER-PL-02-001, Rev. 6, 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 LOP 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. 1O, Basis of Design; 24590-WTP-PER-M-02-002, Rev. 2, Materials for Ancillary Equipment; 24590-WTP-PER-PL-02-001, Rev. 6, 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 and Piping Material Class documents. 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
Corrosion Allowance	<p>Corrosion allowance is adequate for the intended service life of the ancillary equipment.</p>	<p>System Description listed above under References;</p> <p>ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers;</p> <p>24590-WTP-DC-PS-01-001, Rev. 6A, Pipe Stress Design Criteria including “Pipe Stress Criteria” and “Span Method Criteria;”</p> <p>24590-WTP-DB-ENG-01-001, Rev. 1O, Basis of Design;</p> <p>24590-WTP-PER-M-02-002, Rev. 2, Materials for Ancillary Equipment;</p> <p>24590-WTP-PER-PL-02-001, Rev. 6, Piping Material Class Description;</p> <p>24590-LAW-P61C-LOP-00002, Rev. B, Richland RPP WTP LAW Main/Standby Offgas Piping (Pipe Stress Analysis);</p> <p>24590-LAW-P6C-LOP-10001, Rev. C, Pipe Stress Analysis for LAW Primary Offgas (LOP) System;</p> <p>24590-LAW-P6C-LOP-10002, Rev. D, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis);</p> <p>24590-LAW-P6C-LOP-10011, Rev. B, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis);</p> <p>24590-LAW-P6C-LOP-10019, Rev. B, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis);</p> <p>24590-LAW-P6C-LOP-10022, Rev. C, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis);</p> <p>24590-LAW-P6C-LOP-10024, Rev. C, Richland RPP WTP LAW Plant LOP System (Pipe Stress Analysis).</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 are adequate for the intended service life of the ancillary equipment. Sample review of the Pipe Stress Calculations show that the corrosion allowance has been appropriately used in the design process.</p>

Information Assessed		Source of Information	Assessment
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>Drawings listed above under References;</p> <p>24590-WTP-DC-PS-01-001, Rev. 6A, 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-PER-PL-02-001, Rev. 6, Piping Material Class Description.</p>	<p>The Pipe Stress Design Criteria document specifies ASME B31.3 Code as the design code for the WTP piping. ASME B31.3 Code requires provision be made to safely contain or relieve any pressure to which the piping may be subjected. ASME B31.3 Code 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. The Piping Material Class Description document lists enveloping pressure and temperature limits for each piping material class. These requirements are appropriate and adequate for the ancillary equipment design.</p>

Information Assessed		Source of Information	Assessment
Pressure Controls (cont'd)	Maximum flows and any unusual operating stresses are identified	<p>Drawings listed above under References;</p> <p>24590-WTP-DC-PS-01-001, Rev. 6A, 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. 7B, Isometric Drawings and Associated Calculations;</p> <p>24590-WTP-3DP-G04B-00037, Rev. 15B, 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. 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 provide adequate assurance that subject ancillary equipment are properly designed 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;</p> <p>Flooding 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 LP-0112) of the LAW building as shown on the general arrangement drawings. Rooms L-0123 and L-00124 are secondary containment concrete structures provided with stainless steel liner plates and sumps (RLD-SUMP-00029 and RLD-SUMP-00030 in Room L-0123, and RLD-SUMP-00031 and RLD-SUMP-00032 in Room L-0124), as shown in Sump Data document are used to pump out any leaked spillage collected in them. Room LP-0112, known as Melter Gallery, has elevated platforms. In this room dry offgas ancillary equipment is located partly in the Melter plenum and partly above the shielded platform which does not need secondary containment or sump. The secondary containment structures listed herein are out of scope of this integrity assessment; their assessment is conducted in a separate document.</p>



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Subcontract Title:	Tank Integrity Design Assessments
Subcontractor Name:	AREVA Federal Services LLC
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