Bechtel Systems
&
Infrastructure, Inc.

JOB No. 24590

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.

	M	P	ML	H	MH	E	C&I	CS&A	PD	PT	ESH
REVIEWED											N/A

G-321 DOCUMENT CATEGORY N/A
[From Supplement A to G-321-E (E) or G-321-V (V), as applicable]

RESPONSIBLE ENGINEER [signature] DATE 3/31/03

24590-CM-HC4-HXYG-00138-01-07
REV. 00B

SUBCONTRACT SUBMITTAL

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BNI-Subcontracts

STRUCTURAL INTEGRITY ASSESSMENT OF THE WASTE TREATMENT AND IMMOBILIZATION PLANT

PRETREATMENT FACILITY BELOW GRADE PLANT WASH AND DISPOSAL SYSTEM TANKS

COGEMA-IA-009 REV. 1

24590-CM-HC4-HXY6-00138-01-07 Rev. 00B

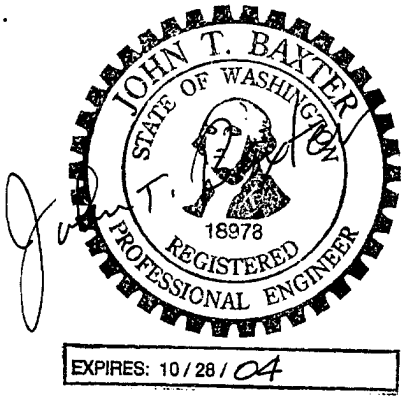
STRUCTURAL INTEGRITY ASSESSMENT OF THE PRETREATMENT FACILITY BELOW GRADE PLANT WASH AND DISPOSAL SYSTEM TANKS

"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 Below Grade Plant Wash And Disposal System Tanks 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 indicate that the design intent fully satisfies the requirements of the WAC.

The attached review is 17 sheets numbered 1 through 17.



John T. Baxter — 03/28/03

Signature — Date

PRETREATMENT WASTE TANK (PWD) EL (-) 45'-0" (Ultimate Overflow Vessel -00033)			COGEMA-IA-009, Rev. 1
Information assessed	Y/N	Source of Information	Assessment
Tank design standards are appropriate and adequate for the tank's intended use.	Y	24590-PTF-M6-PWD-P0002, Rev. 1, P & ID – PTF PLANT WASH & DISPOSAL SYSTEM EFFLUENT COLLECTION PWD-VSL-00033/00043/00044 (Q); 24590-PTF-MV-PWD-P0001001, Rev. 1, EQUIPMENT ASSEMBLY ULTIMATE OVERFLOW VESSEL PWD-VSL-00033 (Q) SHEET 1 OF 2; 24590-PTF-MV-PWD-P0001002, Rev. 1, EQUIPMENT ASSEMBLY ULTIMATE OVERFLOW VESSEL PWD-VSL-00033 (Q) SHEET 2 OF 2; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0001, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00033; 24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication; 24590-WTP-3PS-MV00-TP003, Rev. 1, Engineering Specification for Pressure Vessel Fatigue Analysis.	The Ultimate Overflow Vessel (PWD-VSL-00033) and all appurtenances are to be designed to ASME Section VIII, Division I rules which are appropriate for an unfired pressure vessel operating with aqueous mixed waste solutions over the pressure and temperature range specified for this vessel. Supplementary requirements are specified in the Engineering Specification for Pressure Vessel Design and Fabrication. These supplementary requirements address pressure vessel fatigue analysis, positive material identification, standard fabrication tolerances, acceptable welding procedures for the tank and appurtenances, welder qualifications and testing records, NDE inspections and records, quality assurance requirements, and packaging, shipping, handling and storage requirements. Some of the tank internal equipment is subject to cyclic loading. The pulse jet mixer design pressure pulses and the number of lifetime cycles are conservative. The fatigue design standards (ASME Section VIII, Division 2) are appropriate for components with a high number of load cycles These are acceptable codes and standards. The Ultimate Overflow Vessel (PWD-VSL-00033) is a vertical tank with a 288 in. ID and a vertical length of 89 in. tangent to tangent supported on a cylindrical skirt. Top and bottom heads are flanged and dished torispherical heads. The shell and heads are to have a minimum thickness of 1 inch. Materials for the shell, heads and internals are to be SA-240 316L stainless steel. The operating volume is to be about 29,580 gallons and the total volume is to be 41,650 gallons.

PRETREATMENT WASTE TANK (PWD) EL (-) 45'-0" (Ultimate Overflow Vessel -00033)			COGEMA-IA-009, Rev. 1
Information assessed	Y/N	Source of Information	Assessment
If a non-standard tank is to be used, the design calculations demonstrate sound engineering principles of construction.	N/A	24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication.	The Engineering Specification for Pressure Vessel Design and Fabrication requires that the ASME Section VIII, Division 1 vessels (PWD-VSL-00033) be delivered after design, fabrication, inspection and testing with an ASME U stamp and that the tank be registered with the National Board. It is a shop fabricated tank for mixed waste service in the Pretreatment Facility. As discussed in the item immediately above, the tank design standards are appropriate and adequate for the tank's intended use.
Tank has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.	Y	24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication; 24590-WTP-3PS-MV00-TP002, Rev. 1, Engineering Specification for Seismic Qualification Criteria for Pressure Vessels; 24590-WTP-3PI-SS90-T0001, Rev. 0, Seismic Qualification of Seismic Category I/II Equipment and Tanks; 24590-PTF-MV-PWD-P0001001, Rev. 1, EQUIPMENT ASSEMBLY ULTIMATE OVERFLOW VESSEL PWD-VSL-00033 (Q) SHEET 1 OF 2; 24590-PTF-MV-PWD-P0001002, Rev. 1, EQUIPMENT ASSEMBLY ULTIMATE OVERFLOW VESSEL PWD-VSL-00033 (Q) SHEET 2 OF 2; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0001, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00033.	The Engineering Specification for Pressure Vessel Design and Fabrication requires specific consideration of the operating pressures and temperatures, seismic loads, and corrosion in the design process in accordance with the requirements of ASME Section VIII, Div. I for the vessel and internal ancillary equipment. Supplementary design criteria are specified in the Engineering Specifications for Seismic Qualification Criteria for Pressure Vessels and Seismic Qualification of Seismic Category I/II Equipment and Tanks to provide for the seismic design analysis. The Mechanical Systems Data Sheet identifies the tank operating pressure and temperature ranges and the requirement for seismic qualification in the design and specifies SA-240 316L stainless steel as the shell and head materials. The assembly drawings specify a 1 in. minimum thickness for the tank shell and heads.

PRETREATMENT WASTE TANK (PWD) EL (-) 45'-0" (Ultimate Overflow Vessel -00033) COGEMA-IA-009, Rev. 1			
Information assessed	Y/N	Source of Information	Assessment
Tank foundation will maintain the load of a full tank.	Y	24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication; 24590-WTP-PER-CSA-02-001, Rev. 3, Secondary Containment Design; 24590-PTF-MV-PWD-P0001001, Rev. 1, EQUIPMENT ASSEMBLY ULTIMATE OVERFLOW VESSEL PWD-VSL-00033 (Q) SHEET 1 OF 2; 24590-PTF-MV-PWD-P0001002, Rev. 1, EQUIPMENT ASSEMBLY ULTIMATE OVERFLOW VESSEL PWD-VSL-00033 (Q) SHEET 2 OF 2.	The Ultimate Overflow Vessel (PWD-VSL-00033) is supported by a cylindrical skirt. The fabricator will determine the skirt thickness based on the design requirements in the Engineering Specification for Pressure Vessel Design and Fabrication. It is a general requirement of ASME VIII, Division 1 that vessels shall be so supported and the supporting members shall be arranged and/or attached to the vessel wall in such a way as to provide for the maximum imposed loadings. A ring beam is provided at the base of the skirt to spread the tank loads on the foundation ring and provide for anchor bolting. Typical anchorage details are shown in the Secondary Containment Design document.
If in an area subject to flooding, the tank is anchored.	Y	24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication.	Buoyant forces of an empty tank in a flooded room are a standard design load case in the specification for Pressure Vessel Design and Fabrication.
Tank system will withstand the effects of frost heave.	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD.	The Ultimate Overflow Vessel (PWD-VSL-00033) is located in a cell at the (-) 45'-0" elevation in the Pretreatment Plant. This location is below the annual frost line.

PRETREATMENT WASTE TANK (PWD) EL (-) 45'-0" (Ultimate Overflow Vessel -00033)			COGEMA-IA-009, Rev. 1
Information assessed	Y/N	Source of Information	Assessment
Characteristics of the waste to be stored or treated have been identified (ignitability, reactivity, toxicity, pH range, specific gravity, vapor pressure, flash point, storage temperature)	Y	24590-WTP-PSAR-ESH-01-002-02, Rev. 0, Preliminary Safety Analysis Report to Support Construction Authorization; PT Facility Specific Information; 24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD; 24590-PTF-MV-PWD-P0001001, Rev. 1, EQUIPMENT ASSEMBLY ULTIMATE OVERFLOW VESSEL PWD-VSL-00033 (Q) SHEET 1 OF 2; 24590-PTF-MV-PWD-P0001002, Rev. 1, EQUIPMENT ASSEMBLY ULTIMATE OVERFLOW VESSEL PWD-VSL-00033 (Q) SHEET 2 OF 2; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0001, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00033; VESSEL/TANK MATERIAL SELECTION DATA SHEET, 24590-PTF-N1D-PWD-P0005, Rev. 1, PWD-VSL-00033 (PTF) Ultimate Overflow Vessel.	Based on the Mechanical Systems Data Sheet operating parameters are: Design specific gravity 1.57, Operating temperature 160 °F, Vessel design temperature 185 °F, Internal operating pressure 0 psig, Internal design pressure 15 psig, External operating pressure 0.22 psig, External vessel design condition full vacuum in the tank. The System Description identifies that vessel PWD-VSL-00033 functions to receive and transfer laboratory drains, secondary containment drains for transfer lines, and all Pretreatment overflows. The tank's primary safety functions are to provide containment for potential high level mixed waste overflow streams and control of hydrogen build-up in the tank head space. The hydrogen mitigation funtion is provided by internal ancillary equipment (Pulse Jet Mixers), an air in-bleed system to dilute hydrogen generated through radiolysis, and the PTF Process Vessel Vent System which provides offgas control for the tank. Grounding lugs are included in the tank design to protect against static buildup and discharge. The Vessel/Tank Material Selection Data Sheet states that wastes in PWD-VSL-00033 are expected to be around pH 8 during normal operations and may range from acid to alkaline and include acid conditions with elevated halides and temperatures.
Tank is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD;	The System Description document does not identify any treatment reagents that will be used in this tank during normal operations. Vessel PWD-VSL-00033 is equipped with spray rings to allow for acid and caustic flushes for tank internal maintenance.

PRETREATMENT WASTE TANK (PWD) EL (-) 45'-0" (Ultimate Overflow Vessel -00033)			COGEMA-IA-009, Rev. 1
Information assessed	Y/N	Source of Information	Assessment
The waste types are compatible with each other.	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD; VESSEL/TANK MATERIAL SELECTION DATA SHEET, 24590-PTF-N1D-PWD-P0005, Rev. 1, PWD-VSL-00033 (PTF) Ultimate Overflow Vessel.	The Ultimate Overflow Vessel (PWD-VSL-00033) receives laboratory and other drains and plant overflows. All potential sources of inflows to vessel PWD-VSL-00033 are tabulated in the System Description. This includes both normal and abnormal operations. The range of chemistries for the potential inflows is considered in the Vessel/Tank Material Selection Data Sheet where 316L stainless steel with a maximum carbon content of 0.030% is selected (dual certified) for the tank primary containment. Normal operating conditions are considered to range from acidic to alkaline. Alkaline conditions may exist at elevated temperatures. Acid conditions with elevated halides and temperatures were also considered.
Tank material and protective coatings ensure the tank 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)	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0001, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00033; VESSEL/TANK MATERIAL SELECTION DATA SHEET, 24590-PTF-N1D-PWD-P0005, Rev. 1, PWD-VSL-00033 (PTF) Ultimate Overflow Vessel.	The materials selected for the tank on the Mechanical Systems Data Sheet are of the same type as the minimum recommended material listed in the Vessel/Tank Material Selection Data Sheet for the vessel PWD-VSL-00033. Design life for the tank is specified as 40 years on the Mechanical Systems Data Sheet. The material selected for the primary tank boundary and all internal ancillary equipment is 316L stainless steel (maximum 0.030% Carbon, dual certified). Wastes in the Ultimate Overflow Vessel are expected to range from acidic to alkaline.

PRETREATMENT WASTE TANK (PWD) EL (-) 45'-0" (Ultimate Overflow Vessel -00033) COGEMA-IA-009, Rev. 1			
Information assessed	Y/N	Source of Information	Assessment
Corrosion allowance is adequate for the intended service life of the tank.	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD; 24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0001, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00033; VESSEL/TANK MATERIAL SELECTION DATA SHEET, 24590-PTF-N1D-PWD-P0005, Rev. 1, PWD-VSL-00033 (PTF) Ultimate Overflow Vessel.	The Vessel/Tank Material Selection Data Sheet for vessel PWD-VSL-00033 identifies 316L stainless steel with a 0.080 inch corrosion allowance as an acceptable material for a 40 year design life. 316L stainless steel (maximum 0.030% Carbon, dual certified) has been identified in the Material Selection Data Sheet as the minimum recommended material for resistance to stress corrosion cracking, crevice corrosion, and pitting corrosion under normal conditions. The materials chosen, welding processes selected, surface preparation, and preservice inspections are appropriate for a combined acid/caustic waste service. For tank ancillary equipment inside the tank, the Pressure Vessel Design and Fabrication specification requires that the corrosion allowance be applied to each surface exposed to process vapors or liquids. For example, the Pulse Jet Mixers shall have the corrosion allowance applied to both internal and external surfaces.
Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the tank are exceeded.	Y	24590-PTF-M5-V17T-P0022002, Rev. 0, PROCESS FLOW DIAGRAM PRETREATMENT PLANT WASH AND DRAIN SYSTEM PWD; 24590-PTF-MV-PWD-P0001001, Rev. 1, EQUIPMENT ASSEMBLY ULTIMATE OVERFLOW VESSEL PWD-VSL-00033 (Q) SHEET 1 OF 2; 24590-PTF-MV-PWD-P0001002, Rev. 1, EQUIPMENT ASSEMBLY ULTIMATE OVERFLOW VESSEL PWD-VSL-00033 (Q) SHEET 2 OF 2.	The Ultimate Overflow Vessel (PWD-VSL-00033) receives laboratory and other transfer drains and pretreatment overflows. This tank is also designed to handle the highest overflow rate for any C3/C5 area fire protection system for 30 minutes. The tank is equipped with a 10 in. diameter overflow line that flows first to the HLW Effluent Transfer Vessel (PWD-VSL-00043) and then via an unrestricted overflow line to a sump where the tank is located at elevation (-) 45'-0". The overflow line is equal in diameter to the largest of the inlet lines entering the tank to ensure it can handle the expected flows.
ID = Internal Diameter OD = Outside Diameter N/A = Not Applicable psig = pounds per square inch gage Y=Yes N=No			

PRETREATMENT WASTE TANK (PWD) EL (-) 45'-0" (HLW Effluent Transfer Vessel -00043)			COGEMA-IA-009, Rev. 1
Information assessed	Y/N	Source of Information	Assessment
Tank design standards are appropriate and adequate for the tank's intended use.	Y	24590-PTF-M6-PWD-P0002, Rev. 1, P & ID – PTF PLANT WASH & DISPOSAL SYSTEM EFFLUENT COLLECTION PWD-VSL-00033/00043/00044 (Q); 24590-PTF-MV-PWD-P0003001, Rev. 1, EQUIPMENT ASSEMBLY HLW EFFLUENT TRANSFER VESSEL PWD-VSL-00043 (Q) SHEET 1 OF 2; 24590-PTF-MV-PWD-P0003002, Rev. 1, EQUIPMENT ASSEMBLY HLW EFFLUENT TRANSFER VESSEL PWD-VSL-00043 (Q) SHEET 2 OF 2; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0003, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00043 24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication; 24590-WTP-3PS-MV00-TP003, Rev. 1, Engineering Specification for Pressure Vessel Fatigue Analysis.	The High Level Waste (HLW) Transfer Vessel (PWD-VSL-00043) and all appurtenances are to be designed to ASME Section VIII, Division I rules which are appropriate for an unfired pressure vessel operating with aqueous mixed waste solutions over the pressure and temperature range specified for this vessel. Supplementary requirements are specified in the Engineering Specification for Pressure Vessel Design and Fabrication. These supplementary requirements address pressure vessel fatigue analysis, positive material identification, standard fabrication tolerances, acceptable welding procedures for the tank and appurtenances, welder qualifications and testing records, NDE inspections and records, quality assurance requirements, and packaging, shipping, handling and storage requirements. Some of the tank internal equipment is subject to cyclic loading. The pulse jet mixer design pressure pulses and the number of lifetime cycles are conservative. The fatigue design standards (ASME Section VIII, Division 2) are appropriate for components with a high number of load cycles. These are acceptable codes and standards. The HLW Transfer Vessel (PWD-VSL-00043) is a vertical tank with a 288 in. ID and a vertical length of 89 in. tangent to tangent supported on a cylindrical skirt. Top and bottom heads are flanged and dished torispherical heads. The shell and heads are to have a minimum thickness of 1 inch. Materials for the shell, heads and internals are to be SA-240 316L stainless steel. The operating volume is to be about 29,580 gallons and the total volume is to be about 41,650 gallons.

PRETREATMENT WASTE TANK (PWD) EL (-) 45'-0" (HLW Effluent Transfer Vessel -00043) COGEMA-IA-009, Rev. 1			
Information assessed	Y/N	Source of Information	Assessment
If a non-standard tank is to be used, the design calculations demonstrate sound engineering principles of construction.	N/A	24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication.	The Engineering Specification for Pressure Vessel Design and Fabrication requires that the ASME Section VIII, Division 1 vessels (PWD-VSL-00043) be delivered after design, fabrication, inspection and testing with an ASME U stamp and that the tank be registered with the National Board. It is a shop fabricated tank for mixed waste service in the Pretreatment Facility. As discussed in the item immediately above, the tank design standards are appropriate and adequate for the tank's intended use.
Tank has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.	Y	24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication; 24590-WTP-3PS-MV00-TP002, Rev. 1, Engineering Specification for Seismic Qualification Criteria for Pressure Vessels; 24590-WTP-3PI-SS90-T0001, Rev. 0, Seismic Qualification of Seismic Category I/II Equipment and Tanks; 24590-PTF-MV-PWD-P0003001, Rev. 1, EQUIPMENT ASSEMBLY HLW EFFLUENT TRANSFER VESSEL PWD-VSL-00043 (Q) SHEET 1 OF 2; 24590-PTF-MV-PWD-P0003002, Rev. 1, EQUIPMENT ASSEMBLY HLW EFFLUENT TRANSFER VESSEL PWD-VSL-00043 (Q) SHEET 2 OF 2; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0003, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00043.	The Engineering Specification for Pressure Vessel Design and Fabrication requires specific consideration of the operating pressures and temperatures, seismic loads, and corrosion in the design process in accordance with the requirements of ASME Section VIII, Div. I for the vessel and internal ancillary equipment. Supplementary design criteria are specified in the Engineering Specifications for Seismic Qualification Criteria for Pressure Vessels and Seismic Qualification of Seismic Category I/II Equipment and Tanks to provide for the seismic design analysis. The Mechanical Systems Data Sheet identifies the tank operating pressure and temperature ranges and the requirement for seismic qualification in the design and specifies SA-240 316L stainless steel as the shell and head materials. The assembly drawings specify a 1 in. minimum thickness for the tank shell and heads.

PRETREATMENT WASTE TANK (PWD) EL (-) 45'-0" (HLW Effluent Transfer Vessel -00043) COGEMA-IA-009, Rev. 1			
Information assessed	Y/N	Source of Information	Assessment
Tank foundation will maintain the load of a full tank.	Y	24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication; 24590-WTP-PER-CSA-02-001, Rev. 3, Secondary Containment Design; 24590-PTF-MV-PWD-P0003001, Rev. 1, EQUIPMENT ASSEMBLY HLW EFFLUENT TRANSFER VESSEL PWD-VSL-00043 (Q) SHEET 1 OF 2; 24590-PTF-MV-PWD-P0003002, Rev. 1, EQUIPMENT ASSEMBLY HLW EFFLUENT TRANSFER VESSEL PWD-VSL-00043 (Q) SHEET 2 OF 2.	The HLW Effluent Transfer Vessel (PWD-VSL-00043) is supported by a cylindrical skirt. The fabricator will determine the skirt thickness based on the design requirements in the Engineering Specification for Pressure Vessel Design and Fabrication. It is a general requirement of ASME VIII, Division 1 that vessels shall be so supported and the supporting members shall be arranged and/or attached to the vessel wall in such a way as to provide for the maximum imposed loadings. A ring beam is provided at the base of the skirt to spread the tank loads on the foundation ring and provide for anchor bolting. Typical anchorage details are shown in the Secondary Containment Design document.
If in an area subject to flooding, the tank is anchored.	Y	24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication.	Buoyant forces of an empty tank in a flooded room are a standard design load case in the specification for Pressure Vessel Design and Fabrication.
Tank system will withstand the effects of frost heave.	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD.	The HLW Effluent Transfer Vessel (PWD-VSL-00043) is located in a cell at the (-) 45'-0" elevation in the Pretreatment Facility. This location is below the annual frost line.

PRETREATMENT WASTE TANK (PWD) EL (-) 45'-0" (HLW Effluent Transfer Vessel -00043) COGEMA-IA-009, Rev. 1			
Information assessed	Y/N	Source of Information	Assessment
Characteristics of the waste to be stored or treated have been identified (ignitability, reactivity, toxicity, pH range, specific gravity, vapor pressure, flash point, storage temperature)	Y	24590-WTP-PSAR-ESH-01-002-02, Rev. 0, Preliminary Safety Analysis Report to Support Construction Authorization; PT Facility Specific Information; 24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD; 24590-PTF-MV-PWD-P0003001, Rev. 1, EQUIPMENT ASSEMBLY HLW EFFLUENT TRANSFER VESSEL PWD-VSL-00043 (Q) SHEET 1 OF 2; 24590-PTF-MV-PWD-P0003002, Rev. 1, EQUIPMENT ASSEMBLY HLW EFFLUENT TRANSFER VESSEL PWD-VSL-00043 (Q) SHEET 2 OF 2; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0003, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00043; VESSEL/TANK MATERIAL SELECTION DATA SHEET, 24590-PTF-N1D-PWD-P0002, Rev. 1, PWD-VSL-00043 (PTF) HLW Effluent Transfer Vessel.	Based on the Mechanical Systems Data Sheet operating parameters are: Design specific gravity 1.57, Operating temperature 160 °F, Vessel design temperature 185 °F, Internal operating pressure 0 psig, Internal design pressure 15 psig, External operating pressure 0.22 psig, External vessel design condition full vacuum in the tank. The System Description identifies that vessel PWD-VSL-00043 functions to receive and store waste from the HLW Vitrification Plant, from the pit sump where the tank is located, and from various line drains. Waste is transferred from PWD-VSL-00043 to the Plant Wash Vessel PWD-VSL-00044 for treatment. The tank's primary safety functions are to provide containment for waste from the HLW Vitrification Plant and control of hydrogen build-up in the tank head space. The hydrogen mitigation function is provided by internal ancillary equipment (Pulse Jet Mixers), an air in-bleed system to dilute hydrogen generated through radiolysis, and the PTF Process Vessel Vent System which provides offgas control for the tank. Grounding lugs are included in the tank design to protect against static buildup and discharge. The Vessel/Tank Material Selection Data Sheet states that wastes in PWD-VSL-00043 are expected to be around pH 8 during normal operations. The tank is equipped with internal wash rings for use of neutral and acid washes for flushing the tank as a maintenance activity.
Tank is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD;	The System Description document does not identify any treatment reagents that will be used in this tank during normal operations. The System Description states that the tank is only used to receive and then transfer wastes. Vessel PWD-VSL-00043 is equipped with spray rings to allow for acid and neutral flushes for tank internal maintenance.

PRETREATMENT WASTE TANK (PWD) EL (-) 45'-0" (HLW Effluent Transfer Vessel -00043) COGEMA-IA-009, Rev. 1			
Information assessed	Y/N	Source of Information	Assessment
The waste types are compatible with each other.	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD; VESSEL/TANK MATERIAL SELECTION DATA SHEET, 24590-PTF-N1D-PWD-P0002, Rev. 1, PWD-VSL-00043 (PTF) HLW Effluent Transfer Vessel.	The HLW Effluent Transfer Vessel (PWD-VSL-00043) receives and stores waste from the HLW Vitrification Plant. All potential sources of inflows to vessel PWD-VSL-00043 are tabulated in the System Description. This includes both normal and abnormal operations. The range of chemistries for the potential inflows is considered in the Vessel/Tank Material Selection Data Sheet where 316L stainless steel with a maximum carbon content of 0.030% is selected (dual certified) for the tank primary containment. Operating conditions are considered to range from almost neutral pH 8 to acidic conditions.
Tank material and protective coatings ensure the tank 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)	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0003, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00043; VESSEL/TANK MATERIAL SELECTION DATA SHEET, 24590-PTF-N1D-PWD-P0002, Rev. 1, PWD-VSL-00043 (PTF) HLW Effluent Transfer Vessel.	The materials selected for the tank on the Mechanical Systems Data Sheet are of the same type as the minimum recommended material listed in the Vessel/Tank Material Selection Data Sheet for the vessel PWD-VSL-00043. Design life for the tank is specified as 40 years on the Mechanical Systems Data Sheet. The material selected for the primary tank boundary and all internal ancillary equipment is 316L stainless steel (maximum 0.030% Carbon, dual certified). Wastes in the HLW Effluent Transfer Vessel are expected to range from neutral pH to acidic conditions.

PRETREATMENT WASTE TANK (PWD) EL (-) 45'-0" (HLW Effluent Transfer Vessel -00043) COGEMA-IA-009, Rev. 1			
Information assessed	Y/N	Source of Information	Assessment
Corrosion allowance is adequate for the intended service life of the tank.	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD; 24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0003, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00043; VESSEL/TANK MATERIAL SELECTION DATA SHEET, 24590-PTF-N1D-PWD-P0002, Rev. 1, PWD-VSL-00043 (PTF) HLW Effluent Transfer Vessel.	The Vessel/Tank Material Selection Data Sheet for vessel PWD-VSL-00043 identifies 316L stainless steel with a 0.080 inch corrosion allowance as an acceptable material for a 40 year design life. 316L stainless steel (maximum 0.030% Carbon, dual certified) has been identified in the Material Selection Data Sheet as the minimum recommended material for resistance to stress corrosion cracking, crevice corrosion, and pitting corrosion under normal conditions. The materials chosen, welding processes selected, surface preparation, and preservice inspections are adequate and appropriate for waste service ranging from almost neutral pH 8 to acidic conditions. For tank ancillary equipment inside the tank, the Pressure Vessel Design and Fabrication specification requires that the corrosion allowance be applied to each surface exposed to process vapors or liquids. For example, the Pulse Jet Mixers shall have the corrosion allowance applied to both internal and external surfaces.
Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the tank are exceeded.	Y	24590-PTF-M5-V17T-P0022002, Rev. 0, PROCESS FLOW DIAGRAM PRETREATMENT PLANT WASH AND DRAIN SYSTEM PWD; 24590-PTF-MV-PWD-P0003001, Rev. 1, EQUIPMENT ASSEMBLY HLW EFFLUENT TRANSFER VESSEL PWD-VSL-00043 (Q) SHEET 1 OF 2; 24590-PTF-MV-PWD-P0003002, Rev. 1, EQUIPMENT ASSEMBLY HLW EFFLUENT TRANSFER VESSEL PWD-VSL-00043 (Q) SHEET 2 OF 2.	The HLW Effluent Transfer Vessel (PWD-VSL-00043) receives and stores waste from the HLW Vitrification Plant. This tank is also designed to handle the highest overflow rate for any C3/C5 area fire protection system for 30 minutes because the overflow is coupled to Tank PWD-VSL-00033 overflows with an overflow transfer line. The tank is equipped with a 10 in. diameter overflow line that matches the size of the overflow transfer line from Tank PWD-VSL-00033 and exceeds the size of all other inlet lines entering the tank. The overflow is via an unrestricted overflow line to a sump where the tank is located at elevation (-) 45'-0".
ID = Internal Diameter OD = Outside Diameter N/A = Not Applicable psig = pounds per square inch gage Y=Yes N=No			

PRETREATMENT WASTE TANK (PWD) EL (-) 19'-0" (C3 Floor Drain Collection Vessel -00046) COGEMA-IA-009, Rev. 1			
Information assessed	Y/N	Source of Information	Assessment
Tank design standards are appropriate and adequate for the tank's intended use.	Y	24590-PTF-M6-PWD-P0043, Rev. 1, P & ID – PTF PLANT WASH & DISPOSAL SYSTEM C3 AREA FLOOR DRAINS; 24590-PTF-MV-PWD-P0005, Rev. 1, EQUIPMENT ASSEMBLY C3 FLOOR DRAIN COLLECTION VESSEL PWD-VSL-00046; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0010, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00046; 24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication.	The C3 Floor Drain Collection Vessel (PWD-VSL-00046) and all appurtenances are to be designed to ASME Section VIII, Division I rules which are appropriate for an unfired pressure vessel operating with aqueous mixed waste solutions over the pressure and temperature range specified for this vessel. 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 tank and appurtenances, welder qualifications and testing records, NDE inspections and records, quality assurance requirements, and packaging, shipping, handling and storage requirements. These are acceptable codes and standards. The C3 Floor Drains Collection Vessel (PWD-VSL-00046) is a horizontal tank with a 96 in. ID and a horizontal length of 126 in. tangent to tangent supported on two saddle supports. The heads are ASME 2:1 elliptical heads. The shell and heads are to have a minimum thickness of 7/16 inch. Materials for the shell, heads and internals are to be SA-240 316L stainless steel. The operating volume is to be about 4792 gallons and the total volume is to be about 4982 gallons.
If a non-standard tank is to be used, the design calculations demonstrate sound engineering principles of construction.	N/A	24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication.	The Engineering Specification for Pressure Vessel Design and Fabrication requires that the ASME Section VIII, Division 1 vessels (PWD-VSL-00046) be delivered after design, fabrication, inspection and testing with an ASME U stamp and that the tank be registered with the National Board. It is a shop fabricated tank for mixed waste service in the Pretreatment Facility. As discussed in the item immediately above, the tank design standards are appropriate and adequate for the tank's intended use.

PRETREATMENT WASTE TANK (PWD) EL (-) 19'-0" (C3 Floor Drain Collection Vessel -00046) COGEMA-IA-009, Rev. 1			
Information assessed	Y/N	Source of Information	Assessment
Tank has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.	Y	24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication; 24590-WTP-3PS-MV00-TP002, Rev. 1, Engineering Specification for Seismic Qualification Criteria for Pressure Vessels; 24590-WTP-3PI-FB01-T0001, Rev.0, Engineering Specification for Structural Design Loads for Seismic Category III and IV Equipment and Tanks; 24590-PTF-MV-PWD-P0005, Rev. 1, EQUIPMENT ASSEMBLY C3 FLOOR DRAIN COLLECTION VESSEL PWD-VSL-00046; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0010, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00046.	The Engineering Specification for Pressure Vessel Design and Fabrication requires specific consideration of the operating pressures and temperatures, seismic loads, and corrosion in the design process in accordance with the requirements of ASME Section VIII, Div. I for the vessel and internal ancillary equipment. Supplementary design criteria are specified in the Engineering Specifications for Seismic Qualification Criteria for Pressure Vessels and Structural Design Loads for Seismic Category III and IV Equipment and Tanks to provide for the seismic design analysis. The Mechanical Systems Data Sheet identifies the tank operating pressure and temperature ranges and the requirement for seismic qualification in the design and specifies SA-240 316L stainless steel as the shell and head materials. The assembly drawing specifies a 7/16 in. minimum thickness for the tank shell and heads.
Tank foundation will maintain the load of a full tank.	Y	24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication; 24590-WTP-PER-CSA-02-001, Rev. 3, Secondary Containment Design; 24590-PTF-MV-PWD-P0005, Rev. 1, EQUIPMENT ASSEMBLY C3 FLOOR DRAIN COLLECTION VESSEL PWD-VSL-00046;	The horizontal C3 Floor Drain Collection Vessel (PWD-VSL-00046) is supported by two saddle supports. The fabricator will determine the saddle support thickness and dimensions based on the design requirements in the Engineering Specification for Pressure Vessel Design and Fabrication. Typical anchorage details for the saddle supports are shown in the Secondary Containment Design document. It is a general requirement of ASME VIII, Division 1 that vessels shall be so supported and the supporting members shall be arranged and/or attached to the vessel wall in such a way as to provide for the maximum imposed loadings.
If in an area subject to flooding, the tank is anchored.	Y	24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication.	Buoyant forces of an empty tank in a flooded room are a standard design load case in the specification for Pressure Vessel Design and Fabrication.

PRETREATMENT WASTE TANK (PWD) EL (-) 19'-0" (C3 Floor Drain Collection Vessel -00046) COGEMA-IA-009, Rev. 1			
Information assessed	Y/N	Source of Information	Assessment
Tank system will withstand the effects of frost heave.	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD.	The C3 Floor Drain Collection Vessel (PWD-VSL-00046) is located in a cell at the (-) 19'-0" elevation in the Pretreatment Facility. This location is below the annual frost line.
Characteristics of the waste to be stored or treated have been identified (ignitability, reactivity, toxicity, pH range, specific gravity, vapor pressure, flash point, storage temperature)	Y	24590-WTP-PSAR-ESH-01-002-02, Rev. 0, Preliminary Safety Analysis Report to Support Construction Authorization; PT Facility Specific Information; 24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD; 24590-PTF-MV-PWD-P0005, Rev. 1, EQUIPMENT ASSEMBLY C3 FLOOR DRAIN COLLECTION VESSEL PWD-VSL-00046; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0010, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00046; VESSEL/TANK MATERIAL SELECTION DATA SHEET, 24590-PTF-N1D-PWD-P0006, Rev. 1, PWD-VSL-00046 (PTF) C3 Floor Drain Collection Vessel.	Based on the Mechanical Systems Data Sheet operating parameters are: Design specific gravity 1.12, Operating temperature 200 °F, Vessel design temperature 225 °F, Internal operating pressure 58 psig, Internal design pressure 68 psig, External operating pressure 4.5 psig, External vessel design condition full vacuum in the tank. The System Description identifies that vessel PWD-VSL-00046 functions to receive floor drains from all C3 areas in the PT facility generated from normal cleanup activities or small leaks. This tank also receives all sprinkler water discharges from the C3 areas fire protection systems. Sprinkler discharges may overflow the tank and fill the pit in which the tank is located. The pit is sized to safely contain the sprinkler volume. No waste treatment activities are conducted in PWD-VSL-00046. The System Description states that the tank provides no important to safety functions. During normal operations the tank will receive domestic water mixed with small quantities of caustic or nitric acid as noted in the Vessel/Tank Material Selection Data Sheet. Grounding lugs are included in the tank design for corrosion protection.
Tank is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD;	The System Description document does not identify any treatment reagents that will be used in this tank during normal operations. The System Description states that the tank is only used to receive and then transfer wastes C3 floor drain wastes.

PRETREATMENT WASTE TANK (PWD) EL (-) 19'-0" (C3 Floor Drain Collection Vessel -00046) COGEMA-IA-009, Rev. 1			
Information assessed	Y/N	Source of Information	Assessment
The waste types are compatible with each other.	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD; VESSEL/TANK MATERIAL SELECTION DATA SHEET, 24590-PTF-N1D-PWD-P0006, Rev. 1, PWD-VSL-00046 (PTF) C3 Floor Drain Collection Vessel.	The C3 Floor Drain Collection Vessel (PWD-VSL-00046) receives and stores waste from the PT facility C3 areas floor drains. All potential sources of inflows to vessel PWD-VSL-00046 are tabulated in the System Description. This includes both normal and abnormal operations. The range of chemistries for the potential inflows is considered in the Vessel/Tank Material Selection Data Sheet where 316L stainless steel with a maximum carbon content of 0.030% is selected (dual certified) for the tank primary containment.
Tank material and protective coatings ensure the tank 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)	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0010, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00046; VESSEL/TANK MATERIAL SELECTION DATA SHEET, 24590-PTF-N1D-PWD-P0006, Rev. 1, PWD-VSL-00046 (PTF) C3 Floor Drain Collection Vessel.	The materials selected for the tank on the Mechanical Systems Data Sheet are of the same type as the minimum recommended material listed in the Vessel/Tank Material Selection Data Sheet for the C3 Floor Drain Collection Vessel (PWD-VSL-00046). Design life for the tank is specified as 40 years on the Mechanical Systems Data Sheet. The material selected for the primary tank boundary and all internal ancillary equipment is 316L stainless steel (maximum 0.030% Carbon, dual certified). During normal operations, wastes in vessel PWD-VSL-00046 are expected to be domestic water with small amounts of either nitric acid or caustic..

PRETREATMENT WASTE TANK (PWD) EL (-) 19'-0" (C3 Floor Drain Collection Vessel -00046) COGEMA-IA-009, Rev. 1			
Information assessed	Y/N	Source of Information	Assessment
Corrosion allowance is adequate for the intended service life of the tank.	Y	24590-PTF-3YD-PWD-00001, Rev. 0, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD; 24590-WTP-3PS-MV00-TP001, Rev. 0, Engineering Specification for Pressure Vessel Design and Fabrication; Mechanical Systems Data Sheet 24590-PTF-MVD-PWD-P0010, Rev. 1, PLANT ITEM No. 24590-PTF-MV-PWD-VSL-00046; VESSEL/TANK MATERIAL SELECTION DATA SHEET, 24590-PTF-N1D-PWD-P0006, Rev. 1, PWD-VSL-00046 (PTF) C3 Floor Drain Collection Vessel.	The Vessel/Tank Material Selection Data Sheet for vessel PWD-VSL-00046 identifies 316L stainless steel with a 0.04 inch corrosion allowance as an acceptable material for a 40 year design life. 316L stainless steel (maximum 0.030% Carbon, dual certified) has been identified in the Material Selection Data Sheet as the minimum recommended material for resistance to stress corrosion cracking, crevice corrosion, and pitting corrosion under normal conditions. The materials chosen, welding processes selected, surface preparation, and preservice inspections are adequate and appropriate for waste service ranging from neutral pH 7 to slightly acidic or caustic conditions.
Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the tank are exceeded.	Y	24590-PTF-M6-PWD-P0043, Rev. 1, P & ID – PTF PLANT WASH & DISPOSAL SYSTEM C3 AREA FLOOR DRAINS; 24590-PTF-MV-PWD-P0005, Rev. 1, EQUIPMENT ASSEMBLY C3 FLOOR DRAIN COLLECTION VESSEL PWD-VSL-00046.	The C3 Floor Drain Collection Vessel (PWD-VSL-00046) receives floor drains from all C3 areas in the PT facility generated from normal cleanup activities or small leaks. This tank also receives all sprinkler water discharges from the C3 areas fire protection systems. Sprinkler discharges may overflow the tank and fill the pit in which the tank is located. The tank is equipped with a 6 in. diameter overflow line that matches the size of the floor drain lines in each of the PTF C3 areas. The overflow is via an unrestricted overflow line to the pit floor where the tank is located at elevation (-) 19'-0".
ID = Internal Diameter OD = Outside Diameter N/A = Not Applicable psig = pounds per square inch gage Y=Yes N=No			

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