

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

**Job 10.116529**

District: <b>Grande Prairie, AB</b>	Skid No.
Facility: <b>LaGlace North Oil Battery</b>	Location (LSD): <b>10-14-76-10 W6M</b>
Vessel Name Equipment Number: <b>Oil Treater</b>	
Orientation: <b>Horizontal</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>A0245115</b>		CRN Number: <b>H 2078.2</b>	
Vessel serial number: 87-3568-0		Size: 10 ft x 35 ft	
Shell thickness: 9.5 mm		Shell material: SA 516 70 N	
Head thickness: R: 12.6 mm L: 9.2 mm		Head material: SA 516 70 N	
Tube wall thickness:		Tube material:	
Tube diameter:		Tube length:	
Channel thickness:		Channel material:	
Design pressure	Shell: 50 psi	Operating pressure	Shell: 25 psi
	Tubes:		Tubes:
Design Temp.	Shell: 250°F	Operating temperature	Shell: 32°C
	Tubes:		Tubes:
X-ray: RT 4		Heat treatment: Nil	
Code parameters: ASME VIII, Div 1		Coated: Yes	
Manufacturer: Wells-Hall Fabrication		Year built: 1987	
Corrosion allowance: 1.6 mm		Manway: Yes	

**PRESSURE SAFETY VALVE NAMEPLATE DATA**

PSV Tag #	Manufacture / Model / Serial	Set Pressure (PSI)	Capacity (scfm)	Size	Block Valve	Location	Service by / Date
UVL107756	Consolidated // 1095LC // 94C2431	50	3611	3 x 4	No	Top shell	Unified 03/2010

**SERVICE CONDITIONS-INDICATE ALL THAT APPLY**

Sweet <input checked="" type="checkbox"/>	Sour	Oil <input checked="" type="checkbox"/>	Gas <input checked="" type="checkbox"/>	Water <input checked="" type="checkbox"/>
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>	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 is 60% insulated – good condition, no damage.</b> <b>Wall closure sealed – no egress of moisture.</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 – minor chipping.</b> <b>No corrosion.</b> <b>No damage.</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>Vessel saddle is bolted to skid.</b> <b>No buckling or dents.</b> <b>No corrosion at attachment welds to vessel.</b> <b>Ground wire attached to skid.</b>
<b>Anchor Bolts</b> Hammer tap to ensure secure. Look for cracking in treads or signs of deformation.	X				<b>Anchor bolts are secure.</b> <b>No cracking or deformation.</b>
<b>Concrete foundation</b> Check for cracks, spalling, etc.				X	<b>Steel</b>
<b>Ladder / Platform</b> Describe general condition, ensure support is secure to vessel, and describe any hazards.				X	<b>None.</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>Stud threads are fully engaged to nuts.</b> <b>Threaded nozzles are fully engaged</b> <b>No leaks observed.</b> <b>No damage or deflections.</b> <b>No gussets on nozzles.</b>
<b>Gauges</b> Ensure gauges are visible, working, no leakage, and suitable for range of MAWP/ Temp.	X				<b>Pressure gauge: 0 to 100 psi. Suitable for MAWP range.</b> <b>Temp gauge: -20 to 120°C. Suitable for MAWT range.</b> <b>Liquid sight glass attached.</b> <b>Clean and clear. No leaks.</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.</b> <b>All clamps and supports are in place.</b> <b>No structural overloads or deflections.</b> <b>Paint chipped to 5% exposed metal – no corrosion.</b>
<b>Valving</b> Ensure no leaks are visible. Valves are properly supported and chained if necessary.	X				<b>Well supported, no leaks.</b>
<b>PSV</b> Ensure PSV is set at pressure at or below that of vessel. Discharge piping is same size as valve outlet and is properly supported and routed. Are psv seals in place? Ensure no block valves between psv and vessel, or if there are that they are locked/sealed open.	X				<b>Located on top shell– set at MAWP of vessel.</b> <b>Discharge piping is same size as valve outlet.</b> <b>PSV seal in place.</b> <b>No block valve between vessel and PSV inlet.</b>
<b>NDE methods</b> Was UT/ MPI done on vessel (MI coordinator to review results)	X				<b>Ultrasonic corrosion survey carried out – no metal thickness detected below nominal minus corrosion allowance.</b>
<b>Other</b>					
<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:</b> No recommendations at this time.</p> <p><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. Corrosion rate based on greatest thickness loss (nozzle) 0.036mm per year. Retirement Date to “T”min is year 2051.</p> <p><b>Vessel is fit for service.</b></p>					

**Inspected By:** Chris Maxsom IPV #0539

**Date:** September 16, 2015

<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>Vessel is coated with epoxy. Several coating chips on lower shell repaired at time of inspection.</b>
<b>Anodes.</b> How many, type, condition. % consumed. Are they being replaced?	X				<b>All anodes will be replaced during TAR.</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>Good condition – no pitting, corrosion or mechanical damage.</b>
<b>Trays</b> How many? Type of material. Are valves in place. Check for erosion/ corrosion; wear on tray valve legs. Cleanliness?				X	<b>No trays.</b>
<b>Baffles, deflector plates, etc.</b> If present, describe condition. Look closely at welds attached to vessel wall.	X				<b>Internal baffles and weir plate is in good condition with no corrosion. No mechanical damage. No welding defects on attachment welds.</b>
<b>Inlet Manway</b> Note all corrosion, erosion or mechanical damage. (If vessel is horizontal identify direction of this head)	X				<b>Good condition – Several round bottom pits at</b>
<b>Inlet Head</b> Note all corrosion, erosion or mechanical damage. (If vessel is horizontal identify direction of this head)	X				<b>Good condition – no corrosion or pitting. Firetube throat – scattered round bottom pitting to 0.050 inch depth.</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. If any corrosion greater than corrosion allowance is observed in either shell or head, discuss with Chief Inspector before closing vessel.	X				<b>Shell is in good condition. Scattered coating chips on lower shell repaired at time of inspection.</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>No visual access.</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>Through-wall in firetube support weld. ll welds area in</b>
<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>Repair firetube support structure.</b>
<b>NDE</b> Was any NDE done. ( MI coordinator to review results)		X			<b>Magnetic particle inspection carried out on fire tube. 12 inch crack detected on firetube. Reference MT report.</b>
<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)  <b>Recommendations: 1.Repair fire tube and firetube support structure using an approved CNRL repair procedure.</b>  <b>Summary:</b> This vessel is in good overall condition, visual internal carried out.  <b>Vessel is fit for service</b></p>					

**Inspected By:** Chris Maxsom IPV# 0539

**Date:** September 30, 2015



Overview and PSV location



Data plate



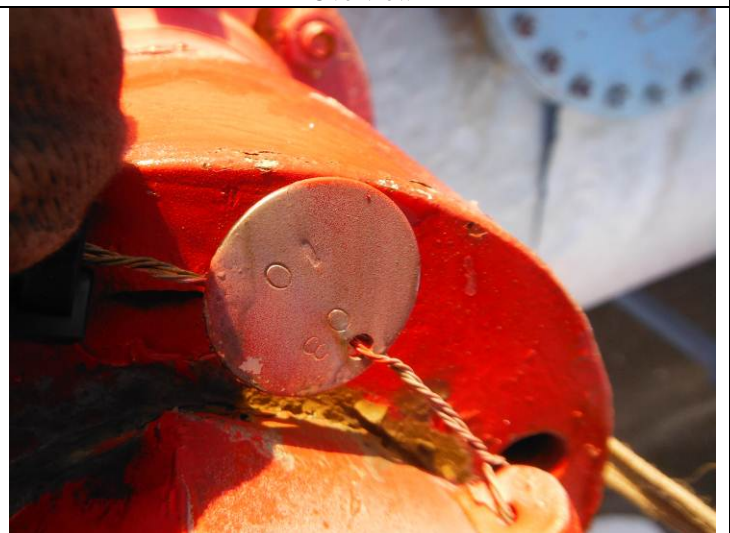
Overview



Overview



PSV data plate – service tag removed



Unified Valve service coin – 03/2010



Pressure gauge



Temperature gauge



Firetube throat – corrosion to 0.050 depth



Bottom shell – several coating chips



Firetube support – weld through-wall location



Wet side: bottom HTSW



Dry side: Manway



Dry side: Bottom HTSW



Overview Dry side grid



New firetube support – MT ok



Overview Firetube LT crack location – reference MT report