Canadian Natural

PRESSURE VESSEL VISUAL INSPECTION REPORT

Report #:	156953-MD-34
Inspect Date:	10/04/2012
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Insp. Co. Job #:	156953

Criticality Designation: Yellow

Insp. Comp:	Matrix_Inspection	District:	St Albert - South	Field:	Holmberg
Location:	15-31-044-17W4	Unit / Skid #:	Sep Pkg	LSD:	15-31-044-17W4
Jurisdiction #:	A3014468	Equip Tag #:	N/A	Serial #:	2855
CRN #:	F5874.2	Nat'l Bd #:	N/A	Year Built:	1994
Manufacturer:	RJV Gas Field Services Ltd	Equipment Description:	Other: 3 Phase Vertical Separator		
Status:	In Service -	Equip. Type:	Vessel: Separator	Service:	Sweet
MAWP Shell:	1440 Psi @ 100 °F	Volume:	N/A	Code Stamp:	☒ Y ☐ N
MAWP Tube:	@	Height/Length:	90 in.	Insulated:	☐ Y ☒ N
MDMT:	-20 °F	RT:	RT-2	Size/Diameter.:	16 in. O.D.
Support	Skirt	Vessel on Original CNRL Inventory List:	☒ Y ☐ N	Manway:	☐ Y ☒ N
C.A.:	0 in.	Coated:	N/A	Clad:	N/A
J.E.:	N/A	Remote Access:	☐ -		

	Component	Material	Nominal Thk	Diameter	OD/ID	Tube Side	Shell Side
1	Main - Shell	SA-106-B	0.844 in.	16.000 in.	OD	☐	☒
2	Top - Head	SA-516-70	0.688 in.	16.000 in.	OD	☐	☒
3	Bottom - Head	SA-516-70	0.688 in.	16.000 in.	OD	☐	☒
4	-					☐	☐
5	-					☐	☐

Static Data: Confirmed ☒ Changed (See Comments) ☐

Comments:
Static data confirmed

PSV Static Data

PSV –1 Tag #:	N/A	Serial #:	15365-36	CRN:	0G1316.2C
Model #:	T-8200-1	Capacity:	5181 SCFM	Set Pressure:	1440 psi
Manufacturer:	Taylor			Service Company:	Powell
Inlet Size & Type:	1.00 in. - Threaded			Last Service Date:	Oct 2012
Outlet Size & Type:	1.00 in. - Threaded			Block Valve:	N/A - -
Carseal Intact:	Yes			Code Stamp:	Yes
Shell Side / Tube Side:	Shell Side	Out for Service During Insp.:	N	Location of PSV:	On Vessel

PSV –2 Tag #:		Serial #:		CRN:	
Model #:		Capacity:		Set Pressure:	
Manufacturer:				Service Company:	
Inlet Size & Type:	-			Last Service Date:	
Outlet Size & Type:	-			Block Valve:	- -
Carseal Intact:				Code Stamp:	
Shell Side / Tube Side:		Out for Service During Insp.:		Location of PSV:	

PSV Comments

Vents to atmosphere

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External Inspection Results – VE External Inspection Performed

Item	N/A	Condition	Comment (Check Status Bar or Press F1 for Help)	NCR	Action Item Integrity	Action Item Maintenance
Nameplate	☐	Accept	Legible and firmly affixed to South side	☐	☐	☐
Foundation and Supports	☐	Accept	Welded skirt welded to skid	☐	☐	☐
Anchor Bolts	☒		No anchor bolts	☐	☐	☐
Grounding	☐	Accept	Grounded by skid on West side	☐	☐	☐
Insulation Condition	☐	Reject	Thru roof caulking seal is deteriorated	☐	☐	☒
PSV	☐	Accept	Carsealed and vents to atmosphere	☐	☐	☐
Shell Heads & Nozzles	☐	Accept	Minor surface corrosion throughout	☐	☐	☐
Metal Surfaces (Paint)	☐	Accept	Deteriorated exposing base metal	☐	☐	☒
Aux Equipment	☐	Accept	Instrumentation is secure and intact	☐	☐	☐
Cathodic Protection	☒		No external anode	☐	☐	☐
Alignment	☐	Accept	Vertical and upright	☐	☐	☐
Flange Connections	☐	Accept	Adequate thread engagement	☐	☐	☐
Pressure Gauge	☐	Accept	0-1500 psi: within acceptable range	☐	☐	☐
Temperature Gauge	☐	Accept	-40-120° F: acceptable range	☐	☐	☐
Sight Glass	☐	Accept	Staining noted in sight glass	☐	☐	☒
Ladder / Platform	☒		No ladders or platforms	☐	☐	☐
Leaks	☐	No	No evidence of leaks	☐	☐	☐
Piping from Vessel	☐	Reject	Inlet piping is off the supports			
Previous UT Survey	☐	No	Locations not marked, no history provided	UT Company: N/A		

External Visual Observations

Staining noted in the sight glass

The PSV is carsealed and vents to atmosphere

The thru roof caulking seal is deteriorated allowing for moisture ingress resulting in paint deterioration

The paint is peeling and flaking exposing the base metal to minor surface corrosion

A UT corrosion survey was performed at the time of inspection with no significant wall losses recorded.

Recommendations:

Clean and touch up the coating to aid in corrosion protection
Consider cleaning the sight glass
Replace thru roof caulking seal

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Internal Inspection Results – VI N/A (Not Applicable)

Item	N/A	Condition	Comment (Check Status Bar or Press F1 for Help)	NCR	Action Item Integrity	Action Item Maintenance
Shell	☒		No Internal Inspection Carried Out	☐	☐	☐
Heads	☒		No Internal Inspection Carried Out	☐	☐	☐
Manway	☒		No Internal Inspection Carried Out	☐	☐	☐
Gasket Surfaces	☒		No Internal Inspection Carried Out	☐	☐	☐
Welds	☒		No Internal Inspection Carried Out	☐	☐	☐
Refractory	☒		No Internal Inspection Carried Out	☐	☐	☐
Heating Coils	☒		No Internal Inspection Carried Out	☐	☐	☐
Demister Pad	☒		No Internal Inspection Carried Out	☐	☐	☐
Vane Pack	☒		No Internal Inspection Carried Out	☐	☐	☐
Baffles	☒		No Internal Inspection Carried Out	☐	☐	☐
Trays	☒		No Internal Inspection Carried Out	☐	☐	☐
Filter	☒		No Internal Inspection Carried Out	☐	☐	☐
Internal Coating	☒		No Internal Inspection Carried Out	☐	☐	☐
Tubesheet	☒		No Internal Inspection Carried Out	☐	☐	☐
Tube Bundle	☒		No Internal Inspection Carried Out	☐	☐	☐

Internal Visual Observations

No Internal Inspection Carried Out

Recommendations:

No Internal Inspection Carried Out

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Firetube Static Data N/A (Not Applicable)

Diameter: Not Applicable Nom Thickness: Not Applicable Bend: Not Applicable

Length: Not Applicable Firetube Description: Not Applicable

Firetube NDE Performed:

UT ☐	Report#: Not Applicable		ET ☐	Report#: Not Applicable	
MT ☐	Report#: Not Applicable		RT ☐	Report#: Not Applicable	
PT ☐	Report#: Not Applicable		Other ☐	Report#: Not Applicable	

Firetube Inspection Results

Item	N/A	Condition	Comment (Check Status Bar or Press F1 for Help)	NCR	Action Item Integrity	Action Item Maintenance
Burner	☒		No Firetube Inspection Carried Out	☐	☐	☐
Stack	☒		No Firetube Inspection Carried Out	☐	☐	☐
Flange (Throat)	☒		No Firetube Inspection Carried Out	☐	☐	☐
Tube Sheet	☒		No Firetube Inspection Carried Out	☐	☐	☐
Hot Side	☒		No Firetube Inspection Carried Out	☐	☐	☐
Miter	☒		No Firetube Inspection Carried Out	☐	☐	☐
Return Bend	☒		No Firetube Inspection Carried Out	☐	☐	☐
Supports	☒		No Firetube Inspection Carried Out	☐	☐	☐
Butt Welds	☒		No Firetube Inspection Carried Out	☐	☐	☐
Fillet Welds	☒		No Firetube Inspection Carried Out	☐	☐	☐

Firetube Visual Observations

No Firetube Inspection Carried Out

Recommendations:

No Firetube Inspection Carried Out

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Vessel NDE and Final Summary:

NDE Performed:	UT	☒	Report#:		ET	☐	Report#:
	MT	☐	Report#:		RT	☐	Report#:
	PT	☐	Report#:		Other	☐	Report#:

Maxi-Trak Observations Summary (Summarize inspection results Max 255 Characters):

Deteriorated coating resulting in minor surface corrosion
Staining in sight glass
Thru roof caulking seal is deteriorated

Maxi-Trak Recommendations Summary (Summarize Recommendations Max 255 Characters):

Clean and touch up the coating to aid in corrosion protection
Consider cleaning the sight glass
Replace thru roof caulking seals

Actions Corrected at Time of Inspection: (If actions were corrected at the time of Inspection – note the corrected actions here.)

No actions were corrected at the time of inspection

Additional Visual Observations

No additional observations made at the time of inspection

Any other safety concerns or observations from associated equipment: (for example associated piping, buildings, pumps etc…)

No safety concerns noted at the time of inspection

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Thickness and Remaining Life Evaluation *" Must be Completed"*

MUST BE COMPLETED AND RESOLVED WITH CNRL IMMEDIATELY UPON DISCOVERY OF LOW WALL THICKNESS AREAS

Step 1: Was any thickness measurement location found to be less than (Nominal WT – Corrosion Allowance)?: ***No***

If YES, proceed to Step 2; if NO, proceed to "Crack Evaluation" and "CNRL Criticality Designation".

Step 2: Which component(s) were found below (Nominal WT – Corrosion Allowance)?

Components found below Nom - CA:

Components
N/A - N/A
N/A - N/A
N/A - N/A
N/A - N/A
N/A - N/A

Perform Steps 3 – 8 for each component with actual thickness less than (Nominal WT – Corrosion Allowance).

Step 3: Describe Location and Extent of Corrosion*:*

Components	Location and Extent of Corrosion
N/A - N/A	Not Applicable for this Inspection
N/A - N/A	Not Applicable for this Inspection
N/A - N/A	Not Applicable for this Inspection
N/A - N/A	Not Applicable for this Inspection
N/A - N/A	Not Applicable for this Inspection

Notes:
Not Applicable for this Inspection

Step 4:

- For shells and nozzles, calculate minimum required thickness (T-min) as per ASME Section VIII UG-27.
- For heads, calculate minimum required thickness (T-min) as per ASME Section VIII UG-32.

Components	T-Min
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A

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Thickness and Remaining Life Evaluation *(Continued)*

Step 5: Is any measured thickness less than calculated minimum required thickness (T-min)? ***N/A***

If YES, complete Step 6
If NO, proceed to Step 7..

Step 6: Is nature and extent of pitting acceptable as per API 510? ***N/A***

Step 7: Calculate Remaining Life as per API 510. How? (Find last reading; use nominal thickness if nothing available). Short Term Corrosion Rates and Long Term Corrosion Rates.

Components	Remaining Life (Yrs)
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A
N/A - N/A	N/A

Step 8: Contact CNRL Integrity Coordinator to discuss above results.

- Name of CNRL contact: Not Applicable for this Inspection
- Date and time of conversation: Not Applicable for this Inspection

Summary/results of conversation:
Not Applicable for this Inspection

Crack Evaluation by Magnetic Particle or Alternative Inspection *" Must be Completed"*

MUST BE COMPLETED AND RESOLVED WITH CNRL IMMEDIATELY UPON DISCOVERY OF CRACK-LIKE INDICATIONS

Were any indications found to suggest the vessel contained cracks? ***N/A***

If NO, proceed to "CNRL Criticality Designation".

If YES, Contact CNRL Integrity Coordinator to discuss results.

- Name of CNRL contact: Not Applicable for this Inspection
- Date and time of conversation: Not Applicable for this Inspection

Summary/results of conversation:
Not Applicable for this Inspection

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CNRL Criticality Evaluation – *"MUST BE COMPLETED"*

The CNRL In-Service Pressure Vessel Inspector MUST answer all the following questions

1. Is the vessel fit-for-service? : ***Yes***
2. Was the measured thickness less than the calculated minimum required thickness (T-min) for any component?: ***No***
3. Were MT indications found?: ***N/A***
4. Was the remaining life less than 6 years for sour service vessels or less than 10 years for sweet service vessels?: ***No***
5. Were NCR's or Action Items generated as a result of the inspection? : ***Yes***
6. Were UT readings below (Nominal WT – Corrosion Allowance) found? : ***No***

Information on CNRL Owner User Program - Criticality Designation and Required Review

RED – Vessel Inspection Results are deemed RED if one of the following occurred:

- The measured thickness was less than the calculated minimum required thickness (T-min) for any component.
- MT indications were found.
- The remaining life was calculated to be less than 6 years for sour-service vessels or less than 10 years for sweet-service vessels.

RED inspection reports must be signed off by the CNRL Chief Inspector.

YELLOW – Vessel Inspection Results are deemed YELLOW if one or more of the following occurred:

- The vessel was declared NOT fit-for-service by the 3rd Party In-Service PV Inspector.
- NCR's or Action Items were generated as a result of the inspection.
- UT readings below (Nominal WT – Corrosion Allowance) were found.

YELLOW inspection reports must be signed off by the CNRL Pressure Equipment Integrity Coordinator.

GREEN – Vessel Inspection Results are deemed GREEN if all of the following are true:

- The vessel was declared fit-for-service by the 3rd Party In-Service PV Inspector.
- UT readings below (Nominal WT – Corrosion Allowance) were NOT found.
- MT indications were NOT found.
- NCR's or Action Items were NOT generated as a result of the VE inspection.

GREEN inspection reports must be signed off by the 3rd Party In-Service Pressure Vessel Inspector.

Criticality Designation				Yellow		

Vehicle #:	380	Kms:		Inspector (Name):	Matthew B Dickinson	PESL:	601
Time In:	00:00	Time Out:	00:00	Hrs	Inspector (Signature):	Matthew Dickinson 2012.10.26 13:54:34 -06'00'	API:	39483
Time In:	00:00	Time Out:	00:00	Hrs	CNRL Coordinator (Name):			
Personnel:	BL				CNRL Coordinator (Signature):			
Billing Info:	AFE :				CNRL Chief Inspector (Signature):	(I am in full agreement with report contents)		
						(I am in full agreement with report contents)		

Equipment Photographs:

01 nameplate

02 overview indoors

03 surface corrosion on inlet

04 corrosion at roof interface

05 loose pipe support

06 PSV overview