

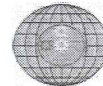
 MEG ENERGY	CHRISTINA LAKE REGIONAL PROJECT Phase 3A EPC for Central Plant Facilities SLI Project No. 511036	 SNC-LAVALIN

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Vendor's drawing review for conformity with specifications and design drawing.													
This review does not relieve the vendor of his responsibility for errors in design and detailing as detailed in his contract.													
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Client Code:	Project: MEG Phase 3A EPC												
Reviewed by: <i>Aus de</i> Date: <i>Nov 13, 2013</i>	<table border="0" style="width: 100%;"> <tr> <td>Document No P-5330-01-0011</td> <td>Submittal 03</td> </tr> </table>	Document No P-5330-01-0011	Submittal 03										
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Heat Exchanger Design, Inc.



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HEAT EXCHANGER SPECIFICATION SHEET										Page 1
Customer MEG Energy Corp.				Job No. 4565A						
Address				Reference No. PO# P-5330-01						
Plant Location Christina Lake, AB				Proposal No. 111-13						
Service of Unit DILUENT RECOVERY / GLYCOL EXCHANGER				Date 8/19/2013		Rev 3				
Size 460 x 19 x 7620mm Type SH18B230-25-02-SS-6B8A				Item No. 3A-E-144 (Maximum Duty Case)						
Surf/Unit (Gross/Eff) 448.14 / 446.74 m2				Shell/Unit 2		Surf/Shell (Gross/Eff) 224.07 / 223.37 m2				
PERFORMANCE OF ONE UNIT										
Fluid Allocation			Shell Side			Tube Side				
Fluid Name			TEG / H2O (60/40 wt%)			Diluent Vapour				
Fluid Quantity, Total kg/hr			45843.2			15170.4				
Vapor (In/Out)						15169.9 223.005				
Liquid			45843.2			0.4693 14947.4				
Steam										
Water										
Noncondensables										
Temperature (In/Out) C			40.00 110.90			126.10 50.00				
Specific Gravity			1.0789 1.0215			0.9339 0.6429				
Viscosity mN-s/m2			4.6610 1.2490			0.0102 V/L 0.2361 0.0108 V/L 0.2685				
Molecular Weight, Vapor										
Molecular Weight, Noncondensables										
Specific Heat kJ/kg-C			3.2230 3.4760			2.1119 V/L 4.443 1.9170 V/L 2.580				
Thermal Conductivity W/m-C			0.3276 0.3400			0.0248 V/L 0.686 0.0262 V/L 0.113				
Latent Heat kJ/kg						2147.35 373.794				
Inlet Pressure kPa			994.002			534.000				
Velocity m/s			0.31			5.10				
Pressure Drop, Allow/Calc kPa			70.000 46.079			75.000 19.858				
Fouling Resistance (min) m2-K/W			0.000180			0.000350				
Heat Exchanged MegaWatts 3.0597			MTD (Corrected)			15.6 C				
Transfer Rate, Service 437.93 W/m2-K			Clean 703.47 W/m2-K			Actual 487.95 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			In inch 6" 300# RFWN		8" 150# RFWN					
Size & Rating			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.										
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