ISSUED BY
RPP-WTP PDC

R10934763

MECHANICAL SYSTEMS DATA SHEET: VESSEL

PLANT ITEM No.
24590-HLW-MV-RLD-VSL-00008

Project:	***RPP-WTP***	P&ID:	***24590-HLW-M6-RLD-00002***
Project No:	***24590***	Calculation:	***24590-HLW-M6C-RLD-00005; 24590-HLW-MVC-11-00001; 24590-HLW-MVC-30-00001***
Project Site:	***Hanford***	Vessel Drawing	***24590-HLW-MV-RLD-00004***
Description:	***Plant Wash and Drains Vessel RLD-VSL-00008***		

Reference Data

Charge Vessels (Tag Numbers)	***RLD-VSL-00016A, RLD-VSL-00016B***
Pulsejet Mixers / Agitators (Tag Numbers)	***RLD-PJM-00001, RLD-PJM-00002, RLD-PJM-00003, RLD-PJM-00004***
RFDs/Pumps (Tag Numbers)	***RLD-RFD-00163A, RLD-RFD-00163B***

Design Data

Quality Level		***Q (See Note 14)*** △7	Fabrication Specs	***24590-WTP-3PS-MV00-T0001***		
Seismic Category		***SC-1***	Design Code	***ASME VIII Div 1***		
Service/Contents		***Radioactive Liquid***	Code Stamp	***Yes***		
Design Specific Gravity		***1.07*** △7	NB Registration	***Yes***		
Maximum Operating Volume	gal	***10,628 (Note 3)***	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	***13,774 (Note 3)***	Estimated	***43,000***	***150,800***	***158,600***
Environmental Qualification △7		***See attached EQ Section***	△7			

Inside Diameter	inch	***156***			Wind Design	***Not Required***	
Length/Height (TL-TL)	inch	***117***			Snow Design	***Not Required***	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design △7	***24590-WTP-3PS-MV00-T0002 24590-WTP-3PS-SS90-T0001***	
Internal Pressure	psig	***Atm***	***15***	***None***			
External Pressure	psig	***0.83*** △7	***FV***	***None***	Postweld Heat Treat	***Not Required***	
Temperature	°F	***200*** △7	***225*** △7 ***(Note 13)***	***None***	Corrosion Allowance	Inch	***0.04 (Note 10 & 11)*** △7
Min. Design Metal Temp.	°F	***40***			△7		

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Top Head	***SA 240 316 (Note 2)***	***See Drawing***	***Auxiliary (see note 4)***
Shell	***SA 240 316 (Note 2)***	***See Drawing***	***Primary (see note 4)***
Bottom Head	***SA 240 316 (Note 2)***	***See Drawing***	***Primary (see note 4)***
Support	***SA 240 304 (Note 2)***	***See Drawing***	***N/A***
Jacket/Coils/Half-Pipe Jacket	***N/A***	***N/A***	***N/A***
Internals	***SA 240 316 (Note 2)***	***See Drawing***	***Thermocouples Primary (see note 4)***
Pipe Seamless	***SA 312 TP316 (Note 2) / SB 622 N06022 (Note 8)***	***See Drawing***	***See Notes 1 and 4***
Forgings/ Bar stock	***SA 182 F316 (Note 2)***	***See Drawing***	***N/A***
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***	Internal Finish	***Descaled as laid***
		External Finish	***Descaled as laid***

Notes/Remarks

* To be determined by the vendor.

Note 1: Nozzle necks below the high operating liquid level are Primary, others Auxillary.

Note 2: Material shall have Carbon Content of 0.030% Max. Non-welded specialty items are excluded from this requirement.

Note 3: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals.

Note 4: All welds forming part of the primary and auxiliary containment including nozzle attachment welds shall be subjected to100% volumetric examination.

Note 5: This vessel is located in a Black Cell.

Note 6: Contents of this document are Dangerous Waste Permit affecting.

Note 7: As a minimum, all welds on internal components and supports shall be dye-penetrant tested.

Note 8: Use SB 622 N06022 material for Ejectors (by others) and Ejector Piping.

Note 9: Deleted as per Report No. 24590-WTP-RPT-M-04-0007 Rev. 0 dated 29 Oct 2004.

Note 10: Seller shall ensure that an additional 0.10" 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.

Note 11: Seller shall ensure that an additional 0.05" is available for erosion in the interior conical surface of the pulse jet mixers.

Note 12: This revision of the data sheet incorporates SDDR No. 24590-WTP-SDDR-PROC-04-00670 by reference.

Note 13: Required data for thermal stress analysis for the nozzle exposed to higher temperatures.

- ***Cell ambient temperature = 112 °F***
- ***Headspace temperature = Operating temperature = 140 °F***
- ***Ambient and headspace natural convection heat xfer coefficients = 1.63 BTU/h-ft2-°F***
- ***Hot ejector transfer into vessel (Ejectors RLD-EJCTR-00007, RLD-EJCTR-00018A/B, & RLD-EJCTR-00038):***
  - ***a. Only one of the hot ejectors will be used at a time during transfers.***
  - ***b. Transfer frequency = 1 transfer/30 days for 3.6 hrs; steam mass flow rate = 1192 lb/hr***

Note 14: Vessel to be designed , fabricated, and tested to L-1 requirements defined in24590-WTP-3PS-MV00-T0001.

Note 15: All hydrodynamic and overblow loads shall be included with the seismic analysis as per this data sheet.

Note 16: 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.

Note 17: The vessel design shall account for bouyancy effects due to the room flood height of 22 ft. assuming the vessel is empty (worst case).

Note 18: Revision 7 revises quality level, design specific gravity, operating & design temperature, operating external pressure, corrosion allowance, added Notes 14 - 18, revised cyclic data, notes under cyclic data for parent vessel, hydrodynamic info, added E&NS Safety Screen box, and added E&NS signature box. Added sections for MOB, revised Nozzle Loads, DOE Radioactive Materials Disclaimer (Note 16), Table of Nozzle Connections, and Equipment Qualification Datasheet.

△7

Seismic △7

Seismic Response Spectra curves: Figures 549, 550, and 552 from calculation 24590-HLW-S0C-S15T-00009 (See CCN 138092). Seismic analysis to be combined with operating conditions, single overblow, and any sloshing loads imposed. Sloshing loads on vessel internals are are considered per ASCE 4-98. Analysis to consider worst case seismic loads on the vessel proper and on the vessel internals. The response curves and sloshing loads will be provided via the Material Requisition.

	MECHANICAL SYSTEMS DATA SHEET: VESSEL	PLANT ITEM No. 24590-HLW-MV-RLD-VSL-00008

Equipment Cyclic Data Sheet

Component Plant Item Number:	*24590-HLW-MV-RLD-VSL-00008*
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*			
Design Life		*40 years*			
Component Function and Life Cycle Description		*See Calculation 24590-HLW-MVC-11-00001.* △7			
Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*15*	*10*	*Nominal assumption*
Operating Pressure	psig	*-6.0* △7 *-0.83*	*0* △7 *-0.18*	*14,600* *3.8E7* △7	*Maximum Operating Case 1* △7 *Maximum Operating Case 2*
Operating Temperature	°F	*59*	*200* △7	*14,600* △7	*One cycle per day.*
Contents Specific Gravity		*0.965* △7	*1.07* △7	*14,600*	
Contents Level	inch	*Empty*	*Flooded*	*14,600* △7	*One cycle per day*
Localized Features					
Nozzles		*Within 50°F of operating temperature range except as noted below*		*Normal operations will cause Superheated Steam at 358 °F design temperature to enter the vessel through the transfer ejectors (Nozzles N23, N24, N31, N41) once per day and through the emptying ejectors (Nozzles N14, N15, N21, N22) once per month.*	
Air Inlet					
Delivery					
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.***
- ***Perform fatigue assessment/analysis for N14, N15, N21, N22, N23, N24, N25, N31, N33, N35, N36, N37, N38, N41, N44, N50, N51, N59, N60 and associated piping over 40 years from 0 psig at 59 °F to the pressure and temperature indicated in the Table of Nozzle Connections for 480 pressure/temperature cycles (pressure cycles shall coincide with temperature cycles).*** △7

Hydrodynamic Loading - Pulse Jet Mixers (PJMs) 7

Pulse Jet Mixers (PJMs) are designed to blow the fluid in the vessel in the form of a jet that induces agitation and mixing in the fluid. The mixing is required for various reasons: to enhance the heat transfer from the fluid to the cooling jackets and to release hydrogen from the fluid are examples. PJMs work on pressurized air to drive the fluid out of the PJM and into the vessel, this is called the "drive" phase. After the drive phase, the PJM is refilled with the vessel fluid via a suction applied to the PJM internals. The end of the drive phase is controlled such that the PJM does not empty completely. However, a condition can exist in which the PJM continues to blow during the drive phase, ejecting air after all the fluid is expelled. This condition is called a PJM overblow. This can occur with a single PJM overblowing or if more than one PJM overblows, it is called Multiple Overblow (MOB). Fluid motion during singleoverblow or MOB in a vessel causes hydrodynamic loads on the internal vessel components in the form of increased pressure. This fluid motion is cyclic based on the number of drive phases imposed by the PJMs. There are several types of hydrodynamic loads that the vessel internals will be designed for: 1) Normal operations, 2) Single Overblow, and 3) Multiple Overblow. The vessel internals shall be designed and supported for all three of these load conditions.and this load combination is also to be assumed to act concurrently with seismic loads The following tables and graphs indicate the required pressure/forces to apply to the vessel internals along with the number of cycles for each condition.

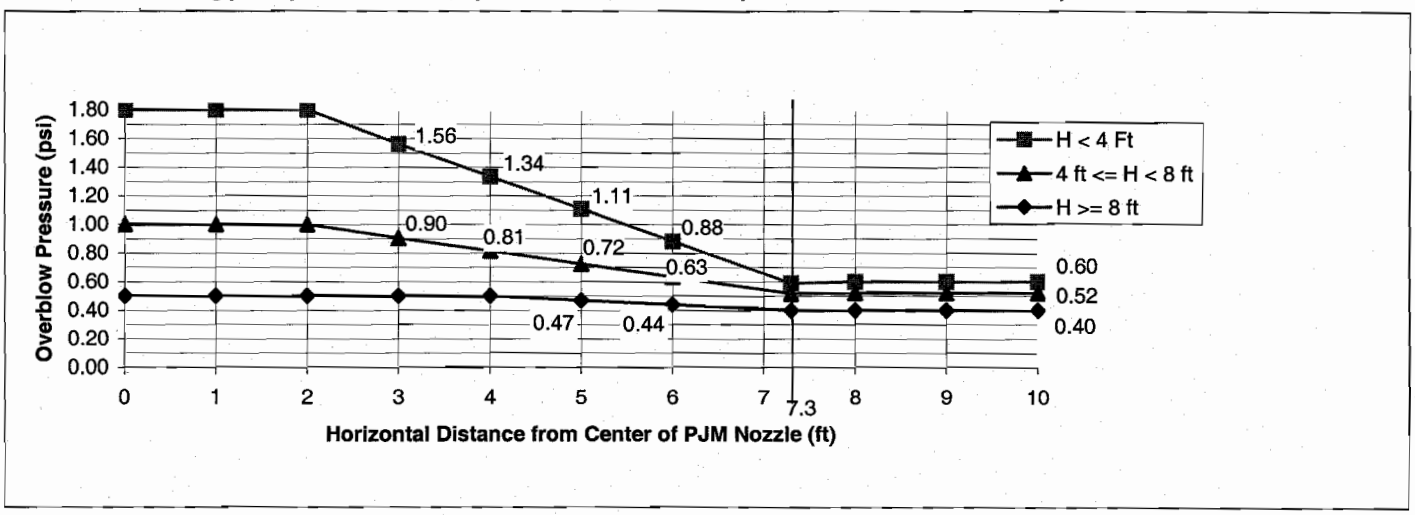
Normal Operations Loading - PJMs

Pulse jet mixers(PJM) impose a cyclical hydrodynamic load on all internal components. The components shall be designed and supported against these hydrodynamic loads due to normal operations. The following table indicates the hydrodynamic pressure for normal conditions at ranges of elevations in the vessel and the number of design cycles for this 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. This load combination acts concurrently with seismic loads for normal PJM operations.

Condition	Hydrodynamic Pressure Range, psi				Number of Cycles
	Between PJM Center and Vessel Wall		Between Vessel Center and PJM Center		
	Radial	Vertical	Radial	Vertical	
Normal Operation	*-0.80 to 0.80*	*-0.80 to 0.40*	*-0.20 to 0.30*	*-0.20 to 0.25*	*4.1E7* 7

Single Overblow - PJMs 7

Single Overblow 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 in the form of overblow pressures:



For all vessel internal components other than the overblowing pulse jet mixer, the overblow forces shall be applied a) in the vertical upward direction, and b) in the horizontal direction, radiating from the centerline of the overblowing pulse jet mixer. For the overblowing pulse jet mixer, the force shall be applied in the vertical upward direction only. The overblow force on all components, including structures and supports, shall be calculated by applying the overblow pressure at the location of the nearest surface of the component and to the projected area of the component, facing the appropriate direction. The normal force component, specified for the normal pulse jet mixer operation condition, is not applicable to the overblow condition. Any single pulse jet mixer may overblow 1000 cycles. Reference CCN 125541 dated 07/27/05.

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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Multiple Overblow Loading- PJMs △7

Multiple PJM Overblow (MOB) loads vary as a function of the horizontal 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 in the form of overblow pressures. Multiple application of the Single Overblow loading forms the basis for the MOB loads. Usage of the above Single Overblow graph along with Report # 24590-WTP-RPT-M-06-003 (Summary Report: Hydrodynamic Loads for PJM Multiple Overblow Condition) is required to determine the forces on each vessel internal component (targets) due to MOB. (Note: this report will be provided in the Material Requisition Package). This load condition does not act concurrently with seismic loads, but will be included with other normal operating load conditions. The number of cycles applied to MOBs is 400 cycles.

Equipment Cyclic Data Sheet - Charge Vessels

Component Plant Item Number:	***RLD-VSL-00016A, RLD-VSL-00016B***
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***
Design Life	***40 years***
Component Function and Life Cycle Description	***This component is part of a pumping system. It repeatedly floods and empties. The action is caused by vacuum or air pressure being presented to the top nozzle. The surrounding parent vessel may contain any level of the fluid between the maximum operating level and the heel level. The charge vessel is subjected to buoyancy forces when immersed in the parent vessel contents. The vessel is in cyclic duty.***

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***FV***	***135*** △7	***100*** △7	***Nominal assumption***
Operating Pressure	psig	***FV***	***See comment.*** △7	***14,600*** △7	***RLD-RFD-00163A maximum operating pressure is 60 psig & RLD-RFD-00163B maximum ioperating pressure is 65 psig.*** △7
Operating Temperature	°F	***59***	***200*** △7	***14,600*** △7	
Contents Specific Gravity		***0.965*** △7	***1.07*** △7	***14,600*** △7	
Contents Level	inch	***Empty***	***Flooded***	***14,600***	***Coincident with pressure cycles***
Localized Features					
Nozzles		***As above***		***As above***	
Air Inlet		***As above***		***As above***	
Delivery					
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.***
- ***CVs inside parent vessels shall have buoyancy effects considered. PJMs shall be similarly considered and also the liquid thrust effect.***

	MECHANICAL SYSTEMS DATA SHEET: VESSEL	PLANT ITEM No. 24590-HLW-MV-RLD-VSL-00008

Equipment Cyclic Data Sheet - PJMs

Component Plant Item Number:	*RLD-PJM-00001, RLD-PJM-00002, RLD-PJM-00003 & RLD-PJM-00004*
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*
Design Life	*40 years*
Component Function and Life Cycle Description	*This component is part of a mixing system. It repeatedly floods and empties. The action is caused by vacuum or air pressure being presented to the top nozzle. The surrounding parent vessel may contain any level of the fluid between the maximum operating level and the heel level. The PJM is subjected to buoyancy forces when immersed in the parent vessel contents. The vessel is in cyclic duty.*

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	*FV*	*135* [7]	*100* [7]	*Nominal assumption*
Operating Pressure	psig	*FV*	*11* [7]	*4.1E7* [7]	*PJM continuous agitation with cycle time of 30 sec.*
Operating Temperature	°F	*59*	*200* [7]	*NA* [7]	
Contents Specific Gravity		*0.965* [7]	*1.07* [7]	*NA*	
Contents Level	inch	*Empty*	*Flooded*	*4.1E7* [7]	*Coincident with pressure cycles*
Thrust	lbf	*-262* [7]	*262*	*4.1E7* [7]	*See Note below*
Localized Features					
Nozzles		*As above*		*As above*	
Air Inlet		*As above*		*As above including pressure cycles*	
Delivery					
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.***
- ***CVs inside parent vessels shall have buoyancy effects considered. PJMs shall be similarly considered and also the liquid thrust effect.***
- ***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.***

Nozzle Loads △7

Nozzle loads per 24590-WTP-3PS-MV00-T0001 Appendix A except for the following nozzles listed below per CCN 166594:

Nozzle Number	Nozzle Size (in)	Orientation (V* / H**)	Load Case	Design Loads (Force in lbs, Moment in ft-lb)					
				Fx	Fy	Fz	Mx	My	Mz
N08	8	H	Weight	310	500	310	490	615	615
			Seismic	325	325	325	790	1180	1180
			Thermal	728	530	595	1426	1920	1920
N10	3	V	Weight	224	70	70	155	100	100
			Seismic	70	106	106	207	310	310
			Thermal	248	113	113	165	333	368
N16	3	V	Weight	110	70	70	155	219	170
			Seismic	70	108	137	246	645	591
			Thermal	254	123	135	165	557	345
N17	4	V	Weight	212	115	115	285	180	425
			Seismic	120	183	183	390	587	587
			Thermal	175	195	569	1350	1095	630
N36	2	V	Weight	55	35	35	42	26	26
			Seismic	70	105	105	155	235	270
			Thermal	100	115	142	169	335	335
N37	2	V	Weight	69	35	35	42	26	26
			Seismic	70	105	105	155	235	235
			Thermal	100	115	115	278	335	335
N38	4	V	Weight	190	115	115	285	180	180
			Seismic	120	304	183	476	648	1118
			Thermal	303	195	195	478	630	675
N42	8	H	Weight	310	1100	310	490	615	1650
			Seismic	325	690	325	790	1180	1180
			Thermal	296	265	298	800	800	800
N43	3	V	Weight	110	70	70	155	104	100
			Seismic	70	108	125	207	310	310
			Thermal	113	113	113	165	333	333
N44	3	V	Weight	159	70	70	155	100	100
			Seismic	78	108	108	207	510	310
			Thermal	320	153	113	165	334	857
N49	3	V	Weight	224	70	70	155	100	100
			Seismic	72	108	108	207	310	310
			Thermal	552	113	136	165	748	333
N50	2	V	Weight	58	35	35	42	26	26
			Seismic	70	105	105	155	235	235
			Thermal	100	115	115	169	335	335

Nozzle Number	Nozzle Size (in)	Orientation (V* / H**)	Load Case	Design Loads (Force in lbs, Moment in ft-lb)					
				Fx	Fy	Fz	Mx	My	Mz
N51	2	V	Weight	71	35	35	42	26	26
			Seismic	70	105	105	155	235	235
			Thermal	100	115	115	169	335	335
N53	4	V	Weight	185	115	115	285	180	180
			Seismic	120	183	183	441	587	587
			Thermal	175	195	195	315	630	630
N54	3	V	Weight	173	70	70	155	100	100
			Seismic	101	108	188	207	1156	310
			Thermal	116	131	113	322	333	683

Notes for Nozzle Loads △7

V = vertical head nozzle - values are x = North/South, y = vertical, z = East/West (global coordinates), Vessel 0° defined as North

****H = horizontal shell nozzle - values are per axes shown in 24590-WTP-3PS-MV00-T0001, Appendix A (local coordinates)***

Nozzle loads shown in table above are to be used in place of those specified in 24590-WTP-3PS-MV00-T0001 – do not apply any thermal reduction factors.

Table of Nozzle Connections △7

Internal vessel piping and nozzle design shall be compatible with the following **external** connection pipe size and pressure/temperature conditions outside the vessel:

Nozzle	Connecting Pipe Size	Design Pressure (psig)	Design Temperature (°F)
N01	2" - 40S	135/FV	113
N02	2" - 40S	135/FV	113
N03	2" - 40S	135/FV	113
N04	2" - 40S	135/FV	113
N05	1" - 40S	135/FV	113
N06	1" - 40S	135/FV	113
N07	2" - 40S	50	113
N08	8" - 10S	50	200
N09	DELETED	DELETED	DELETED
N10	3" - 40S	109	343
N11	CAPPED	N/A	N/A
N12	1-1/2" - 80S	109	358
N13	DELETED	DELETED	DELETED
N14	2" - 80S	109	358
N15	2" - 80S	109	358
N16	3" - 40S	50	225
N17	4" - 40S	50	225
N18	DELETED	DELETED	DELETED
N19	DELETED	DELETED	DELETED
N20	DELETED	DELETED	DELETED
N21	2" - 40S	109	358

N22	2" - 40S	109	358
N23	2" - 40S	109	358
N24	2" - 40S	109	358
N25	2" - 40S	109	358
N26	1" - 40S	110	200
N27	2" - 40S	110	200
N28	2" - 40S	135	113
N29	DELETED	DELETED	DELETED
N30	DELETED	DELETED	DELETED
N31	2" 80S	109	358
N32	1" - 40S	15	113
N33	1-1/2" - 80S	109	358
N34	DELETED	DELETED	DELETED
N35	2" - 40S	60	113
N36	2" - 80S	135	358
N37	2" - 80S	135	358
N38	4" - 40S	50	225
N39	2" - 40S	135	113
N40	DELETED	DELETED	DELETED
N41	2"- 80S	109	358
N42	8" - 10S	50	200
N43	3" - 40S	60	113
N44	3" - 40S	50	225
N45	2" - 40S	109	358
N46	2" - 40S	109	358
N47	1" - 40S	110	200
N48	2" - 40S	110	200
N49	3" - 40S	50	225
N50	2" - 80S	135	358
N51	2" - 80S	135	358
N52	2" - 40S	150	137
N53	4" - 40S	50	113
N54	3" - 40S	109	343
N55	1-1/2" - 40S	0/FV	113
N56	1-1/2" - 40S	0/FV	113
N57	2"-40S	165	130
N58	2" - 40S	50	112
N59	1-1/2" - 80S	109	343
N60	1-1/2" - 80S	109	343
N61	DELETED	DELETED	DELETED
N62	DELETED	DELETED	DELETED
N63	1" - 40S	15	113
N64	1/2" - 40S	15	113

EQUIPMENT QUALIFICATION DATASHEET (EQD)

10 RP 8/5/09

Equipment Identification

Component Tag Number	24590-HLW-MV-RLD-VSL-00008	Safety Classification	☒ SC ☐ SS ☒ APC ☐ SDC ☐ SDS ☐ RRC
Manufacturer / Supplier	Bendalls		
Requisition Number	24590-QL-MRG-MVA0-00002		
Model	custom	Seismic Category	☒ SC-I ☐ SC-II ☐ SC-III ☐ SC-IV
Description (Include descriptive text [e.g., location, elevation])	Radioactive Liquid Waste Disposal System (RLD) Plant Wash and Drains Vessel located in Room H-B014, Elev. (-) 21'-00", Column lines H/11.5		
Safety Function(s)	Provide primary confinement (SC) of liquids, Reference Table 4A-1 of SED 24590-WTP-SED-ENS-03-002-04, Rev 2b. Pulse Jet Mixers (APC) to provide sufficient agitation to prevent hydrogen accumulation (Table 3A-9 of SED 24590-WTP-SED-ENS-03-002-04, Rev 2b).		

Seismic Safety Function	☒ Yes ☐ No	Room Number(s):	H-B014
Maintenance Accessible	☐ Yes ☒ No	Method of Maintenance Access:	☐ Remote ☐ Hands On ☒ None
Seismic Operability Requirements:	☒ During Seismic Event	☒ After Seismic Event	
ITS Equipment Type:	☒ Passive Mechanical	☐ Active Mechanical	☐ Electrical

Equipment Environmental Qualification (EEQ)

Environment ☐ Mild ☒ Harsh Contamination Class: C5 Radiation Class: R5	Hi Rad Service ☒ Yes ☐ No	Design Life (yrs) ☒ 40 ☐ Other ____

Parameter Type/Units	Parameter Value	Time Duration (number)	Time Units	WTP Document Number (BUYER)	Submittal Number (SELLER)
Normal					
Normal High Temperature (°F)	113	40	yrs	24590-HLW-U0D-W16T-00001	Note 19
Normal Low Temperature (°F)	59	40	yrs	24590-HLW-U0D-W16T-00001	Note 19
Normal High Relative Humidity (%RH)	100	40	yrs	24590-HLW-U0D-W16T-00001	Note 19
Normal Low Relative Humidity (%RH)	5	40	yrs	24590-HLW-U0D-W16T-00001	Note 19
Normal High Pressure (in.-w.g.)	0 (Note 20)	40	yrs	24590-HLW-U0D-W16T-00001	Note 19
Normal Low Pressure (in.-w.g.)	- 1.1 (Note 20)	40	yrs	24590-HLW-U0D-W16T-00001	Note 19
Normal Radiation Dose Rate (mR/hr)	105000	40	yrs	24590-HLW-U0D-W16T-00001	Note 19
Vibration Magnitude (g)	N/A	N/A	N/A	N/A	N/A
Vibration Frequency (Hz)	N/A	N/A	N/A	N/A	N/A
Additional Normal Information:	N/A				

Equipment Environmental Qualification (EEQ) *(continued)*

Parameter Type/Units	Parameter Value	Time Duration (number)	Time units	WTP Document Number (BUYER)	Submittal Number (SELLER)
Abnormal					
Abnormal High Temperature (°F)	125	8	hrs/yr	24590-HLW-U0D-W16T-00001	Note 19
Abnormal Low Temperature (°F)	40	8	hrs/yr	24590-HLW-U0D-W16T-00001	Note 19
Abnormal High Relative Humidity (%RH)	100	8	hrs/yr	24590-HLW-U0D-W16T-00001	Note 19
Abnormal Low Relative Humidity (%RH)	8	438	hrs/yr	24590-HLW-U0D-W16T-00001	Note 19
Abnormal High Pressure (in.-w.g.)	4 (Note 20)	8	hrs/yr	24590-HLW-U0D-W16T-00001	Note 19
Abnormal Low Pressure (in.-w.g.)	- 6.7 (Note 20)	8	hrs/yr	24590-HLW-U0D-W16T-00001	Note 19
Abnormal Radiation Dose Rate (mR/hr)	105000	0	N/A	24590-HLW-U0D-W16T-00001	Note 19
Wet Sprinkler System Present	No	N/A	N/A	24590-HLW-U0D-W16T-00001	N/A
Additional Abnormal Information	N/A				
Design Basis Events (DBE)					
DBE High Temperature (°F)	126	1000	hrs	24590-HLW-U0D-W16T-00001	Note 19
DBE Low Temperature (°F)	40	1000	hrs	24590-HLW-U0D-W16T-00001	Note 19
DBE High Relative Humidity (%RH)	100	482	hrs/yr	24590-HLW-U0D-W16T-00001	Note 19
DBE Low Relative Humidity (%RH)	8	1000	hrs/yr	24590-HLW-U0D-W16T-00001	Note 19
DBE High Pressure (in.-w.g.)	4 (Note 20)	1000	hrs	24590-HLW-U0D-W16T-00001	Note 19
DBE Low Pressure (in.-w.g.)	- 6.7 (Note 20)	1000	hrs	24590-HLW-U0D-W16T-00001	Note 19
DBE Radiation Dose Rate (mR/hr)	105000	0	N/A	24590-HLW-U0D-W16T-00001	Note 19
Flood Height (ft)	22	1000	hrs	24590-HLW-U0D-W16T-00001	Note 19
Submergence (ft)	3' - 9"	1000	hrs	24590-HLW-U0D-W16T-00001	Note 19
Chemical/Spray Exposure	Yes	1000	hrs	24590-HLW-U0D-W16T-00001	Note 19
Additional DBE Information	N/A				

DBE Chemical Exposure Details	
DBE Chemical Types/Concentrations	Nitric Acid (1M) Sodium Hydroxide (5M)

Interfaces (Electrical)	
Power Supply Voltage (VAC, VDC)	N/A
Power Supply Frequency (Hz)	N/A
Power Connection Method	N/A
I/O Signals to/from Equipment	N/A
I/O Connection Method	N/A

Interfaces (Mechanical)	
Mounting Configuration (orientation)	Vertical Mounted , Skirt, Located at -21'-0" in the High Level Waste Facility Column Lines H/11.5
Mounting Method (bolts, welds, etc.)	Bolted Anchor Chairs
Auxiliary Devices	Charge Vessels RLD-VSL-00016A, RLD-VSL-00016B, Pulse Jet Mixers RLD-PJM-00001, RLD-PJM-00002, RLD-PJM-00003, RLD-PJM-00004, Reverse Flow Diverters RLD-RFD-00163A, RLD-RFD-00163B, all devices are internal to the parent vessel.

Equipment Seismic Qualification (ESQ)

Parameter	Title	Reference/Document Number	Version / Revision	Remarks
WTP Seismic Design Specification (BUYER)	Engineering Specification for Seismic Qualification of Seismic Category I/II Equipment and Tanks, Engineering Specification for Seismic Qualification Criteria for Pressure Vessels	24590-WTP-3PS-SS90-T0001 24590-WTP-3PS-MV00-T0002	Rev 2 Rev 2	N/A N/A
Specified Seismic Load (BUYER)	HLW Vitrification Building Seismic Analysis, In-Structure Response Spectra (ISRS)	24590-HLW-S0C-S15T-00009	00E	CCN 138092
Design Seismic Load (SELLER	N/A	N/A	N/A	BNI to issue seismic calulation.
Qualification Method (SELLER)	N/A	N/A	N/A	Dynamic analysis utilizing response spectra curves to be issued as a BNI calculation.
Qualification Report Number (SELLER)	N/A	N/A	N/A	BNI to provide calculation to Seller.
Submittal Number (BUYER)	TBD	TBD	TBD	BNI to provide calculation to Seller.

EQUIPMENT QUALIFICATION DATASHEET (EQD)

Notes and Additional Information

Note 19: BNI (BUYER) shall perform Equipment Environmental Qualification in accordance with 24590-WTP-DC-ENG-06-001, Design Criteria for Equipment Seismic and Environmental Qualification.

Note 20: Where pressure is given in inches of water column (in-w.c.) in the source document, it is generally assumed that this is in reference to atmospheric pressure and is therefore equivalent to inches of water gage (in-w.g.)

Safety Screening / Evaluation Required? If yes per 24590-WTP-GPP-SREG-002, E&NS signature required below	X	Yes		No

Approval

Rev	Description	System Engineer	Vessel Engineer	Checked	Reviewed	E&NS	Approved	Date
0	Issued for Purchase	R. Rao	S.L. Lee	M.Wright/ C. Slater	N/A	N/A	M. Hoffmann	09/03/03
1	Added black cell requirement.	M. Grindel	M. Bala	C. Slater/ M. Wright	N/A	N/A	C. Morley	02/05/04
2	Revised as Noted, Re-Issued for Purchase	M. Grindel	S.L. Lee	T.Galioto/ S. Atri/ C. Slater	N/A	N/A	M. Hoffmann	06/03/04
3	Revised as Noted & added notes 9 - 12	T.Galioto	S.L. Lee	D. Adler/ C. Slater	S. Cross / E. Isern	N/A	M. Hoffmann	09/23/04
4	Revised to delete note 9	T.Galioto	S.L. Lee	C. Slater	S. Cross / E. Isern	N/A	M. Hoffmann	11/18/04
5	Revised as Noted & added note 13	S. Cross	S.L. Lee	C. Slater / R. Peters	E. Isern / D Adler	N/A	M. Hoffmann	04/18/05
6	Revised per Note 14 on sheet 2	Rich Peters	S. L. Lee	P. Polani / Ray Peters	D. Adler / C. Slater	N/A	J. Julyk	10/28/05
7	Revised per Note 18 on sheet 2	R. Gibbs	R. Peters	M. Seed	C. Figley	C. Meng	J. Julyk	8/13/08