

**Enerplus Resources
GENERAL PRESSURE VESSEL INFORMATION**

Job # 105.00090

District: B.C. and North	Equipment number: 23465
Facility: Firebird Battery	Location (LSD): 08-11-98-08 W6M Skid: 3219
Vessel Name Equipment Number: Oil Treater	
Orientation: Horizontal	
Status: In service	Regulatory Inspection

PRESSURE VESSEL NAMEPLATE DATA

“A” or “G” or “S” (Sask.) or BC Registration Number. A0191862		CRN Number: E 1466.2	
Vessel serial number: 81-7900-A		Size: 12 ft x 40 ft	
Shell thickness: 12.7 mm		Shell material: SA 516 70 N	
Head thickness: Back end: 15.87 mm // Fire tube end: 28.57mm		Head material: SA 516 70 N	
Tube wall thickness:		Tube material:	
Tube diameter:		Tube length:	
Channel thickness:		Channel material:	
Design pressure	Shell: 75 PSI	Operating pressure	Shell: 40 PSI
	Tubes:		Tubes:
Design Temp.	Shell: 200 ° F	Operating temperature	Shell: 108°F
	Tubes:		Tubes:
X-ray: Full Part		Heat treatment: Nil	
Code parameters: ASME VIII Div I		Coated: Yes	
Manufacturer: Maloney Steel Ltd.		Year built: 1981	
Corrosion allowance: 3.18 mm		Manway: Yes	

PRESSURE SAFETY VALVE NAMEPLATE DATA

PSV Tag #	Manufacture	Model #	Serial #	Set Pressure	Capacity (scfm)	Service Date
CRN #	Service By	Block Valve	Location	Size	Code Stamp	

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 <input checked="" type="checkbox"/>	Air	Glycol

Other (Describe):

Inspection Interval _____ **PSV Service Interval** _____

(Determined by MIC in conjunction with Chief Inspector following guidelines of Enerplus Resources 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

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 Present to 70% of shell surface. No damage to cladding 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 corrosion or damage present.
Leakage Record any leakage at flanges, threaded joints, weep holes on repads, etc.	X				No Leaks Present. Thread joints are not leaking
Saddle/Skirt 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				Saddle is welded to skid; paint is in good condition, no signs of corrosion, buckling or dents present. No leakage present at attachment welds to vessel. Attachment welds are acceptable. Skid is grounded.
Anchor Bolts Hammer tap to ensure secure. Look for cracking in treads or signs of deformation.	X				Saddle is welded to skid floor no anchor bolts present.
Concrete foundation Check for cracks, spalling, etc.				X	
Ladder / Platform Describe general condition, ensure support is secure to vessel, describe any hazards.				X	
Nozzle Assess paint, look for leakage, and ensure stud threads are fully engaged. Record any damage, deflection, etc. Are nozzles gusseted?	X				Nozzle paint is in good condition, no stud threads present, threaded fittings fully engaged,, no damage or deflection present. No gussets present.
Gauges Ensure gauges are visible, working, no leakage, and suitable for range of MAWP/ Temp.	X				Pressure Gauge (0-15 PSI) Suitable for MAWP of Vessel Temperature Gauge (-20-120 ° C) Suitable for Temp Range
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				Piping is well supported and in place. Missing and loose piping clamps present see photos. No evidence of structural overload or deflection. Paint is in good condition. Produced water piping has corrosion up to 1.5mm wall remaining from 5.54mm 2" XS (73%) wall loss. See UT Report for Details
Valving Ensure no leaks are visible. Valves are properly supported and chained if necessary.	X				Valves are properly supported, no leaks present.
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				PSV Present on top off gas boot. No access to PSV No block valves present. Piping is properly routed and supported.
NDE methods Was UT/ MPI done on vessel (MI coordinator to review results)	X				Ultrasonic thickness corrosion survey carried out - no metal loss detected below nominal minus corrosion allowance
<p>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)</p> <p>Recommendations: 1) Replace corroded spools of produced water piping as specified in UT Report – Replaced during TAR 2010.</p> <p>Summary: Vessel is in overall good condition, visual external inspection and ultrasonic corrosion survey performed - no metal thickness detected below nominal minus the corrosion allowance.</p> <p>Vessel is fit for service.</p>					

Internal Inspection Items	G	F	P	N/A	Comments
Coating Assess coating. Describe area coated, general condition of coating.	X				Coating in good condition, no chipped coating or blisters internally. Chipped coating at fire tube man way – no corrosion.
Anodes. How many, type, condition. % consumed. Are they being replaced?			X		2 anodes in the front end and 2 in the back end. The front end anodes are completely consumed. The back end anodes are consumed to 70%. All 4 were replaced this outage.
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				Fuel gas piping in good condition, no dents. Piping is coated, no exposed metal – no corrosion. No mechanical damage.
Trays How many? Type of material. Are valves in place. Check for erosion/ corrosion; wear on tray valve legs. Cleanliness?	X				There is a single strainer tray section in the back end but all other trays and grid sections have been removed in the past. There are 2 sparging chutes in the back end – these are in place, well supported, and coated with epoxy.
Baffles, deflector plates, etc. If present, describe condition. Look closely at welds attached to vessel wall.	X				Inlet diffuser / chute and weir are intact and in place – coated with epoxy – no failed areas. Both are bent and distorted from upset process conditions – the sparging chutes are bent and distorted as well. This does not represent any process difficulties but does indicate the sudden differential in pressure that this vessel has been subjected to. The coating is blistered on the inlet chute but is still intact and is in the oil phase so does not represent a problem. There are vortex breakers in the front end and the back end – are intact and in place. The water drain nozzle in the back end had a rag stuck in it and was not able to drain water from this area – rag and built up calcium was removed.
Control valves / floats etc... : Ensure all control floats move freely and the nozzle is free of obstructions.		X			The water level control in the front end was restricted in movement and had to be removed to clean out asphalt material.
Back end / Stagnant Head Note all corrosion, erosion or mechanical damage. (If vessel is horizontal identify direction of this head)	X				Head is coated with epoxy – no mechanical damage – no exposed metal. No previous corrosion or pitting.
Front end / Fire tube Head Note all corrosion, erosion or mechanical damage. (If vessel is horizontal identify direction of this head)	X				Fire tube gasket seating face is free of corrosion. This head is coated with epoxy – some chips in access area from tube removal but no corrosion.
Shell Sections 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				4 Shell sections. Internal is 100% coated with epoxy – is well bonded – no exposed metal. Man way access in good condition – no chipped coating. No previous corrosion or pitting prior to coating.
Nozzles: Any obstructions? Coated? Corrosion?	X				Coated with epoxy – no failed areas. 1. Water drain nozzle in the back end was plugged with a rag, most likely from the last internal inspection – Removed this outage. 2. All the sample points (7) were plugged with asphalt in both the front end and the back end – Obstructions were removed this outage.

Demister pad Is it in place? Is it clean? If any corrosion is apparent in vessel, lift pad and check top head for corrosion.	X				The gas boot is not viewable from internal surface – it is not known as to whether there is a mistex pad or not in this vessel. However, there is no evidence of moisture carry over from the Treater so if there is no pad, it is probably not required.
Welds Inspect all welds, including attachment welds. Record all service-related damages and if there is any discuss with Chief Inspector before closing.	X				All welds are coated, no corrosion staining or peeling at welds.
Fire Tubes: Pitting? General corrosion – spot check with ultrasonic thickness to ensure sufficient metal exists for operation.	X				2 fire tubes – no pitting to external surface. Ultrasonic thickness inspection carried out at 3, 6, 9, 12 o'clock positions. Both tubes were built at 12.7 mm – min thickness detected was 12.5 mm. The reinforced ends of the West tube (Where the burner and stack attach) have been changed out in the past and are 38.2 mm thick. There is some pitting inside of the gasket seating face on the flanged end of both tubes – approximately .140 inches deep on one and .220 inches deep on the other – 18 inches by 2 inches wide on both flanges – this does not represent a problem at the present as the flanges are 2 inches thick.
Repairs Required. If yes, ensure procedure and copy of AB 40 is on file, and one sent to local ABSA, and Chief Inspector	X				<ol style="list-style-type: none"> 1. Hand patch chips in fire tube access area – completed this outage. Completed 2. Clean out all nozzles of obstructions. Completed 3. Clean out all controllers and ensure serviceability. Completed 4. Replace all anodes. Completed 5. Review operational process to ensure internals are not destroyed.
NDE Was any NDE done. (MI coordinator to review results)	X				Magnetic particle inspection carried out on all fire tube welds – no cracking detected.
<p>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 repairs required.</p> <p>Summary: Vessel in good overall condition, visual internal and external inspections carried out – internal is 100% coated with epoxy – no failed areas, no corrosion or pitting. There has been some deformation of the internal chutes and weir in the past – this seems to be caused from an increase in differential pressure in process from the sudden surge on inlet pressure – some review may be required to ensure this does not break the weir loose from its welded position. Vessel is fit for service.</p>					

Inspected By: Dellas Weidman

Date: June 15, 2010

Photo Table for E-23465 Oil Treater



Equipment Tag



Data Plate



Temperature Gauge



Pressure Gauge



Overview



Overview Truck In



Overview



Overview



Overview



Overview



Overview



Loose support clamp



Missing piping clamp



Saddle



Loose Piping Clamp



Ground Connection



West Fire tube tag



West Fire tube



Internal of burner side of fire tube – some general scaling on impingement area but no real wall loss.



Pitting on internal side of flange but no on gasket seating face to .140 inches deep



East Fire tube tag



East fire tube Over view



Deep pitting to .220 inches on fire tube flange area outside of gasket seating area.

Burner impingement area on internal of tube – scaled with some wall loss but is heavily reinforces – 38.2 mm thick.



Burners – over view



Burner nozzles – free of obstructions



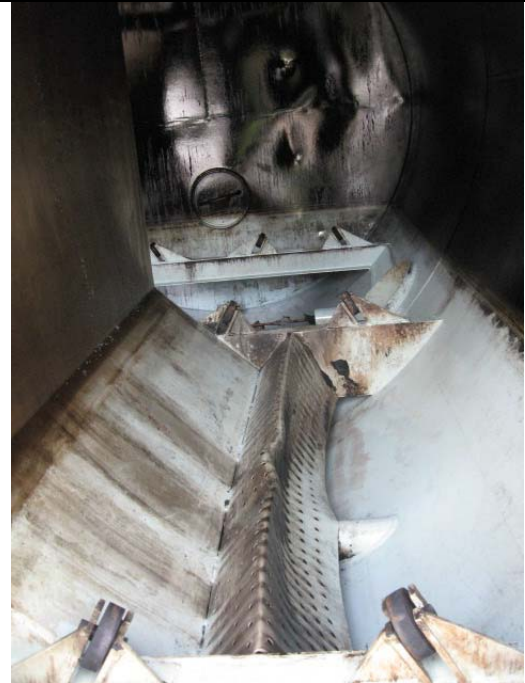
Over view after fire tube were removed.



Fire tube access areas



Opposite side – sparging chute in front end – notice deformation.



Sparging chute in front end – notice deformation.



Over view of weir from front end – deflected rearward approximately 1.5 inches over full width.



Inlet chute – deformation and blistered coating.



Fire tube roller



Anode in front end – completely consumed



Anode in front end – completely consumed.



Sample points in front end – plugged



Vortex de generator in front end.



Sparging chutes in front end – severe deflection and distortion.



Oil level control in between weirs



Anode condition in back end



Oil outlet piping in top section of Treater



Sparging chutes in back end