Canadian Natural

PRESSURE VESSEL VISUAL INSPECTION REPORT

Report #:	91590-MD-05
Inspect Date:	06/29/2011
Page:	1 of 10
Insp. Co. Job #:	91590

Criticality Designation: Green

Insp. Comp:	Matrix_Inspection	District:	St Albert - South	Field:	Morrin 1327
Location:	11-16-031-20W4	Unit / Skid #:	Group Inlet Bld	LSD:	11-16-031-20W4
Jurisdiction #:	A0431756	Equip Tag #:		Serial #:	96-8771-1
CRN #:	M2318.21	Nat'l Bd #:		Year Built:	1997
Manufacturer:	WELLS-HALL FABRICATION LTD	Equipment Description:	Other: INLET SEPARATOR		
Status:	In Service -	Equip. Type:	Vessel: Separator	Service:	Sweet
MAWP Shell:	720 Psi @ 100 °F	Volume:		Code Stamp:	☒ Y ☐ N
MAWP Tube:	Psi @ °F	Height/Length:	114.17 in.	Insulated:	☐ Y ☒ N
MDMT:	-20 °F	RT:	RT-1	Size/Diameter.:	36.00 in.
Support	Skirt	Vessel on Original CNRL Inventory List:	☒ Y ☐ N	Manway:	☐ Y ☒ N
C.A.:	in.	Coated:	Yes	Clad:	No
J.E.:	N/A	Remote Access:	☐ -		

	Component	Material	Nominal Thk	Diameter	OD/ID	Tube Side	Shell Side
1	Main - Shell		0.875 in.	36.000 in.	OD	☐	☒
2	- Head		0.960 in.	36.000 in.	OD	☐	☒
3	- Head		0.960 in.	36.000 in.	OD	☐	☒
4	-					☐	☐
5	-					☐	☐

Static Data: Confirmed ☐ Changed (See Comments) ☒

Comments:
static data updated

PSV Static Data

PSV –1 Tag #:	PSV431756	Serial #:	CE-3914-KD	CRN:	0G254.5C
Model #:	2741U	Capacity:	5609 SCFM	Set Pressure:	720 psi
Manufacturer:	Farris			Service Company:	Power Comm
Inlet Size & Type:	2.00 in. - Threaded			Last Service Date:	5/05/2009
Outlet Size & Type:	2.00 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

Proper venting and set pressure

Insp. Company: Matrix_Inspection LSD: 11-16-031-20W4 Jurisdiction #: A0431756

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	sure and legible	☐	☐	☐
Foundation and Supports	☐	Accept	skid foundation with skirt support	☐	☐	☐
Anchor Bolts	☐	Accept	no evidence of damage	☐	☐	☐
Grounding	☐	Accept	grounded by skid	☐	☐	☐
Insulation Condition	☒		vessel is not insulated	☐	☐	☐
PSV	☐	Accept	proper venting and set pressure	☐	☐	☐
Shell Heads & Nozzles	☐	Accept	condensation noted during inspection	☐	☐	☐
Metal Surfaces (Paint)	☐	Accept	well adhered with a scratch	☐	☐	☐
Aux Equipment	☐	Accept	adequately supported	☐	☐	☐
Cathodic Protection	☒		no anodes for inspection	☐	☐	☐
Alignment	☐	Accept	level with skid	☐	☐	☐
Flange Connections	☐	Accept	correct bolting and thread engagement	☐	☐	☐
Pressure Gauge	☐	Accept	0 - 1000 pi	☐	☐	☐
Temperature Gauge	☐	Accept	-40-160 °F	☐	☐	☐
Sight Glass	☐	Accept	clean and intact	☐	☐	☐
Ladder / Platform	☒		no ladders or platforms	☐	☐	☐
Leaks	☐	No	evidences of previous leaks noted	☐	☐	☐
Piping from Vessel	☐	Accept	secure and well supported			
Previous UT Survey	☒	No	N/A	UT Company: N/A		

External Visual Observations

The overall condition of the separator is good. It should be noted that the separator was not in use during the inspection; the sight glass was empty and pressure was 0.

There is evidence of previsions leaks noted at the flange connections to the sight glass piping.

Condensation was observed on the inside building portion of separator at the time of inspection.

There in minor corrosion in the tell-tale holes of the reinforcement pads on the vessel.

A UT corrosion Survey was performed using a DMS 2 with no significant wall lose noted at the time of inspection

There is a scratch on the shell (north side ~ 7' from grade) extending upwards ~ 19". the depth was not mensurable due to how tight it is. This should be verified to be free of non-linear or crack-like indication prior to operating.

Recommendations:

Buff off paint to perform MT examination to determine if any indication has propagated into the shell, or perform shear wave ultrasonic examination to determine if there is any depth to this suspect area.

Maintain regulatory inspection to ensure safe operation and continued use.

Insp. Company: Matrix_Inspection LSD: 11-16-031-20W4 Jurisdiction #: A0431756

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

Insp. Company: Matrix_Inspection LSD: 11-16-031-20W4 Jurisdiction #: A0431756

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

Canadian Natural	PRESSURE VESSEL VISUAL INSPECTION REPORT	Report #: 91590-MD-05 Inspect Date: 06/29/2011 Page: 5 of 10 Insp. Co. Job #: 91590

Insp. Company: Matrix_Inspection LSD: 11-16-031-20W4 Jurisdiction #: A0431756

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):

There is a scratch on the shell (north side ~ 7' from grade) extending upwards ~ 19". the depth was not mensurable due to how tight it is.

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

Buff off paint to perform MT examination to determine if any indication has propagated into the shell, or perform shear wave ultrasonic examination to determine if there is any depth to this suspect area

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

None

Additional Visual Observations

None

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

None

Insp. Company: Matrix_Inspection LSD: 11-16-031-20W4 Jurisdiction #: A0431756

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

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

Canadian Natural	PRESSURE VESSEL VISUAL INSPECTION REPORT	Report #: 91590-MD-05 Inspect Date: 06/29/2011 Page: 8 of 10 Insp. Co. Job #: 91590

Insp. Company: Matrix_Inspection LSD: 11-16-031-20W4 Jurisdiction #: A0431756

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? : ***No***
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						Green

Vehicle #: Kms:

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

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

Personnel:

Billing Info: :

Inspector (Name): Matthew B Dickinson PESL:

Inspector (Signature): Matthew Dickinson 2011.07.13 15:48:43 -06'00' API: 39483

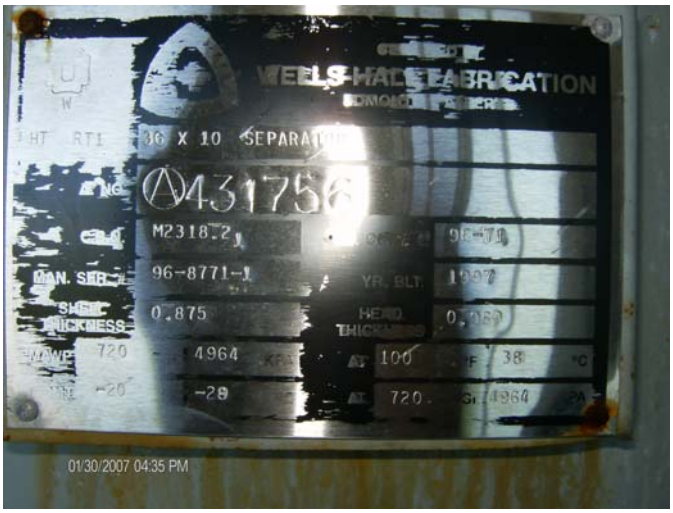
CNRL Coordinator (Name):

CNRL Coordinator (Signature):

CNRL Chief Inspector (Signature): (I am in full agreement with report contents)

(I am in full agreement with report contents)

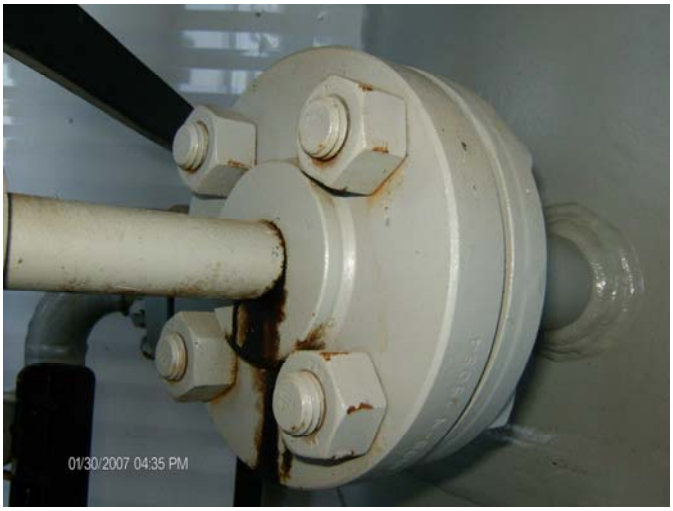
Equipment Photographs:



01 nameplate

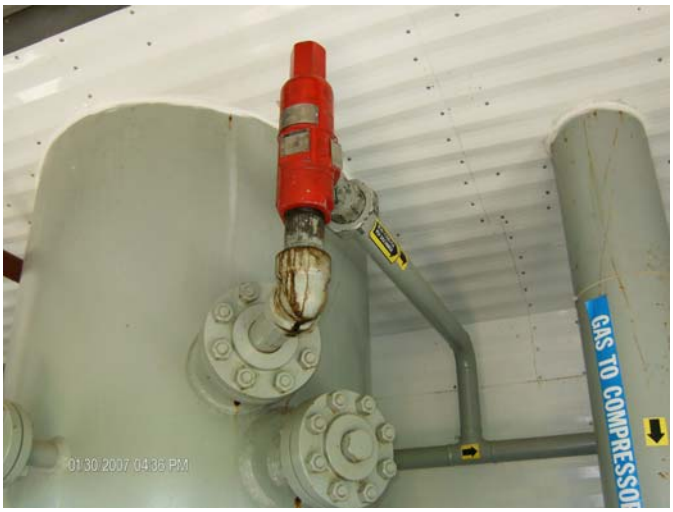
02 overview

02.1 outside overview

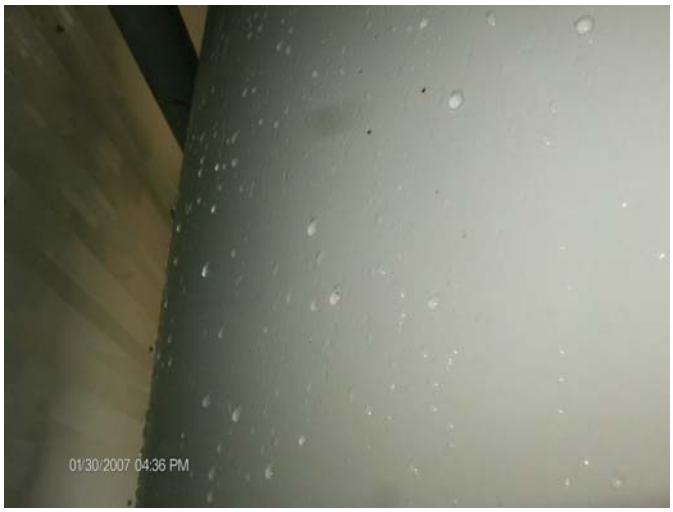


03 previous process leak

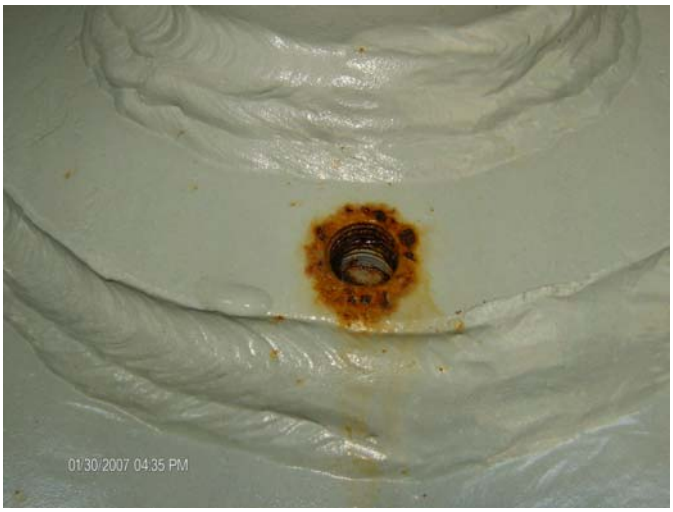
04 gouge like scratch



05 PSV overview



06 condensation on tank



Pic 043