



MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-CNP-VSL-00003

R10327822

Project:	RPP-WTP	P&ID:	24590-PTF-M6-CNP-P000113 & 24590-PTF-M6-CXP-P0007 ¹
Project No:	24590	Process calculation	Deleted
Project Site:	Hanford	Vessel Drawing	24590-PTF-MV-CNP-P0001
Description:	Eluate Contingency Storage Vessel		

ISSUED BY
[Signature]
DATE
6/26/04

Reference Data

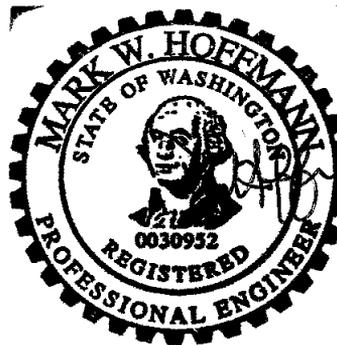
Charge Vessels (Tag Numbers)	1 (CNP-VSL-00166) ¹
Pulsejet Mixers / Agitators (Tag Numbers)	4 (CNP-PJM-00013, CNP-PJM-00014, CNP-PJM-00015, CNP-PJM-00016)
RFDs/Pumps (Tag Numbers)	1 (CNP-RFD-00003) ¹

Design Data

Quality Level	QL-1		Fabrication Specs	24590-WTP-3PS-MV00-TP001 (PVDF)		
Seismic Category	SC-1		Design Code	ASME VIII Div 1		
Service/Contents	Cs Eluant/Concentrate ¹		Code Stamp	Yes		
Design Specific Gravity	1.37 ¹		NB Registration	Yes		
Maximum Operating Volume	gal	18,750 (Note 6) ¹	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	21,570 (Note 6) ¹	Estimated	65,900 ¹	285,100 ¹	247,600 ¹
			Actual *			

Inside Diameter	inch	168			Wind Design	Not Required	
Length/Height (TL-TL)	inch	192 ¹			Snow Design	Not Required	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-TP002 24590-WTP-3PS-SS90-T0001	
Internal Pressure	psig	0 ¹ (Note 7)	15	35 ¹	Seismic Base Moment *	ft*lb	
External Pressure	psig	0.217 ¹	FV (Note 4 & 9) ¹	FV	Postweld Heat Treat	Not Required	
Temperature	°F	77 to 230 ¹ (Note 8)	255	255	Corrosion Allowance	Inch	0.04 Vessel (Note 5), 0.04 Jacket
Min. Design Metal Temp.	°F	40			Hydrostatic Test Pressure *	psig	

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. ¹



6/26/04

EXPIRES 12/10/04

This bound document contains a total of 6 sheets

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Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	SA-240 316 (Note 1) ^{△1}	See Drawing	Auxiliary (see note 10) ^{△1}
Shell	SA-240 316 (Note 1) ^{△1}	See Drawing	Primary (see note 10) ^{△1}
Bottom Head	SA-240 316 (Note 1) ^{△1}	See Drawing	Primary (see note 10) ^{△1}
Support	SA-240 304 (Note 1)	See Drawing	NIA
Jacket/Coils/Half-Pipe Jacket	SA-240 316 (Note 1) ^{△1}	See Drawing	NIA
Internals	SA-240 316 SA-312 TP316 (Note 1)	See Drawing	Thermowells Primary (see note 10) ^{△1}
Pipe (Seamless)	SA-240 316 SA-312 TP316 (Note 1) ^{△1}	See Drawing	Notes 2 and 10 ^{△1}
Forgings/ Bar stock	SA-182 F316 (Note 1)	See Drawing	NIA
Gaskets	NIA ^{△1}	NIA	NIA
Bolting	NIA ^{△1}	NIA	NIA

Miscellaneous Data

Orientation	Vertical	Support Type	Skirt
Insulation Function	Not Applicable	Insulation Material	Not Applicable
Insulation Thickness (inch)	Not Applicable	Internal Finish	Descaled as laid
		External Finish	Note 3

Remarks

* To be determined by the vendor.

Note 1: Material shall have Carbon Content of 0.030% Max. ^{△1}

Note 2: Nozzle necks below normal operating level are Primary, others Auxiliary. See PVDF and vessel drawing for NDT.

Note 3: Shell welds under jacket closure member ground smooth. Others descaled as laid.

Note 4: External design pressure under the jacket shall be rated for the jacket design pressure plus 1 psig internal vacuum in the vessel, to account for ventilation fan pressures. ^{△1}

Note 5: Corrosion allowance of 0.04" is also to be added to the external surface of shell under the jacket.

Note 6: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals. ^{△1}

Note 7: 0 psig is the maximum internal vessel operating pressure. The normal internal vessel operating pressure will range from -0.07 psig to -0.144 psig. ^{△1}

Note 8: 230 °F is the worst case (self-boiling) maximum operating scenario. The normal vessel operating temperature is 77 °F. ^{△1}

Note 9: The vessel design external pressure is estimated only and shall be confirmed by the Seller's calculations. ^{△1}

Note 10: All welds forming part of the primary and auxiliary containment including nozzle attachment welds shall be subjected to 100% volumetric examination. ^{△1}

Note 11: This vessel is located in a Black Cell. ^{△1}

Note 12: Contents of this document are Dangerous Waste Permit affecting. ^{△1}

Note 13: Internal components and supports natural frequencies shall not be less than 4.0 cycle per second. ^{△1}



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Equipment Cyclic Data Sheet

Component Plant Item Number:	CNP-VSL-00003
Component Description	Parent Vessel

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 (Note 1)
Design Life	40 Years
Component Function and Life Cycle Description	The Eluate Contingency Storage Vessel is used as an off normal vessel designed for 3 purposes; to hold one batch volume of eluant in order to elute a loaded cesium IX column, to hold an emergency elution volume, or to hold Cs concentrate in the event that HLP-VSL-00028 or HLP-VSL-00027B is unable to accept concentrate. It will take 18 days to completely fill and empty CNP-VSL-00003.

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	FV	15	10	Nominal assumption for testing.
Operating Pressure	psig	-0.217	0	NIA	This vessel will remain under constant pressure depending upon the HVAC plant.
Operating Temperature	°F	41	230*	5	Off normal conditions may occur bringing the temperature of process fluid to its boiling point of 230 °F possibly 5 times in the life of the vessel.
Contents Specific Gravity		1.015	1.37	NIA	Normally 1.37 without cycling.
Contents Level	inch	0	206**	811***	This vessel will either be full or completely empty (excluding the heel volume).
Localized Features					
Nozzles					Off normal conditions may cause superheated steam at 343 °F to enter the vessel through these ejectors (Nozzles N03, N04, and N28), further causing direct steam impingement upon internal vessel walls possibly 5 times in the life of the vessel.
Supports					

Notes

- Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.**
- *230°F is the worst case (self-boiling) maximum operating scenario. The normal vessel operating temperature is 77 °F.**
- **From Inside crown of bottom head.**
- ***Based on 18 days to completely fill and empty CNP-VSL-00003 over a 40 year life of the vessel.**



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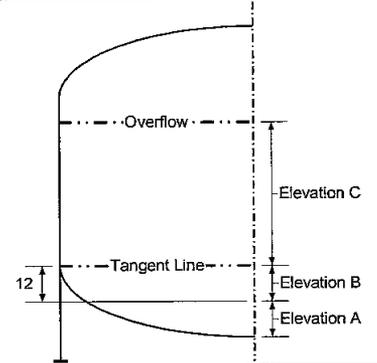
24590-PTF-MV-CNP-VSL-00003

Hydrodynamic Loading



Description

Pulse jet mixers impose a cyclical hydrodynamic load on all internal components. The components shall be supported against these hydrodynamic loads due to both normal operation and overblow conditions. The following table indicates the hydrodynamic pressure for normal and overblow conditions 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.



Condition

Hydrodynamic Pressure Range, psi

Number of Cycles

Condition	Hydrodynamic Pressure Range, psi						Number of Cycles
	Elevation A		Elevation B		Elevation C		
	Radial	Vertical	Radial	Vertical	Radial	Vertical	
Normal Operation	1.10 to -0.50	0.80 to -0.00	0.16 to -0.16	0.80 to -0.00	0.16 to -0.16	0.30 to -0.00	10000
Overblow	0 to 2	0 to 2	0 to 1	0 to 1	0 to 0.5	0 to 0.5	100



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PLANT ITEM No.
24590-PTF-MV-CNP-VSL-00003

Equipment Cyclic Data Sheet

Component Plant Item Number:	CNP-VSL-00166
Component Description	Charge Vessel (Type C, RFD Type 140M) ¹

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 (Note 1) ¹
Design Life	40 Years
Component Function and Life Cycle Description	The charge vessel is cyclically loaded using vacuum to fully fill the charge vessel with process liquid and compressed air to fully empty the charge vessel. The charge vessel is contained within a parent vessel with varying liquid level. It 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).

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	FV	80	10 ¹	Nominal assumption for testing. ¹
Operating Pressure	psig	FV	72.5	12.5 X 10⁴** ¹	Assuming the transferring RFD, CNP-RFD-00003, is used 5 times/year. ¹
Operating Temperature	°F	41 ¹	230* ¹	N/A	Normally 77 °F without cycling. Off normal conditions may occur bringing the temperature of process fluid to its boiling point of 230 °F possibly 5 times in the life of the vessel. Temperature will not cycle appreciably with vessel cycling.
Contents Specific Gravity		1.015 ¹	1.37 ¹	N/A	Normally 1.015 without cycling. ¹
Contents Level	inch	Empty	Flooded	12.5 X 10⁴** ¹	Assuming the transferring RFD, CNP-RFD-00003, is used 5 times/year. ¹
Localized Features					
Nozzles					
Supports					

Notes

- Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.**
- *230°F is the worst case (self-boiling) maximum operating scenario. The normal vessel operating temperature is 77°F.**
- **Based on a 12,500 gallon batch (parent vessel) volume using a charge vessel dollop volume of 20 gallons for a period of 40 years.**

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Equipment Cyclic Data Sheet

Component Plant Item Number:	CNP-PJM-00013, CNP-PJM-00014, CNP-PJM-00015, CNP-PJM-00016
Component Description	Pulse Jet Mixers (PJM Type C)

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 (Note 1)
Design Life	40 Years
Component Function and Life Cycle Description	These pulse jet mixers are cyclically loaded using vacuum to fully fill the vessel with process liquid and compressed air to fully empty the vessel. The pulse jet mixers 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 pulse jet mixer supports shall be designed to cycle between fully buoyant (pulse jet mixer empty and parent vessel full) and fully loaded (pulse jet mixer full and parent vessel empty) in addition to thrust.

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	FV	80	10	Nominal assumption for testing.
Operating Pressure	psig	FV	72.5	10000*	
Operating Temperature	°F	41	230**	N/A	Normally 77 °F without cycling. Off normal conditions may occur bringing the temperature of process fluid to its boiling point of 230 °F possibly 5 times in the life of the vessel. Temperature will not cycle appreciably with vessel cycling.
Contents Specific Gravity		1.015	1.37	N/A	Normally 1.37 without cycling.
Contents Level	inch	Empty	Flooded	10000*	
Thrust	lbf		353	10000*	See Note below

Localized Features

Nozzles	
Supports	

Notes

- Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.**
- *Bounding value for CNP-VSL-00003 which is a contingency vessel and is not normally used.**
- **230°F is the worst case (self-boiling) maximum operating scenario. The normal vessel operating temperature is 77°F**
- 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) states. Thrust load shall be applied only to the fully buoyant state. Assume the parent vessel is full for 50% of the number of PJM cycles..**