

 River Protection Project Waste Treatment Plant	MECHANICAL DATA SHEET <u>LAW Melter Offgas Caustic Scrubber</u>		PLANT ITEM No. 24590-LAW-MK-LVP-SCB-00001	
			Data Sheet No. 24590-LAW-MKD-LVP-00011	Rev. 6

Project:	RPP-WTP	P&ID	Ref 1
Project No:	24590		
Site:	DOE Hanford	Process Calculations	Ref 2; Ref 3
System:	LVP		
Building:	LAW		
Description	LAW Melter Offgas Caustic Scrubber		

General Data

Quality Level	Q	Fabrication Specification	Ref 8
Seismic Category	SC-III	Design Code	ASME Section VIII Division 1
Service/Contents	Melter offgas, air, water, caustic solution	Code Stamp	Yes
Design recirc. fluid density lb/ft ³	65.8 (Ref 3)	NB Registration	Yes
Max. Operating Volume gal	150 (Note 21*)	Wind Design	N/A
Total Volume gal	4,250 *	Snow/Ash Design	N/A
Postweld Heat Treat	N/A	Equipment Qualification	Ref 11

Operating & Design Data (Ref 2, Note 3)

Inside Diameter inch	66 *	Corrosion/Erosion Allowance inch		0.040 (Ref 6; Note 23)
Length / Height inch	Note 17 *	Allowable Overall Differential Pressure (in wg)		16
	Vessel Max Operating	Vessel Design	N01 Inlet Max Operating	
Internal Pressure psig	0	15	0	
External Pressure psig	5.6 (Ref 27)	9.5 (Ref 26)	5.6 (Ref 27)	
Temperature °F	412	486 (Ref 4)	412	
Min. Design Metal Temp. °F	-20 (per ASME Section VIII Division 1)			

Materials of Construction (Ref 6)

Component	Material	Confinement
Top Head	SA-240 Type 316 (max 0.030% C; dual certified) (Note 12)	Primary (Ref 8)
Upper Shell	SA-240 Type 316 (max 0.030% C; dual certified) (Note 12)	Primary (Ref 8)
Lower Shell	UNS N10276 (Alloy C-276) (Note 12)	Primary (Ref 8)
Bottom Head	UNS N10276 (Alloy C-276) (Note 12)	Primary (Ref 8)
Vessel Supports	Note 19	N/A
Internals	UNS N10276 (Alloy C-276) / Type 316 (max 0.030% C; dual certified) (Note 12 and 20)	N/A
Pipe and nozzles	UNS N10276 (Alloy C-276) / Type 316 (max 0.030% C; dual certified) (Note 12)	Primary
Forgings / Bar stock	UNS N10276 (Alloy C-276) / Type 316 (max 0.030% C; dual certified) (Note 12)	Primary - when used for nozzles or for supports welded to the pressure boundary (Ref 8)
Gaskets for B16.5 flanges above the packing	Type 316 (max 0.030% C; dual certified) Spiral-Wound/B16.20 with graphite filler (Note 12)	Primary (Ref 8)
Gaskets for B16.5 flanges below the packing	UNS N10276 (Alloy C-276) Spiral-Wound/B16.20 with graphite filler (Note 12)	Primary (Ref 8)
Gasket for custom removable top head	Thermiculite 815	Primary (Ref 8)
Bolting for B16.5 nozzle and head flanges	SA-193, B7	N/A
Mounting base	Note 19	N/A
Packing	UNS N10276 (Alloy C-276) (notes 12 and 20)	N/A



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Component	Material	Confinement
Mist Eliminator (demister) (Ref 21)	Brownian Diffusion "Flexifiber" mist eliminator (From Koch-Glitsch) Mat'l: Glass Fiber with Type 316 (max 0.030% C; dual certified) cage (Note 12)	N/A

Miscellaneous Data

Orientation	Vertical
Insulation Function	Personnel Protection (Ref 1, Ref 12, Note 6)
Insulation Thickness	4.5" (Ref 1, Ref 12)
Insulation Material	Mineral Fiber on shell, mineral fiber blanket on bottom head, and expanded perlite block or calcium silicate on top head (Ref 12 and Note 6)
External Finish	Mill finish with welds descaled and "as deposited"
Weight - *Note 1	Vessel: Dry * Vessel Operating: * Vessel Test: *
	Packing: dry * wet *
	HEME frame: * HEME filters: dry * wet *
Internal Finish	Mill finish with welds descaled and ground smooth.

Equipment Cyclic Data (Ref 13)

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

Design Life	40 Years			
Component Function and Life cycle Description	Ref 14			
Load Type	Min	Max	Number of Cycles	Comments
Design Pressure psig	-9.5 (Ref 26)	15	10	
Normal Operating Press. psig	-5.6 (Ref 27)	0	100	-154 in wg = -5.6 psig
Overall Operating Temp. °F	59	412	100	
Deleted				
Deleted				
Localized Features				
Demister Wash Operating Temp. for Nozzles N51-N54 and N51A-N54A, °F	59	122	4200	
Demister Wash Operating Press. for Nozzles N51-N54 and N51A-N54A, psig	-5.6 (Ref 27)	45 (Ref 25)	4200	
Packing Wash Operating Temp. for Nozzle N06 °F	59	212*	4200	Vendor to confirm max temperature at N06 under vessel max operating conditions
Packing Wash Operating Press. for Nozzles N06, psig	-5.6 (Ref 27)	49 (Ref 25)	4200	

Cyclic Notes

Cycle increase: The fatigue analyst shall increase the number of operational cycles given above by 10% to account for commissioning duty.

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Notes

Note 1:	An asterisk (*) indicates data to be verified and/or supplied by the Seller.
Note 2:	Deleted
Note 3:	Caustic Scrubber inlet and outlet conditions are taken from Ref 2. Stream Number LVP09 Catalyst Skid Discharge conditions are taken as scrubber inlet conditions at N01. Stream Number LVP18 Caustic Scrubber Discharge conditions are taken as scrubber outlet conditions at N02.
Note 4:	Deleted
Note 5:	Deleted
Note 6:	Personnel Protection insulation will be supplied and installed by Buyer's Subcontractor. Insulation Support Ring shall be supplied and installed by Seller. See Ref 14, Attachment A for insulation support ring details. For weight calculation purposes, a bounding insulation density can be assumed to be 15 lbs/ft ³ (Ref 12).
Note 7:	See EQ Datasheet for environmental radiation data.
Note 8:	Deleted
Note 9:	Deleted
Note 10:	Deleted
Note 11:	Deleted
Note 12:	<p>The lower portion of the scrubber including the nozzles, internal piping, structured packing and associated hardware may be subjected to operating temperatures in excess of 200°F, but bounded by the Design Temperature of 486°F. Therefore, per Ref 6, the lower portion shall be UNS N10276 (Alloy C-276). Per Ref 21*, this higher temperature zone is considered to extend up to the top of the structured packing.</p> <p>The upper portion of the scrubber (above the structured packing) will be exposed to operating temperatures that are less than 200°F. Therefore, per Ref 6, Type 316 (max 0.030% C; dual certified) stainless steel is acceptable for the remainder of the scrubber and internal components. Per Ref 2, normal and max operating temperatures above the packing are 122°F.</p>
Note 13:	For the purpose of design, fabrication and NDE per Ref 8, the design level of this vessel is L-1.
Note 14:	Contents of this document are Dangerous Waste Permit Affecting.
Note 15:	Deleted
Note 16:	Deleted.
Note 17:	Seller to provide new overall height resulting from removable head design.
Note 18:	<p>All nozzle loads to be applied shall conform to the Nozzle Loads table provided in this datasheet. Note that these nozzle loads are contingent upon using an expansion joint on the N01 scrubber inlet nozzle and the N02 scrubber outlet nozzle (Ref 7). Do not apply nozzle loads to manways. Spares do require nozzle load application. Note:</p> <p>*V= vertical head nozzle - values are x = North/South, y = vertical, z = East/West (global coordinates), Vessel 0 deg defined as north</p> <p>**H = horizontal shell nozzle - values are per axes shown in Ref 8, Appendix A (local coordinates)</p>
Note 19:	The vessel support system shall be designed by the Seller in accordance with ASME Section VIII, Division 1. Material of construction shall be Type 316 (max 0.030% C; dual certified) stainless steel. The following requirements shall apply if the Seller opts to use "skirt" type design: Material of construction shall be Type 316 (max 0.030% C; dual certified) stainless steel unless determined to be unacceptable due to excessive thermal stresses at the skirt-to-vessel junction. In such case, the skirt support material shall be UNS N10276



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(Alloy C-276). Anchorage of support skirt/base ring assembly to facility floor shall be achieved by anchor bolts and anchor bolt chairs. See Equipment Specification (Ref 14) for further details. The skirt type vessel support shall be provided with two (2) 10" NPS inspection openings 90 degree apart. Drainage shall be provided through vessel support mechanism **or through grooves cut into the floor underneath the scrubber.** Location of drainage holes to be at 90 degree angles and 1 square inch in area each. Drainage shall be at the floor interface. Inspection holes and drainage holes shall be located so that they do not interfere with the vessel mounting or the shear bars detailed in Ref 14.

Note 20. The internal packing shall be designed to allow for replacement. Inspection access shall be provided through the 24 inch manway located in the vessel shell.

Note 21. Max. operating volume is based on max. liquid height being at the bottom of offgas inlet nozzle N01.

Note 22. Deleted

Note 23. a. 0.040" corrosion allowance applies to surfaces wetted by process fluid, except for internal packing and mist eliminator filters.

b. The Corrosion Evaluation (Ref 6) says that the packing and mist eliminator are considered consumable so no corrosion allowance is required.

- The performance of the mist eliminator filters will be monitored during operation and are expected to require maintenance and replacement during the 40-year life of the plant.
- The packing will be monitored during operation, and will potentially need replacement during the 40-year life of the plant.

For the mist eliminator filters and the packing Seller shall:

- provide a design that is accessible for maintenance and replacement
- identify parameter(s) to be monitored that indicate need for maintenance and replacement
- provide maintenance and replacement instructions

This method of addressing corrosion provides no quantitative margin on material wear, but performance/condition monitoring is relied upon to indicate need for replacement to avoid impacting the safety functions identified on the Equipment Qualification Datasheet (Ref 11).

Notice:

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.



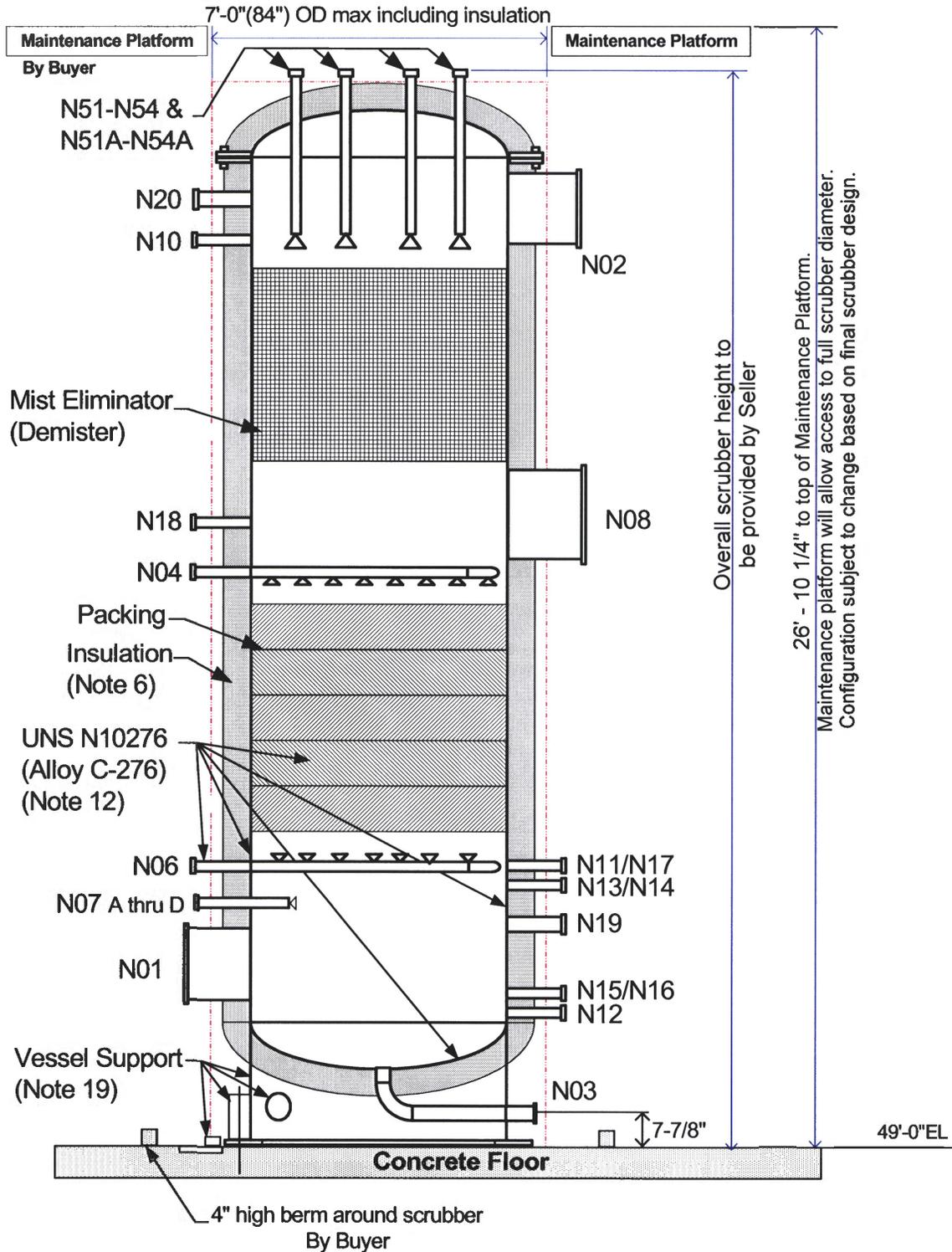
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Nozzle Schedule

Nozzle	Service / Remark	Nominal Pipe Size (in) *	Sch	Type	Facing	Angular Location (degrees) *	Nozzle Elevation (in) *
N01	Offgas Inlet	18	(*)	Horizontal	RF-WN	0	41.5
N02	Offgas Outlet	18	(*)	Horizontal	RF-WN	90	289.5
N03	Caustic Solution Return to Collection Tank / Scrubber Drain (Condensate Discharge)	8	(*)	Vertical	RF-WN	315	7.875
N04	Caustic Solution Supply (Condensate Recirculation)	3	(*)	Horizontal	RF-WN	90	142.25
N05A/ B	Deleted due to removable internals design; new configuration is N51/A - N54/A	-	-	-	-	-	-
N06	Packing Bottom Wash	2	(*)	Horizontal	RF-WN	270	65.5
N07A	Replaceable Quenching Offgas Spray Nozzle	3	(*)	Horizontal	RF-WN	330	41.5
N07B	Replaceable Quenching Offgas Spray Nozzle	3	(*)	Horizontal	RF-WN	345	63.66
N07C	Replaceable Quenching Offgas Spray Nozzle	3	(*)	Horizontal	RF-WN	15	63.66
N07D	Replaceable Quenching Offgas Spray Nozzle	3	(*)	Horizontal	RF-WN	30	41.5
N08	Manway	24	(*)	Horizontal	RF-WN	180	152.75
N09	Deleted	-	-	-	-	-	-
N10	Pressure Differential Transmitter across packing & demister (See Ref 15, Detail 8)	2	(*)	Horizontal	RF-WN	0	289.5
N11	Pressure Differential Transmitter across packing & demister (See Ref 15, Detail 8)	2	(*)	Horizontal	RF-WN	67.5	65.5
N12	Offgas Outlet Condensate Return to Scrubber	2	(*)	Horizontal	RF-WN	67.5	41.5
N13	Spare (Future) Level Transmitter (See Detail 8 of Ref 15), with blind flange, gaskets and bolts	2	(*)	Horizontal	RF-WN	202.5	65.5
N14	Level Transmitter (See Detail 8 of Ref 15)	2	(*)	Horizontal	RF-WN	90	65.5
N15	Spare (Future) Level Transmitter (See Detail 8 of Ref 15), with blind flange, gaskets and bolts	2	(*)	Horizontal	RF-WN	202.5	34.38
N16	Level Transmitter (See Detail 8 of Ref 15)	2	(*)	Horizontal	RF-WN	90	34.38
N17	Pressure Differential Transmitter (See Detail 8 of Ref 15) for Packing	2	(*)	Horizontal	RF-WN	315	65.5



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Nozzle	Service / Remark	Nominal Pipe Size (in) *	Sch	Type	Facing	Angular Location (degrees) *	Nozzle Elevation (in) *
N18	Pressure Differential Transmitter (See Detail 8 of Ref 15) for Packing	2	(*)	Horizontal	RF-WN	315	142.25
N19	Spare with blind flange, gaskets and bolts	3	(*)	Horizontal	RF-WN	150	41.5
N20	Spare with blind flange, gaskets and bolts	3	(*)	Horizontal	RF-WN	180	289.5
N21	Deleted due to removable top head	-	-	-	-	-	-
N51	Demister Wash Nozzles at Vessel Interface	1.5	(*)	Vertical	RF-WN	0	332.47
N52	Demister Wash Nozzles at Vessel Interface	1.5	(*)	Vertical	RF-WN	90	332.47
N53	Demister Wash Nozzles at Vessel Interface	1.5	(*)	Vertical	RF-WN	180	332.47
N54	Demister Wash Nozzles at Vessel Interface	1.5	(*)	Vertical	RF-WN	270	332.47
N51A	Demister Wash Nozzle Spray Lances at Process Service Water Interface	3/4	(*)	Vertical	RF-WN	0	332.47
N52A	Demister Wash Nozzle Spray Lances at Process Service Water Interface	3/4	(*)	Vertical	RF-WN	90	332.47
N53A	Demister Wash Nozzle Spray Lances at Process Service Water Interface	3/4	(*)	Vertical	RF-WN	180	332.47
N54A	Demister Wash Nozzle Spray Lances at Process Service Water Interface	3/4	(*)	Vertical	RF-WN	270	332.47

Nozzle Schedule Notes:

1. Seller shall confirm size, schedule, angular location, and nozzle elevation of all nozzles.
2. Nozzle requirements are as follows:
 - N02 - shall extend 6 inches beyond the insulation surface
 - N06 - shall extend 8 inches beyond the insulation surface
 - Nozzles over 12 inches (excluding N02 and N08) shall extend 12 inches beyond the insulation surface. N08 shall extend 9 inches beyond the insulation surface.
 Detail design requirements are as stated in Ref 15, Ref 16, and Ref 17.
3. (*) Nozzle Schedule shall be determined by Seller, taking into consideration all requirements stated in Ref 8.



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Nozzle Loads (Ref 7, Note 18)

Nozzle	Load Type	Nozzle Loads for LVP-SCB-00001					
		Loads - lbs			Moments - ft-lbs		
		Fx	Fy	Fz	Mx	My	Mz
N01	Weight	500	1200	500	2000	3000	3000
	Seismic	6500	2500	2500	4000	3000	3000
	Thermal	6000	2000	2000	10000	3000	3000
N02	Weight	500	1200	500	2000	3000	3000
	Seismic	3000	2500	2500	10000	10000	10000
	Thermal	3000	2000	2000	3000	3000	3000
N03	Weight	333	534	333	1210	758	758
	Seismic	1180	790	1180	3567	5333	5333
	Thermal	1050	938	1410	1600	3197	3197
N04	Weight	47	85	47	117	73	73
	Seismic	420	400	420	1021	1528	1528
	Thermal	136	121	181	432	865	865
N06	Weight	34	56	34	46	29	29
	Seismic	244	162	244	398	597	597
	Thermal	104	92	138	169	337	337
N08 (Manway)	Weight	0	0	0	0	0	0
	Seismic	0	0	0	0	0	0
	Thermal	0	0	0	0	0	0
N10	Weight	28	45	28	40	35	35
	Seismic	196	130	196	319	478	478
	Thermal	84	74	111	136	270	270
N11	Weight	34	56	34	46	29	29
	Seismic	244	162	244	398	597	597
	Thermal	104	92	138	169	337	337
N12	Weight	34	56	34	46	29	29
	Seismic	244	162	244	398	597	597
	Thermal	104	92	138	169	337	337
N13	Weight	34	56	34	46	29	29
	Seismic	244	162	244	398	597	597
	Thermal	104	92	138	169	337	337
N14	Weight	34	56	34	46	29	29
	Seismic	244	162	244	398	597	597
	Thermal	104	92	138	169	337	337
N15	Weight	34	56	34	46	29	29
	Seismic	244	162	244	398	597	597
	Thermal	104	92	138	169	337	337
N16	Weight	34	56	34	46	29	29
	Seismic	244	162	244	398	597	597
	Thermal	104	92	138	169	337	337
N17	Weight	34	56	34	46	29	29
	Seismic	244	162	244	398	597	597
	Thermal	104	92	138	169	337	337
N18	Weight	28	45	28	40	35	35
	Seismic	196	130	196	319	478	478
	Thermal	84	74	111	136	270	270
N19	Weight	71	113	71	180	112	112
	Seismic	491	327	491	1570	2350	2350
	Thermal	209	185	278	664	1330	1330



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Nozzle	Load Type	Nozzle Loads for LVP-SCB-00001					
		Loads - lbs			Moments - ft-lbs		
		Fx	Fy	Fz	Mx	My	Mz
N20	Weight	54	85	54	135	84	84
	Seismic	420	260	420	1178	1763	1763
	Thermal	157	139	209	498	998	998

Nozzle	Load Type	Nozzle Loads for LVP-SCB-00001			
		Loads - lbs		Moments - ft-lbs	
		Axial	Resultant Lateral	Torsion	Resultant Bending
N07A	Normal (Weight + Thermal)	75	50	25	40
	Occasional (Weight + Thermal + Seismic)	100	100	65	75
N07B	Normal (Weight + Thermal)	75	50	25	40
	Occasional (Weight + Thermal + Seismic)	100	100	65	75
N07C	Normal (Weight + Thermal)	75	50	25	40
	Occasional (Weight + Thermal + Seismic)	100	100	65	75
N07D	Normal (Weight + Thermal)	75	50	25	40
	Occasional (Weight + Thermal + Seismic)	100	100	65	75
N51A	Normal (Weight + Thermal)	75	30	20	25
	Occasional (Weight + Thermal + Seismic)	185	120	40	85
N52A	Normal (Weight + Thermal)	75	30	20	25
	Occasional (Weight + Thermal + Seismic)	185	120	40	85
N53A	Normal (Weight + Thermal)	75	30	20	25
	Occasional (Weight + Thermal + Seismic)	185	120	40	85
N54A	Normal (Weight + Thermal)	75	30	20	25
	Occasional (Weight + Thermal + Seismic)	185	120	40	85



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Process Conditions (Ref 2 unless noted otherwise)

Process Condition	Operating			Remarks
	Unit	Normal	Max.	
INLET OFFGAS, Nozzle N01				
Flow Type		Continuous	Continuous	
Phase		Gas	Gas	
Actual Flowrate	ACFM	8322	9803	
Temperature	°F	370	412	
Pressure	Inches water gage	-111	-135	-135 in wg = -4.9 psig
Volumetric Process Concentration				
N ₂	Vol %	70	70	
O ₂	Vol %	18	18	
H ₂ O	Vol %	10	11	
CO ₂	Vol %	1	1	
Ar	Vol %	1	1	
Process Concentration				
Organic	lb/hr	6.20E-02	1.29E-01	
H ₂ O	lb/hr	1.03E+03	1.17E+03	
CO	lb/hr	3.50E-01	1.20E+00	
CO ₂	lb/hr	2.94E+02	3.71E+02	Ref 29
HCl	lb/hr	1.49E-02	1.89E-02	Ref 29
HF	lb/hr	2.92E-03	7.37E-03	Ref 29
NH ₃	ppmv	251	339	Ref 29
NO	lb/hr	6.58E-01	9.35E-01	
NO ₂	lb/hr	8.73E-01	1.73E+00	
SO ₂	lb/hr	6.95E-02	1.35E-01	
SO ₃	lb/hr	1.39E-05	1.57E-05	Ref 29
OUTLET OFFGAS, Nozzle N02				
Flow Type		Continuous	Continuous	
Phase		Gas	Gas	
Actual Flow rate	ACFM	6894	8156	
Temperature	°F	122	122	
Pressure	Inches water gage	-124	-154 (Ref 27)	-154 in wg = -5.6 psig
CONDENSATE DISCHARGE, Nozzle N03				
Flow Type		Continuous	Continuous	
Phase		Liquid	Liquid	
Actual Flow rate (note 7)	gal /min	200	200	
Pressure	Inches water gage	-111	-135	
Viscosity	cP	0.43	0.43	
pH (note 7)				



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Process Conditions (Ref 2 unless noted otherwise)

Process Condition	Operating			Remarks
	Unit	Normal	Max.	
CONDENSATE RECIRCULATION, Nozzle N04				
Flow Type		Continuous	Continuous	
Phase		Liquid	Liquid	
Actual Flow rate (note 7)	gal/min	200	200	
Temperature	°F	122	122	Equilibrium with outlet offgas
Pressure	psig	44	44	
Viscosity	cP	0.43	0.43	
pH (note 7)				
QUENCH INLET SPRAY, Nozzles N07A thru D (note 5)				
Actual Flow rate (liquid) per nozzle (note 7)	gal/min	1.5	2.2	
Liquid pressure (at vessel nozzle) (note 7)	psig	58	58	Ref 25
PSW wash supply temperature	°F	60	60	Ref 28
Actual Flow rate (air) per spray nozzle (note 7)	std ft ³ /min	26	36	
Air pressure (at vessel nozzle) (note 7)	psig	60	60	
Demister Wash, Nozzles N51-N54 & N51A-N54A				
Wash Frequency (note 7)	Weeks	1	1	
Wash Duration (note 7)	Minutes	5	5	
Wash Flow Rate, per spray nozzle (note 7)	gal/min	4	4	
Wash Supply Press., at vessel nozzle (note 7)	psig	40	45	Ref 25
PSW wash supply temperature	°F	60	60	Ref 28
Packing Wash Lower, Nozzle N06				
Wash Frequency (note 7)	Weeks	1	1	
Wash Duration (note 7)	Minutes	5	5	
Wash Flow Rate, per spray nozzle (note 7)	gal/min	4	4	
Wash Supply Pressure, at vessel nozzle (note 7)	psig	40	49	Ref 25
PSW wash supply temperature	°F	60	60	Ref 28

Design	Unit	Criteria
Design Basis minimum removal efficiency	%	97 (Ref 14)
Design Basis Component		SO _x (SO ₂ + SO ₃)
Maximum Flooding	%	60 (Ref 14)
Packing Height Contingency	%	10



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PROCESS WATER (PSW)			
PSW Source		Domestic water (DOW) provided by DOE. (Ref 19)	
Water Quality Summary: (Ref 20)			
Constituents -	Annual Average Value -	Seasonal / Design Average Value -	Units -
Carbon tetrachloride	< 1	N/A	µg/L
Methylene chloride	< 1	N/A	µg/L
Bromoform	< 0.5	< 0.5	µg/L
Bromodichloromethane	2.1	3.3	µg/L
Chloroform	37	61	µg/L
Dibromochloromethane	< 0.5	< 0.5	µg/L
Total trihalomethanes	43	65	µg/L
Bis(2-ethylhexyl) phthalate	< 1	N/A	µg/L
Metals -			
Arsenic	0.58	N/A	µg/L
Cadmium	0.026	N/A	µg/L
Chromium	0.12	N/A	µg/L
Lead	0.048	N/A	µg/L
Mercury	0.00033	N/A	µg/L
Iron	20	N/A	µg/L
Manganese	< 10	N/A	µg/L
Anions -			
Chloride	3.4	N/A	mg/L
Nitrate	0.11	0.14	mg/L as N
Sulfate	26	N/A	mg/L
Other Analyses -			
Total Dissolved Solids	100	120	mg/L
pH	7.0	N/A	S.U.
Radionuclides -			
Gross Alpha	0.51	N/A	pCi/L
Gross Beta	0.49	N/A	pCi/L
Tritium	154.7	N/A	pCi/L

Process Condition Notes:

- (1). Deleted
- (2). Deleted
- (3). Deleted
- (4). Deleted
- (5). Cooling duty from vaporization of process service water sprayed into scrubber column.
- (6). Deleted
- (7). Supplier to verify or supply for operating conditions.



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET
LAW Melter Offgas Caustic
Scrubber

PLANT ITEM No.

24590-LAW-MK-LVP-SCB-00001

Data Sheet No.

24590-LAW-MKD-LVP-00011

Rev.

6

Approvals

Rev	Description	System Engr	Vessel Engr	Checked	Approved	Date
6	The purpose of this revision is to update the revision of Ref 6 Corrosion Evaluation to support IQRPE. Other reference revisions are updated also. Incorporated SDDR 24590-WTP-SDDR-MS-15-00008 via change to Note 19. Changes to nozzle loads and nozzle elevations on this MDS rev have already been analyzed in the structural/seismic analysis, therefore this datasheet revision does not impact margin.	Mike O'Neill <i>[Signature]</i>	Cathy Christianson <i>[Signature]</i>	Jim Marsh <i>[Signature]</i>	Prabhu Rajagopalan <i>[Signature]</i>	7/30/2015

Approvals

Safety Screening / Evaluation Required? If yes per 24590-WTP-GPP-SREG-002, E&NS signature required below.						Yes X	No
Rev	Description	System Engr	Vessel Engr	Checked	E&NS	Approved	Date
5	Revised Vessel Max Operating Temperature to align with Design Basis Flowsheet and not take credit for quenching or caustic recirculation affects on temperature; revised cyclic data; revised Notes; updated References; used PIBOD values where bounding to Ref 2 flowsheet values for offgas constituents; misc clarification changes. Changes that impact margin are addressed in calculations 24590-LAW-MEC-LVP-00003 Rev 1 and 24590-LAW-MKC-LVP-00004 Rev 1.	M. O'Neill	Cathy Cory AC	Paul Meeuwssen	J. Hinckley	Dan Cragin for P. Omel	9/25/13
4	Incorporate TCNs 24590-QL-MRA-MKAS-00003-T0009 and -T0010 - no rev bars shown. Rev bars shown for other changes: updated pressures & temperatures; updated insulation, nozzle locations, and diagram per DCN 24590-LAW-M6N-LVP-00092; added material requirement for top head gasket; updated bolting material for nozzle and top head flanges; updated cyclic data per ECCN 24590-WTP-MVE-50-00012; updated notes.	M. O'Neill	C. Cory	J. Marsh	D. Krahn	P. Omel	8/7/13



River Protection Project
Waste Treatment Plant

MECHANICAL DATA SHEET
LAW Melter Offgas Caustic
Scrubber

PLANT ITEM No.
24590-LAW-MK-LVP-SCB-00001

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3	Incorporate TCNs 24590-QL-MRA-MKAS-00003-T0001, -T0003, -T0004, and -T0008 - no rev bars shown. Rev bars shown for all other changes: added Attachment 1 for References; revised corrosion allowance for internal components; clarified material req'd for lower section gaskets; updated cyclic data; revised Notes; updated sketch; revised service description of some nozzles; updated process conditions.	M. O'Neill	C. Priest	R. Flieger	D. Krahn	D. Mildon	9/26/12
2	Extensive revisions to Design, Operating and Process specifications per revised LAW Melter Offgas System Design Basis Flowsheets calc 24590-LAW-M4C-LOP-00001, Rev 2A. No change bars or revision triangles used to identify changes.	M. O'Neill	J. Czarnecki	Ray Peters	D. Krahn	J. Julyk	12/22/09
1	The data sheet was generally revised and up dated to incorporate information provided by the supplier. New information added: Equipment support changed to Leg Design, Ap= 2.5 for seismic design, nozzle loads, equipment cyclic data, caustic scrubber outline updated to add maint platform and upper lateral restraint, removed the embed layout arrangement, and added HEME & Packing wash.	P. Martinelli	D. Rickettson	D. Reinemann	D. Krahn	J. Julyk	5/10/07
0	Revised design temperature, pressure drop and process requirements.	S. Sourani	D. Pease	S. Sweeney	N/A	M. Hoffmann	3/17/05

Attachment 1 - References for Mechanical Datasheet 24590-LAW-MKD-LVP-00011 Rev 6 (for internal reference)

Page 1 of 1

Ref#	Document number	Doc rev	Document Title
1	24590-LAW-M6-LVP-00002002	0	P&ID-LAW - LAW Secondary Offgas / Vessel Vent Process System Caustic Scrubber LVP-SCB-00001
2	24590-LAW-M4C-LOP-00001	3	LAW Melter Offgas System Design Basis Flowsheets
3	24590-WTP-DB-PET-09-001	1	Process Inputs Basis of Design, page B-22, stream LVP17
4	24590-LAW-MEC-LVP-00003	1	Design Pressure and Design Temperature Calculation for LVP System
5	24590-WTP-GPG-M-050	2A	Pressure Vessel and Heat Exchanger Design
6	24590-LAW-N1D-LVP-00001	7	LVP-SCB-00001 - Corrosion Evaluation
7	CCN 263548	NA	Nozzle Design Loads for LAW LVP-SCB-00001 (This CCN Supersedes CCN 261004)
8	24590-WTP-3PS-MV00-T0001	4	Engineering Specification for Pressure Vessel Design and Fabrication
9	24590-WTP-3PS-MV00-T0002	3	Engineering Specification for Seismic Qualification Criteria for Pressure Vessels
10	24590-WTP-3PS-FB01-T0001	5	Engineering Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks
11	24590-LAW-MKQ-LVP-00001	1	Equipment Qualification Datasheet for LAW Melters Offgas Caustic Scrubber
12	24590-WTP-3PS-NN00-T0001	3	Thermal Insulation for Mechanical Systems
13	24590-WTP-MVC-50-00009	0	LAB, BOF, and LAW Vessel Cyclic Datasheet Inputs
14	24590-LAW-3PS-MKAS-T0001	2	Engineering Specification for LAW Melter Offgas Caustic Scrubber
15	24590-WTP-MV-M59T-00016001	3	Vessel Connections Standard Details Sheet 1 of 3
16	24590-WTP-MV-M59T-00016002	2	Vessel Connections Standard Details Sheet 2 of 3
17	24590-WTP-MV-M59T-00016003	1	Vessel Connections Standard Details Sheet 3 of 3
18	Deleted		
19	24590-WTP-DB-ENG-01-001	002	Basis of Design
20	CCN 075108	NA	Potable Water Quality for NLD Effluent Characterization
21	24590-QL-POA-MKAS-00003-06-00001	00E	Calculation - LAW Melter Offgas Caustic Scrubber Process
22	Deleted		
23	Deleted		
24	Deleted		
25	24590-LAW-M6C-PSW-00001	1	LAW Process Service Water Distribution Line Calculation
26	24590-LAW-MKC-LVP-00004	1	LAW Caustic Scrubber Process Operating Conditions and Design Requirements
27	24590-LAW-M6C-LVP-00004	1	Offgas Pipe and Exhauster Sizing for LOP and LVP Systems
28	24590-BOF-M6C-PSW-00002	1	BOF PSW Design Pressure/Temperature Calculations for Pipeline and Valve List Support
29	24590-WTP-M4C-V11T-00012	2	Calculation of Process Stream Properties for the WTP, Attachment C