

**Canadian Natural Resources Limited  
GENERAL PRESSURE VESSEL INFORMATION**

**Job # 10.113190**

<b>District: GP South</b>		<b>Skid No.</b>				
<b>Facility: Hamburg Water Injection</b>		<b>Location (LSD): 13-20-96-09 W6M</b>				
<b>Vessel Name &amp; Equipment Number: Line Heater</b>						
<b>Orientation: Horizontal</b>						
<b>Status: In Service</b>		<b>Regulatory Inspection</b>				
<b>PRESSURE VESSEL NAMEPLATE DATA</b>						
"A" or "G" or "S" (Sask.) or BC Registration Number. <b>A0504891</b>		CRN Number <b>D 4268.213</b>				
Vessel serial number: CB-13260		Size: 48 in x 16 ft				
Shell thickness: 6.4 mm		Shell material: SA-36				
Head thickness:		Head material: SA-36				
Tube wall thickness: S80 / S160		Tube material:				
Tube diameter: 3.5 OD		Tube length:				
Channel thickness:		Channel material:				
Design pressure	Shell: Atmos	Operating pressure	Shell:			
	Tubes: 21622 kPa (3136 psi) 11183 kPa (1622 psi)		Tubes:			
Design Temp.	Shell: 93°C	Operating temperature	Shell:			
	Tubes: 93°C		Tubes:			
X-ray: RT-1		Heat treatment: HT				
Code parameters: ASME B31.3		Joint efficiency (if on nameplate):				
Manufacturer: Larsen & D'amico Mfg Ltd.		Year built: 2006				
Corrosion allowance: 1.6 mm		Manway No				
<b>PRESSURE SAFETY VALVE NAMEPLATE DATA</b>						
Tag Number(s)	Manufacture	Model	Serial Number	Set Pressure	Capacity	Set Date
<b>Not required</b>						
CRN#	Serviced by	Block valve	Location	Size	Code Stamp	
<b>SERVICE CONDITIONS-INDICATE ALL THAT APPLY</b>						
Sweet X	Sour		Oil X	Gas X		Water
Amine	LPG		Condensate	Air		Glycol
Other (Describe):						

**Inspection Interval** \_\_\_\_\_ **PSV Service Interval** \_\_\_\_\_

(Determined by MIC in conjunction with Chief Inspector following guidelines of CNRL's Owner-User Inspection Program)

Reports reviewed and accepted by:

**Mechanical Integrity Coordinator** \_\_\_\_\_ **Date** \_\_\_\_\_

<b>External Inspection Items</b>	<b>G</b>	<b>F</b>	<b>P</b>	<b>N/A</b>	<b>Comments</b>
<b>Insulation</b> Verify sealed around manways, nozzles, no damage present, and there is no egress of moisture.	X				<b>Vessel shell is 90% insulated. No open or torn insulation all closures sealed.</b>
<b>External Condition</b> Assess paint condition, areas peeling, record any corrosion, damage, etc (record location, size and depth of corrosion or damage)	X				<b>Paint is in good condition, no exposed metal. No damage.</b>
<b>Leakage</b> Record any leakage at flanges, threaded joints, weep holes on repads, etc.	X				<b>No leaks found.</b>
<b>Skirt/ Saddle</b> Assess condition of paint, fire protection, concrete. Look for corrosion, buckling, dents, etc. Look at vessel surface area near supports. Verify no signs of leakage at attachment to vessel and attachment welds are acceptable. Ground wire attached?		X			<b>Vessel saddle is bolted to steel structure. No evidence of corrosion at skirt to shell – no leaks. Paint is in good condition-no exposed metal. No distortion. No buckles. Skid is welded to piling above ground level. Ground wire attached to skid.</b>
<b>Anchor Bolts</b> Hammer tap to ensure secure. Look for cracking in threads or signs of deformation.	X				<b>Anchor bolts are tight and secure to skid.</b>
<b>Concrete foundation</b> Check for cracks etc.				X	
<b>Ladder / Platform</b> Describe general condition, ensure support is secure to vessel, and describe any hazards.				X	
<b>Nozzle</b> Assess paint, look for leakage, and ensure stud threads are fully engaged. Record any damage, deflection, etc. Are nozzles gusseted?	X				<b>Threaded nozzle joints are fully engaged. Studs fully engaged to nuts – no short bolts. Nozzles are not gusseted. No damage. No deflections. Paint in good condition – no exposed metal.</b>
<b>Gauges</b> Ensure gauges are visible, working, no leakage, and suitable for range of MAWP/ Temp.	X				<b>Gauges are visible and working. No signs of leaks. Suitable for range of MAWP.</b>
<b>External Piping</b> Ensure pipe is well supported. All clamps, supports, shoes, etc. in place. Look for evidence of structural overload, deflection, etc. Paint condition, external corrosion?	X				<b>Piping is well supported and clamps are in place. Paint is in good condition. No evidence of structural overload or deflection.</b>
<b>Valving</b> Ensure no leaks are visible. Valves are properly supported and chained if necessary.	X				<b>No leaks found. Valving is properly supported</b>
<b>PSV</b> Ensure PSV is set at pressure at or below that of vessel. Discharge piping is same size as inlet to valve and is properly supported and routed. Ensure no block valves between psv and vessel or if there are they are locked open.				X	<b>Not required</b>
<b>NDE methods</b> Was UT/ MPI done on vessel (MI coordinator to review results)	X				<b>Ultrasonic thickness survey carried out – no metal thickness detected below nominal minus corrosion allowance.</b>
<b>Other</b>					
<b>Recommendations or corrective actions : Vessel is Fit for Service or describe corrective actions required)</b> (MIC to review corrective actions with Operations, discuss with Chief Inspector where necessary, and get remedial action implemented) <b>Recommendations:</b> No recommendations at this time. <b>Summary:</b> Vessel is in overall good condition, visual external inspection and ultrasonic corrosion survey performed – no metal thickness detected below nominal minus corrosion allowance. <b>Vessel is fit for service.</b>					

<b>Internal Inspection Items</b>	<b>G</b>	<b>F</b>	<b>P</b>	<b>N/A</b>	<b>Comments</b>
<b>Coating</b> Assess coating. Describe area coated, general condition of coating.				X	<b>None.</b>
<b>Anodes.</b> How many, type, condition. % consumed. Are they being replaced?				X	<b>None.</b>
<b>Internal Piping</b> Is there any? If so, carbon or stainless steel. Describe condition, dents, corrosion, erosion, etc. Ensure supports are secure and any bolts are suitable for future use.	X				<b>1 inch fuel gas preheat piping in good condition – No damage no corrosion.</b>
<b>Vortex Breaker</b>				X	<b>None.</b>
<b>Baffles, deflector plates, Weir.</b> If present, describe condition. Look closely at welds attached to vessel wall.	X				<b>None.</b>
<b>Float</b> Check for restricted movement	X				<b>None.</b>
<b>North Head</b> Note all corrosion, erosion or mechanical damage. (If vessel is horizontal identify direction of this head)	X				<b>Good condition – No damage, no corrosion.</b>
<b>South Head</b> Note all corrosion, erosion or mechanical damage. (If vessel is horizontal identify direction of this head)	X				<b>Good condition – No damage, no corrosion.</b>
<b>Shell Sections</b> Record number of shell sections. Record location, size and depth of all erosion, corrosion or mechanical damage. Describe general condition	X				<b>Two shell section in good condition. No pitting. No damage. No corrosion. Loose product deposits at 12:00 shell.</b>
<b>Demister pad</b> Is it in place? Is it clean? If any corrosion is apparent in vessel, lift pad and check top head for corrosion.				X	<b>None.</b>
<b>Welds</b> Inspect all welds, including attachment welds. Record all service-related damages and if there is any discuss with Chief Inspector before closing.				X	<b>All welds are in good condition – no pitting, no corrosion.</b>
<b>Coil</b>	X				<b>Coil tubes are in good condition. No pitting. No corrosion.</b>
<b>NDE methods</b> Was UT/ MPI done on vessel (MI coordinator to review results)	X				<b>Ultrasonic thickness survey carried out on coil 3 inch return bends and inlet elbows – no metal thickness detected below nominal minus corrosion allowance.</b>
<b>Recommendations or corrective actions (indicate if fit for service)</b> <b>Recommendations:</b> No recommendations at this time. <b>Summary:</b> Vessel is in overall good condition, visual external, visual internal inspection and ultrasonic corrosion survey performed – no metal thickness detected below nominal minus corrosion allowance. <b>Vessel is fit for service.</b>					

**Inspected By:** Chris Maxsom

**Date:** June 28, 2013



LSD

Overview -Vessel



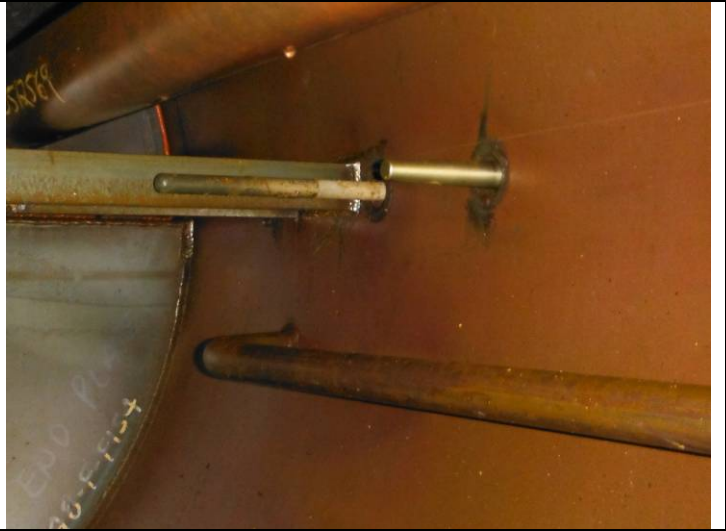
Data plate

Expansion tank and liquid level



Overview - Shell internal

Coil 3 inch return bends



**Top shell**

**Side shell and thermo wells**



**Overview - Tubes**

**South end plate**