MEG ENERGY	CHRISTINA LAKE REGIONAL PROJECT Phase 3A EPC for Central Plant Facilities SLI Project No. 511036	SNC·LAVALIN

SNC·LAVALIN		
Vendor's drawing review for conformity with specifications and design drawing.	☐ A1	Not suitable to initiate fabrication. modify as noted, resubmit for review
This review does not relieve the vendor of his responsibility for errors in design and detailing as detailed in his contract.	☐ B1	Suitable to initiate fabrication as noted. modify as noted, resubmit for review
	☐ C1	Suitable to fabricate to completion as noted. submit final documents including as-builts as required
	☐ D1	Suitable to fabricate to completion. submit final documents including as-built documents as required
	☐ E1	Not suitable as final documents as noted. modify as noted and resubmit.
	☒ F1	Suitable as final documents. no further resubmittal required (unless revised by vendor)

Vendor: Heat Exchanger Design, Inc. - 12427	No.: TSS4565A (Case 2)	Rev: 1	Date Rec'd 2013/10/30
Doc. Title: D00.01 - Thermal Data Sheet - Tag: 3A-E-144			
Client Code:	Project: MEG Phase 3A EPC		
Reviewed by: Ricardo	Document No		Submittal
Date: Nov. 13, 2013	P-5330-01-0012		03

Heat Exchanger Design, Inc.

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HEAT EXCHANGER SPECIFICATION SHEET

		Job No.	4565A
Customer	MEG Energy Corp.	Reference No.	PO# P-5330-01
Address		Proposal No.	111-13
Plant Location	Christina Lake, AB	Date	8/19/2013 Rev 3
Service of Unit	DILUENT RECOVERY / GLYCOL EXCHANGER	Item No.	3A-E-144 (Minimum Duty Case)
Size 460 x 19 x 7620mm	Type **SH18B230-25-02-SS-6B8A**	Horz.	Conn. In 1 Parallel 2 Series
Surf/Unit (Gross/Eff) 448.14 / 446.75 m2	Shell/Unit 2	Surf/Shell (Gross/Eff) 224.07 / 223.38 m2	

PERFORMANCE OF ONE UNIT

Fluid Allocation		Shell Side		Tube Side	
Fluid Name		TEG / H20 (60/40 wt%)		Diluent Vapour	
Fluid Quantity, Total	kg/hr	46041.9		14238.2	
Vapor (In/Out)				14237.7	
Liquid		46041.9	46041.9	0.4362	14238.2
Steam					
Water					
Noncondensables					
Temperature (In/Out)	C	40.00	99.60	117.20	50.00
Specific Gravity		1.0789	1.0316	0.9410	0.6184
Viscosity	mN-s/m2	4.6610	1.4460	0.0097 V/L 0.255	0.2212
Molecular Weight, Vapor					
Molecular Weight, Noncondensables					
Specific Heat	kJ/kg-C	3.2230	3.4360	2.1179 V/L 4.419	2.5620
Thermal Conductivity	W/m-C	0.3276	0.3392	0.0238 V/L 0.684	0.1053
Latent Heat	kJ/kg			2261.41	1793.55
Inlet Pressure	kPa	994.002		534.000	
Velocity	m/s	0.31		3.97	
Pressure Drop, Allow/Calc	kPa	70.000	46.987	75.000	15.400
Fouling Resistance (min)	m2-K/W	0.000180		0.000350	

Heat Exchanged MegaWatts 2.5397 MTD (Corrected) 15.5 C

Transfer Rate, Service 366.66 W/m2-K Clean 632.87 W/m2-K Actual 451.81 W/m2-K

CONSTRUCTION OF ONE SHELL

Sketch (Bundle/Nozzle Orientation)

			Shell Side	Tube Side
Design/Test Pressure		kPaG	1500/FV / Code	1155/FV / Code
Design Temperature		C	-28.9 / 178	-28.9 / 178
No Passes per Shell			1	1
Corrosion Allowance		mm	3.2	6.4 (CS components)
Connections Size & Rating	In	inch	6" 300# RFWN	8" 150# RFWN
	Out	inch	6" 300# RFWN	8" 150# RFWN
	Intermediate			

Tube No. 230 OD 19.050 mm	Thk(Avg) 1.651 mm	Length 7.620 m	Pitch 23.813 mm Layout 60
Tube Type Plain		Material	SA-213-316L
Shell	SA-106 B 457.2mm OD	Shell Cover	SA-516-70N
Channel or Bonnet	SA-240-316L (Note 6)	Channel Cover	N/A
Tubesheet-Stationary	SA-240-316L	Tubesheet-Floating	N/A
Floating Head Cover	N/A	Impingement Plate	None

Baffles-Cross	SS304	Type SINGLE-SEG. (Vert.)	%Cut (Diam) 36.00	Spacing(c/c) 304.801	
Baffles-Long	N/A		Seal Type		
Supports-Tube	SS304		U-Bend	Type	
Bypass Seal Arrangement			Tube-Tubesheet Joint	Seal Welded & Expanded (two grooves)	
Expansion Joint			Type		
Rho-V2-Inlet Nozzle	kg/m-s2		Bundle Entrance	Bundle Exit	kg/m-s2
Gaskets-Shell Side	Kammpro Type		Tube Side	Kammpro Type	
-Floating Head	N/A				
Code Requirements	ASME Section VIII, Div. I			TEMA Class	
Weight/Shell 5760.4	Filled with Water 7950.25			Bundle 2889.14	kg

Remarks: 1. This is HED's standard separated head Hairpin Exchanger with independent bolting. 2. 50mm thick mineral wool insulation is included. 3. Glycol heat tracing for 10°C hold temperature is included. 4. 10% overdesign in surface has been provided. 5. Tube-to-tubesheet welding procedures shall be qualified and tested in accordance with ASME Section IX, QW-193. 6. Tubeside is in sour service, and 100% RT and NACE materials are required. 7. Channel changed to 316L SS to avoid PWHT requirements. 8. U-bends are solution annealed.