



Client	Canadian Natural Resources Ltd.	Inspection Date	Jul 2, 2019		
Prov. Reg. #	AB 0662699	Inspection Type	VE / UT		
Equipment Type	Horizontal Glycol Cooler	Location	Gold Creek		
Tag/Equip.		LSD	AB 13-26-067-05W6		
Status	In Service	Downhole LSD			
Manufacturer	Calhex Industries Ltd	Area			
Serial Number	16-1139	Year Built	2016		
CRN #	Y2702.2	Service	Glycol		
Comp/Unit Id	Glycol Area	Manway	None		
Nat.Board #		Coating			
Interim Insp'n		Interim Type			
Next Thorough Insp	2024	Next Insp Type	VE / UT		
Length		Height			
Volume		Client Reference			
Owner	Canadian Natural Resources Ltd.	RT		HT	YES
Foreman	Chris Maxsom	RAE Job No.	8364		
ABSA	Plant: H Vessel: T Process: H Special: B	ASME	Sec. VIII div. 1		
History Log					

Component	Shell				
MAWP	230.0 PSI @ 351 °F		MDMT	-49 °F @ 230.0 PSI	
Material		Material Thickness			
Diameter		Length			
Corrosion Allowance					



Valve Tag No	25	Relief Type	Pressure Safety Valve
Manufacturer	Consolidated	Set Pressure	150 PSI
Serial Number	69C2085	Capacity	4519 lb/hr
Model	1905 GC S1	Last Service	May 31, 2014
CRN		Next Service	2019
Service Co.	Unified Valve	Service Interval	60 Months
Service Co. Tag	1288V	Inlet Size	1.5 in
ASME Stamp	UV	Outlet Size	2.5 in
NB Stamp	YES	Connection	Flanged
Relief Dest.	To Flare	Valve Loc.	On Vessel
Comments	PSV located on Glycol Surge Tank	Client Reference	

Comments

The following RAE Procedure(s) was/were used in inspecting this vessel:  
INS-669B Air Cooler Exchanger Inspection Procedure  
NDE-701B UT-1 Ultrasonic Thickness Measurement Procedure

Figure: 1



Vessel Location

Building Observations

The cooler was located outside any building structures.



Piping Observations

The attached piping was generally in serviceable condition. It was sufficiently supported with no damage, distortion or undue stress evident. The flanged and threaded joints were properly connected, and exhibited no signs of leakage.

PSV Observations

The Pressure Safety Valve (PSV) was installed outside. The PSV for this particular vessel was attached to the piping. The orientation of the PSV was vertical. It was also noted that the PSV was in good condition. The seal on the PSV was intact and the PSV was easily accessible for inspection. The set pressure of this particular PSV is acceptable to the maximum allowable working pressure of the vessel.

Figure: 2



PSV Overview

Figure: 3



PSV Service Tag

Figure: 4



PSV Service Tag 1



External Observations

The cooler was located outside of any building structures. The cooler was identified by it's A/serial number. The cooler was in good condition. No dents or damage evident on the surface of the cooler. This cooler was mounted horizontally. The louvers appeared to be in good operating condition. The cooler was supported by the cooler housing.

Figure: 5



Cooler Nameplate

Figure: 6



Cooler Overview

Figure: 7



Cooler Overview 1

Figure: 8



Cooler Overview 2

UT1 Observations

Please see the attached Appendices for UT Data.

Recommendations

Based on the scope of this inspection, the vessel appears suitable for continued service.



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Report No: KM004790

**Ken McNeil**


Alberta IBPV #A-75085  
API 510 #39628, API 570 #66961  
API 653 #47993, CWB Level III #483

**Trevor Paananen, P.Eng.**

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

Inspector : Ken McNeil

Reviewed By: Trevor Paananen

	RAE Engineering and Inspection Ltd 4810 - 93 Street Edmonton, AB, T6E 5M4 ph: 780-469-2401 fx: 780-468-2422		Inspection Date: 2-Jul-19	Ultrasonic Thickness Examination
			Page: 1 of 4	
	Client: Canadian Natural Resources Ltd.		RAE Report #: 19-8364-LC-UT-65	
Address: Suite 2500, 855-2St., SW, Calgary, AB, T2P4J8		Project #: 8364		
Client P.O.#: NA		Location/LSD: Gold Creek / 13-26-067-05 W6		
Client Representative: NA		Procedure: NDE-701B UT-1 REV. 7		
		Acceptance Code: ASME VIII, Div. 1 & ASME B31.3		

**JOB DESCRIPTION**

Items Tested: Vessel & Piping	Material: Carbon Steel
Item Number: A0662699	Surface: <input checked="" type="checkbox"/> Painted <input type="checkbox"/> Bare Steel <input type="checkbox"/> Machined
Item Description: Glycol Cooler	Condition: <input type="checkbox"/> As Ground <input type="checkbox"/> Shot Blasted <input type="checkbox"/> As Welded
	Surface Temp: <input type="checkbox"/> < 0 °C <input checked="" type="checkbox"/> 0-120 °C <input type="checkbox"/> 120-260 °C <input type="checkbox"/> >260 °C

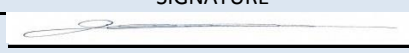
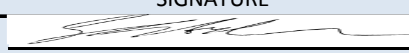
**EQUIPMENT, TECHNIQUE & CALIBRATION**

Instrument Mfr: GE	Model:	DMS Go+:	S/N: GOPLS17070020	Cal. Due: 18-Apr-20											
Cal Block S/N: 12-4693	1 or 2 Point Cal: <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2	Calibrated Range: 0.250"-1.000"	Couplant: Sono 600												
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)
1 TG-790HP	5.0	0°	0.25	<input type="checkbox"/> Single	<input checked="" type="checkbox"/> Dual	NDT Systems	89158	4'	<input type="checkbox"/>	5850	NA	52	80	As Needed	40
2				<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>						
3				<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>						
4				<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>						


**Scope:** Conduct 0° straight beam ultrasonic testing on a glycol cooler while looking for any signs of wall thinning due to corrosion, erosion, laminations or inclusions.

**Results:** The measurements obtained from the inspection locations showed the thickness of all of the components inspected to be consistent in thickness, however no nominal thicknesses were available. 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.

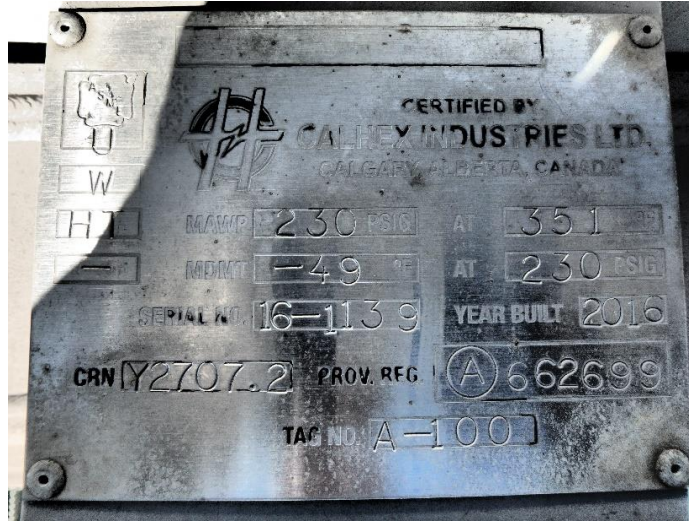
Please see the following pages for the pictures of the nameplate and the overall view, the isometric drawings, and the thickness measurements.

Client Representative	NA	SIGNATURE		
1 <sup>ST</sup> Technician	Hyekyong Colp		CGSB#: 17600	CGSB Level: I
	PRINT	SIGNATURE	SNT#: 710B-010	SNT Level: I
2 <sup>ND</sup> Technician	Stuart Ashman		CGSB#: 18886	CGSB Level: II
	PRINT	SIGNATURE	SNT#:	SNT Level:



	RAE Engineering and Inspection Ltd 4810 - 93 Street Edmonton, AB, T6E 5M4 ph: 780-469-2401 fx: 780-468-2422	Date:	2-Jul-19	Ultrasonic Thickness Examination
		Page:	2 of 4	
Client:	Canadian Natural Resources Ltd.	RAE Report #:	19-8364-LC-UT-65	
Item Number:	A0662699	Project #:	8364	
Item Description:	Glycol Cooler	Location/LSD:	Gold Creek / 13-26-067-05 W6	
		Procedure:	NDE-701B UT-1 REV. 7	
		Acceptance Code:	ASME VIII, Div. 1 & ASME B31.3	

**Photographs of Equipment and Nameplate**



**View of Nameplate**



**Overall View of Equipment**

Client	NA				
Representative	PRINT		SIGNATURE		
1 <sup>ST</sup> Technician	Hyekyong Colp		SIGNATURE	CGSB#: 17600	CGSB Lvl: I
	PRINT			SNT#: 710B-010	SNT Lvl: I
2 <sup>ND</sup> Technician	Stuart Ashman		SIGNATURE	CGSB#: 18886	CGSB Lvl: II
	PRINT			SNT#:	SNT Lvl:



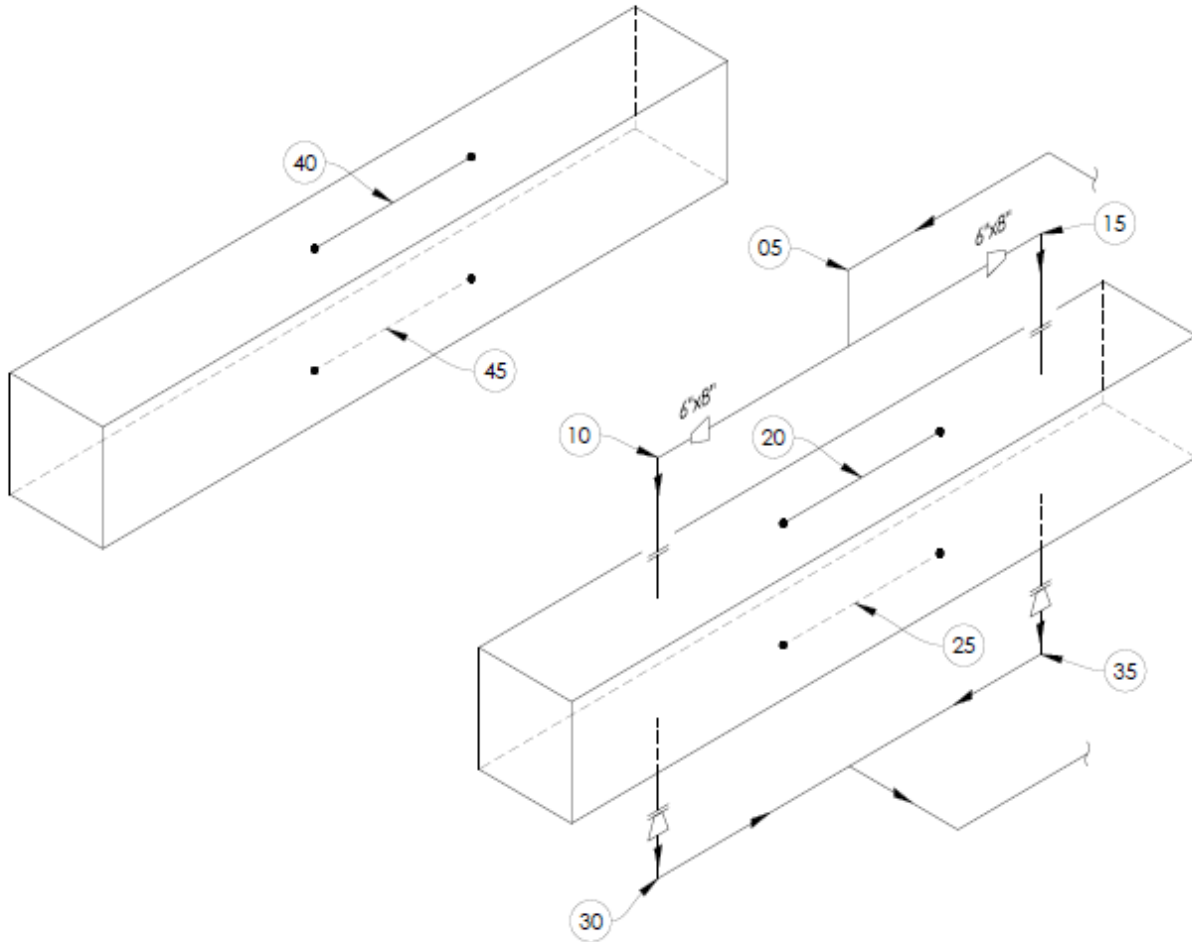
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Ultrasonic Thickness  
 Examination

Client: Canadian Natural Resources Ltd.  
 Item Number: A0662699  
 Item Description: Glycol Cooler

ISO Drawing of Equipment and TMLs



Client Representative	NA PRINT	SIGNATURE			
1 <sup>ST</sup> Technician	Hyekyong Colp PRINT	SIGNATURE	CGSB#: 17600	CGSB Lvl: I	
			SNT#: 710B-010	SNT Lvl: I	
2 <sup>ND</sup> Technician	Stuart Ashman PRINT	SIGNATURE	CGSB#: 18886	CGSB Lvl: II	
			SNT#:	SNT Lvl:	



