Canadian Natural

PRESSURE VESSEL VISUAL INSPECTION REPORT

Report #:	91517-MD-44
Inspect Date:	05/04/2011
Page:	1 of 10
Insp. Co. Job #:	91517

Criticality Designation: Green

Insp. Comp:	Matrix_Inspection	District:	St Albert - South	Field:	Brightview 1431
Location:	14-02-046-01W5	Unit / Skid #:	Inlet Bld	LSD:	14-02-046-01W5
Jurisdiction #:	A0244714	Equip Tag #:		Serial #:	FS5959
CRN #:	H5308.2	Nat'l Bd #:		Year Built:	1988
Manufacturer:	LARSEN D' AMICO MFG LTD	Equipment Description:	Other: SEPARATOR		
Status:	In Service -	Equip. Type:	Vessel: Separator	Service:	Sweet
MAWP Shell:	1440 Psi @ 130 °F	Volume:	0.48 m³	Code Stamp:	☒ Y ☐ N
MAWP Tube:	Psi @ °F	Height/Length:	108.00 in.	Insulated:	☐ Y ☒ N
MDMT:	-20 °F	RT: RT-1	Size/Diameter.: 20.00 in. O.D.	PWHT:	☐ Y ☒ N
Support	Saddle	Vessel on Original CNRL Inventory List:	☒ Y ☐ N	Manway:	☒ Y ☐ N
C.A.:	1.58 mm	Coated: Yes	Clad: No	J.E.: N/A	Remote Access: ☐ -

	Component	Material	Nominal Thk	Diameter	OD/ID	Tube Side	Shell Side
1	Main - Shell	SA-516-70	25.000 mm	20.000 in.	OD	☐	☒
2	North - Head	SA-516-70	22.000 mm	20.000 in.	OD	☐	☒
3	South - Head	SA-516-70	22.000 mm	20.000 in.	OD	☐	☒
4	-					☐	☐
5	-					☐	☐

Static Data: Confirmed ☐ Changed (See Comments) ☒

Comments:
Static data updated

PSV Static Data

PSV –1 Tag #:	PSV244714	Serial #:	88C1802	CRN:	01832.52
Model #:	1997C11111	Capacity:	10693	Set Pressure:	1440 psi
Manufacturer:	Consolidated			Service Company:	
Inlet Size & Type:	1.50 in. -			Last Service Date:	6/21/2006
Outlet Size & Type:	in. -			Block Valve:	- -
Carseal Intact:				Code Stamp:	
Shell Side / Tube Side:		Out for Service During Insp.:		Location of PSV:	

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

To be removed and serviced during the 2011 TA

Insp. Company: Matrix_Inspection LSD: 14-02-046-01W5 Jurisdiction #: A0244714

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	secure and legible	☐	☐	☐
Foundation and Supports	☐	Accept	acceptable condition	☐	☐	☐
Anchor Bolts	☐	Accept	tight with no signs of deformation	☐	☐	☐
Grounding	☐	Accept	grounded to building	☐	☐	☐
Insulation Condition	☒		coalescer does not have insulation	☐	☐	☐
PSV	☐	Accept	vented properly	☐	☐	☐
Shell Heads & Nozzles	☐	Accept	minor surface corrosion noted	☐	☐	☐
Metal Surfaces (Paint)	☐	Accept	mild paint chipping and flaking	☐	☐	☐
Aux Equipment	☐	Accept	instrumentation intact	☐	☐	☐
Cathodic Protection	☒		no anode for inspection	☐	☐	☐
Alignment	☐	Accept	vessel is level with building	☐	☐	☐
Flange Connections	☐	Accept	proper studs and nuts	☐	☐	☐
Pressure Gauge	☐	Accept	0-1500 psi	☐	☐	☐
Temperature Gauge	☐	Accept	0-100°C	☐	☐	☐
Sight Glass	☐	Accept	visible level and intact	☐	☐	☐
Ladder / Platform	☒		no ladders or platforms on vessel	☐	☐	☐
Leaks	☐	No	no leaks noted at the time of inspection	☐	☐	☐
Piping from Vessel	☐	Accept	well supported			
Previous UT Survey	☒		UT Company:			

External Visual Observations

There is mild paint deterioration through out the vessel exposing the base metal to minor surface corrosion. Minor surface corrosion also noted between the flanges and supports. The lifting lugs on the manway are bent with cracking on the painted welds. The thru-wall caulking seal is deteriorated.

UT corrosion survey was performed on selected areas of the shell, heads, nozzles and piping at suspect locations using GE DMS2 SN 01NOV4. All readings recorded were found to be at or above nominal thickness - corrosion allowance. Evidence of previously performed surveys was noted but no access to previous UT data was available at the time of inspection.

Recommendations:

Clean the minor surface corrosion and touch up the point. Remove the paint on the south head lifting lugs and perform MT examination at the next scheduled TA. Replace the existing thru-wall caulking seal. Maintain the inspection and UT corrosion survey frequency.

Insp. Company: Matrix_Inspection LSD: 14-02-046-01W5 Jurisdiction #: A0244714

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: 14-02-046-01W5 Jurisdiction #: A0244714

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 #: 91517-MD-44 Inspect Date: 05/04/2011 Page: 5 of 10 Insp. Co. Job #: 91517

Insp. Company: Matrix_Inspection LSD: 14-02-046-01W5 Jurisdiction #: A0244714

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 mild paint deterioration through out the vessel exposing the base metal to minor surface corrosion. Minor surface corrosion also noted between the flanges and supports. The lifting lugs on the manway are bent with cracking on the painted welds.

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

Clean the minor surface corrosion and touch up the point. Remove the paint on the south head lifting lugs and perform MT examination at the next scheduled TA. Replace the existing thru-wall caulking seal.

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

no actions to correct at the time of inspection

Additional Visual Observations

No additional visual observations made at the time of inspection

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

the south door stairs were removed during the 2011 TA.

Insp. Company: Matrix_Inspection LSD: 14-02-046-01W5 Jurisdiction #: A0244714

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

Insp. Company: Matrix_Inspection LSD: 14-02-046-01W5 Jurisdiction #: A0244714

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 #: 91517-MD-44 Inspect Date: 05/04/2011 Page: 8 of 10 Insp. Co. Job #: 91517

Insp. Company: Matrix_Inspection LSD: 14-02-046-01W5 Jurisdiction #: A0244714

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 #: 380 Kms:

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

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

Personnel:

Billing Info: :

Inspector (Name): MatthewBDickinson PESL:

Inspector (Signature): Matthew Dickinson 2011.06.06 10:24:54 -06'00' API: 39483

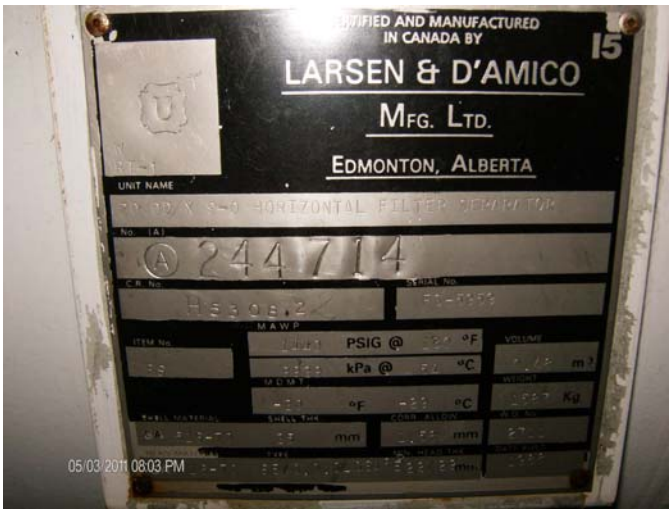
CNRL Coordinator (Name):

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

03 outside overview

04 lugs are bent

05 paint deterioration with surface scale

06 corrosion between flanges