

## Field Inspection Report - Long\_Run 3162251\_11/06/2013\_VT\_Internal

<b>Vessel Number</b>	3162251	<b>Vessel Name</b>	GLYCOL REBOILER	<b>Province</b>	Alberta
<b>District</b>	NORTHERN - AB	<b>LSD</b>	03-26-074-01W6	<b>Location</b>	PUSKWASKAU
<b>Method</b>	VT	<b>Access</b>	Internal	<b>Cleaning</b>	Poor
<b>Inspection Date (mm/dd/yyyy)</b>	11/06/2013	<b>Inspection Interval (months)</b>	60	<b>Next Inspection (mm/dd/yyyy)</b>	11/06/2018
<b>CRN</b>	N1350.2	<b>Skid Number</b>	PKG62777	<b>Service</b>	
<b>Internal Access</b>	Yes	<b>Internal Coating</b>	No	<b>Status</b>	In Service
<b>MAWP (PSI)</b>	5	<b>MAWP (kPa)</b>	34.47	<b>Outstanding NCRs</b>	0
<b>MAWT (°C)</b>	260	<b>MAWT (°F)</b>	500		

### General

Reboiler was washed and cleaned for this 2013 outage.  
60 month interval assigned, but operations has requested a 12 month interval. If operations would like to clean and inspect in 12 month, please call. They have noted issues in the past years and choose to take it down each year for inspection. Previous issues are believed to be a nozzle replacement in 2010, and weld build-up of shell in 2011.

### Safety Valves

PSV NON-CODE Shell side. Set pressure: 5 PSI / 34.474 KPa. MAWP: 5 PSI / 34.47 KPa. Capacity: 0 SCFM / 0 m3/min.

PSV NON-CODE Tube side. Set pressure: 5 PSI / 34.474 KPa. MAWP: 170 PSI / 1172.12 KPa. Capacity: 0 SCFM / 0 m3/min.

### External Condition

All visible shell surfaces and nozzles appear in good condition. Name plate is intact and legible. Vessel supports, foundation, and electrical grounding appear good. External clad insulation requires repair as insulation and cladding was removed for disassembly. Associated piping, supports and components appear in good condition and alignment with no signs of leaks or defects present at the time of inspection. No evidence of short studding or nut rounding at time of inspection.

Reboiler section and still is insulated and requires repair as some was removed for disassembly. The accumulator section is painted with an expanded metal for personal protection attached and is in good condition.

Verify vessel has Alberta CRN and A# stamping.

There are no PSV's on this reboiler as shell is non-code and tubes are open to atmosphere VIA the heat medium heaters. There needs to be a study to ensure that the pumps can't exceed design pressure if a valve is

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closed or exchanger becomes plugged as well as there are to be carseals attached to these valves. Required to follow the new ABSA document AB525.

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### **Internal Condition**

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Glycol Reboiler, Top reboiler section and bottom accumulator section were opened and washed. Still column was removed. Bundle was removed and reboiler was found with little sludge on bottom. Reboiler Shell:

Bundle was removed allowing a visual inspection from opening. (East end). Product remains in the back of the shell around nozzle and lower section where the level is kept over the bundle. This product makes it difficult to make an assessment of the shell condition. It does appear to be product build-up with no material losses. The nozzle section for the bundle has previous weld build up around the circ. weld in the 9 to 11 O'clock position and the 1 to 3 position. Also found the top section of the nozzle where it opens to the larger section of the shell to be completely eroded out and has had weld build-up in this section to retain the fillet weld strength of the nozzle. See pictures. The bundle gasket surface has material losses of 0.060" on the inner edge of the gasket surface. The gasket surface itself is in good condition with no damage noted. Angle iron supports that run from the head to the rear of shell are secure and appear to have no damage. Circs, longs and Cat. D welds appear to be in good order as viewed from shell opening. Need to ensure level is over bundle and nozzle sections to help eliminate erosion of nozzle area.

#### **Bundle:**

3/4" x 105" long U-tube bundle with 4 passes and having 19 tubes/pass. Stainless steel tubes with carbon steel tube sheet, baffles and tie rods. No concerns with tube losses. There is some minor corrosion noted on the carbon steel surfaces, none of any concern. Tie rod nuts are a little loose as the nuts that are doubled have some losses as well as the baffle plates. Baffles are 47" apart and tube sheet is 2" thick. There appears to be no fretting of the tubes through the baffles, but some of these locations appear to be excessive in size compared to the tubes. Gasket surfaces are good. There is 4 tubes plugged in one pass on one end, assuming this is to assist in tube velocity through the tubes. Would recommend Pop-A-Plug as they are easily installed and removed.

#### **Channel Head:**

Partition plates show no signs of corrosion and are secure. Head is too small to have any beneficial MT completed on these partitions. Gasket surfaces are good, nozzle are free of obstructions. Insulation is acceptable

#### **Accumulator:**

Shell was hydro blasted from the opening once the coil was removed. Internal inspection was completed with entry through this end. Found a large amount of heavy build-up on the shell that could not be removed. Was able to scrape areas and determined that there is corrosion to the non-code shell in areas. The extent of corrosion is difficult to determine and recommend on going UT surveys. Welds and nozzles are in good condition. Gasket surface is in good condition with some minor mechanical damage.

SS coil section is attached to the closure. The SS coil is in good condition and is well supported with 3 support straps. This is a 3/4" coil that is coiled to a 20" diameter for 84". The SS coil is welded to a carbon steel closure plate; the weld in this location is seeing some corrosion at the SS to CS interface, but are of no concern at this point. The closure plate is etched, found this corrosion to be quite shallow.

#### **Still column:**

Was removed and disassembled, insulation requires repair. Heavy corrosion and deterioration noted on column internal surfaces and lower flange to re-boiler as well as the upper nozzle inner edge of gasket surface. Found

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the still column walls to have so many irregularities that you cannot determine remaining wall thickness and recommend UTT on shell from OD. The lower flange to re-boiler gasket surface is good, but the internal edge of sealing surface tapers to a knife edge in spots. There is 0.060" loss to the inner edge of the gasket surface on the top nozzle that drains to tank. The expanded metal ration ring support was thin and required replacing. Ration rings were replaced with new. All attachments are secure and gaskets are to be replaced. The SS heating coil in the still column is in good condition with no concerns. Glycol to be replaced with new.

### Recommendations

- Monitor the still column for further wall loss.
- Carseal inlet and outlet valves and review ABSA AB-525 requirements.
- Internally inspect again in 12 months as requested by operations due to previous operating and damage issues.
- Properly clean vessel shell, and bundle. Ensure tubes are cleaned thoroughly.
- Ensure level on the reboiler bundle is above nozzle assemble to help eliminate nozzle erosion.
- Pop-A Plug for exchanger tube plugging. Call the Pickford Group for details and search Pop-A Plug on the internet.

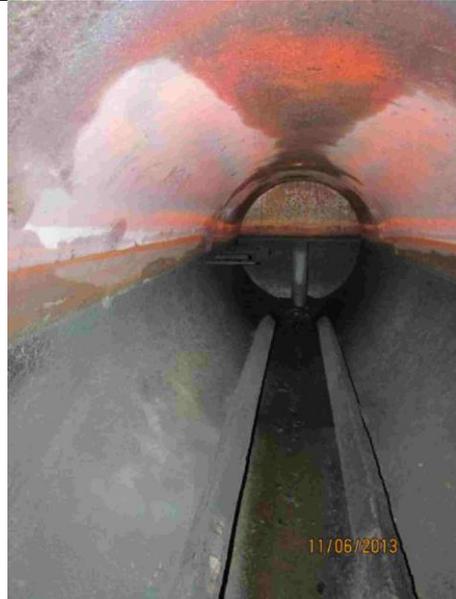
<b>Suitable to be returned to Service</b>	Yes	<b>Suggested Inspection interval (Months)</b>	60
<b>Repairs are still required</b>	No		
Daryl Cole Cert 000391 <b>Inspector</b>			11/12/2013 <b>Date (mm/dd/yyyy)</b>
	<b>Signature</b>		

### Pictures

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LRE - 3162251 GLYCOL REBOILER BUNDLE .  
11-06-13 (5).JPG



LRE - 3162251 GLYCOL REBOILER INT. 11-06-13  
(1).JPG



LRE - 3162251 GLYCOL REBOILER INT. 11-06-  
13 (3).JPG



LRE - 3162251 GLYCOL REBOILER INT. 11-06-13  
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