



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET ACTIVATED CARBON ADSORBER

ISSUED BY
RPP-WTP PDC



R1188507

PLANT ITEM No.
24590-HLW-MV-HOP-ADBR-00002A
24590-HLW-MV-HOP-ADBR-00002B

Data Sheet No.	Rev.
24590-HLW-MVD-HOP-00016	3

Project:	RPP-WTP	Description:	Activated Carbon Adsorber for Mercury Abatement
Project No:	24590	Mech. Drawing:*	
Site:	Hanford	P&ID:	24590-HLW-M6-HOP-20011, Rev 0
System:	HOP (Melter 2)	Process Calculations:	24590-HLW-M4C-HOP-00011, Rev 1 24590-HLW-MKC-HOP-00013, Rev 1
Process flow diagram:	24590-HLW-M5-V17T-20004, Rev 1	Specification:	24590-WTP-3PS-MWK0-T0001, Rev 4

General Data

Quality Level	Q	Code Stamp	N/A
Seismic Category	SC-III	NB Registration	N/A
Design Code	General Note 2	Design Life	40 yrs (Process Note 3)

Process Data (General Note 4)

Offgas Conditions (Inlet):					Offgas Composition (Inlet):																																																	
Parameter		Actual Conditions (Process Note 7)			Major Offgas Components	Actual Composition (Process Note 7)																																																
		Nominal	Maximum	Design		Nominal, Volume %	Maximum, Volume %																																															
Vol. Flow	SCFM	1,403	1,646	2,000	N ₂	70.9	65.7																																															
	ACFM	1,807	2,219	2,633																																																		
Mass Flow	lb/hr	6,127	7,001	N/A	O ₂	19.0	17.6																																															
Temperature	°F	197	230	250	H ₂ O	8.89	15.5																																															
Pressure	in-w.g.	-5.2	-4	(Process Note 4) -82	CO ₂	0.375	0.40																																															
Density	lb/ft ³	0.0565	0.0526	N/A	Ar	0.85	0.79																																															
Relative Humidity	%	(Process Note 8)		N/A	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Minor Offgas Components</th> <th>Nominal (Process Note 3)</th> <th>Maximum (Process Note 5)</th> </tr> <tr> <th>kg/hour</th> <th>kg/hour</th> </tr> </thead> <tbody> <tr><td>NH₃</td><td>2.96E-03</td><td>3.19E-02</td></tr> <tr><td>NO</td><td>4.17E-01</td><td>1.88E+00</td></tr> <tr><td>N₂O</td><td>7.27E-03</td><td>1.50E-01</td></tr> <tr><td>NO₂</td><td>6.24E-02</td><td>2.25E+00</td></tr> <tr><td>CO</td><td>8.80E-03</td><td>1.70E-02</td></tr> <tr><td>H₂</td><td>2.49E-03</td><td>8.79E-02</td></tr> <tr><td>HCl</td><td>3.31E-03</td><td>6.58E-03</td></tr> <tr><td>HF</td><td>1.98E-03</td><td>3.99E-03</td></tr> <tr><td>I₂</td><td>1.11E-03</td><td>1.11E-03</td></tr> <tr><td>SO₂</td><td>4.24E-03</td><td>6.70E-03</td></tr> <tr><td>HNO₂</td><td>9.69E-03</td><td>4.31E-02</td></tr> <tr><td>HNO₃</td><td>9.53E-03</td><td>2.85E-02</td></tr> <tr><td>VOC</td><td>2.40E-03</td><td>3.20E-03</td></tr> <tr><td>Particulate</td><td>1.20E-12</td><td>2.11E-10</td></tr> </tbody> </table>			Minor Offgas Components	Nominal (Process Note 3)	Maximum (Process Note 5)	kg/hour	kg/hour	NH ₃	2.96E-03	3.19E-02	NO	4.17E-01	1.88E+00	N ₂ O	7.27E-03	1.50E-01	NO ₂	6.24E-02	2.25E+00	CO	8.80E-03	1.70E-02	H ₂	2.49E-03	8.79E-02	HCl	3.31E-03	6.58E-03	HF	1.98E-03	3.99E-03	I ₂	1.11E-03	1.11E-03	SO ₂	4.24E-03	6.70E-03	HNO ₂	9.69E-03	4.31E-02	HNO ₃	9.53E-03	2.85E-02	VOC	2.40E-03	3.20E-03	Particulate	1.20E-12	2.11E-10
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Operating	11.7	10.7																																																				
Abnormal	100	100																																																				
Allowable Pressure Drop (Process Note 2)		in-w.g.	12																																																			
Process Notes:																																																						
<ol style="list-style-type: none"> Carbon adsorbers shall be operated in series during normal operation. Allowable pressure drop is for both carbon adsorbers HOP-ADBR-00002A and B operating in series (12 in-w.g. total) and shall be based on end of bed life. Design life for each of the activated carbon adsorber primary beds, at a minimum, shall be for one year at <u>Nominal</u> condition of Mercury with the adsorbers operating in series. Design life for the activated carbon adsorber guard beds (combined for two adsorbers) shall be for one year at <u>Nominal</u> conditions based on specified HCl, HF, I₂, SO₂, HNO₂ & HNO₃ loading with the adsorbers operating in series. Equipment design pressure (Positive) shall be determined by Seller based on pressures generated during a carbon bed fire and activation of the fire suppression water. Maximum component rates are based on the Bounding Condition, except CO, Hg, HCl, HF, I₂, SO₂, HNO₂ and HNO₃, which are based on the Maximum Condition. Bounding/ maximum conditions are used to assess the maximum credible impact on bed life due to competitive effects during Appendix B and C testing (refer to Engineering Specifications, 24590-WTP-3PS-MWK0-T0001). Personnel Protection insulation is required for surfaces with temperature of 140 °F and above. Values listed are representative of specific offgas conditions as a whole and not as individual parameters. For example, the Nominal Relative Humidity is dependent upon the Nominal Temperature. For this reason, 					Mercury Concentration:																																																	
					Parameter	Condition																																																
						Nominal		Maximum (Process Note 5)																																														
						(µg/dscm)	kg/hour	(µg/dscm)	kg/hour																																													
					Hg Mass Flow	7,660	1.66E-02	52,600	1.25E-01																																													
					Required Decontamination Factor (DF) for Hg to comply with <45 µg/dscm					≥ 1000																																												
					Removal Efficiency for I ₂					>90%																																												



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some values in the Maximum Condition column may actually be less than those listed in the Nominal Condition.

8. The abnormal operating condition is isolation of the carbon bed adsorbers without purge of moisture from the interior gas spaces. As the offgas cools the relative humidity increases to 100%. Further cooling of the offgas results in * levels of adsorption within the primary and guard beds and * condensation on the internal walls of the adsorbers.

Removal Efficiency for HCl or HF

>90%

Removal Efficiency for SO₂

>90%

Minimum time between Carbon Media change-out:
Primary Bed
Guard Bed

(Process Note 3)
12 months
12 months

Material Data

Process Pipe and Housing Fabrication -			
Pipe Class	S11V	Valve Material	316 / 316L SS
Inlet Piping Size	14 inches	Valve Trim	TRIM 12, API 600
Outlet Piping Size	14 inches	Flange Material	316L SS
Housing	316L SS	Gasket Material	Spiral-Wound/Flat, Graphite
Activated Carbon Beds Screens	316L SS	Flange Rating	CL 150 RF B16.5
Pipe schedule	TBD	Housing Insulation / Jacket	Calcium Silicate ASTM C533, Type I / 0.024" thk. SST ASTM A240
Pipe Material	316 / 316L SS	Pipe Insulation / Jacket	Calcium Silicate ASTM C533, Type I / 0.024" thk. SST ASTM A240

Fire Protection Pipe -			
Pipe Class	S11V	Valve Trim	Trim 12, API 600
Inlet Piping Size	* 2 inch	Flange Material	316L SS
Pipe Schedule	40S	Gasket Material	316L SS SP-WND / Graphite Filled
Pipe Material	316 / 316L SS	Flange Rating	CL150 RF B16.5
Valve Material	316L SS		

Appurtenances and Other items -			
Support Frames	Carbon Steel	Drain Line Flange Material	316L SS
Pipe Supports	Carbon Steel	Drain Line Flange Rating	CL150 RF B16.5
Maintenance Platforms	Carbon Steel	Radar Guide Design	(General Note 7)
Flange Bolts / Nuts	ASTM F593 / ASTM F594	Radar Guide Pipe/Flange Material	*
Fire Suppression Drain Pipe Material	316 / 316L SS	Radar Guide Pipe Size	*
Fire Suppression Drain Pipe Schedule	40S	Radar Guide Pipe Schedule	*
Drain Line on/off valve	* 2 inch Manual Ball Valve	Radar Guide Pipe Flange	*

Bed Fire Suppression System

Fire Detection Method:	Differential CO_x Monitor	Information on Fire Suppression by Flooding Carbon Beds	
Fire Suppression Activation Method:	Automatic Bed Isolation	Flowrate:	* 22 gpm per unit
Primary Fire Suppression Method:	Isolate Carbon Beds	Pressure:	* 50 psig
Secondary Fire Suppression Method:	Flood Carbon Beds	Total Volume of Water:	* 5400 gal
Fluid Type for Carbon Bed Flooding:	Fire Service Water	Total Time to Fill Vessel:	* 240 minutes
Liquid Level Control Method:	Radar Liquid Level Indication	Drain Pipe Line Size:	* 2 inch
Liquid Level Control Logic:	Connection of a hose and opening of a supply valve (by others) will be required to initiate the flow of Fire Protection Water to a carbon bed. The Fire Protection Water supply will be closed at a pre-determined liquid level.		



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Design Data

Nozzle Loads at Buyer Interface (General Note 5)

Outlet Nozzle:

Nozzle #	Nozzle Size	Orientation	Load Case	F _x (lbs)	F _y (lbs)	F _z (lbs)	M _x (ft-lbs)	M _y (ft-lbs)	M _z (ft-lbs)
N01	14 in	Horizontal	Weight	500	1,500	500	2,100	1,000	1,000
			Seismic	2,700	2,000	9,400	5,600	12,300	5,000
			Thermal	1,000	1,000	2,700	2,500	2,500	3,000

Outlet Nozzle:

Nozzle #	Nozzle Size	Orientation	Load Case	F _x (lbs)	F _y (lbs)	F _z (lbs)	M _x (ft-lbs)	M _y (ft-lbs)	M _z (ft-lbs)
N02	14 in	Horizontal	Weight	500	1,500	500	1,600	1,000	1,000
			Seismic	1,100	2,400	1,200	3,500	2,100	2,200
			Thermal	2,300	2,400	1,000	7,100	2,200	16,300

Note: Values are x = North/South, y = vertical, z = East/West. Note: Forces and moments are +/- and in Global x, y, z direction.

Thermal Information:

Room #	H-A123	Maximum Heat Loss	5 kw (per unit)
Room Temperature	59 - 83 °F	Thermal Cycling Frequency:	For design purposes use a thermal cycle frequency of once every two (2) months for the life of the plant (40 years).
Earth Temperature Beneath Slab	70 °F (Fixed)		
Concrete Slab Base Thickness	72 Inches		
Thermal Conductivity of Concrete Slab	1.8 W / m / K		

Activated Carbon Data:

	Primary Bed	Guard Bed
Manufacturer	* Donau Carbon	* Donau Carbon
Model	* Kombisorb BAT 37	*
Description	* A mixed product composed by inert material and impregnated, cylindrically shaped activated carbon (ratio of mixture 30:70).	*
Activation element/ % Loading	* Sulfur compounds/ *	* / *
Media form (granular, pellet, etc.)	* Extruded & Granular	*
Size of carbon media (mm)	* 3-5	*
Bulk density	* 0.5 g/cc (31.2 lb/ft ³)	*
Total Bed Loading, Lbs/ Lb Media	* (Mercury)	* (Iodine) * (Acid Gases)
Number of beds per vessel	* Two	* Two
Arrangement	* Rectangular parallel beds	* Rectangular parallel beds
Residence time, sec	* (at design flow rate in ACFM)	* (at design flow rate in ACFM)
Thickness of bed, in	* 20	* 10
Total media volume, ft ³ per vessel	* 220	* 110
Total media weight, lbs per vessel	* 6860	*
Spacing between beds, in	* 4	* 4 and 8
Face velocity thru carbon, fpm	* (at design flow rate in ACFM)	* (at design flow rate in ACFM)
Max. allowable temp, °F	*	*
Min. allowable temp, °F	* Ambient	* Ambient

House/vessel -

Material/Thickness	* 0.375" 316L SS with external stiffeners
Vessel dimensions, (L x W x H)	* 138" x 112" x 156"
Total weight of vessel	* est. lbs per vessel
Weight of vessel with carbon, lbs	* lbs
Design pressure, in-w.g.	* in-w.g (Refer to Process Note 4. Positive design pressure is 126 in-Wg)
Operating pressure, in-w.g.	* in-w.g.
Design temperature, °F	*
Recommended housing insulation:	* Calcium silicate and/or foam glass
Material/Thickness, in	* 7 inches on sides, 1 inch over stiffeners
Thermal Cond, Btu-in/hr ft ² °F	* 0.39
Method of Attachment	* Mechanical support via outer jacket and/or straps
Unloading on/off valve	* 8 each per vessel, each 8" size (4 ea. for Primary Bed)



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Discharge Filter -	
Manufacturer	* American Air filter
Type of filter	* Extended surface mini-pleat with metal sides
Filter material	* microglass paper
Filter frame material	* stainless steel type 316
Dimensions of filter, (L x W x H)	* 23-3/8" x 23-3/8" x 3-3/4"
Weight of filter, lbs	* 15 lbs
Number of filters per vessel	* 2
Filter rating (efficiency, particle size)	* 99% on 5 micron particles
Flow rate capacity, scfm	* 2000 per filter
Max. allowable temp, °F	* 250
Min. allowable temp, °F	* Ambient

Connecting Pipe -	
Pipe size, in	* 14
Material/Thickness, in	*
Total length of piping, ft	*
Valve type, (gate, butterfly, etc.)- General Note 8	* butterfly
Weight of valve, lbs	*
Valve manufacturer	*
Total number of valves	*
Actuators (air operated, rack and pinion, FC)	*
Actuator manufacture	*
Weight of actuator	*
Actuator operating pressure (min. and max.)	*
Opening time, seconds	*
Total number of Actuators	*
Required instrument air supply, scfm	*
Recommended piping insulation:	* Calcium silicate or foam glass
Material/Thickness, in	* 1 inches
Thermal Cond, Btu-in/hr ft ² °F	* 0.39
Method of Attachment	* straps

Pneumatic Loading Equipment:	
Manufacturer	* N/A
Blower size, horsepower	* N/A
Blower electrical load, watts	* N/A
Required voltage for blower	* N/A
Skid envelope size, (L x W x H)	* N/A
Skid weight, lbs	* N/A
Skid transportation/mobility	* N/A
Estimated time to load the vessel	* N/A

Note:
System designed to permit loading directly from bulk bags or drums into beds without the need for pneumatic loading devices.

Optional Electric Pre-Heater:	
Manufacturer	* N/A
Heater element electric load, watts	* N/A
Required voltage for heater elements, V	* N/A
an electric load, watts	* N/A
Required voltage for fan, V	* N/A
Fan size, horsepower	* N/A
Skid envelope size, (L x W x H)	* N/A
Skid weight, lbs	* N/A
Skid transportation/mobility	* N/A
Estimated time to preheat the carbon, hrs	* N/A
Total electric load for skid, watts	* N/A
Total required voltage	* N/A

Note:
Electrical Pre-Heater no longer proposed - considered unnecessary.



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Construction Data: (To be determined by the supplier when not specified by the buyer)

Envelope Dimensions (L x W x H)	ft	(25' x 11' x 31')	Shipping Dimensions (L x W x H)	ft	* 3 trailers Each Load 15' x 10' x 9'
Operating Weight of unit (two vessels)	lbs	*	Shipping Weight	lbs	* 71,500
Full Water Flood Weight of unit (two vessels)	lbs	*			

Corrosion Data:

Corrosion Allowance, in **0.010 (General Note 6)**

General Notes:

1. Data marked with an asterisk (*) to be provided by Vendor.
2. The adsorber housing pressure boundary is designed and fabricated to ASME BPVC, Sec VIII, Div 1, the adsorbers and fire protection system are designed and fabricated to applicable ASME AG-1 requirements and the interconnect piping and valves are designed and fabricated to ASME B31.3 - 1996. The packaged unit is tested to ASME AG-1 with ASME AG-1a-2000 Addenda, and the pressure boundary pneumatically tested per ASME BPVC, Sec VIII, Div I.
3. Contents of this document are Dangerous Waste Permit affecting.
4. Ref. 24590-HLW-M4C-HOP-00011, *HLW Melter Offgas System Design Basis Flowsheets*. Unless otherwise noted, Nominal values represent Nominal Offgas Conditions and Maximum values represent Maximum Offgas Conditions.
Ref. 24590-HLW-MKC-HOP-00013, *HLW Activated Carbon Bed Operating Conditions and Process Design Requirements*.
5. Ref. CCN 204114 for nozzle design loads for HOP-ADBR-00001A/B.
6. Ref. 24590-HLW-N1D-HOP-00003, *Corrosion Evaluation*. A value of 0.010 is used for conservatism.
7. Ref. 24590-WTP-J8-50-00001, *Radar Installation Wave Guide Spool Joining Details (Detail 2)*.
8. Ref. 24590-HLW-M6-HOP-00011 and -20011 Note 6- Valves shall be triple offset disk with a leak tightness better than FCI 70-2 Class VI. Valves shall be fire resistant and composed of metal or metal-graphite seats.



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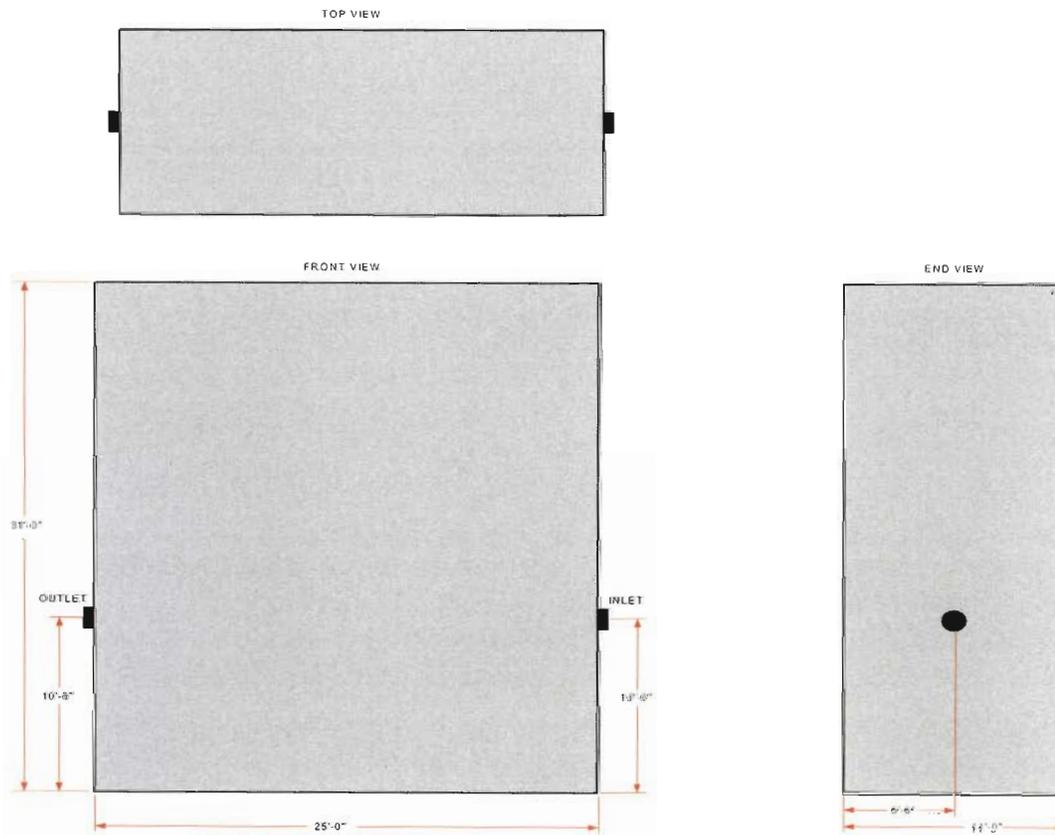
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HLW Adsorber Layout:

Layout Notes:

- Process Inlet and Outlet nozzles are shown for clarity. Other nozzle locations will be per Seller.
- Carbon bed, piping, support frame, and maintenance platform layout shall be per Seller meeting the requirements of engineering specification 24590-WTP-3PS-MWK0-T0001.
- Pneumatic loading system shall be located per Seller's design.





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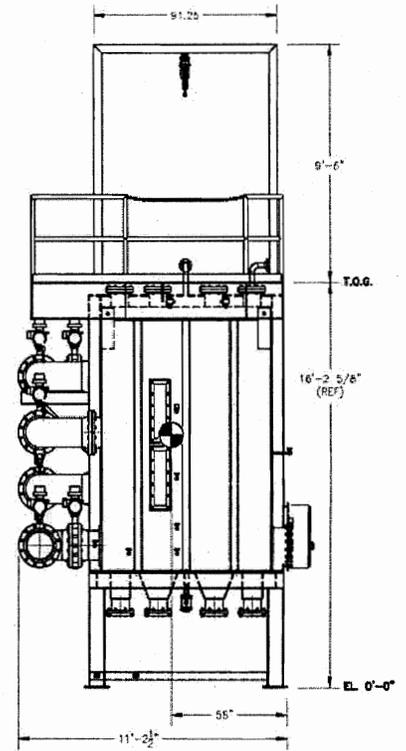
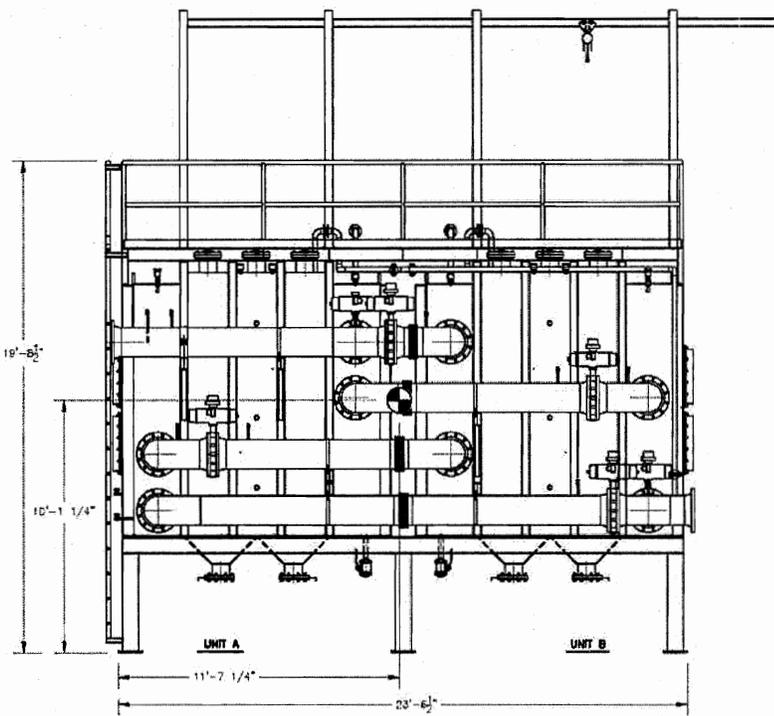
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HLW Adsorber Sketch:

Note: Dimensions provided below are for reference only. See supplier detail drawings for actual dimensions.





EQUIPMENT QUALIFICATION DATASHEET (EQD)

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Equipment Identification			
Full Component Tag Number or BNI Stock Code Number	24590-HLW-MV-HOP-ADBR-00002A 24590-HLW-MV-HOP-ADBR-00002B	Safety Classification <input type="checkbox"/> SC <input checked="" type="checkbox"/> SS <input type="checkbox"/> APC-PAM	
Equipment Datasheet Number	24590-HLW-MVD-HOP-00016		
Description	Activated Carbon Adsorber	Seismic Category <input type="checkbox"/> SC-I <input type="checkbox"/> SC-II <input checked="" type="checkbox"/> SC-III <input type="checkbox"/> SC-IV <input type="checkbox"/> SC-III Seismic Interaction only	
Location (Facility / Building and Room No.)	Located in HLW Room H-A123 at 0'-0" Elevation.		
Safety Function(s)	<p>The following are credited safety functions of the Activated Carbon Bed Adsorbers for either a Seismic or Fire DBE. (P&ID 24590-HLW-M6-HOP-00011 identifies equipment/ instruments/ interlocks that are not within Seller's scope).</p> <ul style="list-style-type: none"> • Activated Carbon Adsorber Skid: Primary Confinement of Offgas during and after either a Seismic or Fire DBE. • CO Gas Analyzers & Interlocks (by others): The carbon monoxide detector(s) and analysis devices must be sufficiently sensitive to register an increase in carbon monoxide across the bed under the full range of melter operations and offgas flows and actuate the fire suppression system isolation valves. • Carbon Bed Isolation Valves (Seller's scope): The carbon bed isolation valves must seal sufficiently tight to limit the amount of offgas that enters the bed to a level that starves the fire of oxygen and causes it to self-extinguish. • Carbon Bed Bypass Valves (by others): The bypass valve shall automatically fail open once the carbon bed isolation valves have been activated. The bypass valves in the secondary offgas system are designed to open when a portion of the secondary offgas train is isolated in order to prevent blockage of the offgas system. <p>(Reference 24590-WTP-PSAR-ESH-01-002-04)</p>		
Equipment Safety Function Type	<input checked="" type="checkbox"/> Passive Mechanical 24590-HLW-MV-HOP-ADBR-00002A/B	<input checked="" type="checkbox"/> Active Mechanical Operation of Carbon Bed Isolation Valves- Fire DBE only	<input type="checkbox"/> Electrical
Seismic Safety Function <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Seismic Operability Requirements <input type="checkbox"/> During Seismic Event <input type="checkbox"/> After Seismic Event <input checked="" 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		
C3/R2		EQ Note 5		
Parameter Type/Units	Parameter Value	Parameter Duration (number)	Duration Units	WTP Source Document Number
Normal Ambients				
High Temperature (°F)	83	Note A	Years	24590-HLW-U0D-W16T-00001



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Equipment Environmental Qualification (EEQ) (continued)

Parameter Type/Units	Parameter Value	Parameter Duration (number)	Duration Units	WTP Source Document Number	
Normal Ambients					
Low Temperature (°F)	59	Note B	N/A	24590-HLW-U0D-W16T-00001	
High Relative Humidity (%RH)	100	Note C	N/A	24590-HLW-U0D-W16T-00001	
Low Relative Humidity (%RH)	10	Note C	N/A	24590-HLW-U0D-W16T-00001	
High Pressure (in.-w.g.)	0	Note D	N/A	24590-HLW-U0D-W16T-00001	
Low Pressure (in.-w.g.)	-0.4	Note D	N/A	24590-HLW-U0D-W16T-00001	
Radiation Dose Rate (mRad/hr)	10	40	Years (Note E-1)	24590-HLW-U0D-W16T-00001	
Plant/Process Induced Vibration	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
Additional Normal Ambient Information:	EQ Notes 1 & 2				
Abnormal Ambients					
High Temperature (°F)	153	8	hours / year	24590-HLW-U0D-W16T-00001	
Low Temperature (°F)	40	Note B	N/A	24590-HLW-U0D-W16T-00001	
High Relative Humidity (%RH)	100	Note C	N/A	24590-HLW-U0D-W16T-00001	
Low Relative Humidity (%RH)	3	Note C	N/A	24590-HLW-U0D-W16T-00001	
High Pressure (in.-w.g.)	4	Note D	N/A	24590-HLW-U0D-W16T-00001	
Low Pressure (in.-w.g.)	-6.7	Note D	N/A	24590-HLW-U0D-W16T-00001	
Radiation Dose Rate (mR/hr)	10	0	Years (Note E-1)	24590-HLW-U0D-W16T-00001	
Exposure to Wet Sprinkler System	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		2 hours	24590-HLW-U0D-W16T-00001	
Additional Abnormal Ambient Information	EQ Notes 1 & 2				
Design Basis Events (DBE) Ambients					
High Temperature (°F)	184	2	hours	24590-HLW-U0D-W16T-00001	
Low Temperature (°F)	40	Note B	N/A	24590-HLW-U0D-W16T-00001	
High Relative Humidity (%RH)	100	2	hours	24590-HLW-U0D-W16T-00001	
Low Relative Humidity (%RH)	2	2	hours	24590-HLW-U0D-W16T-00001	
High Pressure (in.-w.g.)	4	8	hours	24590-HLW-U0D-W16T-00001	
Low Pressure (in.-w.g.)	-6.7	8	hours	24590-HLW-U0D-W16T-00001	
Radiation Dose Rate (mR/hr)	10	N/A	hours	24590-HLW-U0D-W16T-00001	
Submergence	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No EQ Note 3		N/A	hours	24590-HLW-U0D-W16T-00001
Chemical/Spray Exposure	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		N/A	hours	24590-HLW-U0D-W16T-00001 (EQ Note 4)
Additional DBE Information					

DBE Chemical Exposure Details



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DBE Chemical Exposure Details	
DBE Chemical Types / Concentrations	N/A (EQ Note 4)

Electrical Interfaces Supporting the Safety Function	
Power Supply Voltage (VAC, VDC)	(SELLER) 120VAC
Power Supply Frequency (Hz)	(SELLER) 60 Hz
Power Connection Method	(SELLER) Terminal Blocks
I/O Signals to/from Equipment	(SELLER)
I/O Connection Method	(SELLER) Terminal Blocks

Mechanical Interfaces	
Mounting Configuration (orientation)	See 24590-HLW-P1-P01T-00002 for WTP General Arrangement Drawing.
Mounting Method (bolts, welds, etc.)	12" x 12" x 1" steel base plate welded (3/8" fillet weld) to WTP embedded steel plate (6 PL). See 24590-HLW-DD-S13T-00067 for embed quantity and location. See 24590-PTF-DD-S13T-00201 for embed detail. See 24590-QL-POA-MWK0-00001-05-00001 for supplier General Arrangement Drawing.
Auxiliary Devices	Carbon Monoxide Gas Analyzer, Mercury Monitor, 14" Isolation Valves and Actuators, Interlocks.

Equipment Seismic Qualification (ESQ)				
Parameter	Title	Reference/Document Number	Version / Revision	Remarks
WTP Seismic Design Specification	Engineering Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks	24590-WTP-3PS-FB01-T0001	4	
Specified Seismic Load Parameters	Engineering Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks	24590-WTP-3PS-FB01-T0001	4	



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Equipment Qualification (EQ) Notes and Additional Information

- 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.
- 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.
- 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.
- 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.
- 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."
- F. The DBE conditions shall be taken to subsist for the stated number of hours following the qualified life of the equipment.
- 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.
- 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.
- 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.

ADDITIONAL EQ NOTES:

- 1) Ambient conditions shown for equipment qualification are not to be misinterpreted to represent process conditions for melter offgas.
- 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.).
- 3) SELLER's equipment design to preclude submergence of sensitive components of the skids.
- 4) Ammonia and nitric acid listed in the HLW Room Environment Data sheet, 24590-HLW-U0D-W16T-00001, Rev 1 are N/A for DBE Exposure as follows:
 - The nitric acid pipe line identified in CCN 156336 is not located in room H-A123.
 - Confinement of ammonia is achieved by designation of the ammonia lines in HLW as SS, seismic category SC-III.
- 5) If qualified life is other than 40 years, SELLER shall submit the maintenance frequency for components not meeting the 40- year requirement.



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET
ACTIVATED CARBON ADSORBER

PLANT ITEM No.
24590-HLW-MV-HOP-ADBR-00002A
24590-HLW-MV-HOP-ADBR-00002B

Data Sheet No.	Rev.
24590-HLW-MVD-HOP-00016	3

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.

Safety Screening required?: Yes X No ___ (If yes per 24590-WTP-GPP-SREG-002, E&NS signature required below.)

3	Incorporate TCN 24590-QL-MBA-MWK0-00001-70003. TJU 4/9/10	<i>M. O'Neill</i>	<i>R. Jablonski</i>	<i>T. Valenti</i>	<i>G. Goolsby</i>	<i>C. Meng</i>	<i>J. Roth</i>	4/9/10
	Major revision. Revision triangles not used.	M. O'Neill	R. Jablonski	T. Valenti	G. Goolsby	C. Meng	J. Roth	
2	Updated Quality Level, Process Data, Material Data, Bed Fire Suppression System Data, Design Data, and Activated Carbon Data. Added Equipment Qualification Data. Incorporated SDDR 24590-WTP-SDDR-M-06-00287 by reference.	M. O'Neil	R. Jablonski	C. Knauss	G. Goolsby	C. Meng	J. Julyk	04-08-08
1	Revised to comply with Code 1 PO submittal # 24590-QL-POA-MWK0-00001-09-00001 in accordance with CAR # 24590-WTP-CAR-QA-05-120. Added Environmental Qualification.	J. Rouse	D. Pease	A. Benamou C. Morley	-	-	J. Julyk	12-06-05
0	Issued for Purchase	J. Rouse	D. Pease	C. Morley	-	-	M. Hoffmann	9-20-04
Rev.	Reason for Revision	System Engineer	Equipment Engineer	Checked	Reviewed	E&NS	Approved	Date