Canadian Natural Resources Limited GENERAL PRESSURE VESSEL INFORMATION	
District: Hamburg Oil – GP South	**Skid No.**
Facility: Hamburg Water Injection	**Location (LSD): 13-20-96-09 W6M**
Vessel Name & Equipment Number: 1000 Produced Water Tank	
Orientation: Vertical	
Status: In Service	**Regulatory Inspection**

PRESSURE VESSEL NAMEPLATE DATA			
"A" or "G" or "S" (Sask.) or BC Registration Number. **C51990**		CRN Number Not Required	
Vessel serial number: 16804		Size: 17ft 3in x 24 ft	
Shell thickness: 4.8mm		Shell material: SA 36	
Bottom thickness: 6.4mm		Bottom material: SA 36	
Deck thickness:4.8 mm		Deck material: SA 36	
Tube diameter:		Tube length:	
Channel thickness:		Channel material:	
Design pressure	Shell: Atmos. Tubes:	Operating pressure	Shell: Tubes:
Design Temp.	Shell: Tubes:	Operating temperature	Shell: Tubes:
X-ray: Nil		Heat treatment: Nil	
Code parameters: API 650		Joint efficiency (if on nameplate):	
Manufacturer: Platinum Energy Services Corp.		Year built: 2006	
Corrosion allowance: Not Stated		Manway: Yes	

PRESSURE SAFETY VALVE NAMEPLATE DATA						
Tag Number(s)	Manufacture	Model	Serial Number	Set Pressure	Capacity	Set Date
Not Req'd						
CRN#	Serviced by	Block valve	Location	Size	Code Stamp	

SERVICE CONDTIONS-INDICATE ALL THAT APPLY				
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** _____

External Inspection Items	G	F	P	N/A	Comments
Insulation Verify sealed around manways, nozzles, no damage present, and there is no egress of moisture.	X				**Insulation is spray foam. Vessel insulation is sealed around man way and nozzles. No evidence of moisture. No damage present**
External Condition Assess paint condition, areas peeling, record any corrosion, damage, etc (record location, size and depth of corrosion or damage)	X				**Paint is in good condition, no exposed metal.**
Leakage Record any leakage at flanges, threaded joints, weep holes on repads, etc.	X				**No leaks found.**
Skirt/ Saddle 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?	X				**Tank skid is welded to support pilings.** **No leaks found.** **Ground wire attached to tank.**
Anchor Bolts Hammer tap to ensure secure. Look for cracking in threads or signs of deformation.				X	
Concrete foundation Check for cracks etc.				X	
Ladder / Platform Describe general condition, ensure support is secure to vessel, and describe any hazards.	X				**Ladder supports are secured to tank.** **Paint on ladder is in good condition, no loose or missing sections.**
Nozzle Assess paint, look for leakage, and ensure stud threads are fully engaged. Record any damage, deflection, etc. Are nozzles gusseted?	X				**No leaks, damage or deflection noted.** **No gussets.**
Gauges Ensure gauges are visible, working, no leakage, and suitable for range of MAWP/ Temp.	X				**Level indicator intact.** **Temp gauge clear and intact.**
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				**External piping is insulated and covered with metal cladding. No evidence of structural overload or deflection.**
Valving Ensure no leaks are visible. Valves are properly supported and chained if necessary.	X				**No leaks found.**
PSV 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.				X	**No PSV. Vents to atmosphere.**
NDE methods Was UT/ MPI done on vessel (MI coordinator to review results)	X				**Ultrasonic corrosion survey carried out on piping – no metal thickness detected below nominal minus corrosion allowance.**
Secondary containment					**Steel ring wall around tank with vinyl liner – no leaks.**

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: See internal summary.
Summary: See internal summary.

Inspected By: Chris Maxsom **Date:** June 26, 2013

Internal Inspection Items	G	F	P	N/A	Comments
Coating Assess coating. Describe area coated, general condition of coating.			X		**Tank is 100% coated with epoxy – several areas coating failure on floor and shell to floor weld causing corrosion and 1 floor hole location.**
Anodes. How many, type, condition. % consumed. Are they being replaced?				X	**No anodes.**
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	**No internal piping**
Bottom Record location, size and depth of all erosion, corrosion or mechanical damage. Describe General condition.			X		**100 % coated with epoxy – several areas of failed coating. 1 through hole location**
Shell Sections Record number of shell sections. Record location, size and depth of all erosion, corrosion or mechanical damage. Describe General condition.	X				**4 shell sections generally in good condition, 100% coated with epoxy. No areas of failed coating. Heavy deposits on 2nd course.**
Roof / Deck Record location, size and depth of all erosion, corrosion or mechanical damage. Describe General condition.	X				**Good condition, 100% coated with epoxy – no areas of failed coating.**
Float	X				**Good condition, intact and attached.**
Man Way Access	X				**Man way coating. No areas of failed coating.**
Nozzles	X				**All nozzles un obstructed. Nozzles 100% coated with epoxy.**
Thermal Probe	X				**Thermal probe in good condition.**

Welds Inspect all welds, including attachment welds. Record all service-related damages and if there is any discuss with Chief Inspector before closing.	X				**Welds are 100% coated with epoxy. Approx 15 feet of coating on floor to shell weld is cracked and disbonded.**
Fire Tube / Heat Medium Coil:			X		**Fire tube is in poor condition with 1 through wall location and severe corrosion on upper area of tubes. Firetube will be removed from service but will be used as a temporary seal at fire tube access.**
Repairs Required				X	**1. Repair through hole on floor using an 8 inch x 40 inch SA 36 0.25 inch thick plate material. Fillet weld to shell using E 7018-1 Welding rod – max .125 inch diameter.** **2. Grit blast areas of failed coating at shell to bottom weld as well as patch plate / attachment weld and recoat areas of repair with epoxy.** **3. Fill weld identified locations on fire tube.**

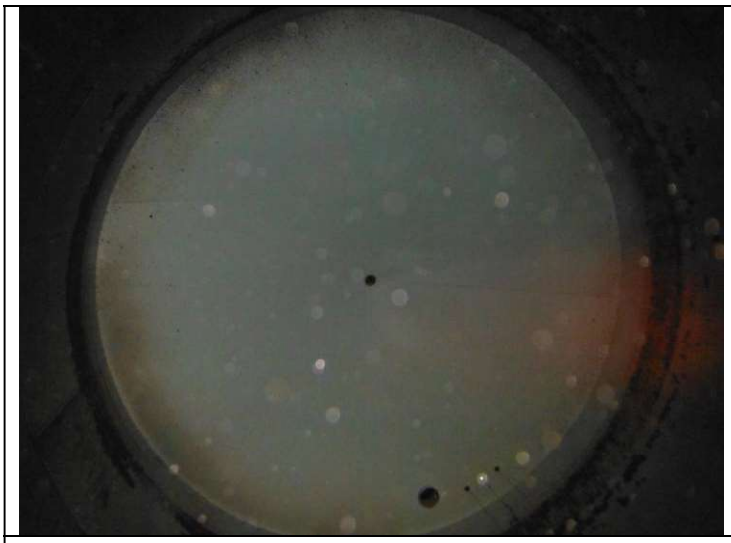
Recommendations or corrective actions (indicate if fit for service)
Recommendations: 1. See above Repairs Required. 2. Next TAR: Grit blast and recoat floor and lower 3 ft of shell with epoxy.
Summary: This tank is in generally good overall condition, internal and external inspection carried out. Coating failure at shell to bottom weld for a length of approx 15 ft. Scattered underlying pitting to 0.020 inch. Two isolated areas of bottom coating failure resulted with 1 through hole location approx 0.375 inch dia. Patch plate repair carried out by REED Energy. Magnetic particle inspection carried – no cracking detected. No coating company was available at time of repair.
Areas of coating repair were prepped and applied by RTD.
Fire tube is in poor condition with 1 through hole location and severe corrosion 10:00 to 2:00 position.
Fire tube will be fill-welded and temporarily remain in place, but will be removed from service.

Inspected By: Chris Maxsom **Date:** June 26, 2013

LSD

Overview - Tank farm

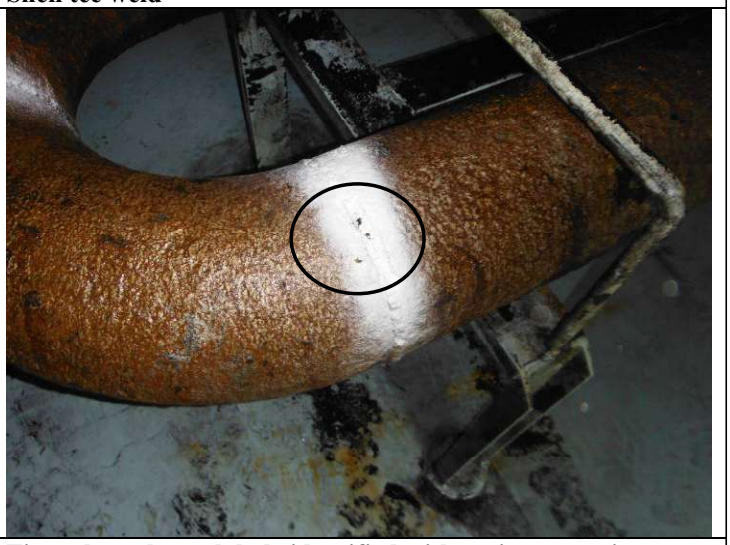
	
Overview – Tank	**Data plate**
	
Manway	**Overview - Bottom**
	
Lower shell	**Upper shell**



Deck internal

Shell tee weld

Overview - fire tube



Fire tube – through hole identified with major corrosion to 0.220 inch depth

Bottom – Failed coating and one through hole identified.

Coating failure at shell to bottom weld to approx 15 ft.

	
Overview Repair- Bottom patch plate and shell to bottom coating repair.	