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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										SSRS
										R/K

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. _____
[When applicable]

Accepted by DC Pfluger DC Pfluger 9/29/04
Print Name Signature Date

Released by N/A _____ _____
[When applicable] Print Name Signature Date

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SUBCONTRACT SUBMITTAL

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R10384058

IQRPE REVIEW
OF
PRETREATMENT FACILITY (PTF), PULSE JET VENTILATION SYSTEM (PJV), DRAIN COLLECTION VESSEL, PJV-VSL-00002

"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 Pretreatment Facility (PTF), Pulse Jet Ventilation System (PJV), Drain Collection Vessel, PJV-VSL-00002 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 six pages numbered 1 through 6.

TARLOK SINGH HUNDAL
STATE OF WASHINGTON
20213
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES: 02/15/06

T S Hundal
Signature

9/27/04
Date

24590-CM-HC4-HXYG-00158-02-00041 REV 00A

STRUCTURAL INTEGRITY ASSESSMENT OF THE PRETREATMENT FACILITY (PTF), PULSE JET VENTILATION SYSTEM (PJV), DRAIN COLLECTION VESSEL, PJV-VSL-00002

COGEMA-IA-071

REV. 0

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 is for PJV Drain Collection Vessel (PJV-VSL-00002), located in cell (P-0102) at Elevation 0'-0" in the Pretreatment Facility.
References	Specifications, Drawings and Mechanical Data Sheet	The following Specifications are listed in the Material Requisition No. 24590-QL-MRC-MVA0-A0002, Rev. 0 (including Material Requisition Supplement Nos. S0001, S0002, S0007, and S0008 to Rev. 0 of the MR): Engineering Specification for Pressure Vessel Design and Fabrication; Engineering Specification for Seismic Qualification Criteria for Pressure Vessels; Specification for Welding of Pressure Vessels, Heat Exchangers and Boilers; General Specification for Supplier Quality Assurance Program Requirements; Specification for Positive Material Identification (PMI); General Specification for Packing, Shipping, Handling, and Storage; Engineering Specification for Pressure Vessel Fatigue Analysis; Engineering Specification for Seismic Qualification of Seismic Category I/II Equipment and Tanks. Drawings: 24590-PFT-MV-PJV-00001, Rev. 0, Equipment Assembly PJV Drain Collection vessel, PJV-VSL-00002 (Q); 24590-PTF-P1-P01T-P0001, Rev. 4, Pretreatment Facility General Arrangement Plan at El. 0'-0"; 24590-PTF-P1-P01T-P0008, Rev. 5, Pretreatment Facility General Arrangement Section B-B; 24590-PTF-P1-P01T-P0013, Rev. 5, Pretreatment Facility General Arrangement Sect. H-H and Sect. J-J; 24590-PTF-M6-PJV-P0001, Rev. 0, P&ID – PTF Pulse Jet Ventilation System Air Racks to Demisters; 24590-PTF-M6-PJV-P0002, Rev. 0, P&ID-PTF Pulse Jet Ventilation System Inlet Header to Demister Outlet; 24590-PTF-M5-V17T-P0021002, Rev. 0, Process Flow Diagram Pretreatment RFD/PJM Exhaust (PJV) Systems PVP/PVV/PJV. Mechanical Data Sheet: 24590-PTF-MVD-PJV-00003, Rev. 1, Mechanical Data Sheet for PJV Drain Collection Vessel (PJV-VSL-00002).
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 ensure the design intent fully satisfies the requirements of Washington Administrative Code, WAC-173-303-640, *Dangerous Waste Regulations*.

	Information Assessed	Source of Information	Assessment
Design	Vessel design standards are appropriate and adequate for the vessel's intended use.	Specifications listed under Material Requisition, Drawings, and Mechanical Data Sheet listed above under References; ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, Rules for Construction of Nuclear Power Plant Components, 1995; ASME Boiler and Pressure Vessel Code, Section VIII, Division 2, Alternative Rules; 24590-PTF-3YD-PJV-00001, Rev. C, System Description for PTF Pulse Jet Ventilation System (PJV) – (including SDCNs 24590-PTF-3YN-PJV-00002 and – 00003).	The Specification for Vessel Design and Fabrication requires the PJV Drain Collection Vessel, PJV-VSL-00002 and all appurtenances to be designed to the ASME Section VIII, Division 1 rules, which are appropriate for pressure vessels operating with mixed waste solutions over the pressure and temperature ranges specified for this vessel. Supplementary requirements are specified in the Engineering Specification for Pressure Vessel Design and Fabrication. Supplementary requirements address pressure vessel fatigue analysis, positive material identification, lifting attachment design, equipment drop evaluation, fabrication tolerances, acceptable welding procedures for the vessel and appurtenances, welder qualifications and testing records, NDE inspections and records, and lifting, packaging, shipping, handling and storage requirements. These are adequate and acceptable design standards for the intended use of the vessel. The vessel is vertical with a 120 in. ID and a height of 144 in. from bottom tangent line to top tangent line supported on a cylindrical skirt (approx. 8' high) which in turn is supported on a ring beam anchored to the concrete floor at Elev. 0'-0". The vessel's top and bottom elliptical heads and the shell are built with 1/2" minimum thick plate. The vessel has internal pipes supported from the top head. Material for the vessel's shell, heads, internals, and support is SA-240 304 stainless steel (0.030% maximum carbon content, dual certified) and is hereafter referred to as 304 stainless steel. The operating vessel volume is to be about 7,410 gallons and the total internal volume is to be about 8,980 gallons.
	If a non-standard vessel is to be used, the design calculations demonstrate sound engineering principles of construction.	Specifications listed under Material Requisition, Drawings, and Mechanical Data Sheet listed above under References.	The PJV Drain Collection Vessel, PJV-VSL-00002 is a standard ASME Section VIII vessel. The Mechanical Data Sheet requires that the ASME Section VIII, Division 1 vessels be delivered after design, fabrication, inspection and testing with an ASME code stamp and that the vessels be nationally registered. Supplemental design information is provided by the reference documents listed in the Source of Information column for utilizing sound engineering principles of construction of the vessel.

	Information Assessed	Source of Information	Assessment
Design	Vessel has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.	Specifications listed under Material Requisition, Drawings, and Mechanical Data Sheet listed above under References; 24590-PTF-3YD-PJV-00001, Rev. C, System Description for PTF Pulse Jet Ventilation System (PJV) – (including SDCNs 24590-PTF-3YN-PJV-00002 and – 00003).	The Mechanical Data Sheet identifies the vessel's operating pressure and temperature ranges, the materials selected for the vessel, the corrosion allowance, and the vessel quality level and seismic category, which determine the requirements for seismic design. The design specification for the vessel requires specific consideration of the operating pressures and temperatures and seismic loads in the design process. ASME Section VIII, Division 1 requires that the corrosion allowance thickness be excluded from the nominal vessel thickness when evaluating the adequacy of vessel components for these loads at the end of life. The Engineering Specification for Seismic Qualification Criteria for Pressure Vessels adopts ASME Section VIII, Division 2 design rules to address seismic design and analysis of the vessel. Detailed requirements for seismic load determination are furnished in the specification for Seismic Category I/II Equipment and Tanks. These codes and standards are adequate and appropriate for the design of the PJV vessel to withstand operating pressure and temperature loads and seismic loads for the specified design life.

	Information Assessed	Source of Information	Assessment
Foundation	Vessel foundation will maintain the load of a full vessel.	Specifications listed under Material Requisition above under References; AISC Manual of Steel Construction, 9th Edition, American Institute of Steel Construction; 24590-WTP-DB-ENG-01-001, Rev. 1B, Basis of Design.	The Engineering Specification for Pressure Vessel Design and Fabrication requires the use of ASME BPV Code, Section VIII, Division 1 and AISC Manual of Steel Construction for the design of the vessel supports. This code ensures an adequate design for the vessel supports. Chapter 14 of the Basis of Design document requires that the vessel foundation design must be adequate to support the loads from full vessel.
	If in an area subject to flooding, the vessel is anchored.	Specifications listed under Material Requisition under References.	Buoyant forces on an empty vessel in a flooded room are mandatory standard design loads in the Specification for Pressure Vessel Design and Fabrication.
	Vessel system will withstand the effects of frost heave.	24590-WTP-DC-ST-01-001, Rev. 3, Structural Design Criteria.	The Structural Design Criteria document requires that all structural foundations for outdoor equipment to extend a distance below grade that exceeds the 30" depth of the frost line. This vessel is located inside/interior of the building at (Elevation 0'-0" level), therefore, the vessel foundation is 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)	Mechanical Data Sheet listed above under References; Plant Item Material Selection Data Sheet, 24590-PTF-N1D-PJV-P0001, Rev. 0, PJV-VSL-00002 (PTF) PJV Drain Collection Vessel; 24590-PTF-3YD-PJV-00001, Rev. C, System Description for PTF Pulse Jet Ventilation System (PJV) – (including SDCNs 24590-PTF-3YN-PJV-00002 and – 00003); 24590-WTP-PER-03-002, Rev. 1, Toxic Vapors and Emissions from WTP Tank Systems and Miscellaneous Treatment Unit Systems; 24590-WTP-PER-03-001, Rev. 1, Prevention of Hydrogen Accumulation in WTP Tank Systems and Miscellaneous Treatment Unit Systems.	The Mechanical Data Sheet presents the waste specific gravity, storage temperatures and pressures. The Plant Item Material Selection Data Sheet addresses the pH range and chemical composition of the waste to select appropriate vessel materials and specify the corrosion allowance. The PJV vessel provides primary confinement of the waste during normal operations, abnormal operations, and during and after a Design Basis Earthquake. Waste characteristics that are hazardous, such as ignitability, reactivity, and toxicity are appropriately addressed in the Toxic Vapors and Emissions document and Prevention of Hydrogen Accumulation document. All PJV system motors and electrically driven equipment are grounded to prevent any ignition. The vessel drain pump operation provides recirculation and mixing of the drain liquid to reduce settling of the solids. The vessel is vented back to the PTF PJV system to prevent any build-up of flammable gases. However, the System Description document does not list the PJV Drain Collection Vessel (PJV-VSL-00002) as having a potential for accumulating flammable gases.
	Vessel is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	Plant Item Material Selection Data Sheet, 24590-PTF-N1D-PJV-P0001, Rev. 0, PJV-VSL-00002 (PTF) PJV Drain Collection Vessel; 24590-PTF-3YD-PJV-00001, Rev. C, System Description for PTF Pulse Jet Ventilation System (PJV) – (including SDCNs 24590-PTF-3YN-PJV-00002 and – 00003).	The Plant Item Material Selection Data Sheet demonstrates that the vessel is designed to process the wastes discussed above. The System Description discusses normal and abnormal operations for the PJV vessel.
	The waste types are compatible with each other.	24590-PTF-3YD-PJV-00001, Rev. C, System Description for PTF Pulse Jet Ventilation System (PJV) – (including SDCNs 24590-PTF-3YN-PJV-00002 and – 00003).	The System Description for the PTF PJV system does not describe any operations where incompatible wastes are mixed in these vessels for processing. The primary function of this vessel is to receive the condensate and/or flush water from the PTF PJV ventilation system headers and sub-headers drains. The accumulated condensate and flush water from the Drain Collection Vessel is transferred by the PJV drain transfer pumps (PJV-PMP-00001A/B) to the PWD plant wash vessel (PWD-VSL-00044).

	Information Assessed	Source of Information	Assessment
Corrosion Protection	Vessel material and protective coatings ensure the vessel structure is adequately protected from the corrosive effects of the waste stream and external environments (expected to not leak or fail for the design life of the system)	Drawings and Mechanical Data Sheet listed above under References; Plant Item Material Selection Data Sheet, 24590-PTF-N1D-PJV-P0001, Rev. 0, PJV-VSL-00002 (PTF) PJV Drain Collection Vessel; 24590-PTF-3YD-PJV-00001, Rev. C, System Description for PTF Pulse Jet Ventilation System (PJV) – (including SDCNs 24590-PTF-3YN-PJV-00002 and – 00003).	The Plant Item Material Selection Data Sheet shows that the PJV Drain Collection Vessel, PJV-VSL-00002 normally operates at atmospheric pressure, pH 9-10, and at 113°F temperature. The vessel is designed for 15 psig pressure and 200°F temperature. The material selected is 304 stainless steel and a corrosion allowance of 0.04 in. This vessel is located in cell (P-0102) at Elevation 0'-0". The cell is equipped with a sump to pump out any leaks. Therefore, the cell should remain dry during normal operation, which will limit external corrosion of the vessel over the facility design life.
Corrosion Allowance	Corrosion allowance is adequate for the intended service life of the vessel.	Mechanical Data Sheet listed above under References; Plant Item Material Selection Data Sheet, 24590-PTF-N1D-PJV-P0001, Rev. 0, PJV-VSL-00002 (PTF) PJV Drain Collection Vessel.	The bases for the PJV vessel's material selection and corrosion allowance are furnished in the Plant Item Material Selection Data Sheet. Selection of 304 stainless steel material with a corrosion allowance of 0.04 in. for a service life of 40 years is adequate and appropriate. The material selection and corrosion allowance are carried forward to the Mechanical Data Sheet.
Pressure Relief	Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the vessel are exceeded.	Drawings listed above under References; 24590-PTF-3YD-PJV-00001, Rev. C, System Description for PTF Pulse Jet Ventilation System (PJV) – (including SDCNs 24590-PTF-3YN-PJV-00002 and – 00003).	The PJV Drain Collection Vessel, PJV-VSL-00002, is designed to overflow into the ultimate overflow vessel (PWD-VSL-00033) through a 6" diameter unrestricted line. Vessel (PWD-VSL-00033) is located in the PTF at Elevation (-) 45'-0", as shown on the drawings and described in the System Description document. This PJV vessel is also connected to the PTF PJV vessel vent system to prevent over pressurization of the vessel.