

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

 SNC-LAVALIN	<table> <tr> <td><input type="checkbox"/> A1</td> <td>Not suitable to initiate fabrication. modify as noted, resubmit for review</td> </tr> <tr> <td><input type="checkbox"/> B1</td> <td>Suitable to initiate fabrication as noted. modify as noted, resubmit for review</td> </tr> <tr> <td><input type="checkbox"/> C1</td> <td>Suitable to fabricate to completion as noted. submit final documents including as-builts as required</td> </tr> <tr> <td><input checked="" type="checkbox"/> D1</td> <td>Suitable to fabricate to completion. submit final documents including as-built documents as required</td> </tr> <tr> <td><input type="checkbox"/> E1</td> <td>Not suitable as final documents as noted. modify as noted and resubmit.</td> </tr> <tr> <td><input type="checkbox"/> F1</td> <td>Suitable as final documents. no further resubmittal required (unless revised by vendor)</td> </tr> </table>	<input type="checkbox"/> A1	Not suitable to initiate fabrication. modify as noted, resubmit for review	<input type="checkbox"/> B1	Suitable to initiate fabrication as noted. modify as noted, resubmit for review	<input type="checkbox"/> C1	Suitable to fabricate to completion as noted. submit final documents including as-builts as required	<input checked="" type="checkbox"/> D1	Suitable to fabricate to completion. submit final documents including as-built documents as required	<input type="checkbox"/> E1	Not suitable as final documents as noted. modify as noted and resubmit.	<input type="checkbox"/> F1	Suitable as final documents. no further resubmittal required (unless revised by vendor)
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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.													

Vendor: Peerless MFG. Co. (Canada) - 11115	No.: 6720006-GA-2	Rev: 3	Date Rec'd
Doc. Title: H00.01, J00.01 - MP Steam Separator General Arrangement Sheet 2 - Tag: 3A-V-326			2012-12-03
Client Code:	Project: MEG Phase 3A EPC		
Reviewed by: <i>Shelton Morrison</i> Date: <i>5-Dec-12</i>	Document No P-5660-01-0037	Submittal 04	

DESIGN DATA				
DESIGN CODE		ASME SECTION VIII, DIVISION 1 2010 ED. A11		
CODE CASES		U STAMP REQUIRED		
TAG NO.	3A-V-326	ASSET NO.		
SERVICE		P.L.D. NO.		
DESCRIPTION	SEPARATOR	CUSTOMER PO.		
MANUFACTURER	HITACHI POWER SYSTEMS CANADA LTD.	MODEL NO.		
NO. REQUIRED	ONE	ITEM NO.		
ITEM NAME	MP STEAM SEPARATOR	HPSCA SERIAL NO.	6720006	
DESIGN CALC.	REV 3	TOTAL CAPACITY	78 m³	
VESSEL				
FLUID	STEAM			
DESIGN PRESSURE (INT.)	1950 kPag @ 214°C			
DESIGN PRESSURE (EXT.)	F.V. @ 214°C			
OP. PRESSURE (INT.)	1461 kPag @ 200°C			
OP. PRESSURE (EXT.)	UNKNOWN			
LIQUID LEVEL (HLL)	8544			
LIQUID SP. GRAVITY	1.0 (DESIGN FULL OF LIQUID)			
MDMT	-29°C @ 2000 kPag			
CORROSION ALLOW.	3.2 mm			
TEST PRESSURE (SHOP)	2600 kPag @ 5°C MIN.			
TEST PRESSURE (CORRODED)	2535 kPag @ 5°C MIN.			
MAWP (HOT & CORRODED)	2000 kPag @ 214°C			
MAP (COLD & NEW)	2410 kPag @ 5°C			
RADIOGRAPHY	100%			
JOINT EFFICIENCY				
	SHELLS 1.0			
	HEADS 1.0			
	NOZZLES 1.0			
SOUR SERVICE	NO			
LETHAL SERVICE	NO			
PWHT	NO			
IMPACT TEST	NONE			
MATERIALS				
	HEADS SA-516-70N			
	SHELLS SA-516-70N			
	PIPING SA-106-B			
	TAILING/LIFTING LUGS SA-516-70N			
	FITTINGS SA-234-WPB			
	FORGINGS SA-105N			
	REINF. PADS SA-516-70N			
	BOLTING SA-193-B7			
	NUTS SA-194-2H			
	ATTACHMENTS SA-516-70N			
	SUPPORTS SA-516-70N			
	GASKETS SPIRAL WOUND, 316L S.S. w/ GRAPHITE FILLER, S.S 316L INNER RING AND C.S OUTER RING			
EXTERNALS	JACKET	NO	TRAYS/PACKING	NO
	INSULATION TYPE	CALCIUM SILICATE	TRAYS/PACKING TYPE	NO
	INSUL. SUPPORTS	YES	VANE PACK	YES
	LIFTING/TAILING LUGS	YES	INLET Baffle	YES
	MANWAY DAVIT/RUNGS	YES	VORTEX BREAKER	YES
	TOP DAVIT	NO	INTERNAL COATING	NO
	FIREPROOFING TYPE	UNKNOWN	AGITATOR	NO
	FIREPROOFING CLIPS	NO	COIL	NO
	PLATFORMS	YES	SHOP PAINT	YES
	PLATFORM CLIPS	YES	FIELD PAINT	UNKNOWN
	PIPE SUPT CLIPS	YES	INSULATION/FIREPROOFING	YES/ NO
	LADDERS	YES	SEISMIC LOAD	YES
	LADDER CLIPS	YES	WIND LOAD	YES
	VESSEL SUPT TYPE	SKIRT	ESTIMATED WEIGHTS	
	HEATING COIL	NO	FABRICATION	31,000 kg
	GROUNDING LUG	YES	SHIPPING	33,000 kg
	CATHODIC PROT'N	NO	LIFTING	33,000 kg
	VACUUM RINGS	NO	OPERATING	134,000 kg
	BASE RING	YES	FULL OF WATER	134,000 kg

REFERENCE DOCUMENTS (GENERAL)		
(*) = PROPRIETARY/NOT SUBJECT TO CUSTOMER REVIEW		
TITLE	NUMBER	REV
PRESSURE VESSELS	085354-3010-PV-10	1
EQUIPMENT WELDING	085354-3010-EW-20	1
ALLOWABLE NOZZLE LOADS FOR MECH. EQUIP.	085354-4060-PS-001	1
GENERAL SPEC. FOR INSULATION	085354-3010-IN-00	2
SPEC. FOR PAINTING & PROTECTIVE COATING	085354-3010-PC-50	2
PROTECTION OF GOODS DURING SHIPMENT	085354-3010-PG-10	0
STRUCTURAL ENGINEERING CRITERIA	085354-3010-5000CS01	2
DESIGN OF STEEL STRUCTURES	085354-5010-5400CS01	2
FABRICATION OF STEEL STRUCTURES	085354-5010-5400CS02	2
ERECTION OF STEEL STRUCTURES	085354-5010-5400CS03	2
ELECTRICAL HEAT TRACING INSTALLATION	085354-6010-6118-02	1
WORK SITE STORAGE & EQUIPMENT PROTECTION	085354-3010-WS-15	1
SITE SPECIFIC ENVIRONMENTAL DATE	SP-CL03A-Q-050-0001	0

DOCUMENT LIST		
TITLE	DWG #	DESCRIPTION
VESSEL DETAILS	6720006-DE	VESSEL FABRICATION
NOZZLE ASSEMBLY	6720006-NOZ	NOZZLE SUB-ASSEMBLY FABRICATION
MANWAY DAVIT C	6720000-MD-C	24" MANWAY DAVIT FABRICATION
SKIRT	6720006-SK	SKIRT FABRICATION
SHIPPING SADDLE	6720006-SS	SHIPPING SADDLE FABRICATION
WELD PROCEDURE	6720006-WPS	WELD PROCEDURE SCHEDULE
PAINT CARD	6720006-STR	PAINTING PROCESS CARD
HEAT TRACE	6720006-EHT	HEAT TRACING DETAILS
HYDROTEST	6720006-HTC01	HYDROTEST PROCESS CARD

ALLOWABLE NOZZLE LOADS					
NOZZLE	FLANGE RATING	Pr (N)	Vc, Vi (N)	Mt (Nm)	Mc, Mi (Nm)
N3	300	6060	7425	8075	5710
N1A,N12	300	10665	13065	18830	13315
N1B,N2	300	16495	20200	31700	22415
MAXIMUM MOMENT AND SHEAR FORCE AT BASE					
SEISMIC	N-m MOMENT	1,717,100			
SEISMIC	N SHEAR	156,600			
MAXIMUM MOMENT AND SHEAR FORCE AT BASE					
WIND	N-m MOMENT	562,600			
WIND	N SHEAR	52,150			

GENERAL NOTES:

- ALL BUTT WELDS SHALL BE DOUBLE WELDED AND FULL PENETRATION WELDS UNLESS OTHERWISE SPECIFIED.
- ALL NOZZLE ATTACHMENT WELDS TO SHELL OR HEADS SHALL BE FULL PENETRATION WELDS AND WHERE ACCESSIBLE, BACK-GROUTING IS REQUIRED.
- ALL NOZZLE BOLT HOLES TO STRADDLE PRINCIPAL VESSEL CENTRELINES.
- ALL INTERNAL CONNECTIONS SHALL BE ROUNDED TO A 3.2 mm MINIMUM RADIUS.
- THE EXTERNAL PROJECTION OF A NOZZLE SHALL BE MEASURED FROM THE VESSEL OD TO THE FLANGE FACE.
- FABRICATION TOLERANCES SHALL COMPLY WITH ASME SECTION VII, DIV. 1, AND SPEC 085354-3010-PV-27.
- GASKETS SHALL BE 1/8" THICK 316SS SPIRAL WOUND, GRAPHITE FILLED WITH CARBON STEEL CENTERING RING AND 316L INNER RING.
- AFTER HYDROTEST, VESSEL SHALL BE THOROUGHLY DRAINED AND DRIED.
- ALL FLANGE FACES SHALL BE COVERED WITH 12 mm THICK WOOD, SECURED WITH A MINIMUM OF FOUR BOLTS AND SEALED WITH DUCT TAPE. ALL BUTT WELD FACES SHALL BE COVERED WITH A POLYURETHANE SHEET (SHRINK WRAP) AND SEALED WITH DUCT TAPE.
- SHOP INSTALL 2.5" (63.5mm) THICK CALCIUM SILICATE INSULATION WITH 0.5mm THK X 32mm (PITCH) X 6mm (DEPTH) CORRUGATED ALUMINUM CLADDING PER 085354-3010-IN-00.
- LADDER AND PLATFORM SUPPORTS AS PER CUSTOMER DESIGN.
- VESSEL TO BE CLEANED INSIDE AND OUTSIDE PRIOR TO SHIPMENT.
- BOTTOM HALF OF THE SEPARATOR AND BLOWDOWN LIQUID LINE SHALL BE ELECTRICAL HEAT TRACED FOR A HOLDING TEMPERATURE OF 10°C.
- SUPPLIED & SHIPPED LOOSE ANCHOR BOLT TEMPLATE, TO BE MARKED WITH TAG NUMBER AND LOCATIONS OF 0°, 90°, 180° & 270°.
- STRAIGHT LIFT IS REQUIRED ON TRUNNIONS.

NDE REQUIREMENTS:

- 100% RADIOGRAPHY IN ACCORDANCE WITH ASME SEC VIII DIV 1, UW-51 ON ALL PRESSURE CONTAINING BUTT WELDS.
- 100% MT OF ALL SKIRT, SHELL, TRUNNION, TAIL LUG ATTACHMENT WELDS.

WPS SCHEDULE:

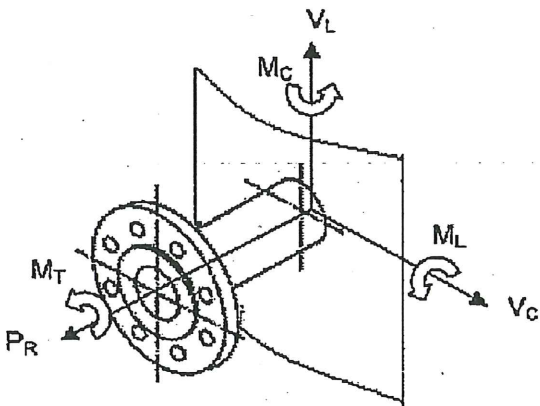
- FOR WELD NUMBERS AND PROCEDURES REFER TO WELD MAP 6720006-WPS.

ASSUMPTIONS & NOTES:

- LIFTING TRUNNIONS ARE USED AT THE TOP OF THE VESSEL. DUE TO LIMITATIONS IN THE SOFTWARE, THE TRUNNIONS HAVE LUGS ATTACHED TO THEM; THE ACTUAL TRUNNIONS WILL BE SHOWN IN THE DRAWINGS WITHOUT THE LUG. THEREFORE ALL TRUNNION LUG CALCULATIONS ARE TO BE IGNORED.
- PRESSURE GRADIENT THROUGH THE VANE PACK IS UNKNOWN. ASSUME DESIGN PRESSURE WILL ACCOUNT FOR THE PRESSURE GRADIENT.
- LADDER AND PLATFORM WEIGHTS ARE CALCULATED USING THE FOLLOWING VALUES: GRATINGS AT 730 kg/m² (TO ACCOUNT FOR NBC LOADINGS), RAILING AT 175N/m AND NO LADDERS. AS PLATFORMS WILL INTERFERE WITH TAIL LUG RIGGING, ASSUME VESSEL IS LIFTED WITHOUT PLATFORMS.
- INSULATION DENSITY IS ASSUMED TO BE 200 kg/M³ WITH CLADDING. ASSUME NO FIREPROOFING.
- FOR WIND LOAD CALCULATIONS: ASSUME BASE IS AT GRADE. PRESSURE COEFFICIENT USED IS (AS SUPPLIED BY CUSTOMER), EXPOSURE CATEGORY A WITH IMPORTANCE FACTOR (Iw) OF 1.15.
- VESSEL DESIGNED FULL OF LIQUID. LIQUID SPECIFIC GRAVITY IS 1.0.
- FOR SEISMIC CALCULATIONS: SA(0.2)=0.12, SA(0.5)=0.056, SA(1.0)=0.023, SA(2.0)=0.006, I=1.3, SITE CLASS=D, R=1, R=1, FA=1.3, FV=1.4.
- AS TAIL IS ATTACHED TO BASE RING, WRC CALCULATION IS TURNED OFF. AS IT WILL NOT TAKE INTO ACCOUNT THE BASE RING, BENDING STRESS OF THE BASE RING IS CHECKED INSTEAD.
- AS VANE PACK WEIGHT IS UNKNOWN, IT IS ASSUMED TO BE 2000KG FOR LOADING PURPOSES.
- SPEC CALLS FOR ONE ADDITIONAL VESSEL DIAMETER TO BE ADDED TO THE TOP OF THE VESSEL FOR WIND LOADING. AS OUR SOFTWARE DOES NOT ALLOW THIS WITHOUT CHANGING THE PHYSICAL DIMENSIONS AND WEIGHT OF THE VESSEL, THE EXTRA AREA WAS ADDED AS DIAMETER.

MATERIAL NOTE:

- SA-516-70N-H7 DENOTES THE FOLLOWING SPECIAL MATERIAL REQUIREMENTS:
- MATERIAL MUST CONFORM TO SA-516-70.
 - MATERIAL SHALL BE IMPACT TESTED AT -45 DEG C (-49 DEG F) TO CSA W59.
 - MATERIAL SHALL BE NORMALIZED.



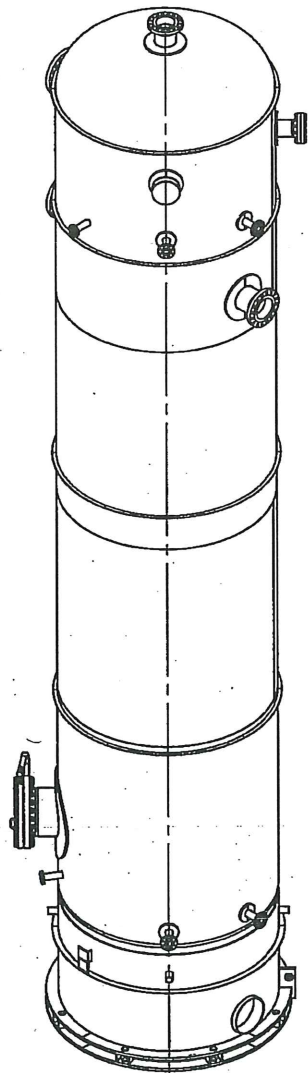
CERTIFIED BY:
Hitachi Power Systems Canada Ltd.

W MAWP 2000 kPag @ 214 DEG C
RT-1 MAEP FV kPag @ 214 DEG C
MDMT -29 DEG C @ 2000 kPag

SERIAL NO. 6720006 YEAR BUILT 2013

CRN
TAG. NO. 3A-V-326 P.O. NO.
SERVICE NAME MP STEAM SEPARATOR
SHELL MTL. SA-516-70N SHELL THK. 25.4 mm
HEAD MTL. SA-516-70N HEAD THK. 25.4 mm
CORR. ALLOW. 3.2 mm VOLUME 78 m³
A#

NAMEPLATE 3



MAKING ENERGY SAFE,
EFFICIENT, AND CLEAN

ITEM	QTY	DESCRIPTION	MATERIAL	PART ID	DWG NO.
1	1	VESSEL DETAILS			6720006-DE
2	1	24" 300# MANWAY DAVIT			6720000-MD-C
3	24	STUD 1-1/2" UN X 9-1/4" LG	SA-193-B7	0401-03026	0401-03026
4	48	NUT HEX 1-1/2" UN	SA-194-2H	0404-01009	0404-01008
5	1	GASKET 24" 300# CG 316SS	SA-105N	0803-02049	0803-02049
6	1	BLIND FLS 8" 300# ANSI B16.5 RF	SA-193-B7	0302-042013	0302-042013
7	12	STUD 7/8" UNC X 5-3/4" LG	SA-194-2H	0404-01004	0404-01004
8	24	NUT HEX 7/8" UNC	SA-194-2H	0404-01004	0404-01004
9	1	GASKET 8" 300# CG 316SS	SA-240-316L	0803-02041	0803-02041
10	1	HCI NAMEPLATE, 3.2 THK.	SA-240-316L	6720006-NP	6720006-NP
11	1	PEERLESS NAMEPLATE	SA-240-316L		PEERLESS-NP

03	11/27/2012	- UPDATED CALCS REV NUMBER IN DESIGN DATA - UPDATED NAME PLATE - REVISED GENERAL NOTE 13
02	9/21/2012	- ADDED DRAWING NUMBERS TO NOZZLE SCHEDULE - REVISED NAMEPLATE ELEVATION AND MANWAY DAVIT HINGE LOCATION - REVISED REFERENCE DOCUMENTS TABLE - UPDATED GENERAL NOTE 14, NDE NOTES AND ADDED H7 MATERIAL NOTES - REVISED NAMEPLATE
01	8/19/2012	- REVISED ANCHOR BOLT SIZE - ADDED PROCESS NOZZLE LOAD CHART - ADDED WIND AND SEISMIC LOAD CHART - REVISED WEIGHTS AND NAME PLATE - ADDED GENERAL NOTE 15 AND ASSUMPTIONS NOTES - ADDED REV NUMBER TO REFERENCE DOCUMENT LIST
00	05/16/2012	- INITIAL DRAWING CREATION
REV	DATE	DESCRIPTION

REVISION HISTORY			
COPYRIGHT - HITACHI POWER SYSTEMS CANADA LTD. ALL RIGHTS RESERVED THE INFORMATION CONTAINED IN THIS DRAWING IS CONFIDENTIAL AND THE EXCLUSIVE PROPERTY OF HITACHI POWER SYSTEMS CANADA LTD. DELIVERY OF THIS DOCUMENT OR ANY COPY THEREOF OR DISCLOSURE OF SUCH INFORMATION TO UNAUTHORIZED PERSONS IS FORBIDDEN			
CUSTOMER	MEG ENERGY CORP.		
PROJECT NAME	CHRISTINA LAKE REGIONAL PROJECT - PHASE 3A		
MATERIAL REQ. NO.		EQUIP. NO.	3A-V-326
HITACHI Inspire the Next		MP STEAM SEPARATOR GENERAL ARRANGEMENT	
DRAWN: 11/27/12	DESIGNED: 11/27/12	JOB NO. 6720006	DRAWING NO. 6720006-GA
CHECKED: 11/27/12	APPROVED: 11/27/12	UNITS: MILLIMETERS	SHEET: 2 OF 2 REV. 03