



MECHANICAL SYSTEMS DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-PWD-VSL-00015

R10452768

Project	RPP-WTP	P&ID	24590-PTF-M6-PWD-P0003, 24590-PTF-M6-PWD-P0023/24		
Project No	24590	Process Calculation	Deleted		
Project Site	Hanford	Vessel Drawing	24590-PTF-MV-PWD-P0007		
Description	Acidic/Alkaline Effluent Vessel			ISSUED BY RPP-WTP PDC	

Reference Data

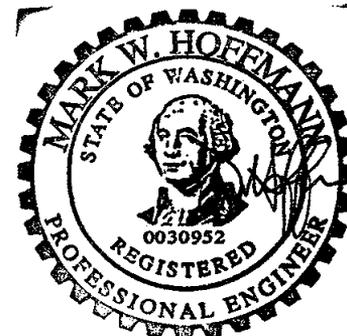
Charge Vessels (Tag Numbers)	PWD-VSL-00101, PWD-VSL-00102, PWD-VSL-000103, PWD-VSL-00104, PWD-VSL-00105
Pulsejet Mixers / Agitators (Tag Numbers)	PWD-PJM-00001, PWD-PJM-00002, PWD-PJM-00003, PWD-PJM-00004, PWD-PJM-00005, PWD-PJM-00006, PWD-PJM-00007, PWD-PJM-00008
RFDs/Pumps (Tag Numbers)	PWD-RFD-00101, PWD-RFD-00102, PWD-RFD-00103, PWD-RFD-00104, PWD-RFD-00105

Design Data

Quality Level	QL-1		Fabrication Specs	24590-WTP-3PS-MV00-TP001		
Seismic Category	SC-1		Design Code	ASME VIII Div 1		
Service/Contents	Radioactive Liquid		Code Stamp	Yes		
Design Specific Gravity	1.52		NB Registration	Yes		
Operating Volume	gal	105,850	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	119,150	Estimated	281,000	1,640,000	1,285,000
			Actual *			

Inside Diameter	inch	264			Wind Design	Not Required	
Length/Height (TL-TL)	inch	415			Snow Design	Not Required	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-SS90-T0001 24590-WTP-3PS-MV00-TP002	
Internal Pressure	psig	Atm	15	N/A	Seismic Base Moment *	ft*lb	
External Pressure	psig	0.22	10	N/A	Postweld Heat Treat	Not Required	
Temperature	°F	212	237	N/A	Corrosion Allowance	Inch	0.08 (Notes 7, 8)
Min. Design Metal Temp.	°F	0			Hydrostatic Test Pressure *	Psig	

Note: 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.



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12/29/06
12/29/04

EXPIRES 12/10/06

This Bound Document Contains a total of 5 sheets.

3	12/29/04	Issued for Permitting Use				
2	11/17/04	Issued for Permitting Use	C. Thompson	H. Khurana	C. Slater	M. Hoffmann
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Materials of Construction

Component	Material	Minimum Thickness/Size	Containment
Top Head	SA 240 316 with max. Carbon of 0.030%	See Drawing	Auxiliary (Note 1)
Shell	SA 240 316 with max. Carbon of 0.030%	See Drawing	Primary (Note 1)
Bottom Head	SA 240 316 with max. Carbon of 0.030%	See Drawing	Primary (Note 1)
Support	SA 240 304 with max. Carbon of 0.030%	See Drawing	N/A
Jacket/Coils/Half-Pipe Jacket	N/A	N/A	N/A
Internals	SA240 316 with max. Carbon of 0.030%	See Drawing	Thermowell Primary (Note 1)
Pipe	SA312 TP316 Smls with max. Carbon of 0.030%	See Drawing	Note 1
Forgings/ Bar stock	SA182 F316 SA479 316 with max. Carbon of 0.030%	See Drawing	As Note 1 for Nozzle Necks
Gaskets	N/A	N/A	N/A
Bolting	N/A	N/A	N/A

Miscellaneous Data

Orientation	Vertical	Support Type	Skirt
Insulation Function	Not Applicable	Insulation Material	Not Applicable
Insulation Thickness (inch)	Not Applicable	Weld Surface Finish	De-scaled as laid

Remarks

* To be determined by the vendor.

- Note 1:** All welds forming part of the primary and auxiliary containments, including the nozzle attachment welds shall be subjected to 100% volumetric examination.
- Note 2:** Radiography for this vessel shall be per para. 6.2 of specification 24590-WTP-3PS-MV00-TP001. Nozzle repads shall not be used.
- Note 3:** Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals.
- Note 4:** Contents of this document are Dangerous Waste Permit affecting.
- Note 5:** This vessel is located in a Black Cell.
- Note 6:** Deleted
- Note 7:** BNI shall ensure that an additional 0.093" is available for erosion in the bottom head and shall report the minimum thickness required for all specified loading conditions, exclusive of erosion and corrosion allowances. △ 3
- Note 8:** BNI shall ensure that an additional 0.065" is available for erosion in the interior conical surface of the pulse jet mixers. △ 3
- Note 9:** All Hydrodynamic loads are for BNI internal use only and are to be disregarded by the seller. △ 3



MECHANICAL SYSTEMS DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-PWD-VSL-00015

Equipment Cyclic Data Sheet

Plant Item Number	24590-PTF-MV-PWD-VSL-00015
Component Description	Parent Vessel
<i>The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.</i>	
Materials of Construction	SA 240 316 with max. Carbon of 0.030 %
Design Life	40 years
Component Function and Life Cycle Description	This is a "batch" vessel and cycle from nearly empty to nearly full every six days.

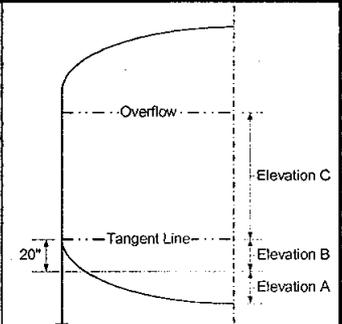
Load Type	Min	Max	Number of Cycles	Comment	
Design Pressure	psig	-10	15	10	Nominal assumption
Operating Pressure	psig	-0.22	0.00	2,450	
Operating Temperature	°F	59	212	2,450	Uniform material temperature range, not between two points
Contents Specific Gravity		1.00	1.52	N/A	
Contents Level	inch	Empty	Flooded	2,450	Coincident with pressure cycles
Localized Features					
Nozzles	Within 50°F of vessel operating range		As above		

Hydrodynamic Loading

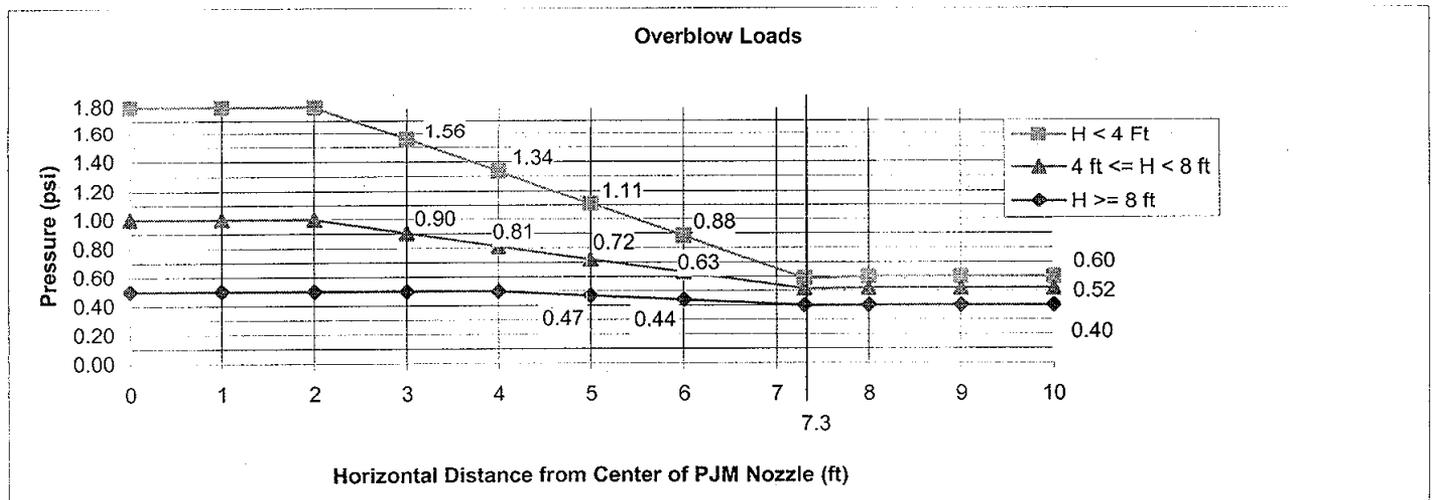
In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overflow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overflow loads, and this load combination is also to be assumed to act concurrently with seismic loads.

The following table indicates the normal hydrodynamic pressure for at ranges of elevations in the vessel and the number of design cycles for each condition. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Seller shall apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

Normal Operation Hydrodynamic Pressure Range, psi						Number of Cycles
Elevation A		Elevation B		Elevation C		
Radial	Vertical	Radial	Vertical	Radial	Vertical	
-0.15 to 0.25	-0.15 to 0.15	-0.05 to 0.12	-0.15 to 0.15	-0.03 to 0.05	-0.06 to 0.15	14.1 X 10 ⁶



Overflow loads vary as a function of the distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle up to the overflow level as plotted:



The overflow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Seller shall consider that any single pulse jet mixer may overblow 100 cycles.

Notes

- Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.



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Equipment Cyclic Data Sheet

Plant Item Number	PWD-VSL-00101, PWD-VSL-00102, PWD-VSL-000103, PWD-VSL-00104, PWD-VSL-00105, PWD-VSL-00106
Component Description	Charge Vessels

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	SA 240 316 with max. Carbon of 0.030 %
Design Life	40 years
Component Function and Life Cycle Description	<i>These charge vessels are cyclically loaded using vacuum to fully fill the charge vessel with process liquid and compressed air to fully empty the charge vessel. The charge vessels are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The charge vessel supports shall be designed to cycle between fully buoyant (charge vessel empty and parent vessel full) and fully loaded (charge vessel full and parent vessel empty).</i>

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	FV	55	10	Nominal assumption
Operating Pressure	psig	FV	30	391,000	
Operating Temperature	°F	59	212	2,450	Pressure cycles to be at 212° F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.
Contents Specific Gravity		1.00	1.52	N/A	
Contents Level	inch	Empty	Flooded	391,000	Coincident with pressure cycles
Localized Features					
Supports	As above		As above with contents level changing coincident with pressure cycles.		

Notes

- **Cycle increase:** The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.



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Equipment Cyclic Data Sheet

Plant Item Number	PWD-PJM-00001, PWD-PJM-00002, PWD-PJM-00003, PWD-PJM-00004, PWD-PJM-00005, PWD-PJM-00006, PWD-PJM-00007, PWD-PJM-00008
Component Description	Pulse Jet Mixers

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

Materials of Construction	SA 240 316 with max. Carbon of 0.030 %
Design Life	40 years
Component Function and Life Cycle Description	These pulse jet mixers (PJMs) are cyclically loaded using vacuum to fully fill the PJM with process liquid and compressed air to fully empty the PJM. The PJMs are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The PJM supports shall be designed to cycle between fully buoyant (PJM empty and parent vessel full) and fully loaded (PJM full and parent vessel empty) in addition to thrust.

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	FV	85	10	Nominal assumption
Operating Pressure	psig	FV	60	14.1×10^6	
Operating Temperature	°F	59	212	14.1×10^6	Pressure cycles to be at 212° F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points.
Contents Specific Gravity		1.00	1.52	N/A	
Contents Level	inch	Empty	Flooded	14.1×10^6	Coincident with pressure cycles
Thrust	lbf	0	280	14.1×10^6	
Localized Features					
Supports		As above			As above with contents level changing coincident with pressure cycles.

Notes

- **Cycle increase:** The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.