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										Fins

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]

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[When applicable]

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REV. 00A

SUBCONTRACT SUBMITTAL

R10342840

IQRPE REVIEW – PRETREATMENT FACILITY (PTF) ELEVATION 0'-0" SPENT RESIN COLLECTION AND DEWATERING PROCESS – SYSTEM (RDP) VESSEL RDP-VSL-00004

"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 Pretreatment Facility (PTF) Elevation 0'-0" Spent Resin Collection And Dewatering Process – System (RDP) Vessel RDP-VSL-00004 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 (6) pages numbered one (1) through six (6).

JOHN T. BAXTER
STATE OF WASHINGTON
18978
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES: 10/28/2004

John T. Baxter
Signature

07/29/2004
Date

24590-CM-HC4-HXYG-00138-02-00040 R.004

STRUCTURAL INTEGRITY ASSESSMENT OF THE PRETREATMENT FACILITY (PTF) ELEVATION 0'-0" SPENT RESIN COLLECTION AND DEWATERING PROCESS – SYSTEM (RDP) VESSEL RDP-VSL-00004

COGEMA-IA-065

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 addresses Pretreatment Facility (PTF) Spent Resin Collection and Dewatering Process System (RDP) Spent Resin Dewatering Moisture Separation Vessel, RDP-VSL-00004, as shown on P&ID drawing 24590-PTF-M6-RDP-P0002, Rev. 2, located at Elevation 0'-0" in Room P-0119. The function of RDP-VSL-00004 is to provide a separation, condensation and knock-out point for liquids and moist air removed from or transferred through spent resin slurried into a transport container. Recovered liquids are returned to the process for reuse as transport liquid.
References	Drawings, System Description, Mechanical Data Sheet, Plant Item Material Selection Data Sheet, Engineering Specification, Material Requisition	24590-PTF-3YD-RDP-00001, Rev. 0, System Description for Spent Resin Collection and Dewatering Process - System RDP; 24590-PTF-3YN-RDP-00001, System Description Change Notice (SCDN) for System Description Number 24590-PTF-3YD-RDP-00001, Rev. 0; 24590-PTF-3YN-RDP-00002, System Description Change Notice (SCDN) for System Description Number 24590-PTF-3YD-RDP-00001, Rev. 0; 24590-PTF-M5-V17T-P0020, Rev. 1, Process Flow Diagram Spent Resin Collection and Dewatering Process System RDP; 24590-PTF-M6-RDP-P0002, Rev. 2, P&ID – PTF Ion Exchange Spent Resin Collection and Dewatering; 24590-PTF-MVD-RDP-00008, Rev. 0, Mechanical Data Sheet: Vessel, Spent Resin Dewatering Moisture Separation Vessel, RDP-VSL-00004; 24590-PTF-N1D-RDP-P0002, Rev. 0, Plant Item Material Selection Data Sheet: Spent Resin Dewatering Moisture Separation Vessel, RDP-VSL-00004 (PTF); 24590-PTF-3PS-MWD0-T0003, Rev. 0, Engineering Specification for RDP Spent Resin Dewatering Equipment Package; Material Requisition No: 24590-QL-MRA-MWD0-00005, Rev. 1, Spent Resin Dewatering System, MR Section 2 – Technical Specifications (Rev. 2, November 26, 2002)

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 WAC requirements.

Information Assessed		Source of Information	Assessment
Design	Vessel design standards are appropriate and adequate for the vessel's intended use.	Mechanical Data Sheet listed above under References; 24590-WTP-3PS-MV00-T0001, Rev. 1, Engineering Specification for Pressure Vessel Design and Fabrication; ASME Boiler & Pressure Vessel (B & PV) Code, Section VIII, Div. 1, Rules for Construction of Pressure Vessels	The Engineering Specification for Pressure Vessel Design and Fabrication requires that the Spent Resin Dewatering Moisture Separation Vessel (RDP-VSL-00004) and all vessel appurtenances are to be designed to ASME Section VIII, Division 1 rules. These design requirements are appropriate for unfired pressure vessels operating with aqueous mixed waste solutions over the pressure and temperature ranges specified for these vessels. Supplementary requirements are specified in the Engineering 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. These are adequate and acceptable codes and standards for this Commercial-grade Quality Level – Commercial Grade (CM), Seismic Category (SC-III) vessel. The Spent Resin Dewatering Moisture Separation Vessel is a vertical vessel with 23.5 in. ID. Vessel vertical length is approximately 59-1/2 in. overall, with the vessel supported on a skid. The vessel minimum material wall thicknesses are: shell 0.25 in., top head 0.5 in., and bottom head 0.625 in. Materials for the shells, heads and appurtenances are to be 316 (max 0.030% C; dual certified) stainless steel. Dual certified 316 stainless steel meets the chemistry requirements of specification SA 240 316L and the mechanical requirements of specification SA 240 316. This material is hereinafter referred to as 316L stainless steel. The maximum operating volume for the vessel is about 80 gallons with an overall vessel volume of about 101 gallons.

Information Assessed		Source of Information	Assessment
Design	If a non-standard vessel is to be used, the design calculations demonstrate sound engineering principles of construction.	Mechanical Data Sheet listed above under References; ASME Boiler & Pressure Vessel (B & PV) Code, Section VIII, Div. 1, Rules for Construction of Pressure Vessels; 24590-WTP-3PS-MV00-T0001, Rev. 1, Engineering Specification for Pressure Vessel Design and Fabrication	The mechanical data sheet requires vessel design to be compliant with that of ASME Section VIII, Division 1, and code stamped. The Engineering Specification for Pressure Vessel Design and Fabrication requires that this ASME Section VIII, Division 1 vessel (RDP-VSL-00004) be delivered after design, fabrication, inspection and testing with an ASME U stamp and that the vessel be registered with the National Board. This is a shop fabricated vessel for mixed waste service in the Pretreatment Facility. As discussed in the item immediately above, the vessel design standards are appropriate and adequate for the vessel's intended uses.
	Vessel has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.	Engineering Specification and Mechanical Data Sheet listed above under References; 24590-WTP-3PS-MV00-T0001, Rev. 1, Engineering Specification for Pressure Vessel Design and Fabrication; 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	The Engineering Specification for Pressure Vessel Design and Fabrication requires consideration of the operating pressures, temperatures, seismic loads, and corrosion allowance in the design process. Supplementary seismic design criteria are specified in the Engineering Specification for Seismic Qualification Criteria for Pressure Vessels to provide for the vessels seismic design analysis. The Mechanical Data Sheet identifies the vessel's operating pressure and temperature ranges, the materials selected for the vessel, the corrosion allowance selected for the vessel, and the requirements for seismic design of the vessel. The Data Sheet indicates that vessel RDP-VSL-00004 is to be analyzed as a Seismic Category (SC-III), Quality Level (CM), vessel which requires use of the seismic design analysis and acceptance requirements of ASME Section VIII, Division 1. Details of this analysis methodology are furnished in the Engineering Specification for Seismic Qualification Criteria for Pressure Vessels and the Engineering Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks. These are appropriate requirements and criteria to ensure the vessels have adequate strength to withstand all loads at their end of service life.

Information Assessed		Source of Information	Assessment
Foundation	Vessel foundation will maintain the load of a full vessel.	Mechanical Data Sheets, and Engineering Specification listed above under References; 24590-WTP-3PS-MV00-T0001, Rev.1, Engineering Specification for Pressure Vessel Design and Fabrication	This vessel is not directly mounted to the foundation, but skid-mounting supports are specified for the vessel of 316L stainless steel as specified in the Mechanical Data Sheet. The Engineering Specification for Pressure Vessel Design and Fabrication requirements provide for adequate vessel foundation design and anchorage to the skid. The Engineering Specification for RDP Spent Resin Dewatering Equipment Package provides for adequate structural design and anchorage of the skid.
	If in an area subject to flooding, the vessel is anchored.	Engineering Specification listed above under References; 24590-WTP-3PS-MV00-T0001, Rev.1, Engineering Specification for Pressure Vessel Design and Fabrication	Buoyant forces of an empty vessel in a flooded room are a standard design load case in this specification for Pressure Vessel Design and Fabrication. The Engineering Specification for RDP Spent Resin Dewatering Equipment Package includes the Engineering Specification for Pressure Vessel Design and Fabrication in its requirements.
Frost Heave	Vessel system will withstand the effects of frost heave.	System Description listed above under References; 24590-WTP-DC-ST-01-001, Rev. 2, Structural Design Criteria	The System Description identifies that vessel RDP-VSL-00004 is located in an above grade process cell (Room P-0119) in the PTF. The Structural Design Criteria requires that structural foundations extend into the surrounding soil below the frost line to preclude frost heave. The frost line is located 30" below finished grade. The PTF foundations are not subject to frost heave; therefore, RDP-VSL-00004 will not be 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)	P&ID Drawing, Mechanical Data Sheet, Plant Item Material Selection Data Sheet, 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 System Description states that the primary function of the RDP-VSL-00004 is to collect and recover slurry waters used in transfer of spent ion exchange (IX) resin from the IX columns to the disposal container. When disposal is approved, the dewatered resin is transferred to the Radioactive Solid Waste Handling System for disposal. The System Description discusses the main functions for this RDP vessel as waste containment and offgas confinement. Normal design and operating conditions and waste characteristics (chemistry) are listed for vessel RDP-VSL- 00004 in the Mechanical Data Sheet and in the Plant Item Material Selection Data Sheet. The Toxic Vapors and Emissions from WTP Tank Systems and Miscellaneous Treatment Unit Systems document provides a summary of the Vessel equipment design features that provide for confinement and treatment of acutely or chronically toxic vapors and emissions during normal operations, abnormal operations, and during and after a design basis seismic event. The Pretreatment Vessel Vent Process System provides for headspace purge during normal bulk dewatering and abnormal operations.
Compatibility	Vessel is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	Mechanical Data Sheet, Plant Item Material Selection Data Sheet, and System Description listed above under References	As noted in the entry above, vessel RDP-VSL-00004 is designed to contain the waste it receives. The RDP System Description document identifies that the vessel will be part of a vendor skid subsystem used to provide dewater spent resin slurries and recover the liquid for reuse in slurry transfer. No additional chemical reagents will be added to the vessel's contents for processing during normal operations as discussed in the System Description. The Plant Item Material Selection Data Sheet provides a listing of waste chemistry for normal operations.
	The waste types are compatible with each other.	System Description listed above under References	The primary material handled in vessel RDP-VSL-00004 is slightly contaminated waters and condensate from air used to dewater spent IX resin from the Cesium Ion Exchange Process. All wastes handled in this vessel are of similar composition.

Information Assessed		Source of Information	Assessment
Corrosion	Vessel 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, Mechanical Data Sheets, Plant Item Material Selection Data Sheet and System Description listed above under References	The RDP system description identifies that vessel RDP-VSL-00004 will be located in a process cell at elevation 0 feet (Room P-0119) in the PTF with a design service life of 40 years. The Plant Item Material Selection Data Sheet for this vessel identifies the chemical characteristics of the slightly caustic transport fluid for the spent IX resin from the Cesium Ion Exchange Process. Based on these parameters, SA 240 304L (maximum 0.030% carbon, dual certified) stainless steel was selected as an appropriate minimum material choice for a 40 year service life for this vessel. This material is hereinafter referred to as 304L stainless steel.
Corrosion Allowance	Corrosion allowance is adequate for the intended service life of the vessel.	Plant Item Material Selection Data Sheet and Mechanical Data Sheet listed above under References	The Plant Item Material Selection Data Sheet specifies a uniform corrosion allowance of 0.040 inches for a 40 year vessel life as adequate for 304L stainless steel in this waste environment. The Mechanical Data Sheet issued for purchase specifies 316L stainless steel with a 0.125 inch corrosion allowance, which exceeds that deemed necessary by the material selection data sheet. 316L stainless steel is more corrosion resistant than 304L stainless steel. The material selection is appropriate for this waste service.
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 and System Description listed above under References	The vessel is instrumented for liquid level and redundantly piped to the vessel discharge pump. During bulk dewatering of the resin, approximately 600 gallons of resin is being slurried in a total volume of approximately 7,500 gallons of resin and transfer liquid from one of the spent resin slurry vessels (RDP-VSL-00002A/B/C) and is dewatered through the dewatering container with the liquid continuing into RDP-VSL-00004 where it is continuously discharged back to another spent resin slurry vessel. During final dewatering, the system blower circulates air through the resin in the dewatering container back into vessel RDP-VSL-00004 where moisture is condensed and separated from the air stream. This collected condensate is also continuously pumped to a spent resin slurry vessel. In these operations, the vessel is vented during bulk dewatering to ensure adequate pressure relief. Pressure relief is not provided at this vessel during final dewatering, but is provided in the air circulation loop at the dewatering container dewatering fill head. This vacuum relief provides for protection of the vessel against vacuum excursion during final dewatering vessel liquid discharge.