Canadian Natural

PRESSURE VESSEL VISUAL INSPECTION REPORT

Report #:	156892-MD-49
Inspect Date:	08/07/2012
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Insp. Co. Job #:	156892

Criticality Designation: Yellow

Insp. Comp:	Matrix_Inspection	District:	St Albert - North	Field:	Sedalia
Location:	04-23-30-04W4	Unit / Skid #:	N/A	LSD:	04-23-30-04W4
Jurisdiction #:	A0541718	Equip Tag #:	N/A	Serial #:	25519
CRN #:	P7298.21	Nat'l Bd #:	N/A	Year Built:	2005
Manufacturer:	Panax Oil & Gas Inc.	Equipment Description:	Other: Vertical Separator		
Status:	Out of Service - 888 -	Equip. Type:	Vessel: Separator	Service:	Sweet
MAWP Shell:	1480 Psi @ 100 °F	Volume:	N/A	Code Stamp:	☐ Y ☒ N
MAWP Tube:	@	Height/Length:	78 in.	Insulated:	☐ Y ☒ N
MDMT:	-20 °F	RT: RT-2	Size/Diameter.:	16.00 in. O.D.	PWHT: ☐ Y ☒ N
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		in.	16.000 in.	OD	☐	☒
2	Top - Head		in.	16.000 in.	OD	☐	☒
3	Bottom - Head		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 #:	N/A	CRN:	N/A
Model #:	N/A	Capacity:	N/A	Set Pressure:	N/A
Manufacturer:	N/A			Service Company:	N/A
Inlet Size & Type:	1.00 in. - Threaded			Last Service Date:	N/A
Outlet Size & Type:	1.00 in. - Threaded			Block Valve:	--- - -
Carseal Intact:	Yes			Code Stamp:	Yes
Shell Side / Tube Side:	Shell Side	Out for Service During Insp.:	Y	Location of PSV:	Downstream

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

PSV Comments

To be removed for service during 2012 TA

Insp. Company: Matrix_Inspection LSD: 04-23-30-04W4 Jurisdiction #: A0541718

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	Firmly affixed and legible	☐	☐	☐
Foundation and Supports	☐	Accept	Welded skirt welded to skid	☐	☐	☐
Anchor Bolts	☒		No anchor bolts, welded to skid	☐	☐	☐
Grounding	☐	Accept	Grounded by skid	☐	☐	☐
Insulation Condition	☒		No insulation of separator	☐	☐	☐
PSV	☒		To be serviced during 2012 TA	☐	☐	☒
Shell Heads & Nozzles	☐	Accept	Minor surface corrosion on exposed surfaces	☐	☐	☐
Metal Surfaces (Paint)	☐	Accept	Flaking and chipped exposing the base metal	☐	☐	☒
Aux Equipment	☐	Accept	Well supported and secure	☐	☐	☐
Cathodic Protection	☒		No anode on separator	☐	☐	☐
Alignment	☐	Accept	Vertical and upright	☐	☐	☐
Flange Connections	☐	Reject	Open flanges on disconnected piping	☐	☐	☒
Pressure Gauge	☐	Accept	0-2000 psi: acceptable range	☐	☐	☐
Temperature Gauge	☒		No temperature gauge on separator	☐	☐	☐
Sight Glass	☐	Accept	Very minor staining on sight glass	☐	☐	☒
Ladder / Platform	☒		No ladders or platforms on vessel	☐	☐	☐
Leaks	☐	No	No evidence of any previous process leaks	☐	☐	☐
Piping from Vessel	☐	Accept	secure and adequately supported with riser saddles and u-bolts			
Previous UT Survey	☒		vessel is not marked, no history provided	UT Company: N/A		

External Visual Observations

At the time of inspection the separator was not in operation, various threaded and flanged piping was disconnected. Some of the threaded and flanged piping connections were left open to environmental conditions (weather/ animals)

The PSV will be removed for service as discussed with the CNRL integrity representative

The paint is chipping and flaking exposing the base metal to minor surface corrosion with no evidence of pitting

No evidence of leaks noted at the time of inspection.

There is very minor staining noted in the sight glass

A UT corrosion survey was performed at the time of inspection with no significant wall loss recorded at the time of examination.
Note: the utm file was corrupted and lost during data transfer

Recommendations:

Service the PSV during the 2012 TA
Clean and touch up the paint to aid in corrosion protection
Consider blinding and covering the open threaded connections to reduce evironmental type corrosion
Consider cleaning the sight glass
Update Maxi-trac to reflect field status

Insp. Company: Matrix_Inspection LSD: 04-23-30-04W4 Jurisdiction #: A0541718

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):

Not in operation during inspection, wellhead is isolated
PSV due for service
Chipped/ flaked paint
Very minor staining in sight glass

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

Service PSV during the 2012 TA Clean and touch up the paint
Consider blinding and covering the open threaded connections to reduce evironmental type corrosion
Consider cleaning the sight glass
Update Maxi-trac to reflect field status

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 visual observations

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:

Time In: 00:00 Time Out: 00:00 Hrs

Time In: 00:00 Time Out: 00:00 Hrs

Personnel: KK

Billing Info: :

Inspector (Name): Matthew B Dickinson PESL: 601

Inspector (Signature): Matthew Dickinson 2013.01.10 10:19:29 -07'00' API: 39483

CNRL Coordinator (Name):

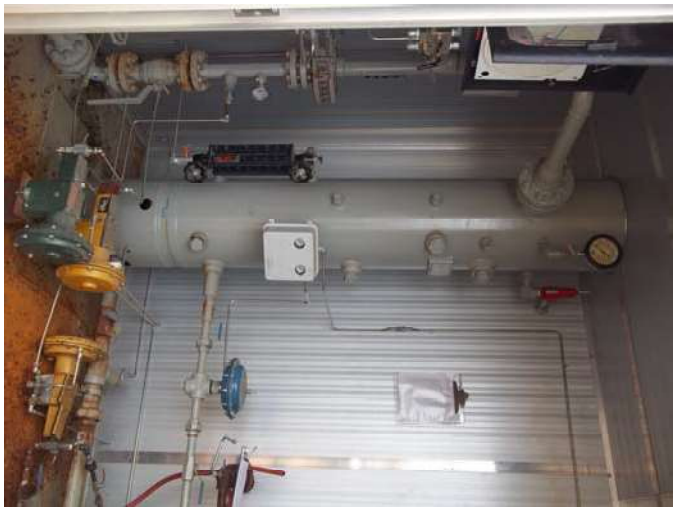
CNRL Coordinator (Signature):

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

03 bottom head

04 flaking paint

05 surface corrosion

06 PSV overview

07 disconnected piping

08 isolated well