

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

**Job: 10.113559**

District: <b>Fort St. John BC.</b>	Skid No.
Facility: <b>Graham Gas Plant</b>	Location (LSD): <b>c-76-K-94-B-08</b>
Vessel Name Equipment Number: <b>Glycol Contactor</b>	
Orientation: <b>Vertical</b>	
Status: <b>In Service</b>	<b>Regulatory Inspection</b>

**PRESSURE VESSEL NAMEPLATE DATA**

"A" or "G" or "S" (Sask.) or BC Registration Number. <b>A2987167</b>		CRN Number: <b>H5197.1</b>	
Vessel serial number: 93C-5080-01		Size: 42 in. X 36 ft. 6 in.	
Shell thickness: 50.8mm		Shell material: SA 516-70N	
Head thickness: 50mm		Head material: SA 516-70N	
Tube wall thickness:		Tube material:	
Tube diameter:		Tube length:	
Channel thickness:		Channel material:	
Design pressure	Shell: 1440 PSI	Operating pressure	Shell:
	Tubes:		Tubes:
Design Temp.	Shell: 120 Deg F.	Operating temperature	Shell:
	Tubes:		Tubes:
X-ray: RT 1		Heat treatment: HT	
Code parameters: ASME VIII Div 1		Coated: No	
Manufacturer: Alco Gas & Oil		Year built: 1994	
Corrosion allowance: 3.2mm		Manway: Yes	

**PRESSURE SAFETY VALVE NAMEPLATE DATA**

PSV Tag #	Manufacture / Model / Serial	Set Pressure (PSI / kPa)	Capacity (scfm)	Size	Block Valve	Location	Service by Date
					No	Lower Shell	

**SERVICE CONDITIONS-INDICATE ALL THAT APPLY**

Sweet	Sour X	Oil	Gas X	Water
Amine	LPG	Condensate	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** \_\_\_\_\_

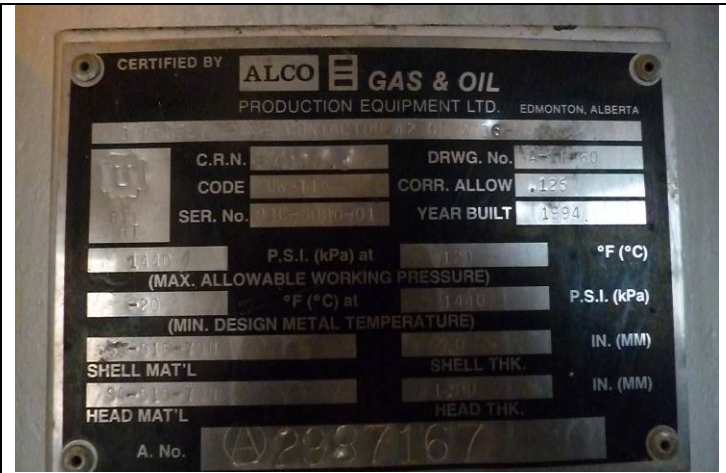
Fill out all forms as completely as possible. All information is important! Use back of sheets to record additional information or sketch if required.  
 Copy of report to be filed by MIC at site, and copy sent to Chief Inspector

<b>External Inspection Items</b>	G	F	P	N/A	<b>Comments</b>
<b>Insulation</b> Verify sealed around manways, nozzles, no damage present, and there is no egress of moisture.				X	<b>Vessel not insulated.</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 in good condition on saddles – no exposed metal.</b>
<b>Leakage</b> Record any leakage at flanges, threaded joints, weep holes on repads, etc.	X				<b>No leaks observed.</b>
<b>Saddle/skirt</b> 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				<b>Skirt: Bolted directly to skid floor. No buckling or dents. No corrosion at attachment welds to vessel. Ground wire attached to skirt.</b>
<b>Anchor Bolts</b> Hammer tap to ensure secure. Look for cracking in treads or signs of deformation.	X				<b>Vessel skirt bolted firmly to skid floor – no deformation.</b>
<b>Concrete foundation</b> Check for cracks, spalling, etc.				X	
<b>Ladder / Platform</b> Describe general condition, ensure support is secure to vessel, and describe any hazards.	X				<b>Bolted firmly to shell of vessel. No broken or loose sections. Paint in good condition. No exposed metal.</b>
<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>Flanged and threaded nozzle joints are fully engaged. No damage or deflections – no leaks. Nozzles are not gusseted.</b>
<b>Gauges</b> Ensure gauges are visible, working, no leakage, and suitable for range of MAWP/ Temp.	X				<b>Clear and clean- no leaks. Within operational range for service. Pressure gauge 0 – 3000 PSI.</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; no deflection, all clamps and supports are in place. Paint in good condition – no exposed metal.</b>
<b>Valving</b> Ensure no leaks are visible. Valves are properly supported and chained if necessary.	X				<b>Valves are supported properly – no leaks.</b>
<b>PSV</b> Ensure PSV is set at pressure at or below that of vessel.	X				<b>Location: Lower shell – PSV removed for service. No block valve between vessel and PSV. Discharge piping is same size as valve out let.</b>
<b>NDE methods</b> Was UT/ MPI done on vessel (MI coordinator to review results)	X				<b>Ultrasonic corrosion survey carried out April 2013 – pipe metal thickness detected below nominal minus corrosion allowance. Thickness calculations carried out: 2” Circ band – nominal thickness is 8.7mm / min thickness is 7.5mm / T min thickness is 2.1mm.</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. <b>Summary: See Internal 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	Vessel not coated.
<b>Anodes.</b> How many, type, condition. % consumed. Are they being replaced?				X	None.
<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				Piping in place – no dents or deflections. No corrosion or erosion.
<b>Trays</b> How many? Type of material. Are valves in place? Check for erosion/ corrosion; wear on tray valve legs. Cleanliness?	X				Top tray – in place no bent or loose sections caps in place. Mid section tray not bent – clips secure. Bottom down comer in good condition. Mid tray covered with water. Trays were not remove for inspection.
<b>Baffles, deflector plates, etc.</b> If present, describe condition. Look closely at welds attached to vessel wall.	X				Deflector plate welded to shell – no erosion.
<b>Top Head</b> Note all corrosion, erosion or mechanical damage. (If vessel is horizontal identify direction of this head)	X				Not viewed – demister pad in place.
<b>Bottom Head</b> Note all corrosion, erosion or mechanical damage. (If vessel is horizontal identify direction of this head)	X				Not viewed – no access.
<b>Shell Sections</b> 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				In good condition – product scale on surface- welds in good condition. Nozzles unobstructed. Tray attachment welds in good overall condition – no service related damage. Mane way attachment welds in good condition – no corrosion in man ways.
<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				Top demister pad and bottom demister pad – in place. No open or torn sections – top pad not clean – bottom pad clean. Support bars bolted securely.
<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				No corrosion or erosion noted. No service related damage. Welds in good condition.
<b>Repairs Required.</b> If yes, ensure procedure and copy of AB 40 is on file, and one sent to local ABSA, and Chief Inspector				X	
<b>NDE</b> Was any NDE done. ( MI coordinator to review results)					
<p><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)</p> <p><b>Recommendations: No recommendations at this time.</b></p> <p><b>Summary: This vessel is in good condition, visual external and ultrasonic thickness inspection carried out – pipe metal thickness detected below nominal minus corrosion allowance. Thickness calculations carried out to ensure sufficient metal exists for safe operation.</b></p> <p><b>Corrosion rate based on greatest thickness loss (nozzle) 0.026mm per year. Retirement Date to “T”min is year 2123.</b></p> <p><b>Vessel is fit for service.</b></p>					

Inspected By: Gerry Avery//D. Wiedman

Date: August 23, 2013



Vessel data plate



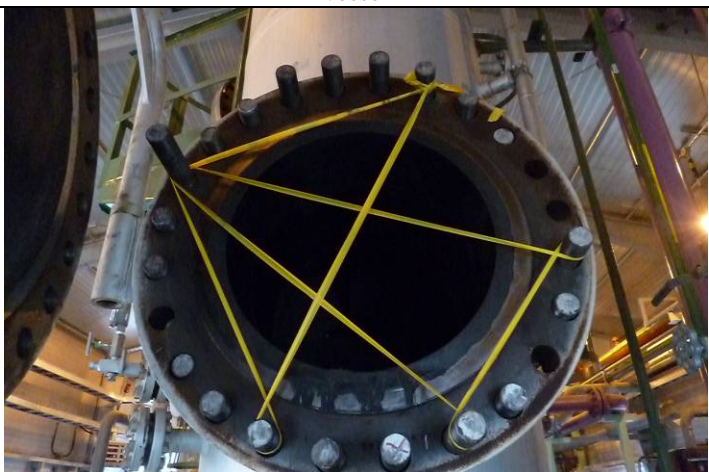
Pressure gauge



vessel



Vessel overview



Bottom man way



Bottom demister pad



Down comer attachment weld



Demister pad housing



View to bottom head



Inlet nozzle and deflector



Cover attachment weld to shell



Mid section man way



chimney



Bottom tray



Water at bottom chimney



Down comer



Top man way



Top demister pad



Top tray



Shell weld



Tray attachment weld



Shell scale