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PO/SCT	Submittal	Rev

Job No. 24590

Bechtel National, Inc.

SUPPLIER DOCUMENT STATUS

1. [X] **Work may proceed.**
2. [ ] **Revise and resubmit. Work may proceed subject to resolution of indicated comments.**
3. [ ] **Revise and resubmit. Work may not proceed.**
4. [ ] **Review not required. Work may proceed.**

Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods, or materials developed or selected by the supplier and does not relieve supplier from full compliance with contractual obligations.

REVIEWED									

EGNS

G-321 Document Category N/A
[From Supplement A to G-321-E (E) or G-321-V (V), as applicable, or "N/A" if SSRS is used]

Supersedes BNI Document No. N/A Rev. _____
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SUBCONTRACT SUBMITTAL

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R10396363

IQRPE REVIEW –
HIGH-LEVEL WASTE (HLW) FACILITY MELTER 1 & 2 OFFGAS TREATMENT PROCESS (HOP) SYSTEM MISCELLANEOUS TREATMENT UNIT SYSTEMS

"I, John T. Baxter, 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 High-Level Waste (HLW) Melter 1 & 2 Offgas Treatment Process (HOP) System Miscellaneous Treatment Unit Systems as required by the Dangerous Waste Regulations, namely, WAC 173-303-640(3) applicable paragraphs, i.e., (a) through (g)."

"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 intent fully satisfies the requirements of the WAC.

The attached review is sixteen (16) pages numbered one (1) through sixteen (16).

10/01/2004

John T. Baxter
Signature

10/01/2004
Date

24590-CM-HC4-HXYG-00138-01-00021 REV 00B

STRUCTURAL INTEGRITY ASSESSMENT OF THE HIGH-LEVEL WASTE (HLW) FACILITY MELTER 1 & 2 OFFGAS TREATMENT PROCESS (HOP) SYSTEM MISCELLANEOUS TREATMENT UNIT SYSTEMS

COGEMA-IA-045
REV. 2

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.

Scope	Scope of this Integrity Assessment	This Integrity Assessment addresses Miscellaneous Treatment Unit Systems (MTUs) that are components of the HLW Melter 1 & 2 Primary and Secondary Offgas Treatments Systems (HOP). These MTUs include; Booster Extraction Fans, Stack Extraction Fans, Wet Electrostatic Precipitators, Activated Carbon Adsorbers and Catalyst Skids shown on the Process Flow Diagrams listed below under References.
References	Drawings, Material Requisition, Specification and Data Sheets	24590-HLW-M5-V17T-P0003, Rev. 0, Process Flow Diagram HLW Vit Primary Offgas Treatment (HOP System); 24590-HLW-M5-V17T-P0004, Rev. 1, Process Flow Diagram HLW Vitrification Melter 1 Secondary Offgas Treatment (System HOP); 24590-HLW-M5-V17T-P20003, Rev. 0, Process Flow Diagram HLW Vit Melter 2 Primary Offgas Treatment (HOP System); 24590-HLW-M5-V17T-P20004, Rev. 0, Process Flow Diagram HLW Vitrification Melter 2 Secondary Offgas Treatment (System HOP); Material Requisition No. 24590-QL-MRA-MACS-00002, Rev. 2, High Integrity Centrifugal Blowers QL2 (U6L9) (HV006) dated 8/31/04, MR Section 2 – Technical Specifications; 24590-WTP-3PS-MACS-T0004, Rev. 1, Engineering Specification for High Integrity Centrifugal Blowers; High-Pressure Centrifugal Blower Data Sheet:, 24590-HLW-MAD-HOP-00018, Rev. 1, HLW Offgas Booster Fan HOP-FAN-00001A/B/C & -00009A/B/C; High-Pressure Centrifugal Blower Data Sheet:, 24590-HLW-MAD-HOP-00038, Rev. 0, HLW Offgas Stack Extraction Fan HOP-FAN-00008/A/B/C & -00010A/B/C; Material Requisition No. 24590-QL-MRA-MKE0-00001, Rev. 5, Wet Electrostatic Precipitators (WESP) QL-1/2 (QOL5) (MLT001) (N085) dated 08/18/04, MR Section 2 – Technical Specifications; 24590-WTP-3PS-MKE0-T0001, Rev. 4, Engineering Specification for Wet Electrostatic Precipitators; Plant Item Material Selection Data Sheet 24590-HLW-N1D-HOP-P0002, Rev. 0, Melter 1 & 2 Wet Electrostatic Precipitator HOP-WESP-00001 & 2 (HLW);

References	Specifications, Material Requisitions and Data Sheets	Material Requisition No. 24590-QL-MRA-MBT0-00002, Rev. 3, Thermal Catalytic Oxidizers / Reducers (N073) (MS056) dated 5/17/04, MR Section 2 – Technical Specifications; 24590-WTP-3PS-MBTV-T0001, Rev. 0, Engineering Specification for Thermal Catalytic Oxidizers/Reducers; Plant Item Material Selection Data Sheet 24590-HLW-N1D-HOP-P0004, Rev. 1, Thermal Catalytic Oxidizer, HOP-SCO-00001 & HOP-SCO-00004 (HLW); Plant Item Material Selection Data Sheet 24590-HLW-N1D-HOP-P0005, Rev. 1, NOx Selective Catalytic Reducer, HOP-SCR-00001 & HOP-SCR-00002 (HLW); HLW Catalytic Oxidizer/Reducer Mechanical Data Sheet No. 24590-HLW-MKD-HOP-00019, Rev. 1, HLW Catalytic Oxidizer/Reducer HOP-SCO-00002; HLW Catalytic Oxidizer/Reducer Mechanical Data Sheet No. 24590-HLW-MKD-HOP-00020, Rev. 1, HLW Catalytic Oxidizer/Reducer HOP-SCO-00003; Material Requisition No. 24590-QL-MRA-MWK0-00001, Rev.1, Carbon Bed Adsorbers (MS002) (N151) dated 9/27/04, MR Section 2 – Technical Specifications; 24590-WTP-3PS-MWK0-T0001, Rev. 0, Engineering Specification for Activated Carbon Bed Adsorbers; Plant Item Material Selection Data Sheet 24590-HLW-N1D-HOP-P0003, Rev. 0, Activated Carbon Adsorber HOP-ADBR-00001A/B & 2A/B (HLW); Mechanical Data Sheet Activated Carbon Adsorber 24590-HLW-MVD-HOP-00015, Rev. 0, Activated Carbon Adsorbers HOP-ADBR-00001A/B; Mechanical Data Sheet Activated Carbon Adsorber 24590-HLW-MVD-HOP-00016, Rev. 0, Activated Carbon Adsorbers HOP-ADBR-00002A/B;

References	System Description	24590-HLW-3YD-HOP-00001, Rev. 0, Systems Description for HLW Melter Offgas Treatment Process and Process Vessel Vent Extraction (HOP and PVV Systems); System Description Change Notice (SDCN) SDCN No. 24590-HLW-3YN-HOP-00001 for System Description No. 24590-HLW-3YD-HOP-00001, Rev. 0; SDCN No. 24590-HLW-3YN-HOP-00002 for System Description No. 24590-HLW-3YD-HOP-00001, Rev. 0; SDCN No. 24590-HLW-3YN-HOP-00003 for System Description No. 24590-HLW-3YD-HOP-00001, Rev. 0; SDCN No. 24590-HLW-3YN-HOP-00004 for System Description No. 24590-HLW-3YD-HOP-00001, Rev. 0
Definitions	Nomenclature	Catalyst Skid: The catalyst skids are comprised of four components. These components are the Catalyst Skid Preheater, the Catalyst Skid Electric Heater, a Thermal Catalytic Oxidizer Unit and a Selective Catalytic Reducer. Additional information is available in the System Description.

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 controls and requirements to assure the design intent fully satisfies the Washington Administrative Code Dangerous Waste Regulations WAC 173-303 requirements.

	Information Assessed	Source of Information	Assessment
Design	Plant item design standards are appropriate and adequate for the plant item's intended use.	Drawings, System Description and High-Pressure Centrifugal Blower Data Sheets listed above under references; 24590-WTP-3PS-MACS-TP004, Rev. 1, Engineering Specification for High Integrity Centrifugal Blowers; ASME AG-1-1997, Code on Nuclear Air and Gas Treatment; ASME AG-1a-2000, Addenda to ASME AG-1-1997, Code on Nuclear Air and Gas Treatment	The Booster Extraction Fans (HOP-FAN-00001A/B/C & 9A/B/C) and Stack Extraction Fans (HOP-FAN -00008A/B/C & 10A/B/C) are components in the Melter 1/2 Offgas Treatment Systems (HOP). The Booster Extraction Fans are located in Room H-B001C at elevation (-) 21'-0" and the Stack Extraction Fans are located in Room H-0429 at elevation 58'-0" as noted on the Data Sheets. They are accessible for maintenance. The Engineering Specification for High Integrity Centrifugal Blowers requires that these fans be designed, fabricated, and tested in accordance with the requirements in ASME AG-1-1997 and ASME AG-1a-2000. Supplementary requirements are specified in the Engineering Specification for High Integrity Centrifugal Blowers. The supplementary requirements address design, materials, fabrication, inspection, testing, quality assurance, documentation and storage requirements. The fans are identified as Quality Level (QL-2) and Seismic Category (SC-III) in the High-Pressure Centrifugal Blower Data Sheets. These are adequate and acceptable design standards for the Booster and Stack Extraction Fans.
	If a non-standard plant item is to be used, the design calculations demonstrate sound engineering principles of construction.	Drawings and High-Pressure Centrifugal Blower Data Sheets listed above under References; 24590-WTP-3PS-MACS-TP004, Rev. 1, Engineering Specification for High Integrity Centrifugal Blowers	The Booster and Stack Extraction Fans are components in the Melter 1/2 Offgas Treatment Systems (HOP). These fans are standard offgas treatment assemblies that are shop fabricated. The Engineering Specification for High Integrity Centrifugal Blowers requires that the ASME AG-1/1a fan assemblies be delivered after design, fabrication, inspection, and testing. The Booster and Stack Extraction Fans design codes and standards are appropriate and adequate for the intended service.

	Information Assessed	Source of Information	Assessment
Design	Plant item has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.	Drawings and High-Pressure Centrifugal Blower Data Sheets listed above under references; 24590-WTP-3PS-MACS-TP004, Rev. 1, Engineering Specification for High Integrity Centrifugal Blowers; ASME AG-1-1997, Code on Nuclear Air and Gas Treatment; ASME AG-1a-2000, Addenda to ASME AG-1-1997, Code on Nuclear Air and Gas Treatment 24590-WTP-3PS-FB01-T0001, Rev. 1, Engineering Specification for Structural Design Loads for Seismic Category III and IV Equipment and Tanks; Uniform Building Code (UBC), 1997, International Conference of Building Officials	The High-Pressure Centrifugal Blower Data Sheets identify the Booster and Stack Extraction Fans operating pressure and temperature ranges, the materials selected for the fan housings, shafts, fan wheels and the mounting frame, the fans quality levels, and the requirements for seismic design. The Engineering Specification for High Integrity Centrifugal Blowers requires use of ASME AG-1/1a for design which provides for specific consideration of the operating pressures and temperatures and seismic loads in the design process. The Blower Data Sheets indicate that the fans all operate in "dry" conditions (non-condensing); therefore, a corrosion resistant material is specified for the fan housing and internal components, but no corrosion allowance is specified. Detailed requirements for seismic design of the fans are furnished in the Engineering Specification for Structural Design Loads for Seismic Category III and IV Equipment and Tanks. Seismic design loads are taken from the UBC. These codes and standards are adequate and appropriate for design of the Booster and Stack Extraction Fans to withstand operating pressure and temperature loads and seismic loads for the specified design life while considering corrosion resistance.
Foundation	Plant item foundation will maintain the load of a full vessel.	24590-WTP-3PS-MACS-TP004, Rev. 1, Engineering Specification for High Integrity Centrifugal Blowers; ASME AG-1-1997, Code on Nuclear Air and Gas Treatment; ASME AG-1a-2000, Addenda to ASME AG-1-1997, Code on Nuclear Air and Gas Treatment	The Engineering Specification for High Integrity Centrifugal Blowers requires use of ASME AG-1/1a for design of the Booster and Stack Extraction Fans. The ASME codes have adequate provisions to assure proper foundation support for the fans. These codes and standards are adequate and appropriate for design of the Booster and Stack Extraction Fans supports. The fans are furnished as package units with their drives on skid platforms for installation in the HLW Vitrification Building.

	Information Assessed	Source of Information	Assessment
Foundation	If in an area subject to flooding, the plant item is anchored.	Drawings, System Description listed above under references; 24590-WTP-3PS-MACS-TP004, Rev. 1, Engineering Specification for High Integrity Centrifugal Blowers	The Booster Extraction Fans (HOP-FAN-00001A/B/C & 9A/B/C) are components in the Melter 1/2 Secondary Offgas Treatment Systems (HOP). This system handles offgas vapors from the melters and process vessels ventilation. Cell H-B001C contains only components of this offgas system; therefore, there are no local sources of liquids to flood the cell except for firewater from the sprinkler system. A similar condition exists in Room H-0429 where the Stack Extraction Fans (HOP-FAN-00008A/B/C & 10A/B/C) are located. Design for flooding is not a required load case in the Engineering Specification for High Integrity Centrifugal Blowers. The fans are anchored to provide for adequate seismic resistance.
Frost Heave	Plant item system will withstand the effects of frost heave.	System Description listed above under references; 24590-WTP-DC-ST-01-001, Rev. 3, Structural Design Criteria	The Structural Design Criteria document requires that all structural foundations extend a distance below grade that exceeds the depth of the frost line in order to preclude frost heave. The frost line is 30 in. below grade. The HLW Vitrification Building foundations are not subject to frost heave, therefore, the Booster and Stack Extraction Fans, located in rooms inside the HLW Vitrification Building, are not subject to frost heave.

	Information Assessed	Source of Information	Assessment
Waste Characteristics	Characteristics of the waste to be stored or treated have been identified (ignitable, reactive, toxic, specific gravity, vapor pressure, flash point, storage temperature)	High-Pressure Centrifugal Blower Data Sheets listed above under References; 24590-WTP-PER-PR-03-002, Rev. 1, Toxic Vapors and Emissions from WTP Tank Systems and Miscellaneous Treatment Unit Systems; System Description listed above under References	The High-Pressure Centrifugal Blower Data Sheets present the offgas specific gravity, operating temperatures and pressures, and the chemical composition of hazardous materials in the offgas. The main safety function of the Booster Extraction Fans is to provide protection for the facility workers from the acutely or chronically toxic vapors and emissions in the Melter 1/2 offgas systems as discussed in the Toxic Vapors and Emissions from WTP Tank Systems and Miscellaneous Treatment Unit Systems document. The System Description identifies that the offgas in the fans is hazardous, but not ignitable or flammable. The fans' function during normal operations is to maintain flow of the offgas to the HLW Building Stack. The Booster and Stack Extraction Fans designs are required to provide an intact housing pressure boundary during normal operations, abnormal operations and during and after a design level earthquake.
	Plant item is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	High-Pressure Centrifugal Blower Data Sheets, System Description listed above under References	The High-Pressure Centrifugal Blower Data Sheets identify that the fans provide pressure head to maintain normal offgas flow. The System Description discusses normal and abnormal operations for the fans. Additional reagents will not normally be added to the Booster and Stack Extraction Fans process streams during normal operations.
Compatibility	The waste types are compatible with each other.	High-Pressure Centrifugal Blower Data Sheets, System Description listed above under References	The System Description for the HLW Melter Offgas Treatment Process (HOP) System does not describe any operations where incompatible wastes are mixed in the Booster and Stack Extraction Fans offgas streams. The offgas chemistries for both normal and abnormal operations were fully considered in the material selections for the fans.

	Information Assessed	Source of Information	Assessment
Corrosion	Plant item material and protective coatings ensure the vessel structure is adequately protected form the corrosive effects of the waste stream and external environments (expected to not leak or fail for the design life of the system)	Drawings, High-Pressure Centrifugal Blower Data Sheets and System Description listed above under References; ASME AG-1-1997, Code on Nuclear Air and Gas Treatment; ASME AG-1a-2000, Addenda to ASME AG-1-1997, Code on Nuclear Air and Gas Treatment	The High-Pressure Centrifugal Blower Data Sheets list 316L stainless steel as the preferred material for the fan housings, shafts, fan wheels and the mounting frame. The Data Sheets indicate that the fans all operate in "dry" conditions (non-condensing); therefore, a corrosion resistant material is specified for the fan housing and internal components, but no corrosion allowance is specified. ASME AG-1/1a do require mandatory consideration of corrosion/erosion in the design of these fans. The external environment for the fans will be dry air in rooms H-B001C and H-0429. Therefore, external corrosion is not a concern.
	Corrosion allowance is adequate for the intended service life of the plant item.	High-Pressure Centrifugal Blower Data Sheets listed above under references; 24590-WTP-3PS-MACS-TP004, Rev. 1, Engineering Specification for High Integrity Centrifugal Blowers; ASME AG-1-1997, Code on Nuclear Air and Gas Treatment; ASME AG-1a-2000, Addenda to ASME AG-1-1997, Code on Nuclear Air and Gas Treatment	The bases for the HLW Offgas Booster Fans material selection is furnished in the High-Pressure Centrifugal Blower Data Sheets. Selection of 316L stainless steel for a service life of 40 years is adequate and appropriate considering that the fans all operate in "dry" conditions (non-condensing). The Engineering Specification for High Integrity Centrifugal Blowers does not specify use of a corrosion allowance. However, the ASME AG-1/1a codes do require mandatory consideration of corrosion/erosion in the design of these fans.
Pressure Relief	Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the plant item are exceeded.	High-Pressure Centrifugal Blower Data Sheets; 24590-WTP-3PS-MACS-TP004, Rev. 1, Engineering Specification for High Integrity Centrifugal Blowers; ASME AG-1-1997, Code on Nuclear Air and Gas Treatment; ASME AG-1a-2000, Addenda to ASME AG-1-1997, Code on Nuclear Air and Gas Treatment	The High-Pressure Centrifugal Blower Data Sheets provide the design pressure and temperature conditions for the Booster Extraction Fans. The Engineering Specification for High Integrity Blowers and ASME AG-1/1a both require that the fan enclosures be designed for pressures that are a minimum of 125% of the highest pressure the fan can produce while retaining adequate code based design stress and deformation margins.

	Information Assessed	Source of Information	Assessment
Design	Plant item design standards are appropriate and adequate for the plant item's intended use.	Material Requisitions, Engineering Specifications and Mechanical Data Sheets listed above under References; 24590-WTP-3PS-MV00-T0001, Rev. 1, Engineering Specification for Pressure Vessel Design and Fabrication; ASME Boiler and Pressure Vessel (B&PV) Code, Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; ASME AG-1-1997, Code on Nuclear Air and Gas Treatment; American Society of Mechanical Engineers; ASME AG-1a-2000, Addenda to ASME AG-1-1997, Code on Nuclear Air and Gas Treatment; American Society of Mechanical Engineers; ASME N509-1989, Nuclear Power Plant Air-Cleaning Units and Components, American Society of Mechanical Engineers	The Material Requisitions and the associated Engineering Specifications require use of the Engineering Specification for Pressure Vessel Design and Fabrication for the external pressure boundaries of the WESPs, the Catalytic Skid components and the Activated Carbon Bed Adsorbers. This specification requires that the MTU external pressure boundaries are to be designed to ASME B&PV Code, Section VIII, Division 1 rules. Additional supplementary requirements are specified in the specification for Pressure Vessel Design and Fabrication. These supplementary requirements address positive material identification, standard fabrication tolerances, acceptable welding procedures for the vessel and appurtenances, welder qualifications and testing records, NDE inspections and records, quality assurance requirements, and packaging, shipping, handling and storage requirements. The Engineering Specifications for Catalytic Oxidizers/Reducers and Activated Carbon Bed Adsorbers require that the ASME B&PV Code, Section VIII, Division 1 rules be supplemented with the ASME AG-1/1a and ASME N509 design requirements as appropriate for the design of the external pressure boundaries. The Material Requisitions and the Mechanical Data Sheets identify Seismic Categories and Quality Levels for each MTU: HOP-WESP-00001 & 2, Seismic Category (SC-III), Quality Level (QL-2); HOP-SCO-00002 & 3, Seismic Category (SC-III), Quality Level (QL-2); and HOP-ADBR-00001A/B & 2A/B, Seismic Category (SC-III), Quality Level (QL-2). These are adequate and acceptable codes and standards for design and fabrication of these HOP system MTUs.

	Information Assessed	Source of Information	Assessment
Design	If a non-standard plant item is to be used, the design calculations demonstrate sound engineering principles of construction.	Engineering Specifications listed above under References; 24590-WTP-3PS-MV00-T0001, Rev. 1, Engineering Specification for Pressure Vessel Design and Fabrication; ASME Boiler and Pressure Vessel (B&PV) Code, Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; ASME AG-1-1997, Code on Nuclear Air and Gas Treatment; American Society of Mechanical Engineers; ASME AG-1a-2000, Addenda to ASME AG-1-1997, Code on Nuclear Air and Gas Treatment; American Society of Mechanical Engineers; ASME N509-1989, Nuclear Power Plant Air-Cleaning Units and Components, American Society of Mechanical Engineers	The Engineering Specification for Pressure Vessel Design and Fabrication requires that the HOP System WESP pressure vessels are to be designed and fabricated in accordance with the requirements of ASME B&PV Code, Section VIII, Division 1. The vessels are to be delivered after design, fabrication, inspection and testing with ASME U stamps and the vessels will be registered with the National Board. The Engineering Specifications for the Catalytic Oxidizer/Reducers and the Activated Carbon Adsorbers require that the external pressure boundaries of these MTUs be designed in accordance with the requirements of ASME B&PV Code, Section VIII, Division 1, supplemented by selected requirements from ASME AG-1/1a and ASME N509. Code stamps are not required for these MTUs. These are shop fabricated MTUs for melter offgas service in the HLW Facility.

	Information Assessed	Source of Information	Assessment
Design	Plant item has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.	Engineering Specifications listed above under References; 24590-WTP-3PS-MV00-T0001, Rev. 1, Engineering Specification for Pressure Vessel Design and Fabrication; ASME Boiler and Pressure Vessel (B&PV) Code, Section VIII, Division 1, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; ASME AG-1-1997, Code on Nuclear Air and Gas Treatment; American Society of Mechanical Engineers; ASME AG-1a-2000, Addenda to ASME AG-1-1997, Code on Nuclear Air and Gas Treatment; American Society of Mechanical Engineers; ASME N509-1989, Nuclear Power Plant Air-Cleaning Units and Components, American Society of Mechanical Engineers; 24590-WTP-3PS-MV00-T0002, Rev. 1, Engineering Specification for Seismic Qualification Criteria for Pressure Vessels; 24590-WTP-3PS-FB01-T0001, Rev. 1, Engineering Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks; UBC, 1997, Uniform Building Code, International Conference of Building Officials	The Material Requisitions and the associated Engineering Specifications require use of the Engineering Specification for Pressure Vessel Design and Fabrication for the external pressure boundaries of the WESPs, the Catalytic Skid components and the Activated Carbon Bed Adsorbers. This specification requires that the MTU external pressure boundaries are to be designed to ASME B&PV Code, Section VIII, Division 1 rules. This code requires specific consideration of the operating pressures, temperatures, seismic loads, and corrosion allowance in the design process. The Engineering Specifications for Catalytic Oxidizers/Reducers and Activated Carbon Bed Adsorbers require that the ASME B&PV Code, Section VIII, Division 1 rules be supplemented with the ASME AG-1/1a and ASME N509 design requirements as appropriate for the design of the external pressure boundaries for these MTUs. The Specifications and Mechanical Data Sheets identify the operating pressure and temperature ranges for each MTU, the materials selected in the corrosion report, the corrosion allowance, and the requirements for seismic qualification in the design. General seismic design criteria are specified in the Engineering Specification for Seismic Qualification Criteria for Pressure Vessels which are applicable to the WESPs design. All of the MTUs considered in this assessment are SC-III, as noted above. The Engineering Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks provides detailed guidance for this seismic analysis which requires use of the seismic design requirements in the 1997 UBC. These are appropriate codes and criteria to ensure the HOP system MTUs have adequate strength at the end of their design lives.

	Information Assessed	Source of Information	Assessment
Foundation	Plant item foundation will maintain the load of a full vessel.	Material Requisitions, Engineering Specifications and Mechanical Data Sheets listed above under References; 24590-WTP-3PS-MV00-T0001, Rev. 1, Engineering Specification for Pressure Vessel Design and Fabrication; Specification Change Notice (SCN) No. 24590-WTP-3PN-MV00-00006 for Engineering Specification for Pressure Vessel Design and Fabrication; ASME AG-1-1997, Code on Nuclear Air and Gas Treatment; American Society of Mechanical Engineers; ASME AG-1a-2000, Addenda to ASME AG-1-1997, Code on Nuclear Air and Gas Treatment; American Society of Mechanical Engineers	The Engineering Specification for Wet Electrostatic Precipitators shows the WESPs supported on cylindrical skirts. The Engineering Specification for Pressure Vessel Design and Fabrication provides requirements that assure adequate vessel skirt foundation designs. The Catalytic Oxidizers/Reducers and the Activated Carbon Adsorbers are to be designed with support frames adequate for both shipping and installation. Design requirements for these support frames are specified in ASME AG-1/1a and ASME N509. These are adequate codes and standards to assure that the plant item foundations will support the MTUs under all required load conditions.
	If in an area subject to flooding, the plant item is anchored.	Material Requisitions, Engineering Specifications and Mechanical Data Sheets listed above under References;	The MTUs considered in this assessment are components in the Melter 1/2 Offgas Treatment Systems (HOP). These systems handle offgas vapors from the melters and process vessels ventilation. Cells where the Catalytic Oxidizers/Reducers and Activated Carbon Adsorbers are located contain only components of these offgas systems; therefore, there are no local sources of liquids to flood the rooms except for firewater from the sprinkler systems and the internal fire protection deluge system built into the Activated Carbon Adsorbers. Operation of the deluge system includes automatic provisions for overflow control to avoid flooding the room. The process cells where the WESPs are located contain no fire suppression systems. Design for flooding is not a required load case in the Engineering Specifications these MTUs. They are anchored to provide for adequate seismic resistance.

	Information Assessed	Source of Information	Assessment
Frost Heave	Plant item system will withstand the effects of frost heave.	System Description listed above under References; 24590-WTP-DC-ST-01-001, Rev. 3, Structural Design Criteria	The System Description identifies that the WESPs, Catalytic Oxidizers/Reducers, and Activated Carbon Adsorbers are located in cells and rooms at various locations in the HLW Vitrification Building. These rooms are supported by the HLW Building mat foundation. The Structural Design Criteria requires that all structural foundations extend into the surrounding soil below the frost line in order to preclude frost heave. The frost line is located 30 in. below finished grade. The mat foundation is not subject to frost heave, therefore the HOP system MTUs will not be subject to frost heave.
Waste Characteristics	Characteristics of the waste to be stored or treated have been identified (ignitable, reactive, toxic, specific gravity, vapor pressure, flash point, storage temperature)	Specifications, Data Sheets and System Description listed above under References; 24590-WTP-PER-PR-03-002, Rev. 1, Toxic Vapors and Emissions from WTP Tank Systems and Miscellaneous Treatment Unit Systems	The Specifications and Data Sheets present the offgas operating temperatures and pressures, relative humidity and the radiological and chemical composition of hazardous materials in the offgas. The main safety function of the WESPs, Catalytic Oxidizers/Reducers, and Activated Carbon Adsorbers is to provide confinement of the toxic vapors and emissions in the Melter 1/2 offgas systems to protect the facility workers as discussed in the Toxic Vapors and Emissions from WTP Tank Systems and Miscellaneous Treatment Unit Systems document. The System Description identifies that the offgas in these MTUs is hazardous, but not ignitable or flammable. The Activated Carbon Adsorber design includes an internal deluge system for fire suppression to control potential fires in the activated carbon filter media. The MTU designs are required to provide an intact external pressure boundary during normal operations, abnormal operations and during and after a design level earthquake.

	Information Assessed	Source of Information	Assessment
Waste Characteristics	Plant item is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	Specifications, Data Sheets and System Description listed above under References	The Specifications and Plant Item Material Selection Data Sheets show that the material selections for these MTUs take into account both normal and abnormal operations offgas waste characteristics. The material selections also address reagent use for cleaning and periodic maintenance of the MTUs.
Compatibility	The waste types are compatible with each other.	Specifications, Data Sheets and System Description listed above under References	The System Description for the HLW Melter Offgas Treatment Process (HOP) System does not describe any operations where incompatible wastes are mixed in the MTU offgas streams. The Specifications and Data Sheets show that offgas chemistries for both normal and abnormal operations were fully considered in the material selections for the MTUs.

	Information Assessed	Source of Information	Assessment
Corrosion	Plant item material and protective coatings ensure the vessel structure is adequately protected form the corrosive effects of the waste stream and external environments (expected to not leak or fail for the design life of the system).	Specifications, Data Sheets and System Description listed above under References; 24590-WTP-3PS-NN00-T0001, Rev. 0, Engineering Specification for Hot and Anti-Sweat Thermal Insulation	The Engineering Specification for Wet Electrostatic Precipitators lists UNS N08367 (AL6XN, 6% Mo Alloy) as the material of choice for the WESP vessel external pressure boundary and wetted internal metal components. The Plant Item Material Selection Data Sheets for the Catalytic Oxidizers/Reducers, and Activated Carbon Adsorbers list 316 stainless steel (maximum 0.030% Carbon, dual certified), hereinafter called 316L stainless steel, as the material of choice for the external pressure boundaries (housings). No corrosion allowance is requiredfor these items. The Engineering Specification for Activated Carbon Bed Adsorbers requires external insulation of the Carbon Bed Adsorber housings and connecting piping in accordance with the Engineering Specification for Hot and Anti-Sweat Thermal Insulation. The Material Data Sheets refer to ASTM C533 Calcium Silicate, Type I insulation materials. The Material Data Sheets for the Catalytic Oxidizers/Reducers list both Internal Ceramic Fiber block insulation for the housings and external insulation in accordance with the Engineering Specification for Hot and Anti-Sweat Thermal Insulation. These requirements assure that the MTUs will have adequate corrosion protection for the expected design life (40 years).

	Information Assessed	Source of Information	Assessment
Corrosion	Corrosion allowance is adequate for the intended service life of the plant item.	Specifications, Data Sheets and System Description listed above under References	The Engineering Specification for Wet Electrostatic Precipitators lists UNS N08367 (AL6XN, 6% Mo Alloy) as the material of choice for the WESP vessel external pressure boundary with a corrosion allowance of 0.04" for a 40 year service life. The Mechanical Data Sheets for the Activated Carbon Absorbers list 316L stainless steel as the material selected for the housing with no corrosion allowance as adequate for a 40 year service life. The Plant Item Material Selection Data Sheets for the Catalytic Oxidizers/Reducers lists 316L stainless steel as the material selection for the housings with no corrosion allowance as adequate for a 40 year service life.
Pressure Relief	Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the plant item are exceeded.	Specifications, Data Sheets and System Description listed above under References	The Engineering Specifications for these MTUs list design pressures for the vessels and housings that exceed the range of the normal and abnormal operating pressures for the Melter 1/2 Offgas Treatment Process System at each MTU location.