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										DNE E&NS

G-321 Document Category N/A
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Supersedes BNI Document No. N/A Rev. 00 3/3/04
[When applicable]

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

416 GP&S 7-03

24590-CM-HC4-HXYG-00138-02-00014

REV. 00A

PURCHASE ORDER SUBMITTAL

Best Available Copy

R10222780

IQRPE REVIEW
OF
PRETREATMENT FACILITY (PTF) PLANT WASH AND DISPOSAL SYSTEM (PWD) VESSELS (PWD-VSL-00015/00016 AND PWD-VSL-00044)

"I, Tarlok S. 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) Plant Wash System (PWD) Vessels (PWD-VSL-00015/00016 and PWD-VSL-00044) 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 12 pages numbered 1 through 12. Pages 1 through 6 are for Acidic/Alkaline Effluent Vessels (PWD-VSL-00015/00016). Pages 7 through 12 are for Plant Wash Vessel (PWD-VSL-00044).

TARLOK SINGH HUNDAL
STATE OF WASHINGTON
20273
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES: 02/15/06

T S Hundal
Signature

3/2/04
Date

24590-CM-HC4-HXYG-00138-02-00014, REV.00A

STRUCTURAL INTEGRITY ASSESSMENT OF THE PRETREATMENT FACILITY (PTF) PLANT WASH AND DISPOSAL SYSTEM (PWD) VESSELS (PWD-VSL-00015/00016 AND PWD-VSL-00044)

COGEMA-IA-037

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 includes two PWD Acidic/Alkaline Effluent Vessels: PWD-VSL-00015/00016, located in a cell (P-0109) at Elevation 0'-0" in the Pretreatment Facility.
References	Specifications, Drawings and Mechanical Data Sheets	The following Specifications are listed in the Material Requisition No. 24590-QL-MRF-MVA0-00001, Rev. 1 (including Material Requisition Supplement Nos. S01 and S03 to Rev. 1): 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-PTF-MV-PWD-00006, Rev. 0, Equipment Assembly Acidic/Alkaline Effluent Vessel, PWD-VSL-00016 (Q); 24590-PTF-MV-PWD-00007, Rev. 0, Equipment Assembly Acidic/Alkaline Effluent Vessel, PWD-VSL-00015 (Q); 24590-PTF-P1-P01T-P0001, Rev. 2, Pretreatment Facility General Arrangement Plan at El. 0'-0"; 24590-PTF-P1-P01T-P0006, Rev. 1, Pretreatment Facility General Arrangement Plan at El. (-) 45'-0"; 24590-PTF-P1-P01T-P0009, Rev. 6, Pretreatment Facility General Arrangement Section C-C; 24590-PTF-P1-P01T-P0010, Rev. 3, Pretreatment Facility General Arrangement Section D-D; 24590-PTF-P1-P01T-P0011, Rev. 4, Pretreatment Facility General Arrangement Section E-E; 24590-PTF-P1-P01T-P0016, Rev. 3, Pretreatment Facility General Arrangement Sect. P-P and Sect. Q-Q; 24590-PTF-M5-V17T-P0022001, Rev. 0, Process Flow Diagram Pretreatment Effluent Plant Wash and Disposal System PWD 24590-PTF-M5-V17T-P0022002, Rev. 2, Process Flow Diagram Pretreatment Effluent Plant Wash and Disposal System PWD Mechanical Data Sheets: 24590-PTF-MVD-PWD-00011, Rev.3, Mechanical Data Sheet for Acidic/Alkaline Effluent Vessel (PWD-VSL-00015); 24590-PTF-MVD-PWD-00012, Rev.3, Mechanical Data Sheet for Acidic/Alkaline Effluent Vessel (PWD-VSL-00016).
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* for Tank Systems.

	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 Sheets 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-PWD-00001, Rev. 1, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System PWD.	The Specification for Vessel Design and Fabrication requires the PWD system Acidic/Alkaline Effluent Vessels, PWD-VSL-00015/00016 vessel 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 these vessels. 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. The vessels are subjected to cyclic loading. The Specification for Fatigue Analysis requires the use of ASME Section VIII, Division 2 rules for vessel components with a high number of load cycles. These are adequate and acceptable design standards for the intended use of the vessels. These vessels are vertical with a 264 in. ID and a height of 415 in. from bottom tangent line to top tangent line supported on a cylindrical skirt (approx. 7'-0" high) which in turn is supported on a ring beam anchored to the concrete floor at Elev. 0'-0". The vessels' top and bottom heads are semi-elliptical, built with 1" thick plate. The shell is also specified to be made of 1" thick plate. Each vessel has internal equipment including eight pulse jet mixers, six charge vessels, and six reverse flow diverters/pumps supported from the top head. Material for the vessel's shell, heads, and internal equipment is SA-240 316 stainless steel (0.030% maximum carbon content, dual certified) and is hereafter referred to as 316. The supporting skirt is SA-240 304 stainless steel (0.030% maximum carbon content, dual certified) and is hereafter referred to as 304. The operating vessel volume is to be about 105,850 gallons and the total internal volume is to be about 119,150 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.	Specifications listed under Material Requisition, Drawings, and Mechanical Data Sheets listed above under References.	The PWD Acidic/Alkaline Effluent Vessels, PWD-VSL-00015/00016 are standard ASME Section VIII vessels. The Mechanical Data Sheets require 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 vessels.
	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 Sheets listed above under References; 24590-PTF-3YD-PWD-00001, Rev. 1, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System PWD.	The Mechanical Data Sheets identify the vessels' 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 PWD vessels 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. 1A, 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 vessels.
	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-DB-ENG-01-001, Rev. 1A, Basis of Design.	The Basis of Design document requires that all structural foundations for outdoor equipment extend a distance below grade that exceeds the depth of the frost line. These vessels are 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 Sheets listed above under References; Vessel/Tank Material Selection Data Sheet, 24590-PTF-N1D-PWD-P0003, Rev. 0, PWD-VSL-000015/00016 (PTF) Acidic/Alkaline Effluent Vessels; 24590-WTP-PSAR-ESH-01-002-02, Rev. 1a, Preliminary Safety Analysis Report to Support Construction Authorization: PT Facility Specific Information; Department of Ecology Permit # WA7890008967, *Dangerous Waste Portion of the Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste,* Chapter 10, and Attachment 51, "Hanford Tank Waste Treatment and Immobilization Plant."	The Mechanical Data Sheets present the waste specific gravity, storage temperatures and pressures. The Vessel/Tank Material Selection Data Sheet addresses the pH range and chemical composition of the waste to select appropriate vessel materials and specify the corrosion allowance. Other waste characteristics that are hazardous, such as ignitability, reactivity, and toxicity are addressed by the Preliminary Safety Analysis Report for the PTF Building and in Part A of the Permit, as an integral part of the design process. The PWD vessels provide primary confinement of the waste during normal operations, abnormal operations, and during and after a Design Basis Earthquake. Each vessel is provided with an air in-bleed to dilute any hydrogen generated in the vessel. Each vessel also has eight pulse jet mixers to mitigate any such gas buildup in the waste. The vessels are actively vented via the PTF vent system to prevent any build-up of flammable gases. The vessels are grounded to control ignition sources.
	Vessel is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	Vessel/Tank Material Selection Data Sheet, 24590-PTF-N1D-PWD-P0003, Rev. 0, PWD-VSL-000015/00016 (PTF) Acidic/Alkaline Effluent Vessels; 24590-PTF-3YD-PWD-00001, Rev. 1, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System PWD.	The Vessel/Tank 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 PWD vessels. Excess acidic effluent is neutralized with 19M sodium hydroxide supplied from a reagent header. Acid and water will be used for flushing/rinsing.
	The waste types are compatible with each other.	24590-PTF-3YD-PWD-00001, Rev. 1, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System PWD.	The System Description for the PTF PWD system does not describe any operations where incompatible wastes are mixed in these vessels for processing. The primary function of these vessels is to receive effluent for storage, neutralization, and transfer it to the evaporation systems. The effluent includes plant wash from PTF vessels and sumps, acidic and alkaline generated during pretreatment operations, and solid wash from Ultrafiltration. PWD also receives plant wash from HLW and LAW vitrification, HLW submerged bed scrubbers condensate, and also wastes from the LAB facility. The neutralized effluent of these vessels is sent to the Waste Feed Evaporator Feed Vessels (FEP-VSL-00017A/B) for recycling.

	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 Sheets listed above under References; Vessel/Tank Material Selection Data Sheet, 24590-PTF-N1D-PWD-P0003, Rev. 0, PWD-VSL-000015/00016 (PTF) Acidic/Alkaline Effluent Vessels; 24590-PTF-3YD-PWD-00001, Rev. 1, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System PWD.	The Vessel/Tank Material Selection Data Sheet shows that the PWD Acidic/Alkaline Effluent Vessels, PWD-VSL-00015/00016 normally operate at atmospheric pressure, pH 12, and at 100 °F temperature. The vessel is designed for 15 psig pressure and 237 °F temperature. Potential acid/water cleaning operations of the vessel were also considered. The material selected is 316 and a corrosion allowance of 0.04 in. The PWD vessels are located in the PTF cell (P-0109) at Elevation 0'-0". This cell is equipped with a sump to pump out any leaks. Therefore, the cell should remain dry during normal operations 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 Sheets listed above under References; Vessel/Tank Material Selection Data Sheet, 24590-PTF-N1D-PWD-P0003, Rev. 0, PWD-VSL-000015/00016 (PTF) Acidic/Alkaline Effluent Vessels.	The bases for the PWD vessels' material selection and corrosion allowance are furnished in the Vessel/Tank Material Selection Data Sheet. Selection of 316 materials 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 of 0.08 in (conservative) is carried forward to the Mechanical Data Sheets.
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-PWD-00001, Rev. 1, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System PWD.	The PWD Acidic/Alkaline Effluent Vessels, PWD-VSL-00015/00016 are designed to overflow into each other but ultimately overflow to the Ultimate Overflow Vessel (PWD-VSL-00033) through a 6" diameter unrestricted line. Vessel (PWD-VSL-00033) is located at Elevation (-) 45'-0", as shown on the drawings and described in the System Description document. These PWD vessels are also connected to the PTF vessel vent system to prevent over pressurization of the vessel.

Scope	Scope of this Integrity Assessment	This integrity assessment includes one PWD Plant Wash Vessel: PWD-VSL-00044, located in a cell (P-0104) 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-MRE-MVA0-00001, Rev. 1 (including Material Requisition Supplement Nos. S01, S03, and S04 to Rev. 1): 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-PTF-MV-PWD-00010, Rev. 0, Equipment Assembly Plant Wash Vessel, PWD-VSL-00044 (Q); 24590-PTF-P1-P01T-P0001, Rev. 2, Pretreatment Facility General Arrangement Plan at El. 0'-0"; 24590-PTF-P1-P01T-P0006, Rev. 1, Pretreatment Facility General Arrangement Plan at El. (-) 45'-0"; 24590-PTF-P1-P01T-P0008, Rev. 3, Pretreatment Facility General Arrangement Section B-B; 24590-PTF-P1-P01T-P0009, Rev. 6, Pretreatment Facility General Arrangement Section C-C; 24590-PTF-P1-P01T-P0014, Rev. 5, Pretreatment Facility General Arrangement Sect. L-L and Sect. K-K; 24590-PTF-M5-V17T-P0022001, Rev. 0, Process Flow Diagram Pretreatment Effluent Plant Wash and Disposal System PWD 24590-PTF-M5-V17T-P0022002, Rev. 2, Process Flow Diagram Pretreatment Effluent Plant Wash and Disposal System PWD Mechanical Data Sheet: 24590-PTF-MVD-PWD-00002, Rev. 1, Mechanical Data Sheet for Plant Wash Vessel (PWD-VSL-00044).
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* for Tank Systems.

	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-PWD-00001, Rev. 1, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System PWD.	The Specification for Vessel Design and Fabrication requires the PWD system Plant Wash Vessel, PWD-VSL-00044 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. The vessels are subjected to cyclic loading. The Specification for Fatigue Analysis requires the use of ASME Section VIII, Division 2 rules for vessel components with a high number of load cycles. These are adequate and acceptable design standards for the intended use of the vessel. The vessel is vertical with a 276 in. ID and a height of 306 in. from bottom tangent line to top tangent line supported on a cylindrical skirt (3/4" thick plate x approx. 7'-9" 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 heads are elliptical, built with 7/8" minimum thick plate. The shell is specified to be made of 1" thick plate. The vessel has internal equipment including eight pulse jet mixers, six charge vessels, and six reverse flow diverters/pumps supported from the top head. Material for the vessel's shell, heads, and internal equipment is SA-240 316 stainless steel (0.030% maximum carbon content, dual certified) and is hereafter referred to as 316. The supporting skirt is SA-240 304 stainless steel (0.030% maximum carbon content, dual certified) and is hereafter referred to as 304. The operating vessel volume is to be about 88,630 gallons and the total internal volume is to be about 103,000 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.	Specifications listed under Material Requisition, Drawings, and Mechanical Data Sheet listed above under References.	The PWD Plant Wash Vessel, PWD-VSL-00044 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.
	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-PWD-00001, Rev. 1, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System PWD.	The Mechanical Data Sheet identifies the vessels' 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 PWD 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. 1A, 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 vessels.
	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-DB-ENG-01-001, Rev. 1A, Basis of Design.	The Basis of Design document requires that all structural foundations for outdoor equipment to extend a distance below grade that exceeds the 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; Vessel/Tank Material Selection Data Sheet, 24590-PTF-N1D-PWD-P0001, Rev. 0, PWD-VSL-000044 (PTF) Plant Wash Vessel; 24590-WTP-PSAR-ESH-01-002-02, Rev. 1a, Preliminary Safety Analysis Report to Support Construction Authorization: PT Facility Specific Information; Department of Ecology Permit # WA7890008967, *Dangerous Waste Portion of the Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste,* Chapter 10, and Attachment 51, "Hanford Tank Waste Treatment and Immobilization Plant."	The Mechanical Data Sheet presents the waste specific gravity, storage temperatures and pressures. The Vessel/Tank Material Selection Data Sheet addresses the pH range and chemical composition of the waste to select appropriate vessel materials and specify the corrosion allowance. Other waste characteristics that are hazardous, such as ignitability, reactivity, and toxicity are addressed by the Preliminary Safety Analysis Report for the PTF Building and in Part A of the Permit as an integral part of the design process. The PWD vessel provides primary confinement of the waste during normal operations, abnormal operations, and during and after a Design Basis Earthquake. The vessel is provided with an air in-bleed to dilute any hydrogen generated in the vessel. The vessel also has eight pulse jet mixers to mitigate any such gas buildup in the waste. The vessels are actively vented via the PTF vent system to prevent any build-up of flammable gases. The vessel is grounded to control ignition sources.
	Vessel is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	Vessel/Tank Material Selection Data Sheet, 24590-PTF-N1D-PWD-P0001, Rev. 0, PWD-VSL-000044 (PTF) Plant Wash Vessel; 24590-PTF-3YD-PWD-00001, Rev. 1, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System PWD.	The Vessel/Tank 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 PWD vessel. Excess acidic effluent is neutralized with 19M sodium hydroxide supplied from a reagent header. Acid and water will be used for flushing/rinsing.
	The waste types are compatible with each other.	24590-PTF-3YD-PWD-00001, Rev. 1, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System PWD.	The System Description for the PTF PWD 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 high-activity plant wash and recycles from numerous sources and components in PTF, LAW, HLW, and LAB facilities. The vessel is sized to receive washes from the largest potential wash and still be able to transfer waste from other sources. The neutralized effluent of this vessel is sent to the Waste Feed Evaporator Feed Vessels (FEP-VSL-00017A/B) for recycling.

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; Vessel/Tank Material Selection Data Sheet, 24590-PTF-N1D-PWD-P0001, Rev. 0, PWD-VSL-000044 (PTF) Plant Wash Vessel; 24590-PTF-3YD-PWD-00001, Rev. 1, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System PWD.	The Vessel/Tank Material Selection Data Sheet shows that the PWD Plant Wash Vessel, PWD-VSL-00044 normally operates at atmospheric pressure, pH 12, and at 115°F temperature. The vessel is designed for 15 psig pressure and 237 °F temperature. Potential acid and water cleaning operations of the vessel were also considered. The material selected is 316 and a corrosion allowance of 0.08 in. This vessel is located in cell (P-0104) at Elevation 0'-0". The cell is equipped with a sump to pump out any leaks. Therefore, the cell should remain dry during normal operations 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; Vessel/Tank Material Selection Data Sheet, 24590-PTF-N1D-PWD-P0001, Rev. 0, PWD-VSL-000044 (PTF) Plant Wash Vessel;	The bases for the PWD vessel's material selection and corrosion allowance are furnished in the Vessel/Tank Material Selection Data Sheet. Selection of 316 materials 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 of 0.08" (conservative) is 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-PWD-00001, Rev. 1, System Description for Plant wash and Disposal System PWD and Radioactive Liquid Waste Disposal System PWD.	The PWD Plant Wash Vessel, PWD-VSL-00044, is designed to overflow into the ultimate overflow vessel (PWD-VSL-00033) through an 8" 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 PWD vessel is also connected to the PTF vessel vent system to prevent over pressurization of the vessel.