



Client	Canadian Natural Resources Ltd.	Inspection Date	Apr 20, 2020		
Prov. Reg. #	AB 0493000	Inspection Type	VE / UT		
Equipment Type	Inlet Gas Cooler	Location	Narraway		
Tag/Equip.	E-100	LSD	AB 10-12-063-12W6		
Status	In Service	Downhole LSD			
Manufacturer	Petro-Tech Heaters Ltd	Area	East Gunderson		
Serial Number	03-114	Year Built	2003		
CRN #	R2413.2	Service	Sweet		
Comp/Unit Id	Inlet Building	Manway	20"		
Nat.Board #		Coating			
Interim Insp'n		Interim Type			
Next Thorough Insp	2025	Next Insp Type	VE / UT		
Length		Height			
Volume		Client Reference			
Owner	Canadian Natural Resources Ltd.	RT	1	HT	YES
Foreman		RAE Job No.	9249		
ABSA	Plant:	Vessel:	Process:	Special:	ASME Sec. VIII div. 1
History Log					

Component	Tubeside				
MAWP	1440.0 PSI @ 300 °F		MDMT	-40 °F @ 1440.0 PSI	
Material			Material Thickness		
Diameter			Length		
Corrosion Allowance					



Valve Tag No	WAP-1515	Relief Type	Pressure Safety Valve
Manufacturer	Crosby	Set Pressure	1440.000 PSI
Serial Number	03-09997	Capacity	36799 SCFM
Model	JOS E 55 N8 U	Last Service	Sep 15, 2015
CRN	0G0703.9C	Next Service	2020
Service Co.	Unified	Service Interval	60 Months
Service Co. Tag	17271G	Inlet Size	3 in
ASME Stamp	UV	Outlet Size	4 in
NB Stamp	YES	Connection	Flanged
Relief Dest.	To Flare	Valve Loc.	On Piping
Comments	Serial number on service tag and on PSV nameplate don't match.	Client Reference	

Building Observations

The vessel was not located inside a building.

Piping Observations

The attached piping was in good condition.

The piping was sufficiently supported with no damage, distortion or undue stress evident.

The piping was insulated and painted and was painted and generally in good condition.

The piping had welded joints and flanged connections that showed no signs of leakage.

The pipe flanges and bolting appeared to be in good condition. The flanged connections were fully bolted.

There were no concerns with the piping.

Figure: 1



Inlet Piping

Figure: 2



Outlet Piping



PSV Observations

Overpressure protection via inlet separator PSV.

The PSV is due for service in 2020.

The PSV was mounted in the vertical position and securely attached to the piping.

The nameplate and service tag were securely attached and legible.

The set pressure was acceptable for the vessel.

The PSV seal wire was attached and intact.

The vent size was adequate and the vent line was positioned safely.

The outlet piping provided positive drainage for the PSV.

There were no block valves on the PSV piping.

Figure: 3



PSV Service Tag Front

Figure: 4



PSV Service Tag Back

Figure: 5



PSV General



External Observations

The vessel was located outside.

The vessel nameplate was legible and securely attached to the vessel.

The vessel was identified by A number and serial number on the nameplate.

The heads, shell, nozzles and bolting appeared to be in good condition.

There was no stress evident on piping or nozzle connections

There was no damage or distortion evident on the vessel surface.

The vessel was not insulated. It was painted and generally in good condition.

The gauges were in good condition.

The vessel was adequately supported.

Figure: 6



Vessel Nameplate

Figure: 7



Vessel Overview

Figure: 8



Vessel Header

Figure: 9



Vessel Gauge 1



Figure: 10



Vessel Gauge 2

UT1 Observations

See attached appendices for ultrasonic testing (UT) report.

Recommendations

Serial number on service tag and on PSV nameplate don't match.

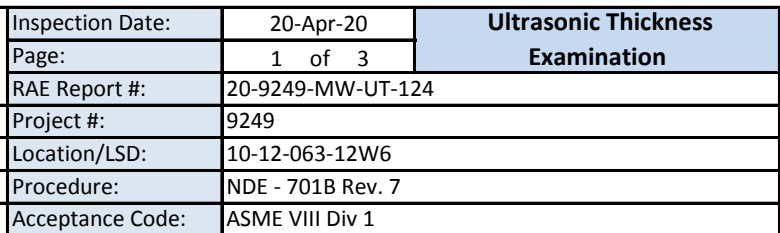
Based on the scope and results at the time of this inspection, the vessel is fit for service.

Inspector : Alex Williams

Trevor Paananen, P.Eng.

Alberta IBPV #A-55680
CWB Level I #4816, API 570 #76796
API 653 #22574, NACE Level I #12488

Reviewed By: Trevor Paananen



Items Tested:	1	Material:	CS	Nominal Thickness:	Various
Item Number:	A 0493000	Surface	☒ Coated	☐ Bare Steel	☐ Machined
Item Description:	Cooler	Condition:	☐ As Ground	☐ Shot Blasted	☐ As Welded
		Surface Temp:	☐ < 0 °C	☒ 0-120 °C	☐ 120-260 °C

Instrument Mfr:	Olympus	Model:	38DL Plus	S/N:	120408804	Cal. Due:	Jan 06/ 21
Cal Block S/N:	60796	1 or 2 Point Cal:	☐ 1 ☒ 2	Calibrated Range:	0.100"-0.800"	Couplant:	UTX

	Probe Model	Freq MHz	Angle	Dia. (in)	Probe Type		Manufacturer	Serial #	Cable length	Delay line	Vel. (m/sec)	Transfer Value	Ref dB	Ref %FSH	Scan dB	Range (mm)
					Single	Dual										
1	NS	5.0	0°	0.38	☐	☒	Stresstel	0168FF	4'	☐	5850	NA	60	80	As Needed	50
2					☐	☐				☐						
3					☐	☐				☐						
4					☐	☐				☐						

Scope: Conduct 0° straight beam ultrasonic testing on Cooler assessing the *components* for any signs of wall thinning due to corrosion, erosion, laminations or inclusions.

Results: The measurements obtained from the inspection locations show the thickness of all of the components inspected to be at or around nominal. There were no signs of wall thinning, internal corrosion, erosion, laminations or inclusions at the time of inspection. All piping measurements were within the 12.5% mill tolerance, as per ASTM specifications.

Please see the following pages for the pictures of the nameplate and the overall view, the isometric drawings, and the thickness measurements.

Client Representative	PRINT	SIGNATURE				
1 ST Technician	Zong Jun Wang PRINT		CGSB#:	17304	CGSB Level:	2
			SNT#:		SNT Level:	
2 ND Technician	PRINT	SIGNATURE	CGSB#:		CGSB Level:	
			SNT#:		SNT Level:	

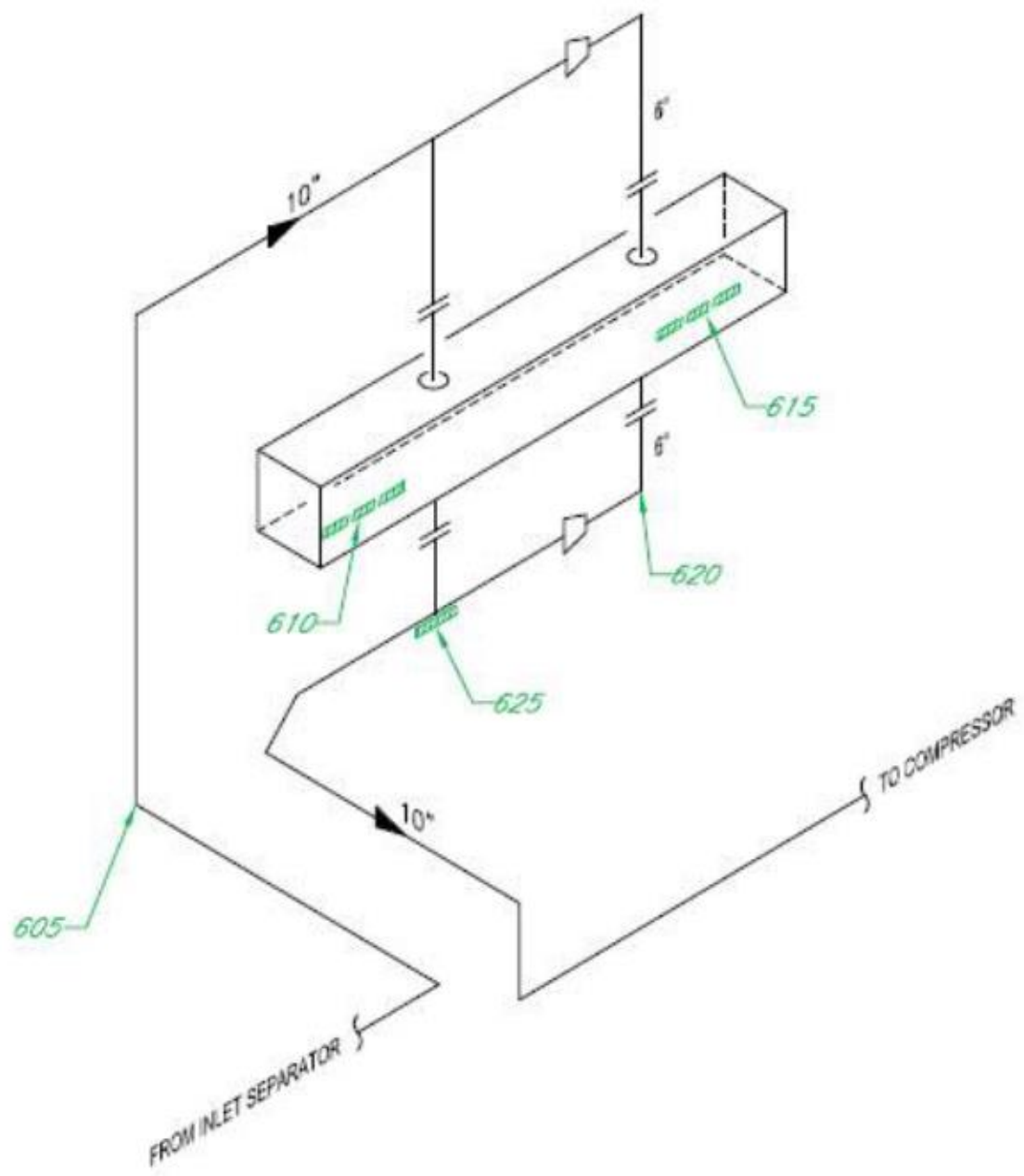


RAE Engineering and Inspection Ltd
4810 - 93 Street Edmonton, AB, T6E 5M4
ph: 780-469-2401 fx: 780-468-2422

Date:	20-Apr-20	Ultrasonic Thickness Examination
Page:	2 of 3	
RAE Report #:	20-9249-MW-UT-124	
Project #:	9249	
Location/LSD:	10-12-063-12W6	
Procedure:	NDE - 701B Rev. 7	
Acceptance Code:	ASME VIII Div 1	

Client:	CNRL
Item Number:	A 0493000
Item Description:	Cooler

ISO Drawing of Equipment and TMLs



Client Representative	PRINT	SIGNATURE				
1 ST Technician	Zong Jun Wang		CGSB#:	17304	CGSB Lvl:	2
	PRINT		SNT#:		SNT Lvl:	
2 ND Technician			CGSB#:		CGSB Lvl:	
	PRINT	SIGNATURE	SNT#:		SNT Lvl:	



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Measurements in: millimeters							TML Data											
TML	Description						1	2	3	4	5	6	7	8	9	10	11	12
610	Header						25.850	26.010	25.950	25.940	26.130	26.100	26.390	26.390	26.290	26.100		
	Nom.	25.40	Min.	22.20	Direc.	L-R									Min. =	25.850	Ave. =	26.115
615	Header						25.800	25.910	25.880	26.020	25.860	25.910	25.880	25.900	25.830	25.820		
	Nom.	25.40	Min.	22.20	Direc.	L-R									Min. =	25.800	Ave. =	25.881
605	10"	Sch 80	90° Elbow				15.610	15.420	15.260	15.210	14.990	14.970	15.000	15.040	14.980	14.840		
	Nom.	15.09	Min.	13.20	Direc.	T-B									Min. =	14.840	Ave. =	15.132
620	6"	XH	90° Elbow				10.260	10.180	10.420	10.420	10.530	10.550	10.590	10.660	10.700	10.710		
	Nom.	10.97	Min.	9.60	Direc.	T-B									Min. =	10.180	Ave. =	10.502
625	10"	Sch 80	Tee				16.920	17.100	17.200	17.580	16.920	16.930	16.920	16.920	16.900	16.970		
	Nom.	15.09	Min.	13.20	Direc.	L-R									Min. =	16.900	Ave. =	17.036