



### Mechanical Data Sheet: PTF Vessel Vent Caustic Scrubber

ISSUED BY  
PTF P&ID

Plant Item Number  
24590-PTF-MK-PVP-SCB-00002  
Data Sheet Number  
24590-PTF-MKD-PVP-00002, Rev 11

Project:	WTP	P&ID	24590-PTF-M6-PVP-00017001
Project No.:	24590	Calculation	Attachment 1
Project Site:	DOE Hanford		
Area No.:	200E		
Building:	PTF	Vessel Drawing	24590-QL-POA-MKAS-00002-02-00011
System No.:	PVP		

Service Data			
Quality Level	Q	Fabrication Specification	24590-WTP-3PS-MV00-T0001 & 24590-PTF-3PS-MKAS-T0001
Seismic Category	SC-I (Note 12)	Design Code	ASME Section VIII, Division 1
Service/Contents	Radioactive Liquid	Code Stamp	Yes
Design Specific Gravity	1.04	NB Registration	Yes
Max Operating Volume	gal 2040	Wind Design	None
Total Volume	gal 2310	Snow/Ash Design	None
Postweld Heat Treat	Not Required	Seismic Design	24590-WTP-3PS-MV00-T0002 24590-WTP-3PS-SS90-T0001
Seismic Base Moment	ft*lb Deleted		
Environmental Qualification	See EQ Sections (All Metal Construction)		

Design Data			
Packed Column Inside Diameter (A)	48"	Floor to Bottom of Sump Vessel (E)	105 1/8"
Sump Vessel Inside Diameter (B)	108"	Scrubber Height (F)	630 11/16"
Sump Height	83" min.	Ring Beam Height (G)	18"
Dimension D	525 9/16"	Ring Beam Center-to Center Diameter (H)	108"
		Corrosion Allowance	0.04" (Note3)
		Minimum Design temperature for Metal	-20 °F
		Hydrostatic Test Pressure	PSIG ASME Section VIII, Division 1
Internal Pressure	PSIG	Vessel Oper	-1.5
External Pressure	PSIG	Vessel Design	-5/+15
Temperature	°F	Deleted	Deleted
Deleted		Deleted	Deleted

Materials of Construction			
Component	Material	Containment	Notes
Column Top Head	SA-240 316	Primary	Notes 4 and 8
Column Shell	SA-240 316	Primary	Notes 4 and 8
Sump Vessel Top Head	SA-240 316	Primary	Notes 4 and 8
Sump Vessel Shell	SA-240 316	Primary	Notes 4 and 8
Sump Vessel Bottom Head	SA-240 316	Primary	Notes 4 and 8
Vessel Internals	SA-240 316	N/A	Notes 4, 5 and 8
Dry Packing	UNS N08367/N08926	N/A	0.012" material thickness or maximum standard thickness available
Wet Packing	UNS N08367/N08926	N/A	0.012" material thickness or maximum standard thickness available
Vessel Support	SA-240 304	N/A	Note 4
Deleted			
Pipe	SA-312 TP316	Primary (Note 6)	Notes 4 and 8
Forgings/ Bar stock	SA-182 F316	N/A	Notes 4 and 8
Gaskets	None		
Packing support plate, bed limiter, support grid and all hardware for the internals	UNS N08367/N08926		
Mounting Base	Note 7	N/A	18" high ring beam

Miscellaneous Data						
Orientation	Vertical					
Support Type	Skirt					
Insulation Function	None					
Insulation Thickness	inch None					
Insulation Material	None					
External Finish	Welds descaled as laid					
Internal Finish	Welds ground smooth					
Reference 3	Dry Weight (lbs)	Dry C.G. (inches: X,Y,Z)	Operating Weight (lbs)	Operate C.G. (inches: X,Y,Z)	Testing Weight (lbs)	Shipping Wt (lbs)
Scrubber	61,242	0.351, 0.694, 240.327	80,919	0.265, 0.525, 220.179	NA	66,242
Packed Column	18,114	0.000, 0.000, 412.096	19,137	0.000, 0.000, 412.641		
Sump Vessel	26,315	0.000, 0.000, 175.098	44,969	0.000, 0.000, 161.762		

- Notes**
- Note 1: Deleted.
  - Note 2: Deleted.
  - Note 3: The corrosion allowance of 0.04" shall apply to all surfaces in contact with process fluids except for the dry and wet packings and associated hardware which has 0.0" corrosion allowance.
  - Note 4: Material shall have a carbon content not to exceed 0.030%, dual certified.
  - Note 5: Seller shall submit item details for customer review.
  - Note 6: Nozzles are primary confinement. The spare nozzle shall have a welded cap. See Note 8.
  - Note 7: Ring Beam web and top flange shall be SA-240 304L, bottom flange shall be A-572 GR50.
  - Note 8: All welds forming part of the primary and auxiliary confinements, including the nozzle attachment welds shall be subjected to 100% volumetric examination.
  - Note 9: The scrubber is located in a Black Cell. (R5 / C5 area)
  - Note 10: Contents of this document are Dangerous Waste Permit Affecting.
  - Note 11: References are included for BNI use only and will not be shown with revision triangles - only data being changed will require revision triangles.
  - Note 12: Internal packings and demister sections qualified to SC-I.



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 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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Plant Item Number  
24590-PTF-MK-PVP-SCB-00002

Data Sheet Number  
24590-PTF-MKD-PVP-00002, Rev 11

### Notes for Outline Profile of the PTF Vessel Vent Caustic Scrubber

- Note 1: See "Design Data" in sheet 1 of 11 for the bounding dimensions of the scrubber.
- Note 2: The maximum sump batch volume shall be determined based on given dimensions:  
- Seller to provide the batch volume and total time of operation per batch based on runback, maximum expected condensate and caustic makeup.
- Note 3: The minimum allowance from maximum sump operating volume to overflow shall satisfy the larger of all three conditions below:  
- minimum 2" liquid depth  
- at least 2% of maximum operating liquid depth  
- change in liquid level equivalent to 5 minutes of maximum liquid accumulation in the scrubber sump
- Note 4: Nozzle requirements are as follows:  
- Unless noted otherwise, nozzles shall extend 12 inches beyond the vessel.  
- Nozzle schedule shall be determined by the Seller, taking into consideration all requirements stated in Buyer document # 24590-WTP-3PS-MV00-T0001, *Engineering Specification for Pressure Vessel Design and Fabrication*.  
- All nozzles with connecting pipes shall be end-prepared per Buyer document # 24590-WTP-PW-P30T-00001, *WTP End Prep Detail for Field Butt Welds*, to tie in with the respective connecting pipe size and schedule in note 7.  
- Seller shall confirm size and schedule/wall thickness for all nozzles, specified in note 7 below.
- Note 5: Ring Beam Detail  
- Refer to Buyer document 24590-WTP-MV-M59T-00001, for ring beam details.  
- Ring beam top and bottom flanges shall be 6" wide.  
- Ring beam web shall be 3/4" thick.  
- The ring beam web to flange weld shall be full penetration.  
- Ring beam design per River Protection Project - Waste Treatment Plant, vessel supports at El. 0' and below, 24590-PTF-DDC-S13T-00001.  
- NDE requirements shall be in accordance with 24590-WTP-3PS-SS00-T0002, section 11.6 "Additional Examination for Quality Levels 1 and 2 Structural Steel Welds". All welds of Ring beam are critical welds.  
Section 11.6 is mandatory even if the web to flange weld NDE is not indicated on the drawing.
- Note 6: Locate inlet nozzle (N01) on the sump vessel and use as inspection manway. Inlet nozzle (N01) must be higher than the overflow nozzle (N12).
- Note 7: Nozzle data are as follows:

Nozzle		Connecting Pipe		Function
No.	Size	NPS	Schedule	
N01	24" NPS	24	0.375"	Offgas Inlet
N02	24" NPS	24	0.375"	Offgas Outlet
N03	2" NPS	1.5	40S	Recirculated Caustic Solution for Mixing (dip pipe) <span style="float: right;">△ 11</span>
N04	2" NPS	2	40S	Recirculated Caustic Solution for Scrubbing
N05	4" NPS	4	40S	Pump Suction
N06	2" OD	1	40S	Demineralized Water Inlet (See Detail 7, Dwg 24590-WTP-MV-M59T-00016001)
N07	2" OD	1	40S	Demineralized Water Inlet (See Detail 7, Dwg 24590-WTP-MV-M59T-00016001) <span style="float: right;">△ 11</span>
N08	1.5" NPS	1.5	40S	Reagent Inlet (5M NaOH)
Deleted				
Deleted				
N11	2" OD	1	40S	Sample Recirculation Return (See Detail 6, Dwg 24590-WTP-MV-M59T-00016001)
N12	6" NPS	6	10S	Scrubber Sump Vessel Overflow <span style="float: right;">△ 11</span>
N13	6" NPS	1	40S	Bubbler Type Level Indicator (See Detail 19, Dwg. 24590-WTP-MV-M59T-00016002)
N14	3" NPS			Spare (with welded cap)
N15	2" OD	0.75	40S	Pressure Transmitter Leg (See Detail 6, Dwg 24590-WTP-MV-M59T-00016001)
N16	2" OD	0.75	40S	Pressure Transmitter Leg (See Detail 6, Dwg 24590-WTP-MV-M59T-00016001)
N17	2" OD	0.75	40S	Pressure Transmitter Leg (See Detail 6, Dwg 24590-WTP-MV-M59T-00016001)
N18	2" OD	0.75	40S	Pressure Transmitter Leg (See Detail 6, Dwg 24590-WTP-MV-M59T-00016001)
Deleted				
Deleted				

NPS - Nominal Pipe Size (inch)

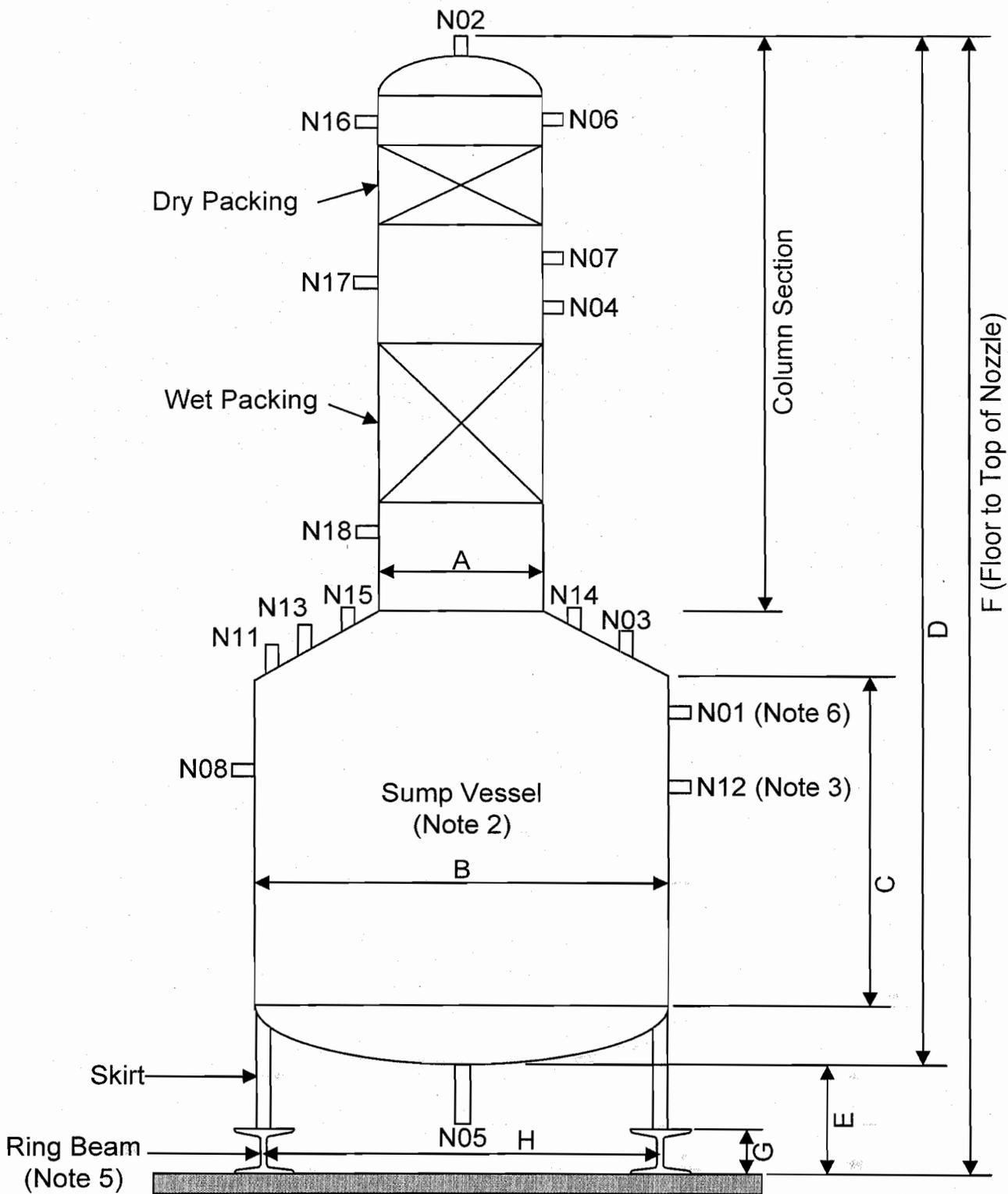
OD - Outside Diameter (inch)



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Outline Profile of the PTF Vessel Vent Caustic Scrubber



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## PROCESS DATA

Description	Instrument Tag	Unit	Operating				Remarks
			Lo	Normal	Hi		
Inlet Offgas	Pressure	PC-0404	W.G.	-40.0"	-35.0"	-10"	
Inlet Offgas	Temperature	TI-0401	°F	113	120	138	
Inlet Offgas	Volume Flow Rate		SCFM	(Note 2)	3600	*	Deleted
Inlet Offgas	Rel. Humidity		%		100	100	
Inlet Offgas	NO <sub>2</sub>		ppm vol		130	200	Dry basis concentration
Inlet Offgas	NO		ppm vol		70		Dry basis concentration
Inlet Offgas	CO <sub>2</sub>		ppm vol		330		Dry basis concentration
Inlet Offgas	Mass Flow Rate		kg/hr	See	Attachment	2 & 3	
Scrubber Sump Vessel	Pressure	PI-0408	W.G.	-40.0"	-35.0"	-10"	
Scrubber Sump Vessel	Liquid Temperature	TC-0405	°F		95		
Scrubber Sump Vessel	Liquid Level	LI-0409		22"	22 59"	59"	Overflow is at 65" (Note 4)
Scrubbing Liquid	pH		pH	7*	7.0 - 7.5*	7.5*	
Scrubbing Liquid	Density	DI-1704	lbs/ft <sup>3</sup>	*	62.3*	*	
Recirc. to sump - mixing	Flow Rate	FI-0461	GPM		60*		
Recirc. to sump - mixing	Temperature		°F		70		
Recirc. to packing - scrubbing	Flow Rate	FI-0444	GPM		60*		
Recirc. to packing - scrubbing	Temperature		°F		70		
Deleted							
Deleted							
Deleted							
Deleted							
Deleted							
Deleted							
Packed Section	Pressure Drop	PDI-0406	W.G.		3.0**	6.0**	Max. allowable (Note 1)
Demineralized Water Inlet at Nozzle N06	Flow Rate		GPM	N.A.	22.5*	N.A.	
Dry Packing	Pressure Drop	PDI-0407	W.G.		0.2*	1.0**	Max. allowable (Note 1)
Demineralized Water Inlet at Nozzle N07	Flow Rate		GPM	N.A.	22.5*	N.A.	Mfr. Suggests a periodic flush of 1 GPM/sq. ft. min.
Outlet Offgas	Pressure		W.G.	-47.0"	-42.0"	-17"	
Outlet Offgas	Temperature		°F	77	77	77	
Outlet Offgas	Mass Flow Rate		kg/hr	*	*	*	
Outlet Offgas	Flow Rate		SCFM		3600	3600	
Outlet Offgas	Rel. Humidity		%		100	100	
Outlet Offgas	NO <sub>2</sub>		ppm vol		41*		Dry basis concentration
Outlet Offgas	NO		ppm vol		70*		Dry basis concentration
Outlet Offgas	CO <sub>2</sub>		ppm vol		329*		Dry basis concentration
DF (minimum) for Nitrogen Oxides			DF		1.8*		
DF (minimum) for Solid Particulates			DF		3.5*		2.0 micron particulates

## Notes for Process Data

\* - Seller to verify/provide data considering aerosol loading against existing design specifications and provide recommended process changes/EQPT changes as necessary

1 - Maximum differential pressure across scrubber in clean condition shall not exceed 8 in-WG. Seller to provide data.

2 - Standard conditions of flow are 77 deg F and 1 atmosphere as dry air (density = 0.074 lb/ft<sup>3</sup>) - humidity accounts for additional volume and mass flow

3 - Deleted

4 - Dimension is measured from inside bottom of vessel sump to bottom of nozzle N12.

5- Deleted



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### Equipment Cyclic Data Sheet

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

Design Life	<b>40 Years</b>
Component Function and Life Cycle Description	See Specification 24590-PTF-3PS-MKAS-T0001

Load Type		Min	Max	Number of Cycles	Comments
Design Pressure	PSIG	-5	+15	10	WTP Calculation 24590-PTF-MVC-10-00003
Operating Pressure 1	PSIG	-1.5	0	7,000,000	WTP Calculation 24590-PTF-MVC-10-00003
Operating Pressure 2	PSIG	0	+2.8	40	WTP Calculation 24590-PTF-MVC-10-00003
Operating Temperature	°F	59	140	40	WTP Calculation 24590-PTF-MVC-10-00003
Contents Specific Gravity		1.0	1.04	2,080	WTP Calculation 24590-PTF-MVC-10-00003
Contents Level	inch	23	63	29,200	WTP Calculation 24590-PTF-MVC-10-00003

Localized Features	
Nozzles	N/A WTP Calculation 24590-PTF-MVC-10-00003
Deleted	Deleted Deleted

### Equipment Cyclic Data Sheet Notes

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

### Nozzle Loads

Nozzle Number	Nozzle Size (in)	Design Nozzle Pressure (psig) (Note E)	Design Nozzle Temp (°F) (Note E)	Orientation (V* / H**)	Load Case	Design Loads (Force in lbs, Moment in ft-lb)					
						Fx	Fy	Fz	Mx	My	Mz
N01	24	15	200	H	Weight	1200	2195	1200	8250	5153	8982
					Seismic	8325	5573	8325	72075	108000	108000
					Thermal	6300	8336	5801	33900	67800	67800
N02	24	15	150	V	Weight	1200	1928	1200	8250	5153	5153
					Seismic	8325	5573	8325	72075	108000	108000
					Thermal	3930	3495	5243	33900	67800	67800
N03	2	117	150	V	Weight	50	60	50	75	75	75
					Seismic	244	162	244	398	597	597
					Thermal	104	92	138	169	337	337
N04	2	117	150	H	Weight	50	60	50	75	75	75
					Seismic	244	162	244	398	597	597
					Thermal	104	92	138	169	337	337
N05	4	124	150	V	Weight	90	144	90	257	161	161
					Seismic	626	418	626	2220	3330	3330
					Thermal	359	238	493	945	1890	1890
N06	2" (OD)	124	100	H	Weight	35	35	35	40	40	40
					Seismic	138	92	138	228	342	342
					Thermal	58	52	78	96	192	192
N07	2" (OD)	124	100	H	Weight	35	41	35	40	40	60
					Seismic	138	92	138	228	342	342
					Thermal	58	52	78	96	192	192
N08	1.5	167	120	V	Weight	35	67	35	40	40	40
					Seismic	138	92	138	228	342	364
					Thermal	58	52	78	96	192	192
N11	2" (OD)	119	150	V	Weight	35	35	35	40	40	40
					Seismic	138	92	138	228	342	342
					Thermal	58	52	78	96	192	192
N12	6	15	150	H	Weight	218	347	218	714	447	447
					Seismic	1519	1013	1519	6218	9300	9300
					Thermal	657	1541	878	2685	5370	5370
N13	6	15	150	Parent	Weight	N13 is parent nozzle, nozzle loads are applied via N13A, N13B, N13C					
					Seismic						
					Thermal						
N13A (Note C)	1	15	150	V	Weight	15	20	15	20	20	20
					Seismic	66	44	66	92	137	137
					Thermal	28	24	38	38	77	77
N13B (Note C)	1	15	150	V	Weight	15	20	15	20	20	20
					Seismic	66	44	66	92	137	137
					Thermal	28	24	38	38	77	77
N13C (Note C)	1	15	150	V	Weight	15	20	15	20	20	20
					Seismic	66	44	66	92	137	137
					Thermal	28	24	38	38	77	77
N14 Spare	3	15	150	V	Weight	54	85	54	135	84	84
					Seismic	369	246	369	1178	1763	1763
					Thermal	157	139	209	498	998	998
N15	2" (OD)	15	150	V	Weight	35	35	35	40	40	40
					Seismic	138	92	138	228	342	342
					Thermal	58	52	78	96	192	192



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Nozzle Number	Nozzle Size (in)	Design Nozzle Pressure (psig) (Note E)	Design Nozzle Temp (°F) (Note E)	Orientation (V* / H**)	Design Loads (Force in lbs, Moment in ft-lb)						
					Load Case	Fx	Fy	Fz	Mx	My	Mz
N16	2" (OD)	15	150	H	Weight	35	35	35	40	40	40
					Seismic	138	92	138	228	342	342
					Thermal	58	52	78	96	192	192
N17	2" (OD)	15	150	H	Weight	35	35	35	40	40	40
					Seismic	138	92	138	228	342	342
					Thermal	58	52	78	96	192	192
N18	2" (OD)	15	150	H	Weight	35	35	35	40	40	40
					Seismic	138	92	138	228	342	342
					Thermal	58	52	78	96	192	192

#### Notes for Nozzle Loads

- A. Direction of load application for shell nozzles is per diagrams in 24590-WTP-3PS-MV00-T0001, Appendix A.
- B. For nozzles in head: x = North/South, y = Vertical, and z = East/West - 0° defined as North.
- C. Values provided at plate on top of parent nozzle.
- D. Nozzle loads shown are to be used in place of those specified in 24590-WTP-3PS-MV00-T0001 - do not apply any thermal reduction factors.
- E. Design Pressures and Temperatures for qualification of nozzles only.
- F. All Pretreatment RGM Seismic Piping Nozzles loads from Plant design shall have a 1.75 load factor applied to all loads to address coupling effects between the flexible vessels and piping in accordance with the Seismic Classification and Evaluation for the Pretreatment Facility Piping and Vessels, 24590-WTP-RPT-ENG-09-040.



# EQUIPMENT QUALIFICATION DATASHEET (EQD)

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Equipment Identification			
Full Component Tag Number or BNI Stock Code Number	24590-PTF-MK-PVP-SCB-00002	Safety Classification	
Equipment Datasheet Number	24590-PTF-MKD-PVP-00002	<input checked="" type="checkbox"/> SC <input type="checkbox"/> SS <input type="checkbox"/> APC-PAM	
Description	Vessel Vent Caustic Scrubber for the Pretreatment Vessel Vent Process System (PVP)	Seismic Category	
		<input checked="" type="checkbox"/> SC-I <input type="checkbox"/> SC-II <input type="checkbox"/> SC-III <input type="checkbox"/> SC-IV <input type="checkbox"/> SC-III Seismic Interaction only	
Location (Facility / Building and Room No.)	PTF Building; located in Room P-0104, Elev. 0'-00", column lines K/16		
Safety Function(s)	Provide confinement of PVP exhaust during normal and upset conditions. Reference: 24590-WTP-PSAR-ESH-01-002-02, Preliminary Documented Safety Analysis to Support Construction Authorization; PT Facility Specific Information.		
Equipment Safety Function Type	<input checked="" type="checkbox"/> Passive Mechanical	<input type="checkbox"/> Active Mechanical See E-Note 6	<input type="checkbox"/> Electrical
Seismic Safety Function	Seismic Operability Requirements		
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> During Seismic Event	<input checked="" type="checkbox"/> After Seismic Event	<input type="checkbox"/> None

Equipment Environmental Qualification (EEQ)				
(Parameter values stated in this section do not include process conditions or operation induced conditions)				
Classification of Environment <input checked="" type="checkbox"/> Mild <input type="checkbox"/> Harsh		Qualified Life (years) <input checked="" type="checkbox"/> 40 <input type="checkbox"/> Other		
		See E-Note 7		
Parameter Type/Units	Parameter Value	Parameter Duration (number)	Duration Units	WTP Source Document Number
<b>Normal Ambients</b>				
High Temperature (°F)	113	Note a	Years	24590-PTF-U0D-W16T-00001, E-Note 1
Low Temperature (°F)	59	Note b	N/A	24590-PTF-U0D-W16T-00001, E-Note 1
High Relative Humidity (%RH)	90	Note c	N/A	24590-PTF-U0D-W16T-00001, E-Note 1
Low Relative Humidity (%RH)	5	Note c	N/A	24590-PTF-U0D-W16T-00001, E-Note 1
High Pressure (in.-w.g.)	0 (E-Note 2)	Note d	N/A	24590-PTF-U0D-W16T-00001, E-Note 1
Low Pressure (in.-w.g.)	(-) 1.4 (E-Note 2)	Note d	N/A	24590-PTF-U0D-W16T-00001, E-Note 1
Radiation Dose Rate (mRad/hr)	533000 (E-Note 4)	40 (E-Note 3)	Years (Note e-1)	24590-PTF-U0D-W16T-00001, E-Note 1
Plant/Process Induced Vibration	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Additional Normal Ambient Information:	N/A			



# EQUIPMENT QUALIFICATION DATASHEET (EQD)

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## Equipment Environmental Qualification (EEQ) (continued)

Parameter Type/Units	Parameter Value	Parameter Duration (number)	Duration Units	WTP Source Document Number
<b>Abnormal Ambients</b>				
High Temperature (°F)	127	8	hours / year	24590-PTF-U0D-W16T-00001, E-Note 1
Low Temperature (°F)	40	Note b	N/A	24590-PTF-U0D-W16T-00001, E-Note 1
High Relative Humidity (%RH)	100c	Note c	N/A	24590-PTF-U0D-W16T-00001, E-Note 1
Low Relative Humidity (%RH)	6	Note c	N/A	24590-PTF-U0D-W16T-00001, E-Note 1
High Pressure (in.-w.g)	4 (E-Note 2)	Note d	N/A	24590-PTF-U0D-W16T-00001, E-Note 1
Low Pressure (in.-w.g)	(-) 7.3 (E-Note 2)	Note d	N/A	24590-PTF-U0D-W16T-00001, E-Note 1
Radiation Dose Rate (mR/hr)	533000 (E-Note 4)	0 (E-Note 3)	Years (Note e-1)	24590-PTF-U0D-W16T-00001, E-Note 1
Exposure to Wet Sprinkler System	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	N/A	hours	24590-PTF-U0D-W16T-00001, E-Note 1
Additional Abnormal Ambient Information	N/A			
<b>Design Basis Events (DBE) Ambients</b>				
High Temperature (°F)	135	1000	hours	24590-PTF-U0D-W16T-00001, E-Note 1
Low Temperature (°F)	40	Note b	N/A	24590-PTF-U0D-W16T-00001, E-Note 1
High Relative Humidity (%RH)	100c	40	hours	24590-PTF-U0D-W16T-00001, E-Note 1
Low Relative Humidity (%RH)	6	1000	hours	24590-PTF-U0D-W16T-00001, E-Note 1
High Pressure (in.-w.g)	4	8	hours	24590-PTF-U0D-W16T-00001, E-Note 1
Low Pressure (in.-w.g)	(-) 7.3 (E-Note 2)	1000	hours	24590-PTF-U0D-W16T-00001, E-Note 1
Radiation Dose Rate (mR/hr)	533000 (E-Note 4)	0 (E-Note 3)	hours	24590-PTF-U0D-W16T-00001, E-Note 1
Submergence	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	N/A	hours	24590-PTF-U0D-W16T-00001, E-Note 5
Chemical/Spray Exposure	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	12.5	hours	24590-PTF-U0D-W16T-00001, E-Note 1
Additional DBE Information	N/A			

<b>DBE Chemical Exposure Details</b>	
DBE Chemical Types / Concentrations	Process Rad Condensate Nitric Acid (2M) Sodium Hydroxide (2M) Sodium Permanganate (1M) Strontium Nitrate (1M)





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DBE Chemical Exposure Details	
	Water

Electrical Interfaces Supporting the Safety Function	
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

Mechanical Interfaces	
Mounting Configuration (orientation)	Vertically, see 24590-PTF-PJ-P23T-00105
Mounting Method (bolts, welds, etc.)	Welded, see 24590-QL-POA-MKAS-00002-02-00011 and 24590-PTF-DD-S13T-00028
Auxiliary Devices	N/A

Equipment Seismic Qualification (ESQ)				
Parameter	Title	Reference/Document Number	Version / Revision	Remarks
WTP Seismic Design Specification	Engineering Specification for Seismic Qualification of Seismic Category I/II Equipment and Tanks	24590-WTP-3PS-SS90-T0001	2	N/A
	Engineering Specification for Seismic Qualification Criteria for Pressure Vessels	24590-WTP-3PS-MV00-T0002	2	
Specified Seismic Load Parameters	Seismic Analysis of Pretreatment Building - WSGM In-Structure Response Spectra (ISRS)	24590-PTF-S0C-S15T-00057	A	CCN: 214812; WSGM ISRS Curves: Figures 37, 38, 39, 67, 68, and 69.

Equipment Qualification Notes and Additional Information	
Note a)	For thermal aging, the high normal temperature shall be assumed to subsist for 40 years less the duration of the high abnormal temperature. For any lesser qualified life, the normal and abnormal condition durations shall be assigned proportionally. The abnormal temperature is stated to subsist for a certain number of hours per year. It shall be taken to subsist for this number of hours for each year of the qualified life.
Note b)	The ability to provide the safety function at the low normal temperature, the low abnormal temperature or the low DBE temperature (whichever be the lowest) shall be established by test, analysis, or operating experience. The thermal aging at these respective low temperatures will be conservatively covered by the thermal aging per item a) above. Therefore, no duration is assigned for the low temperatures.
Note c)	The ability to provide the safety function at the extremes of the normal and abnormal humidity conditions, taking into consideration the high and the low normal and high and low abnormal, shall be established by test, analysis, or operating experience. No duration is assigned for the normal and abnormal humidity conditions.
Note d)	If the performance of the safety function of the equipment is affected by ambient pressure, the ability to provide the safety function at the extremes of the normal and abnormal pressure conditions, taking into consideration the high and the low normal and the high and low abnormal pressures, shall be established by test, analysis, or operating experience. No duration is assigned to the normal and abnormal pressure conditions.



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## Equipment Qualification Notes and Additional Information

- Note e) (1) If the abnormal radiation dose rate is the same as the normal radiation dose rate, the normal radiation dose rate shall be assumed to subsist for 40 years, or any lesser qualified life, and the duration of the abnormal radiation dose rate is "0."  
(2) If the abnormal radiation dose rate is higher than the normal radiation dose rate, the abnormal radiation dose rate shall be assumed to subsist for 40 years, or any lesser qualified life, and the duration of the normal radiation dose rate is "0."
- Note f) The DBE conditions shall be taken to subsist for the stated number of hours following the qualified life of the equipment.
- Note g) Spray due to fire sprinkler actuation shall be taken to occur once over the entire qualified life duration for a period of 2 hours, even if the qualified life is a period less than 40 years. If spray qualification is provided for DBE conditions (whether for water or chemical spray), then separate qualification for the fire sprinkler spray need not be provided.
- Note h) The values stated in this EQD are the ambients and do not include the thermodynamic and radiation conditions imposed by the process fluids, self-heating, etc. The data pertaining to process fluid and service induced parameters are to be taken into account where significant, such as in thermal aging analyses. These data can be obtained from the equipment data sheets or the Equipment Specification.
- Note i) Equipment that is to be installed in inaccessible locations must be qualified to a 40-year life without the need for maintenance or replacement.

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- E-Note 1: BNI (BUYER) shall perform Equipment Environmental Qualification in accordance with 24590-WTP-DC-ENG-06-001, Design Criteria for Equipment Seismic and Environmental Qualification.
- E-Note 2: 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.).
- E-Note 3: Normal, Abnormal, and DBE dose rates are the same, therefore, abnormal and DBE doses do not add to total integrated dose based on normal dose rates over 40 years.
- E-Note 4: Radiation Dose Rates are for determining shielding requirements only for the black cell and are not at the source (vessel). Since the vessel is all metallic and the source has no neutron components for material embrittlement, the dose rates are of no concern on the vessel or its subcomponents.
- E-Note 5: Flood height is 2.08 ft above the floor, bottom of vessel is above this level therefore, no submergence evaluation is required.
- E-Note 6: Seller to provide input for internals/sprays.
- E-Note 7: Seller to provide input for design life.
- E-Note 8: Seller to provide Equipment Seismic Qualification (ESQ).



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**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
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**Approval**

Rev	Description	System Engineer	Vessel Engineer	Checked	Reviewed / MET	E&NS	Approved	Date
0	Issued for Bid	A Molina/ J Dave	K W Chin	U Sen/ J Julyk	N/A	N/A	M Hoffmann	12/18/02
1	Issued for Purchase	T A Lix	N Sentanu/ C Morley	A Molina	N/A	N/A	J Julyk	10/22/03
2	Reissued for Purchase	T A Lix	K W Chin/ C Morley	A Molina	N/A	N/A	J Julyk	11/12/03
3	Added Black Cell Requirements	E Strieper	K W Chin/ C Morley	A Molina/ J Julyk	N/A	N/A	M Hoffmann	04/15/04
4	Deleted scrubber cooling jacket. Revised scrubber heat duty, inlet and outlet temperatures, and vent gas flow rate.	J Dave	K W Chin/ C Morley	A Molina	N/A	N/A	J Julyk/ M Hoffmann	08/04/04
5	Seismic category and design revised. Environmental qualification added, Connecting pipes details	J Dave	B Donigan/ C Morley	A Molina	N/A	N/A	J Julyk/ M Hoffmann	03/29/05
6	Revised to comply with CODE 1 vendor submittal 24590-QL-POA-MKAS-00002-03-00001, in accordance with 24590-WTP-CAR-QA-05-120. Added liquid density.	J Dave	D Pease	D Rickettson/ C Morley	N/A	N/A	J Julyk	11/27/05
7	QL-2 revised to Q, per simplified quality system. Revised data sheet to add fatigue and cyclic blocks. Added note 10 DWP Affected. Fixed typo in Note 4. Revised Note 5 of "notes for Outline Profile of the PTF Vessel Vent Caustic Scrubber" to include: Ring Beam design details and NDE requirements from ANSI/AISC N690 for ring beam. Added note to N03 "Dip Pipe". Noz N13 on scrubber outline moved to correct location.	J Dave	D J Rickettson	N Johnson	N/A	N/A	J Julyk	03/18/06
8	Rev scrubber dims D, E and F to agree with fab dims. Add vessel drawing number. Add signature column for E&NS. Deleted fatigue and cyclic blocks from page one. Add Equip Cyclic data page 6. Cyclic data on hold. Added Ref Calc. Rev pres on page 5. Rev overflow pg 5 based on fab dim. Incorp 24590-WTP-SDDR-M-06-00132 Rev n/a	J Dave/ C Sarka	D J Rickettson	L Donovan	N/A	G Hendricks	J Julyk	07/24/06
9	Deleted Rev for P&ID on page 1. Added ref # for applicable data. Deleted Seismic Base Moment and hydro test pres on page 1. Moved matl of const to page 2. Revised note 10 wording page 2. Added note 11 on page 2. Added ref Table on page 2. Deleted hold on cyclic data on page 6. Deleted support note on cyclic data page 6.	J Dave/ C Sarka	D J Rickettson	R P Hills	N/A	J Cook	J Julyk	07/24/06



# EQUIPMENT QUALIFICATION DATASHEET (EQD)

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Rev	Description	System Engineer	Vessel Engineer	Checked	Reviewed / MET	E&NS	Approved	Date
10	Added Environmental Qualification Data (EQD) and DOE disclaimer (pages 7-11). Moved E&NS statement and revision history table to pages 10-11. Added nozzle loads and notes for nozzle loads. Added note 17 per 24590-WTP-GPP-SANA-001. Revised cyclic loads data and process data pages 4-5. Incorporated 24590-WTP-M6N-M80T-00002.	C R Zook	J Czamecki	C Chung	N/A	J Brown	J Julyk	12/03/08
11	Revised as noted by revision triangles. Revised Equipment Qualification data, implemented new EQ form and renumbered/revised EQ additional notes section (e.g., E-Note 1). Added design pressures and temperatures for Nozzle Loads and revised notes for Nozzle Loads. Revised Seismic Category to SC-I. Incorporated CCN 222995. Supersedes 24590-PTF-MKD-PVP-P0002, Rev 3.	Ryan Wilson <i>[Signature]</i>	Kuldip Singh <i>[Signature]</i> 11/24/10	Mike Seed <i>[Signature]</i>	Debbie Adler <i>[Signature]</i>	John Hinckley <i>[Signature]</i>	John Julyk <i>[Signature]</i>	1/4/11

Data	Document No	Rev	Document Title
Quality Level	24590-PTF-M6-PVP-00017001	0	<i>P&amp;ID - PTF Pretreatment Vessel Vent Process System Caustic Scrubber PVP-SCB-00002. (24590-PTF-M6N-PVP-00062)</i>
Seismic Category	24590-PTF-M6-PVP-00017001	0	<i>P&amp;ID - PTF Pretreatment Vessel Vent Process System Caustic Scrubber PVP-SCB-00002. (24590-PTF-M6N-PVP-00062)</i>
PTF Room No	24590-PTF-U0D-W16T-00001	2	<i>PTF Room Environment Data Sheet. (P-0104)</i>
Contamination Class	24590-PTF-U0D-W16T-00001	2	<i>PTF Room Environment Data Sheet. (C5, P-0104)</i>
Radiation Class	24590-PTF-U0D-W16T-00001	2	<i>PTF Room Environment Data Sheet. (R5, P-0104)</i>
Service/Contents	24590-PTF-3YD-PVP-00001	1	<i>System Description For Pretreatment Vessel Vent Process System. PVP. (Radioactive Liquid [Substances], Sections 4.1 and 4.3)</i>
Design (Maximum) Specific Gravity	24590-PTF-MVC-10-00003	C	<i>PTF Vessel Cyclic Data Sheet Inputs. (Sheet A-5)</i>
	24590-QL-POA-MKAS-00002-02-00011	F	<i>Drawing - PTF Vessel Vent Caustic Scrubber - Assembly &amp; Sections</i>
Maximum Operating Volume	24590-QL-POA-MKAS-00002-05-00003	C	<i>Pretreatment Facility Vessel Vent Caustic Scrubber Operating Instructions</i>
Total Volume	24590-QL-POA-MKAS-00002-05-00003	C	<i>Pretreatment Facility Vessel Vent Caustic Scrubber Operating Instructions</i>
Packed Column Inside Diameter	24590-QL-POA-MKAS-00002-03-00001	E	<i>Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber</i>
	24590-QL-POA-MKAS-00002-02-00011	F	<i>Drawing - PTF Vessel Vent Caustic Scrubber - Assembly &amp; Sections</i>
Sump Vessel Inside Diameter	24590-QL-POA-MKAS-00002-03-00001	E	<i>Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber</i>
	24590-QL-POA-MKAS-00002-02-00011	F	<i>Drawing - PTF Vessel Vent Caustic Scrubber - Assembly &amp; Sections</i>
Dimension "D" Total Height	24590-QL-POA-MKAS-00002-02-00011	F	<i>Drawing - PTF Vessel Vent Caustic Scrubber - Assembly &amp; Sections</i>
Dimension "E" Floor To Bottom Of Sump	24590-QL-POA-MKAS-00002-02-00011	F	<i>Drawing - PTF Vessel Vent Caustic Scrubber - Assembly &amp; Sections</i>
Dimension "F" Floor To Top Of Scrubber	24590-QL-POA-MKAS-00002-02-00011	F	<i>Drawing - PTF Vessel Vent Caustic Scrubber - Assembly &amp; Sections</i>
Dimension "G" Ring Beam Height	24590-QL-POA-MKAS-00002-02-00011	F	<i>Drawing - PTF Vessel Vent Caustic Scrubber - Assembly &amp; Sections</i>
Dimension "H" Ring Beam Center To Center Diameter	24590-QL-POA-MKAS-00002-03-00001	E	<i>Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber. (Based On Sump Vessel Inside Diameter)</i>
	24590-QL-POA-MKAS-00002-02-00011	F	<i>Drawing - PTF Vessel Vent Caustic Scrubber - Assembly &amp; Sections</i>



Corrosion Allowance	24590-PTF-N1D-PVP-00001	6	<i>PVP-SCB-00002 PTF Vessel Vent Caustic Scrubber, (0.04 Inch (0.024 Corrosion + 0.004 Erosion)</i>
Minimum Design Temperature For Metal	24590-WTP-DB-ENG-01-001	1P	<i>Basis Of Design, Table 4-4, -20F (Minus 20F Degrees), See Note 1</i>
Vessel Internal Operating Pressure	24590-PTF-M6C-PVP-00017	A	<i>HADCRT Analysis Of PTF PVP System At Various Operating Scenarios, Section 8.2.1(-35" WG converts to -1.3 psig. Use 1.5 psig conservative)</i>
Vessel Internal Design Pressure	24590-PTF-M6C-PVP-00017	A	<i>HADCRT Analysis Of PTF PVP System At Various Operating Scenarios, Section 8.2.1(-135" WG fan suction equivalent to -.50 psig conservative)</i>
Vessel Operating Temperature	24590-PTF-MVC-10-00003	C	<i>PTF Vessel Cyclic Data Sheet Inputs, Sheet A-5</i>
Vessel Design Temperature	24590-PTF-MVC-10-00003	C	<i>PTF Vessel Cyclic Data Sheet Inputs, Sheet A-5</i>
Materials of Construction	24590-PTF-N1D-PVP-00001	6	<i>PVP-SCB-00002 PTF Vessel Vent Caustic Scrubber</i>
Scrubber Dry Weight	24590-QL-POA-MKAS-00002-03-00001	E	<i>Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber</i>
Scrubber Dry CG (Inches X,Y,Z)	24590-QL-POA-MKAS-00002-03-00001	E	<i>Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber</i>
Scrubber Operating Weight	24590-QL-POA-MKAS-00002-03-00001	E	<i>Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber</i>
Scrubber Operating CG (Inches X,Y,Z)	24590-QL-POA-MKAS-00002-03-00001	E	<i>Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber</i>
Packing Column Dry Weight	24590-QL-POA-MKAS-00002-03-00001	E	<i>Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber</i>
Packing Column Dry CG (Inches X,Y,Z)	24590-QL-POA-MKAS-00002-03-00001	E	<i>Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber</i>
Packing Column Operating Weight	24590-QL-POA-MKAS-00002-03-00001	E	<i>Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber</i>
Packing Column Operating CG (Inches X,Y,Z)	24590-QL-POA-MKAS-00002-03-00001	E	<i>Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber</i>
Sump Vessel Dry Weight	24590-QL-POA-MKAS-00002-03-00001	E	<i>Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber</i>

Sump Vessel Dry CG (Inches X,Y,Z)	24590-QL-POA-MKAS-00002-03-00001	E	Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber
Sump Vessel Operating Weight	24590-QL-POA-MKAS-00002-03-00001	E	Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber
Sump Vessel Operating CG (Inches X,Y,Z)	24590-QL-POA-MKAS-00002-03-00001	E	Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber
Scrubber Testing Weight	24590-QL-POA-MKAS-00002-03-00001	E	Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber
Scrubber Shipping Weight	24590-QL-POA-MKAS-00002-03-00001	E	Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber
Scrubber Orientation	24590-QL-POA-MKAS-00002-03-00001	E	Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber
Support Design	24590-QL-POA-MKAS-00002-03-00001	E	Data Sheet - Mechanical Data Sheet PTF Vessel Vent Caustic Scrubber
Containment Classification	24590-3PS-MV00-T0001, WTF A KS 1/4" / 11"	3	Pressure Vessel Design And Fabrication, Section 1.2.6
Design Life	24590-PTF-3YD-PVP-00001	1	System Description For Pretreatment Vessel Vent Process System, PVP, Section 4.3
Dangerous Waste	24590-PTF-3YD-PVP-00001	1	System Description For Pretreatment Vessel Vent Process System, PVP, Section 4.3 And Section 9.1.2
Nozzle Data (e.g., Nozzle No, Nozzle Size, Connecting Pipe, Connecting Pipe Schedule (Pipe Wall Thickness))	24590-QL-POA-MKAS-00002-02-00012	F	Drawing - PTF Vessel Vent Caustic Scrubber - Column Assembly & Details
	24590-QL-POA-MKAS-00002-02-00020	E	Drawing - PTF Vessel Vent Caustic Scrubber - Sump Assembly & Details
<b>Load Type</b>			
Design Pressure	24590-PTF-MVC-10-00003	C	PTF Vessel Cyclic Data Sheet Inputs, Sheet A-5
Operating Pressure 1	24590-PTF-MVC-10-00003	C	PTF Vessel Cyclic Data Sheet Inputs, Sheet A-5
Operating Pressure 2	24590-PTF-MVC-10-00003	C	PTF Vessel Cyclic Data Sheet Inputs, Sheet A-5
Operating Temperature	24590-PTF-MVC-10-00003	C	PTF Vessel Cyclic Data Sheet Inputs, Sheet A-5
Content Specific Gravity	24590-PTF-MVC-10-00003	C	PTF Vessel Cyclic Data Sheet Inputs, Sheet A-5
Content Level	24590-PTF-MVC-10-00003	C	PTF Vessel Cyclic Data Sheet Inputs, Sheet A-5
Nozzle Loads	123005	N/A	Nozzle Design Loads for PVP-SCB-00002
Nozzle Design Pressure and Temperature	24590-PTF-M6X-PVP-00047	0	MS Line List For P&ID 24590-PTF-M6-PVP-00017001



Attachment 1: Page 4 of 4

REFERENCES for Data Sheet: 24590-PTF-MKD-PVP-00002, Rev 11

Plant Item No: 24590-PTF-MK-PVP-SCB-00002

*(For BNI Use Only)*

**Notes:**

Note 1: Per discussions between the previous Responsible Engineer (RE) Dennis Rickettson and current Responsible Engineer (RE) Kuldip Singh the "Minimum Design Temperature For Metal of -20F (Minus 20F Degrees)" is most likely based on Hanford Site Climatological Data in 24590-WTP-DB-ENG-01-001, Table 4-4 as follows:



Ambient Air Temperature Minimum -23F (Minus 23F Degrees) and Maximum 113F