IA-3001246-001

IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAW LMP 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 Melter Process System (LMP) 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).

TARLOK SINGH HUNDAL
STATE OF WASHINGTON
20213
REGISTERED
PROFESSIONAL ENGINEER

T S Hundal
Signature

1/16/09
Date

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Scope	Scope of this Integrity Assessment.	This report consists of Integrity Assessment for the Dangerous Waste Permit (DWP) effecting sub-system equipment (ancillary equipment) associated with the LAW Melter Process System (LMP) two Melters (LMP-MLTR-00001/2) to be located in LAW Melter Gallery (Room L-0112) at Elevation 3'-0" as shown in the General Arrangement drawing 24590-LAW-P1-P01T-00002. Throughout the balance of this report the term ancillary equipment will be used to represent sub-system equipment. The DWP affecting ancillary equipment for the LMP system is shown in the P&ID drawings listed under References below. This report also addresses secondary containment for the Melter Feed Line Encasement Assemblies. Secondary containment for other ancillary equipment and services interfacing with the LAW melters such as sumps, liners, and drains in the melter gallery area is addressed in a separate report. The Integrity Assessment of the LAW Melters (LAW-LMP-00001/2) is not in the scope of this report. Their assessment is included in a separate report.
Summary of Assessment		For each item of "Information Assessed" (i.e., Criteria) on the following pages, the items listed under "Source of Information" were reviewed and found to furnish adequate design requirements and controls to ensure that the design fully satisfies the requirements of Washington Administrative Code (WAC), Chapter 173-303 WAC, *Dangerous Waste Regulations,* WAC-173-303-640, *Tank Systems.*

References	Material Requisition, Specifications, and Drawings.	Material Requisition (MR): 24590-QL-MRA-PF00-00006, Rev. 3, LAW- Melter Spool Connections (ML020). Specifications: The following Specifications with their respective revision and Specification Change Notices (SCNs) are listed in the above listed Material Requisition: 24590-WTP-3PS-M000-T0002, General Specification for Mechanical Handling, Equipment Design, and Manufacture; 24590-WTP-3PS-G000-T0001, General Specification for Supplier Quality Assurance Program Requirements; 24590-WTP-3PS-G000-T0002, Engineering Specification for Positive Material Identification (PMI); 24590-WTP-3PS-G000-T0003, Engineering Specification for Packaging, Handling, and Storage Requirements; 24590-LAW-3PS-PF00-T0001, Engineering Specification for Shop Fabrication of LAW Melter Piping and Components. 24590-LAW-3PS-NWP0-T0001, Engineering Specification for General Welding NDE Requirements for Supplier Fabricated Piping. Drawings: 24590-LAW-P1-P01T-00002, Rev. 5, LAW Vitrification Building General Arrangement Plan at EL. 3'-0"; 24590-LAW-M5-V17T-00004, Rev. 4, Process Flow Diagram LAW Vitrification Melter 1 (System LMP & LOP); 24590-LAW-M5-V17T-00005, Rev. 4, Process Flow Diagram LAW Vitrification Melter 2 (System LMP & LOP); 24590-LAW-M6-LMP-00001, Rev. 2, P&ID LAW Melter Process System Melter 1 Agitation-Zone 1 & Zone 2; 24590-LAW-M6-LMP-00002, Rev. 2, P&ID LAW Melter Process System Melter 1 Agitation Zone 3 & Level Detection System; 24590-LAW-M6-LMP-00003, Rev. 4, P&ID LAW Melter Process System Melter 1 Walls And Floor Panels Cooling System; 24590-LAW-M6-LMP-00005, Rev. 2, P&ID LAW Melter Process System Melter 1 Electrode Extension Cooling & Glass/Plenum Temperatures; 24590-LAW-M6-LMP-00007, Rev. 3, P&ID LAW Melter Process System Melter 1 Glass Pouring And Monitoring Instrumentation; 24590-LAW-M6-LMP-00008, Rev. 3, P&ID LAW Melter Process System Melter 1 Discharge Heaters, Power Controls (1-4) & Air Lift Eastside; 24590-LAW-M6-LMP-00010, Rev. 3, P&ID LAW Melter Process System Melter 1 Discharge Heaters, Power Controls (1-4) & Air Lift Westside; 24590-LAW-M6-LMP-00012, Rev. 5, P&ID LAW Melter Process System Melter 1 Feed Nozzles Cooling System and Feed Nozzles; 24590-LAW-M6-LMP-00013, Rev. 5, P&ID LAW Melter Process System Melter 1 Lid, Plenum And Offgas Ports Cooling System; 24590-LAW-M6-LMP-00031, Rev. 2, P&ID LAW Melter Process System Melter 2 Agitation-Zone 1 & Zone 2; 24590-LAW-M6-LMP-00032, Rev. 2, P&ID LAW Melter Process System Melter 2 Agitation Zone 3 & Level Detection System; 24590-LAW-M6-LMP-00033, Rev. 4, P&ID LAW Melter Process System Melter 2 Walls And Floor Panels Cooling System; 24590-LAW-M6-LMP-00035, Rev. 2, P&ID LAW Melter Process System Melter 2 Electrode Extension Cooling & Glass/Plenum Temperatures; 24590-LAW-M6-LMP-00037, Rev. 3, P&ID LAW Melter Process System Melter 2 Glass Pouring And Monitoring Instrumentation; 24590-LAW-M6-LMP-00038, Rev. 3, P&ID LAW Melter Process System Melter 2 Discharge Heaters, Power Controls (1-4) & Air Lift Eastside; 24590-LAW-M6-LMP-00040, Rev. 3, P&ID LAW Melter Process System Melter 2 Discharge Heaters, Power Controls (1-4) & Air Lift Westside; 24590-LAW-M6-LMP-00042, Rev. 5, P&ID LAW Melter Process System Melter 2 Feed Nozzles Cooling System and Feed Nozzles; 24590-LAW-M6-LMP-00043, Rev. 5, P&ID LAW Melter Process System Melter 2 Lid, Plenum Cooling System Ports Cooling System; 24590-LAW-M61-P23T-00060, Rev. 0, LAW Melter Feed Lines & Encasement Layout/Penetration Locations LMP-MLTR-00001; 24590-LAW-M61-P23T-00061, Rev. 0, LAW LMP-MLTR-00001 Feed Line Encasement Assembly LMP-LBD-00001; 24590-LAW-M61-P23T-00064, Rev. 0, LAW LMP-MLTR-00001 Feed Line Encasement 1 Assembly LMP-LBD-00001; 24590-LAW-M61-P23T-00070, Rev. 0, LAW Melter Feed Lines & Encasement Layout/Penetration Locations LMP-MLTR-00002; 24590-LAW-M61-P23T-00071, Rev. 0, LAW LMP-MLTR-00002 Feed Line Encasement Assembly LMP-LBD-00002; 24590-LAW-M61-P23T-00074, Rev. 0, LAW LMP-MLTR-00002 Feed Line Encasement 1 Assembly LMP-LBD-00002; 24590-LAW-M6-LOP-00004, Rev. 4, P&ID LAW Primary Offgas Process System Melter 1 Offgas Film Coolers; 24590-LAW-M6-LOP-00005, Rev. 4, P&ID LAW Primary Offgas Process System Melter 2 Offgas Film Coolers.

References (cont'd)	Drawings and System Description.	Drawings (cont'd): 24590-LAW-P3-LMP-WS20093001, Rev. 0, LAW Vitrification Building Isometric (Line No. LMP-WS-20093-S11B-1); 24590-LAW-P3-LMP-WS20094001, Rev. 0, LAW Vitrification Building Isometric (Line No. LMP-WS-20094-S11B-1); 24590-LAW-P3-LMP-PB00017001, Rev. 1, LAW Vitrification Building Isometric (Line No. LMP-PB-00017-S12A-0.75); 24590-LAW-P3-LMP-PB00021001, Rev. 1, LAW Vitrification Building Isometric (Line No. LMP-PB-00021-S12A-0.75); 24590-LAW-P3-LMP-PB00023001, Rev. 1, LAW Vitrification Building Isometric (Line No. LMP-PB-00023-S12A-0.75); 24590-LAW-P3-LMP-PB00024001, Rev. 1, LAW Vitrification Building Isometric (Line No. LMP-PB-00024-S12A-0.75); 24590-LAW-P3-LMP-PB00026001, Rev. 1, LAW Vitrification Building Isometric (Line No. LMP-PB-00026-S12A-0.75); 24590-LAW-P3-LMP-PB00028001, Rev. 1, LAW Vitrification Building Isometric (Line No. LMP-PB-00028-S12A-0.75); 24590-WTP-PH-50-00012001, Rev. 6, Standard Pipe Support Details, Guide –U Bolts GU; 24590-WTP-PH-50-00003001, Rev. 4, Standard Pipe Support Details, Cantilever-Cantilever CC; 24590-WTP-PH-50-00004001, Rev. 3, Standard Pipe Support Details, Frames –L Shape FL; 24590-WTP-PH-50-00001001, Rev. 3, Standard Pipe Support Details, Axial Stop –Welded AW; 24590-WTP-PH-50-00014001, Rev. 1, Standard Pipe Support Details, Rods-Hangers RH; 24590-WTP-PH-50-00014002, Rev. 1, Standard Pipe Support Details, Rods-Hangers RH; 24590-LAW-LMP-H10001001, Rev. 1, Pipe Support (LAW-LMP-H10001); 24590-LAW-LMP-H10001002, Rev. 1, Pipe Support (LAW-LMP-H10001); 24590-LAW-LMP-H10535001, Rev. 1, Pipe Support (LAW-LMP-H10535); 24590-LAW-LMP-H10535002, Rev. 1, Pipe Support (LAW-LMP-H10535). System Description: 24590-LAW-3YD-LMP-00001, Rev.2, System Description for the System LMP, Low Activity Waste Melter (including SDCN 00003 to Rev. 2); 24590-LAW-3YD-LOP-00001, Rev. 2, System Description for LAW Primary Offgas Process (LOP) and LAW Secondary Offgas/Vessel Vent Process (LVP) System.

Information Assessed		Source of Information	Assessment
Design	Ancillary equipment design standards are appropriate and adequate for the equipment's intended use.	Drawings and System Description listed above under References; 24590-WTP-DC-PS-01-001, Rev. 6, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria;" ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers; 24590-WTP-3DP-G04T-00905, Rev. 10, Determination of Quality Levels.	The Pipe Stress Design Criteria identifies ASME B31.3 as the design code for piping systems of the WTP. 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, standards, and documents identified and used above are acceptable and adequate for the design of the ancillary equipment's intended service.

Information Assessed		Source of Information	Assessment
Design (cont'd)	If the ancillary equipment to be used is not built to a design standard, the design calculations demonstrate sound engineering principles of construction.	Drawings listed above under References; 24590-WTP-DC-PS-01-001, Rev. 6, 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-VV-PS-01-001, Rev. 6, Verification and Validation Test Plan/Test Report for ME101, Linear Elastic Analysis of Piping; 24590-LAW-P6C-RLD-10042, Rev. B, Richland RPP WTP LAW RLD System (Pipe Stress Analysis); 24590-LAW-P6C-LMP-10005, Rev. B, Richland RPP WTP LAW Plant LMP System (Pipe Stress Analysis); 24590-LAW-P61C-LMP-00001, Rev. A, RPP-WTP LAW Melter Feed Line Assembly Calculation-LMP System (including ECCN 00001); 24590-LAW-PHC-LMP-10002, Rev. B, RPP-WTP Engineered Support Calculation for LAW-LMP-H10001 and LAW-LMP-H10535); 24590-WTP-PHC-P50-00001, Rev. 1, RPP/WTP Support Standards (Calculations); 24590-WTP-3DP-G04T-00906, Rev. 7, Isometric Drawings and Associated Calculations; 24590-WTP-3DP-G04B-00037, Rev. 14, Engineering Calculations; 24590-WTP-3PS-PH01-T0002, Rev. 4, Installation of Pipe Supports.	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 Calculations, 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 LMP ancillary equipment are properly designed and will be 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.

Information Assessed		Source of Information	Assessment
Design (cont'd)	Ancillary equipment has adequate strength at the end of its design life to withstand the operating pressure, operating temperature, thermal expansion, and seismic loads. Equipment is protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction.	Drawings listed above under References; 24590-WTP-DC-PS-01-001, Rev. 6, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria;" ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers (1996); 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, Safety Evaluation for Design (Seismic Design of Piping and Pipe Supports); 24590-LAW-P6C-RLD-10042, Rev. B, Richland RPP WTP LAW RLD System (Pipe Stress Analysis); 24590-LAW-P6C-LMP-10005, Rev. B, Richland RPP WTP LAW Plant LMP System (Pipe Stress Analysis); 24590-LAW-P61C-LMP-00001, Rev. A, RPP-WTP LAW Melter Feed Line Assembly Calculation-LMP System (including ECCN 00001); 24590-LAW-PHC-LMP-10002, Rev. B, RPP-WTP Engineered Support Calculation for LAW-LMP-H10001 and LAW-LMP-H10535); 24590-WTP-PHC-P50-00001, Rev. 0, RPP/WTP Support Standards (Calculations).	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. Review of sample ancillary equipment calculations and drawings indicates that they are adequately designed meeting the requirements of the aforementioned applicable code and standards.

Information Assessed		Source of Information	Assessment
Supports	Ancillary equipment supports are adequately designed.	Drawings listed above under References; 24590-WTP-DC-PS-01-002, Rev. 4, Pipe Support Design Criteria; 24590-WTP-PER-PS-02-001, Rev. 4, Ancillary Equipment Pipe Support Design; ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers (1996); ASME Boiler and Pressure Vessel Code, Section III, Division I, Subsection NF, Appendix N and F, Rules for Construction of Nuclear Power Plant Components (2001); 24590-WTP-PL-PS-01-001, Rev. 1, Verification and Validation Test Plan for Bechtel's ME150 Pipe Support Family of Programs (PCFAPPS); 24590-LAW-PHC-LOP-10002, Rev. B, RPP-WTP Engineered Support Calculation for LAW-LMP-H10001 and LAW-LMP-H10535; 24590-WTP-PHC-P50-00001, Rev. 0, RPP/WTP Support Standards (Calculations).	The Pipe Support Design Criteria considers all load types identified in ASME B31.3 and utilizes ASME B&PV Code, Section III, Division 1, Subsection NF and Appendix F to supplement the requirements of ASME B31.3 for seismic design of 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. Analysis is by manual calculation and computer programs that have been tested and approved as discussed in the Verification and Validation Test Plan for Bechtel's ME150 Pipe Support Family of Programs. The Ancillary Equipment Pipe Support Design document shows examples of typical equipment supports. Ancillary equipment supports are to be designed in such a way that the heat transferred from supports to the building structure does not raise the building structure temperature to exceed 150°F for concrete and 200°F for steel. Review of sample ancillary equipment supports calculations and drawings indicates that they are adequately designed.
Foundation	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 structural foundations for outdoor equipment shall extend into the surrounding soil below the 30" frost line depth to preclude frost heave. The LMP melters and ancillary equipment associated with the LMP system considered in this assessment are located inside the LAW Facility at Elev. 3'-0" as shown on General Arrangement Plan drawing. The majority of the LAW building foundation mat is at Elev. (-) 21'-0" level, therefore, the melters and ancillary equipment are not subject to frost heave.

Information Assessed		Source of Information	Assessment
Connections	Seams and connections are adequately designed.	Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 1M, Basis of Design; 24590-WTP-DC-PS-01-001, Rev. 6, Pipe Stress Design Criteria Including "Pipe Stress Criteria" and "Span Method Criteria"; ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers (1996); ASME Boiler and Pressure Vessel (B&PV) Code, Section IX, Welding and Brazing Qualifications; ASME B16.5 Code, Piping Flanges and Flanged Fittings, (1988); 24590-LAW-P6C-RLD-10042, Rev. B, Richland RPP WTP LAW RLD System (Pipe Stress Analysis); 24590-LAW-P6C-LMP-10005, Rev. B, Richland RPP WTP LAW Plant LMP System (Pipe Stress Analysis); 24590-LAW-P61C-LMP-00001, Rev. A, RPP-WTP LAW Melter Feed Line Assembly Calculation-LMP System (including ECCN 00001).	The Basis of Design document states that in-cell piping that is non-maintainable will be fully welded. The Pipe Stress Design Criteria document requires the use of ASME B31.3 Process Piping design code for piping systems. Welding is performed in accordance with the requirements of ASME B31.3 and ASME B&PV Code, Section IX. Flange connections are to be designed in accordance with ASME B16.5 Code. 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 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 low-activity waste 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 Systems document indicates 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 dangerous waste vapors and emissions during normal operations, abnormal operations, and during and after a design level seismic event. The LMP System Description document describes the equipment installed in the LMP system to route acid gases, NOx, SOx, volatile organics, particulates and aerosols, and radioactive gases to offgas system for treatment and release. The LMP systems are designed to treat the offgas so that it conforms to relevant federal, state, and local air emissions requirements at the point of discharge from the facility stack.

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.	System Description and Drawings listed above under References; 24590-LAW-3PS-AE00-T0001, Rev. 4, Engineering Specification for Low Activity Waste Melters; 24590-WTP-PER-M-02-002, Rev. 2, Materials for Ancillary Equipment; CCN # 191062 (Material Selection Supplement Information); 24590-WTP-PER-PL-02-001, Rev. 6, Piping Material Class Description.	The characteristics of the blended slurry of pretreated liquid low-activity waste and glass former additives supplied to the melters and the molten glass discharged from the melters to form immobilized low-activity waste is described in the LMP System Description document. The Engineering Specification for Low Activity Waste Melters provides performance requirements for all phases of melter life. The characteristics of the LMP melter offgas to be treated and cooled in the LAW Primary Offgas Process (LOP/LVP) System is described in the LOP System Description document. The LOP/LVP System Description identifies the safety functions for ancillary equipment to include maintaining the confinement boundary of the offgas stream and ensuring that the flow path between the melters and stack remains unobstructed during and following a SC-III seismic event. The integrity assessment of LOP system is not in the scope of this assessment, it is provided in a separate report. The Materials for Ancillary Equipment document specifies that ancillary equipment downstream of a waste source vessel or miscellaneous plant items is to be constructed of the same or better material, unless the service seen in the downstream line warrants a different material, corrosion allowance, or other modification. The selection of materials listed in the Piping Material Class Description and CCN documents and as shown on drawings, for the ancillary equipment is compatible with the operating environment for their required design life. This requirement envelops consideration for defined characteristics of waste and any treatment reagents which are added to the plant items only and not to the ancillary equipment.

	Information Assessed	Source of Information	Assessment
Compatibility	The pH range of the waste, waste temperature and the corrosion behavior of the structural materials are adequately addressed. Ancillary equipment material and protective coatings ensure the ancillary equipment structure is adequately protected from the corrosive effects of the waste stream and external environments. The protection is sufficient to ensure the equipment will not leak or fail for the design life of the system.	System Description and Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev.1M, 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; CCN # 191062 (Material Selection Supplement Information); 24590-WTP-3PS-NN00-T0001, Rev. 2, Engineering Specification for Thermal Insulation for Mechanical Systems; Annual Book of ASTM Standards, American Society of Testing and Materials; 24590-LAW-3PS-AE00-T0001, Rev. 4, Engineering Specification for Low Activity Waste Melters.	The LMP System Description document provides pertinent information about various elements of the waste to be processed. The Basis of Design document identifies a service design life of 40 years for the ancillary equipment. All non-maintainable items are designed to last the life of the facility. Detailed material selection (corrosion) analyses are conducted for each vessel and major components in the LMP system in the LAW facility during process design. The Materials for Ancillary Equipment document specifies that ancillary equipment downstream of a waste source vessel or miscellaneous plant items is to be constructed of the same or better material and with the same corrosion allowance as the source vessel or plant items, unless the service seen in the downstream line warrants a different material, corrosion allowance, or other modification. 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 procedures and tests to preclude external corrosion of ancillary equipment. Both internal and external corrosion has been considered for all ancillary equipment, therefore, the ancillary equipment will provide the expected design service life. The Engineering Specification for Low activity Waste Melters specifies each melter, excluding consumable SSCs, shall have a 5 year design life. Materials of construction provided in accordance with the specification for Melters are able to withstand the radioactive, thermal, and corrosive environment caused by the melter feed, molten glass, and offgasses. Corrosion and erosion allowances are included in the design. The selection of materials listed in the Piping Material Class Description and CCN documents and as shown on drawings, for the ancillary equipment is compatible with the operating environment for their required design life.

Information Assessed		Source of Information	Assessment
Corrosion Allowance	Corrosion allowance is adequate for the intended service life of the ancillary equipment.	Drawings listed above under References; 24590-WTP-DC-PS-01-001, Rev. 6, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria;" ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers (1996); 24590-WTP-DB-ENG-01-001, Rev. 1M, 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; CCN # 191062 (Material Selection Supplement Information); 24590-LAW-P6C-LOP-00002, Rev. B, Richland RPP WTP LAW Main/Standby Offgas Piping (Pipe Stress Analysis); 24590-LAW-P6C-RLD-10042, Rev. B, Richland RPP WTP LAW RLD System (Pipe Stress Analysis); 24590-LAW-P6C-LMP-10005, Rev. B, Richland RPP WTP LAW Plant LMP System (Pipe Stress Analysis).	The Pipe Stress Design Criteria document requires use of the ASME B31.3 Code for ancillary equipment design. Consideration of corrosion, including corrosion allowance, is a mandatory requirement of ASME B31.3. A required service design life of 40 years is identified in the Basis of Design document for ancillary equipment. Detailed material selection (corrosion) analyses are conducted for each vessel and major components in the LMP system in the LAW Facility during process design. The Materials for Ancillary Equipment document specifies that ancillary equipment downstream of a waste source vessel or miscellaneous plant items is to be constructed of the same or better material and with the same corrosion allowance as the source vessel or plant items, unless the service seen in the downstream line warrants a different material, corrosion allowance, or other modification. Bounding corrosion allowances are listed for each piping material class in the Piping Material Class Description document. The selection of materials listed in the Piping Material Class Description and CCN documents and as shown on drawings, for the ancillary equipment is compatible with the operating environment for their required design life. Review of the Pipe Stress Analysis documents shows that appropriate corrosion allowance has been used.

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 are exceeded.	24590-WTP-DC-PS-01-001, Rev. 6, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria;" ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers (1996); 24590-WTP-PER-PL-02-001, Rev. 6, Piping Material Class Description.	The Pipe Stress Design Criteria document specifies use of 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 reliving device must be designed for at least the highest pressure that can be developed. Bounding pressure and temperature limits are listed for each of the piping material classes in the Piping Material Class Description document. These requirements are appropriate and adequate for the ancillary equipment design.
	Maximum flows and any unusual operating stresses are identified	Drawings and System Description listed above under References; 24590-WTP-DC-PS-01-001, Rev. 6, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria;" ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers (1996); 24590-WTP-PER-PL-02-001, Rev. 6, Piping Material Class Description.	The expected flow paths for molten glass and ancillary systems servicing the melters are identified on the Process Flow and P&ID drawings. The LMP System Description document requires the melter shell design to withstand the effects of full offgas suction. The LOP System Description Document defines normal and off-normal operating conditions for the offgas system. The Pipe Stress Design Criteria document specifies the ASME B31.3 Code for ancillary piping system 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 the code allowable values. The Piping Material Class Description document lists the bounding pressure and temperature limits for each piping material class.

Information Assessed		Source of Information	Assessment
Secondary Containment	Ancillary equipment is designed with secondary containment that is constructed of materials compatible with the waste and of sufficient strength to prevent failure (pressure gradients, waste, climatic conditions, daily operations), provided with a leak-detection system, and designed to drain and remove liquids.	24590-LAW-3PS-AE00-T0001, Rev. 4, Engineering Specification for Low Activity Waste Melters; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-DB-ENG-01-001, Rev. 1M, Basis of Design.	The Engineering Specification document requires the LMP melter shell design to contain the molten glass pool and to prevent leakage of bulk glass to the building cave in the event of refractory failures. The Basis of Design document requires that "Tank system ancillary equipment that manages dangerous waste shall have secondary containment" and "All secondary containments will be provided with drains and leak detection systems for detection of primary containment leaks." The ancillary equipment considered in this assessment is located in melter gallery and process areas inside the LAW facility. The Secondary Containment Design document provides typical standard details of secondary containment equipment for various WTP buildings. This report also addresses secondary containment for the Melter Feed Line Encasement Assemblies. Secondary containment for other ancillary equipment and services interfacing with the LAW melters such as sumps, liners, and drains within the melter gallery area is addressed in a separate report.