ISSUED BY
RPP-WTP PDC

MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-HLW-MV-HDH-VSL-00002
24590-HLW-MV-HDH-VSL-00004

R1186358

Project:	RPP-WTP	P&ID:	24590-HLW-M6-HDH-00001 and 24590-HLW-M6-HDH-20001
Project No:	24590	Calculations:	See Attachment 1
Project Site:	Hanford	Vessel Drawing:	24590-HLW-MV-HDH-00010001, 00010002, 00010003, and 24590-HLW-MV-HDH-00011001, 00011002, 00011003
Description:	Canister Decon Vessel 1, 24590-HLW-MV-HDH-VSL-00002. Canister Decon Vessel 2, 24590-HLW-MV-HDH-VSL-00004.	Reports:	24590-HLW-N1D-HDH-00003, 24590-HLW-WSF-ENG-07-002

Reference Data

Charge Vessels (Tag Numbers)	Not Required
Pulsejet Mixers / Agitators (Tag Numbers)	Not Required
RFDs/Pumps (Tag Numbers)	Not Required

Design Data

Quality Level		CM (Note 6)	Fabrication Specs	24590-WTP-3PS-MV00-T0001		
Seismic Category		SC-III	Design Code	Per ASME VIII Div 1		
Service/Contents		Nitric Acid, Water, Ceric Nitrate	Code Stamp	No		
Design Specific Gravity		1.25	NB Registration	No		
Maximum Operating Volume	gal	214 with Canister in Vessel	Weights (lbs)	Empty	Operating	Test
Total Volume	gal	630 (Note 2)	Estimated	3400	21,200	21,200
Environmental Qualification		N/A				

Inside Diameter	inch	30			Wind Design	None	
Length/Height (TL-TL)	inch	220 (OAL)			Snow Design	None	
		Vessel Operating	Vessel Design	Coil/Jacket Design	Seismic Design	24590-WTP-3PS-MV00-T0002 24590-WTP-3PS-FB01-T0001	
Internal Pressure	psig	Atm	15	Note 1			
External Pressure	psig	1.5	Atm	Note 1	Postweld Heat Treat	None	
Temperature	°F	149	225	Note 1	Corrosion Allowance (Vessel)	Inch	0.04
Min. Design Metal Temp.	°F	40			Corrosion Allowance (Coil)	Inch	0.00

Materials of Construction

Component	Material	Minimum Thickness / Size	Containment
Lid Assembly / Hinge Block, & Lock Pin	B-265 2 / SA-479-304	See Drawing	N/A
Shell	B-265 2	See Drawing	N/A
Bottom Head	B-265 2	See Drawing	N/A
Support	B-265 2	See Drawing	N/A
Shaft	N/A	N/A	N/A
Bearings	N/A	N/A	N/A
Pipe/Elbow	B-861 2 Seamless/B-363 2	See Drawing	N/A
Tubing (Coil)	B-338 2W	See Drawing	N/A
Forgings / Bar stock	B-381 F2 / SB348-2 Note 5	See Drawing	N/A
Gaskets	Note 3	N/A	N/A
Bolting	A-193 B8 / A-194 8	N/A	N/A

Miscellaneous Data

Orientation	Vertical	Support Type	Collar
Insulation Function	Not Applicable	Insulation Material	Not Applicable
Insulation Thickness (inch)	Not Applicable	Internal Finish	Welds Descaled as Laid. Break sharp corners and smooth finish on canister guides.
External Finish	Welds Descaled as Laid		

BECHTEL	**MECHANICAL DATA SHEET: VESSEL**	**PLANT ITEM No.** ***24590-HLW-MV-HDH-VSL-00002*** ***24590-HLW-MV-HDH-VSL-00004***

Equipment Cyclic Data Sheet

Component Plant Item Number:	***24590-HLW-MV-HDH-VSL-00002 and 24590-HLW-MV-HDH-VSL-00004***
Component Description	***Canister Decon Vessels 1 & 2***

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

Materials of Construction	***SB-265 2***
Design Life	***40 Years***
Component Function and Life Cycle Description	***A cycle consists of the following: (24590-HLW-3YD-HDH-00002)*** ***Acid Etch:*** • ***A 10,000 lb canister is loaded into the vessel and the lid closed.*** • ***The vessel will fill to the overflow with one-molar nitric acid and Cerium +4 solution.*** • ***The coil will be used to raise the temperature of the liquid from 73°F to 149°F. Coil hot water conditions: 180 °F inlet, 151 °F outlet, 29 psig pressure drop.*** 5 • ***The coil will maintain the temperature of the liquid at 149 °F (+/- 5°F) for 6 hours.*** • ***After the 6-hour decontamination period the liquid in the vessel is cooled to 104 °F. Coil cooling water conditions: 83 °F inlet, 119 °F outlet, 37 psig pressure drop.*** 5 • ***The nitric acid solution is then drained from the vessel.*** ***Acid Rinse:*** • ***The upper and lower spray rings will rinse the top of the canister with nitric acid (10 seconds).*** • ***Flow to the spray rings will stop, the lid will open, and the canister will be slowly removed from the vessel while the lower spray ring is utilized to rinse the canister.*** • ***The canister is raised until it is above the top spray ring. Total rinse volume is approximately 200 gallons.*** • ***The acid rinse is drained from vessel and the canister is lowered back into the vessel.*** ***Demineralized Water Rinse:*** • ***Repeat the steps for the Acid Rinse using demineralized water.*** • ***Water rinse volume is approximately 200 gallons.*** • ***The demineralized water rinse is drained from vessel, and the canister is lowered back into the vessel for drying.***

Vessel Contents

Load Type		Min	Max	Number of Cycles	Comment
Design Pressure	psig	***FV***	***15***	***10***	
Operating Pressure	psig	***-1.44***	***0***	***23,000***	
Operating Temperature	°F	***73*** ***149***	***149*** ***104***	***23,000*** ***23,000***	***Hot water heating process (24590-HLW-MEC-HDH-00001)*** ***Cooling water process (24590-HLW-MEC-HDH-00001)***
Contents Specific Gravity		***1.00***	***1.25***	***23,000***	
Contents Level	inch	***Empty***	***Full***	***69,000***	***Vessel is filled 3 times for each process cycle - see above description***
Localized Features					
Vessel and Supports		***Empty / Full Canister***		***69,000***	***Canister is lifted out of the vessel 3 times for each process cycle - see above description***

Cyclic Notes

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

- The Seller is to consider impact loading due to a full canister being loaded in the vessel with crane hoist slow speed of 5 feet per minute. 5

- Hot water outlet temp and cooling water outlet temp represent initial conditions which are the worst case thermal differential condition. 5

Notes and Additional Information

Note 1: Heating and Cooling Coil design pressure = 180 psig, design temperature = 210°F. Coil serves for either heating or cooling.

Note 2: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals.

Note 3: Body flange gasket shall be Garlock Helicoflex HN 208A seal configuration with titanium jacket.

Note 4: Contents of this document are Dangerous Waste Permit affecting.

Note 5: Bar SB348-2 is used for Spray Nozzles (Full Jet - Size 10) P/N 08D & 09D, Rollers and Roller Pins P/N 18C & 18D, Thermowells P/N 38A & 38C, Stabilizer bars P/N 19B, Lid Hold Downs P/N 28B & 31K. (See vendor dwgs for P/N).

Note 6: This vessel has passive WAI attributes. Quality level remains CM.

Note 7: Added DOE Radioactive Materials Disclaimer and Safety Screening statement. Renamed Remarks to, Notes and Additional Information and moved section. Added Note 6 (above). Revised Note 1 and equipment cyclic data. Equipment Qualification Datasheet (EQD) is not required for APC/SC-III equipment. Renamed Notes to "Cyclic Notes" for clarification of section. Clarified corrosion allowance for coil. Added reference calculations & report numbers. Added Attachment 1 for BNI use only. Included plant item number 24590-HLW-MV-HDH-VSL-00004, thus superseding previous data sheet.

Note 8: This document contains information pertinent to an accident analysis calculation and receives a screening from E&NS, in accordance with procedures, anytime the document is modified. *(Internal - For BNI Use Only)*

Note 9: Nozzle Loads are in accordance with 24590-WTP-3PS-MV00-T0001, Appendix A, Table A2, *Engineering Specification for Pressure Vessel Design and Fabrication.*

DOE Radioactive Materials Disclaimer: Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the US 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.

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	MET	E&NS	Approved	Date
0	Issue for Purchase	D. Choi	R. Simmons	M. Staley C. Slater	M. Wright	N/A	M. Hoffmann	06/16/03
1	Revised as Indicated	G. Fenton	R. Simmons	T. Galioto C. Slater	D Yarbrough	N/A	M. Hoffmann	10/29/03
2	Issued to Incorporate 24590-WTP-SDDR-PROC-04-01079	R. Tometczak	Paul Polani	Steve Crow	Jeff Pullen	N/A	M. Hoffmann	1/21/05
3	Revised per Note 3 on sheet 1 of 2.	Ronda Russell	Bart Makadia	P Polani A.P. Pinto	Debbie Adler Cliff Slater	N/A	J Julyk	11/28/05
4	Revised per Note 7. This document Supersedes 24590-HLW-MVD-HDH-00012, Rev 3; 24590-HLW-MVD-HDH-P0006, Rev 3, and 24590-HLW-MVD-HDH-P0012, Rev 2. Incorporated and resolved the following: 24590-HLW-MVN-HDH-00009, 24590-WT6P-M6N-M80T-00002, and 24590-WTP-SDDR-MS-07-00046.	M. Kufahl	Bart Makadia	Mike Seed	Debbie Adler	Barb Dubiel	John Julyk	4/24/09
5	Add impact loading requirements and crane travel speed. Added note for hot water temp and cooling water temp initial conditions. Added reference for crane speed. revised hot water heating and cooling water conditions	M. Kufahl	Bart Makadia	Mike Seed	Debbie Adler	Matt Wulp	John Julyk	3/26/10

ATTACHMENT 1
REFERENCES for Data Sheet: 24590-HLW-MVD-HDH-00006, Rev 5 (For BNI Use only)
Vessel Tag Numbers: HDH-VSL-00002 and HDH-VSL-00004

Data	Document #	Rev	Document Title
Quality Level	24590-HLW-M6-HDH-00001	4	*P&ID HLW Canister Handling Decontamination System*
Seismic Category	24590-HLW-M6-HDH-00001	4	*P&ID HLW Canister Handling Decontamination System*
Design Specific Gravity	24590-HLW-MVC-HDH-00005	A	*HDH Vessel and Tank Process Data Calculation*
Max Operating Volume	24590-HLW-M6C-HDH-00008	C	*HLW HDH Canister Decontamination Vessel (HDH-VSL-00002 and HDH-VSL-00004)*
Total Volume	24590-HLW-M6C-HDH-00008	C	*HLW HDH Canister Decontamination Vessel (HDH-VSL-00002 and HDH-VSL-00004)*
Inside Diameter	24590-HLW-M6C-HDH-00008	C	*HLW HDH Canister Decontamination Vessel (HDH-VSL-00002 and HDH-VSL-00004)*
Length TL-TL	24590-HLW-M6C-HDH-00008	C	*HLW HDH Canister Decontamination Vessel (HDH-VSL-00002 and HDH-VSL-00004)*
Operating Pressure (external)	24590-HLW-MVC-HDH-00005	A	*HDH Vessel and Tank Process Data Calculation*
Operating Pressure (internal)	24590-HLW-MVC-HDH-00005	A	*HDH Vessel and Tank Process Data Calculation*
Design Pressure (internal)	24590-HLW-MVC-HDH-00005	A	*HDH Vessel and Tank Process Data Calculation*
Design Pressure (external)	24590-HLW-MVC-HDH-00005	A	*HDH Vessel and Tank Process Data Calculation*
Design Pressure Internal (Coil) 5	24590-HLW-M6C-HDH-00015 24590-HLW-M6E-HDH-00020	A N/A	*Design Pressure and Temperature Calculation for HLW Canister Decontamination Handling (HDH) System* *Amend HDH System Pressure and Temperature Calculation for Defined Set Pressure in Head Vessels*
Design Pressure External (Coil) 5	24590-HLW-M6C-HDH-00015 24590-HLW-M6E-HDH-00020	A N/A	*Design Pressure and Temperature Calculation for HLW Canister Decontamination Handling (HDH) System* *Amend HDH System Pressure and Temperature Calculation for Defined Set Pressure in Head Vessels*
Design Temperature (Coil) 5	24590-HLW-M6C-HDH-00015 24590-HLW-M6E-HDH-00020	A N/A	*Design Pressure and Temperature Calculation for HLW Canister Decontamination Handling (HDH) System* *Amend HDH System Pressure and Temperature Calculation for Defined Set Pressure in Head Vessels*
Operating Temp	24590-HLW-MVC-HDH-00005	A	*HDH Vessel and Tank Process Data Calculation*
Design Temp	24590-HLW-MVC-HDH-00005	A	*HDH Vessel and Tank Process Data Calculation*
Corrosion Allowance, Erosion allowance	24590-HLW-N1D-HDH-00003	6	*Corrosion Evaluation HDH-VSL-00002/4*
Materials of Construction	24590-HLW-N1D-HDH-00003	6	*Corrosion Evaluation HDH-VSL-00002/4*
Cyclic Data (Vessel)	24590-HLW-MVC-HDH-00006 24590-HLW-MVC-30-00001 24590-HLW-MEC-HDH-00001 24590-HLW-M6N-HDH-00021	0 B B N/A	*Heating and Cooling Cycles for HDH-VSL-00002/4* *HLW Vessel Cyclic Datasheet Inputs* *HDH-VSL-00002/4 Cooling and Heating Coils Process Information* / coil operating conditions, vessel operating conditions *HDH System Changes for Replacement of Steam heating with Hot water Heating System* / coil design pressure and temperature
Nozzle Loads	24590-WTP-3PS-MV00-T0001	3	Pressure Vessel Design and Fabrication Specification
Crane/Canister Travel Speed 5	24590-HLW-M0D-HDH-00021	4	*Mechanical Handling Data Sheet, Decontamination Swabbing and Monitoring Crane* - use crane hoist slow speed of 5 ft/min