

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

10.110899

District: Grande Prairie AB	Skid No.
Facility: Wembley Gas Gathering	Location (LSD): 14-31-73-09-W6M
Vessel Name Equipment Number: Line Heater	
Orientation: Horizontal	
Status: Not In service	Regulatory Inspection

PRESSURE VESSEL NAMEPLATE DATA

"A" or "G" or "S" (Sask.) or BC Registration Number. A0194884		CRN Number: F 6670.2	
Vessel serial number: 911558		Size: 66 in x 24 ft	
Shell thickness: 6.4 mm		Shell material: SA 36	
Head thickness: 6.4 mm		Head material: SA 36	
Tube wall thickness: 3 inch – 15.1 mm / 2 inch – 11.8 mm		Tube material: SA 333 Gr 6	
Tube diameter:		Tube length:	
Channel thickness:		Channel material:	
Design pressure	Shell: Atmospheric	Operating pressure	Shell:
	Tube: 23270 Kpa		Tubes:
Design Temp.	Shell : 93 deg C	Operating temperature	Shell:
	Tube : 93 deg C		Tubes:
X-ray: RT 1 – Gas Coil		Heat treatment: Yes – Gas Coil	
Code parameters: ASME VIII, Div 1		Coated: No	
Manufacturer: ABAX Energy Services		Year built: 1986	
Corrosion allowance: Not Stated		Man way: No – Fire tube access.	

PRESSURE SAFETY VALVE NAMEPLATE DATA

PSV Tag Shell	Manufacture / Model / Serial	Set Pressure (PSI / kPa)	Capacity (scfm / usgpm)	Size	Block Valve	Location	Service by / Date
PSV Tag Tube	Manufacture / Model / Serial	Set Pressure (PSI / kPa)	Capacity (scfm / usgpm)	Size	Block Valve	Location	Service by / Date

SERVICE CONDITIONS-INDICATE ALL THAT APPLY

Sweet	Sour X	Oil	Gas X	Water
Amine	LPG	Condensate X	Air	Glycol X

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** _____

Fill out all forms as completely as possible. All information is important! Use back of sheets to record additional information or sketch if required. Copy of report to be filed by MIC at site, and copy sent to Chief Inspector

External Inspection Items	G	F	P	N/A	Comments
Insulation Verify sealed around man ways, nozzles, no damage present, and there is no egress of moisture.	X				<ul style="list-style-type: none"> ▪ 80% cladded – Good condition, no open or torn sections.
External Condition Assess paint condition, areas peeling, record any corrosion, damage, etc (record location, size and depth of corrosion or damage)	X				<ul style="list-style-type: none"> ▪ 20% Painted – no exposed metal.
Leakage Record any leakage at flanges, threaded joints, weep holes on repads, etc.	X				<ul style="list-style-type: none"> ▪ No previous leakage noted – no stains.
Saddle Assess condition of paint, fire protection, and 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				<ul style="list-style-type: none"> ▪ Saddle: No mechanical damage noted – no apparent leaks at saddle to shell area – no wet insulation. ▪ Ground wire not attached to skid at this time – Line heater is located in lay down yard.
Anchor Bolts Hammer tap to ensure secure. Look for cracking in treads or signs of deformation.	X				<ul style="list-style-type: none"> ▪ Firmly bolted to skid. ▪ No cracking or deformation noted.
Concrete foundation Check for cracks, spalling, etc.				X	
Ladder / Platform Describe general condition, ensure support is secure to vessel, and describe any hazards.	X				<ul style="list-style-type: none"> ▪ Firmly attached to shell.
Nozzle Assess paint, look for leakage, and ensure stud threads are fully engaged. Record any damage, deflection, etc. Are nozzles gusseted?	X				<ul style="list-style-type: none"> ▪ All studs fully engaged to nuts – no short bolts. ▪ No gussets on nozzles. ▪ No damage or deflection noted – no leaks.
Gauges Ensure gauges are visible, working, no leakage, and suitable for range of MAWP/ Temp.	X				<ul style="list-style-type: none"> ▪ Pressure gauge: 0 to 5000 PSI. ▪ Temperature Gauge: minus 20 to 120 deg C. ▪ Both within range for service.
External Piping 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				<ul style="list-style-type: none"> ▪ Piping well supported, no deflection, all clamps and supports in place. ▪ Piping is painted – no exposed metal.
Valving Ensure no leaks are visible. Valves are properly supported and chained if necessary.	X				<ul style="list-style-type: none"> ▪ Well supported – no apparent leaks – not in service at this time.
PSV Ensure PSV is set at pressure at or below that of vessel.	X				<ul style="list-style-type: none"> ▪ Shell: Located on separator shell – set below MAWP of coils – currently out for servicing.
NDE methods Was UT/ MPI done on vessel (MI coordinator to review results)	X				<ul style="list-style-type: none"> ▪ Ultrasonic thickness inspection carried out on fire tube – min thickness 6.4 mm / nominal thickness is 6.4 mm. ▪ Ultrasonic thickness inspection carried out on stack – min thickness detected was 6.2 mm / nominal thickness is 6.4 mm. ▪ Magnetic Particle Inspection carried out on fire tube welds – no cracking detected – 1 gouge on flange of stack attachment flange – requires welding.
Fire Tube Identify and pitting or corrosion on external.	X				<ul style="list-style-type: none"> ▪ There are 2 small corroded areas at the ends of both fire and stack side at the 12:00 position from discharge to sled during operation – these areas are shallow – max depth is .020 inches.
<p>Recommendations or corrective actions: (MIC to review corrective actions with Operations, discuss with Chief Inspector where necessary, and get remedial action implemented) See internal inspection report for summary and recommendations.</p>					

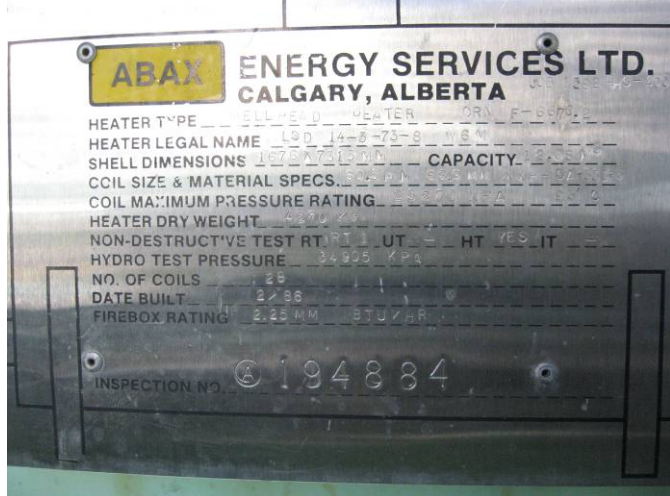
Internal Inspection Items	G	F	P	N/A	Comments
Coating Assess coating. Describe area coated, general condition of coating.				X	<ul style="list-style-type: none"> Heater is not coated.
Anodes. How many, type, condition. % consumed. Are they being replaced?				X	<ul style="list-style-type: none"> No anodes in heater
Internal Piping 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				<ul style="list-style-type: none"> 2 and 3 inch gas coil inside this line heater – no corrosion or pitting detected on external surface – no corrosion at baffles.
Trays How many? Type of material. Are valves in place. Check for erosion/ corrosion; wear on tray valve legs. Cleanliness?				X	<ul style="list-style-type: none"> No trays in vessel.
Baffles, deflector plates, etc. If present, describe condition. Look closely at welds attached to vessel wall.				X	<ul style="list-style-type: none"> No baffles or deflectors.
East Head Note all corrosion, erosion or mechanical damage. (If vessel is horizontal identify direction of this head)	X				<ul style="list-style-type: none"> No corrosion or pitting detected.
Fire tube Head Note all corrosion, erosion or mechanical damage. (If vessel is horizontal identify direction of this head)	X				<ul style="list-style-type: none"> No corrosion or pitting detected.
Shell Sections Record number of shell sections. Record location, size and depth of all erosion, corrosion or mechanical damage. Describe general condition. If any corrosion greater than corrosion allowance is observed in either shell or head, discuss with Chief Inspector before closing vessel.	X				<ul style="list-style-type: none"> (3) Shell sections. Shell is in good condition – light scaling in the vapor space from glycol starvation – no pitting.
Demister pad Is it in place? Is it clean? If any corrosion is apparent in vessel, lift pad and check top head for corrosion.				X	<ul style="list-style-type: none"> No demister pad present or required.
Welds Inspect all welds, including attachment welds. Record all service-related damages and if there is any discuss with Chief Inspector before closing.	X				<ul style="list-style-type: none"> All welds acceptable. No service related damages present.
Repairs Required. If yes, ensure procedure and copy of AB 40 is on file, and one sent to local ABSA, and Chief Inspector	X				<ul style="list-style-type: none"> No repairs required.
NDE Was any NDE done. (MI coordinator to review results)	X				<ul style="list-style-type: none"> Ultrasonic thickness inspection carried out on 2 inch and 3 inch gas coil return bends – no metal thickness detected below nominal minus 12.5% mill tolerance. 3 inch coil nominal thickness is 15.1 mm / min thickness is 14.8 mm. 2 inch coil nominal thickness is 11.8 mm / min thickness is 11.6 mm.
<p>Recommendations or corrective actions : Vessel is Fit for Service or describe corrective actions required) (MIC to review corrective actions with Operations, discuss with Chief Inspector where necessary, and get remedial action implemented) Recommendations: 1. Weld repair stack attachment flange – gouge from cutting bolts off. 2. Blend grind / buff corroded areas on 12:00 position of fire tube – see photos.</p> <p>Summary: This Line Heater is in good condition, visual external and internal carried out – light scaling in upper shell at 12:00 position – no measureable pitting. Ultrasonic thickness inspection carried out on gas coil – no thickness detected below nominal minus 12.5% mill tolerance. Ultrasonic thickness inspection carried out on fire tube and stack – no thickness detected below nominal minus 12.5% mill tolerance.</p> <p>Line Heater is fit for service</p>					

Inspected By: D. Wiedman



Date: Oct 15, 2011

Photo Table



Data Plate

Over view



Pressure Gauge

Temp Gauge

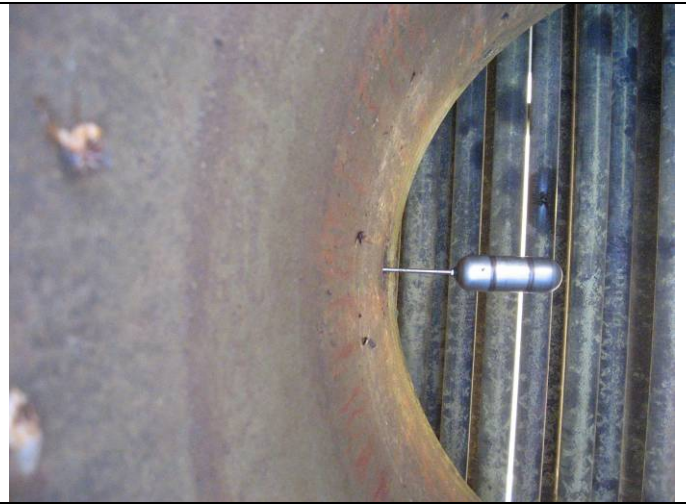


Over view

Saddle bolting to skid



Burner



Expansion tank over view and top side of tubes



Glycol low level float inside expansion tank



Fire tube access



Over view of internals



Gas coil return bends



Shell at 12:00 position – light scaling in vapor space – no measureable pitting.

Fuel gas preheat coil



Internal shell weld

Over view of head and gas coil supports



Gouge on inside area of stack attachment flange – to be welded.



Fire tube – stack side – corroded patch near mitered joints – max depth .020 inches.



Fire tube – burner side – corroded patch near mitered joints – max depth .020 inches.



Line heater stack.