

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

<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: 1000 bbl Produced Water Tank</b>						
<b>Orientation: Vertical</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>C51989</b>		CRN Number  Not Required				
Tank serial number: 16805		Size: 17 ft. 3 in. X 24 ft.				
Shell thickness: 4.8mm		Shell material: SA 36				
Bottom thickness: 6.4mm		Bottom material: SA 36				
Deck thickness: 4.8mm		Deck material: SA 36				
Tube diameter:		Tube length:				
Channel thickness:		Channel material:				
Design pressure	Shell: 4 oz	Operating pressure	Shell:			
	Tubes:		Tubes:			
Design Temp.	Shell:	Operating temperature	Shell:			
	Tubes:		Tubes:			
X-ray: Nil		Heat treatment: Nil				
Code parameters: API 12 F		Coated: Yes				
Manufacturer: Platinum Energy Services		Year built: 2005				
Corrosion allowance: Not Stated		Manway: Yes				
<b>PRESSURE SAFETY VALVE NAMEPLATE DATA</b>						
Tag Number(s)	Manufacture	Model	Serial Number	Set Pressure	Capacity	Set Date
CRN#	Serviced by	Block valve	Location	Size	Code Stamp	
<b>SERVICE CONDITIONS-INDICATE ALL THAT APPLY</b>						
Sweet X	Sour	Oil X	Gas	Water X		
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.		<b>X</b>			<b>Foam insulated – Two large open sections on shell. No signs of water ingress.</b>
<b>External Condition</b> Assess paint condition, areas peeling, record any corrosion, damage, etc (record location, size and depth of corrosion or damage)	<b>X</b>				<b>Inward deflection on lower shell to approx. 1.5 inches</b>
<b>Leakage</b> Record any leakage at flanges, threaded joints, weep holes on repads, etc.	<b>X</b>				<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?	<b>X</b>				<b>Tank skid is welded to pilings – No buckling or dents. No sign of leakage at attachment welds to tank. Grounded through pilings.</b>
<b>Anchor Bolts</b> Hammer tap to ensure secure. Look for cracking in threads or signs of deformation.				<b>X</b>	
<b>Concrete foundation</b> Check for cracks etc.				<b>X</b>	
<b>Ladder / Platform</b> Describe general condition, ensure support is secure to vessel, and describe any hazards.	<b>X</b>				<b>Ladder firmly attached to vessel – no missing sections. Paint in good overall condition. No loose or broken sections.</b>
<b>Nozzle</b> Assess paint, look for leakage, and ensure stud threads are fully engaged. Record any damage, deflection, etc. Are nozzles gusseted?	<b>X</b>				<b>Paint is in good condition. No leaks found. Stud threads are fully engaged to nuts. No gussets.</b>
<b>Gauges</b> Ensure gauges are visible, working, no leakage, and suitable for range of MAWP/ Temp.	<b>X</b>				<b>Temp gauge is visible and working. Level gauge is operational.</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?	<b>X</b>				<b>Piping is supported and clamps are in place. Piping is insulated and sealed in metal cladding. No evidence of structural overload or deflection.</b>
<b>Valving</b> Ensure no leaks are visible. Valves are properly supported and chained if necessary.	<b>X</b>				<b>Well supported. No leaks found.</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.				<b>X</b>	<b>No PSV on tank system. Vacuum breaker installed.</b>
<b>NDE methods</b> Was UT/ MPI done on vessel (MI coordinator to review results)	<b>X</b>				<b>Ultrasonic corrosion survey carried out – pipe metal thickness detected below nominal minus corrosion allowance. Thickness calculations carried out: UT point 705 (4" elbow) – nominal thickness is 6.0mm / min thickness is 5.0mm / T min thickness is 1.6mm.</b>
<b>Secondary Containment</b>	<b>X</b>				<b>Steel ring wall around tank with vinyl liner – no leaks.</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:</b> See Internal Summary  <b>Summary:</b> This tank is in good overall condition, visual external, visual internal and ultrasonic thickness survey carried out on piping – pipe metal thickness detected below nominal minus corrosion allowance. Thickness calculations carried out to ensure sufficient metal exists for safe operation.  <b>Tank is fit for service</b></p>					

Internal Inspection Items	G	F	P	N/A	Comments
<b>Coating</b> Assess coating. Describe area coated, general condition of coating.	X				<b>Internal surface - 100% coated with epoxy – Several previous coating repairs on floor and lower shell. All are in good condition – no areas of failed coating.</b>
<b>Anodes.</b> How many, type, condition. % consumed. Are they being replaced?				X	<b>None. To be installed during June 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>None</b>
<b>Bottom</b> Record location, size and depth of all erosion, corrosion or mechanical damage. Describe General condition.	X				<b>Good condition. Bottom is 100% coated – Several patch plates previously installed and in good condition. No areas of failed coating.</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>Four shell sections in good condition, 100% coated with epoxy – Coating repair on a large section of shell to floor weld remains in good condition – No areas of failed coating.</b>
<b>Roof / Deck</b> Record location, size and depth of all erosion, corrosion or mechanical damage. Describe General condition.	X				<b>Good condition, 100% coated with epoxy – tight product scale. No damage.</b>
<b>Float</b>			X		<b>Float is not attached.</b>
<b>Man Way Access</b>	X				<b>Man way coated with several minor coating chips. Repaired at time of inspection.</b>
<b>Nozzles</b>	X				<b>All nozzles un obstructed. Nozzles 100% coated with epoxy.</b>
<b>Thermal Probe</b>				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>Welds are 100% coated with epoxy. No failed areas.</b>
<b>Fire Tube / Heat Medium Coil:</b>	X				<b>Fire tube is externally corroded range 0.050 to 0.150 inch depth. Several previous fill weld repairs.</b>
<b>NDE Inspections</b>				X	<b>No NDE inspections at this time.</b>
<b>Recommendations or corrective actions (indicate if fit for service)</b> <b>Recommendations: 1. Install float and reattach cable. 2. Repair open sections of open insulation. 3. Install separate ground wire.</b> <b>Summary: This tank is in good overall condition, visual internal and external inspection carried out.</b> <b>Tank is fit for service.</b>					



LSD

Overview - Tank farm



Overview - Tank with large areas of insulation removed

Data plate



Manway

Overview - floor with loose float cable detached.



**Lower shell**



**Upper shell**



**Deck internal**



**Anode installed**



**Previously installed patch plates**



**Overview – fire tube**