Pressure Equipment Static Data

General Information

Date:	June 16, 2023	**Location:**	Surface:	10-15-056-27W5	
Client/Owner:	CNRL		UWI/DH:	10-15-056-27W5	
District/Region:	Hinton	**Location Access:**		All Year	
Area:	Wildhay	**Inspection Type(s):**		VE UT NDE_MT VI	
Facility:	Compressor				

Pressure Equipment Information

Equip Name:	Line Heater			**CA** (in)**:**	N/A	mm:	
Manufacturer:	Alco Gas & Oil			**MDMT:**	- 20 F		
Provincial #:	A0506174	**Unit /Skid #:**	N/A	**PWHT:**	N/A		
S/N:	2004-7184-02	**Equip #:**	N/A	**RT:**	N/A (Pipe)		
CRN:	D-3826.21	**Year Built:**	2004	**Manway:**	Yes	**Size** (in)**:**	Firetube Opening
NB #:	N/A	**Orientation:**	Horizontal				

Zones

	MAWP (PSI)	MAWT (F)	MAWP (KPA)	MAWT (C)	Comment
Shell Side	15				Atmospheric pressure
Coil 1	1800	200			
Piping	Flange Rating	600	MAWP (PSI)	1480	No nameplate iinfo for 2" coil. Flange rating used.

Components

	Dia (OD) in.	Type	Material	Nominal (in)	Nominal (mm)	Comment
Shell	72	Plate	SA-36	0.250		
Head	72	Flat	SA-36	0.375		
Shell 2	30	Plate	SA-36	0.250		Material and nominal assumed

Pressure Safety Valve(s)

Zone:	**Shell Side**	
Equip #		
Location		
Set Press (PSI)		
Capacity		SCFM
Set Press (KPA)		
Manufacturer		
S/N		
Model		
Inlet Size (in)		Locked Open?
Outlet Size (in)		
Inlet I/V		
Outlet I/V		
Service Co.		
Serv. Date		

Service Status and Conditions

Status:	Out of Service	Service:	Sour	Primary Contents - Shell:	Glycol
		Concentration:		Primary Contents - Tube:	Gas

Comments

Vessel is out of service and disconnected.

Static data above is for pressure coil. Line heater shell S/N 2004-7184-01.

AVALANCHE INTEGRITY

REVIEWED

By Tylor Mombourquette at 8:34 am, Jun 27, 2023

Pressure Vessel External Inspection

Date:	June 16, 2023			**Equip Name:**	Line Heater
Inspector:	Kyle Bruns			**Prov #:**	A0506174
Client/Owner:	CNRL			**S/N:**	2004-7184-02
District/Region:	Hinton			**Unit /Skid #:**	N/A
Area:	Wildhay			**Equip #**	N/A
Facility:	Compressor	**Location:**		**Surface:**	10-15-056-27W5
				UWI/DH:	10-15-056-27W5

Component	Condition	Comment
Nameplate	Acceptable	Good condition. Securely attached, legible and all required information is present.
Grounding	Acceptable	Vessel is grounded through skid.
Foundation/Supports	Acceptable	Vessel is well supported on saddles, no concerns noted. All anchor bolts are installed and are secure.
Ladder/Platform	Acceptable	Ladder is in good condition and safe for use.
Insulation/Cladding	Acceptable	Vessel is 90% insulated and cladded. Insulation is in good overall condition.
Shell	Acceptable	Shell is in good condition, no concerns noted. Shell is well painted, no external corrosion concerns.
Heads	Acceptable	Heads are in good condition, no concerns noted.
Nozzles/Threadolets	Acceptable	All nozzles are in good condition. No concerns noted with deflection, improper thread engagement or bolting (as applicable).
Piping/Valves	Acceptable	All associated piping is adequately supported and in good condition. No concerns noted with leaks, deflection, thread engagement or bolting (as applicable).
Appurtenances & Instrumentation	Acceptable	Instrumentation is in good condition, no leaks noted. Pressure/Temperature gauge(s) are in good condition and operating within design limits (as applicable).
Sight Glass/Level Gauges	Acceptable	Sight glass(es) are in good condition. Rated for current vessel service with no concerns noted.
Other	N/A	
PSV	N/A	No PSV present.
NDE Methods	Acceptable	UT survey and MPI performed by Avalanche. No concerns at this time. No indications were noted during MPI.
Inspection Summary		

Recommendations	NCR #

Fit for Service:	Yes

** Fit for Service is only a recommendation based on the results of the current inspection.*

Recommended Intervals:	
VE	yrs
UT	yrs
PSV	yrs

Signature of Inspector:		
Cert #	API 510:	54849
	AB/SK:	979
Quality Systems Manager or Delegate:		Mike Williams
		
Cert #	API 510:	24838
	AB/SK:	200

External Inspection Pictures

PHOTOS

LSD Sign

Site Overview

Nameplates

Overview

Pressure Vessel Internal Inspection

Date:	June 16, 2023		**Equip Name:**	Line Heater	
Inspector:	Kyle Bruns		**Prov #:**	A0506174	
Client/Owner:	CNRL		**S/N:**	2004-7184-02	
District/Region:	Hinton		**Unit /Skid #:**	N/A	
Area:	Wildhay		**Equip #**	N/A	
Facility:	Compressor	**Location:**	**Surface:**	10-15-056-27W5	
			UWI/DH:	10-15-056-27W5	

Component	Condition	Comment
Shell	Acceptable	All accessible shell surfaces were in good overall condition. There was limited access to all shell surfaces above and around the process coil. Minor corrosion was visible at the 6 o'clock position in a 38" long area at the back end of shell measured from the back head. The deepest corrosion was measured to be 0.020" deep using a pit gauge. Corrosion is not a significant concern at this time. Product scaling was noted throughout the shell at the 12 o'clock position. Unable to visually confirm any corrosion depths due to the process coil.
Heads	Acceptable	Both heads were in good overall condition. There was no visible corrosion or mechanical damage noted during inspection. Inspection was limited on the top surface area of the back head due to the process coils.
Manway	Acceptable	Firetube opening is the manway for the line heater. No visible concerns at time of inspection.
Nozzles	Acceptable	All accessible nozzles were free of corrosion, mechanical damage or any deflection. Accessible nozzles are in good overall condition.
Gasket Surfaces	Acceptable	The gasket seating surfaces on the firetube tube sheet and the line heater shell flange were in good overall condition. There was no visible corrosion or mechanical damage. No sealing concerns at this time.
Internals	Acceptable	All accessible internals including firetube support brackets, fuel gas coil, process coil support brackets, and the process coils were securely in place. The was no visible corrosion or mechanical damage noted. There was no visible fretting at any of the process coil to support plate interfaces.
Welds	Acceptable	Accessible welds were in good condition. There was no visible corrosion. All accessible welds had full profile and had the same general appearance as the HAZ and the parent material.
Coating	N/A	
Firetube	Acceptable	24" Firetube was in good overall condition. There was no significant corrosion or mechanical damage noted. Minor corrosion noted inside the stack side tube at the 5-7 o'clock position. There was no visible hot spots or deformation noted during inspection.
Tubesheet	Acceptable	Firetube tubesheet is in good overall condition. There was no visible corrosion, mechanical damage, or deflection noted at time of inspection.
Tube Bundle	N/A	
Other	Observation	Thief hatch is in good overall condition and was in good working order. Minor corrosion noted in nozzle neck. All corrosion was less than 0.020" deep. Hatch seal is in poor condition and needs to be replaced.
NDE Methods	Acceptable	MT and UT was completed on the 24" firetube. No visible significant surface indications noted during MT. Minor internal wall loss noted on the stack side tube at the 5-7 o'clock position of tube. UT thickness readings were taken on all accessible return bends of the process coils. No significant wall loss noted at time of inspection.

Inspection Summary	Line Heater is in good overall condition. Minor corrosion noted at the 6 o'clock position of shell at the back end of line heater. The deepest corrosion was 0.020" measured with a pit gauge. There was no other significant corrosion or mechanical damage noted.
	Thief hatch seal was cracked and damaged. No relevant surface indications noted during Firetube MT inspection. No significant wall loss noted during process coil return bend UT.
	Inspection of the internal upper surfaces of line heater was limited due to the process coils.

Recommendations	NCR #
Replace thief hatch seal prior to start up.	

Pressure Vessel Internal Inspection

Fit for Service:	Yes

** Fit for Service is only a recommendation based on the results of the current inspection.*

Recommended Intervals:	
VI	yrs
UT	yrs
PSV	yrs

Signature of Inspector:		
Cert #	API 510:	54849
	AB/SK:	979
Quality Systems Manager or Delegate:		Mike Williams 
Cert #	API 510:	24838
	AB/SK:	200

AVALANCHE INTEGRITY

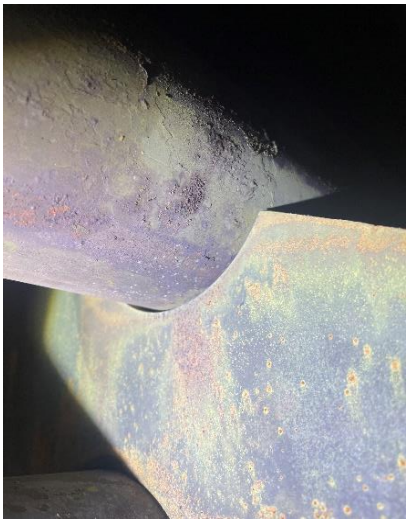
Internal Inspection Pictures

PHOTOS	
	
FIRETUBE OVERVIEW	ATMOSPHERE SIDE OF TUBESHEET
	
PRODUCT SIDE OF TUBESHEET	MITER SECTION END
	
STACK SIDE INTERNAL OVERVIEW	BURNER SIDE INTERNAL OVERVIEW

Internal Inspection Pictures

PHOTOS	
	
FIRETUBE OPENING OVERVIEW	TYPICAL FIRETUBE OPENING GASKET SURFACE
	
EXPANSION TANK THIEF HATCH NOZZLE NECK	EXPANSION TANK THIEF HATCH GASKET CONDITION
	
INTERNAL OVERVIEW	PROCESS COIL OVERVIEW

Internal Inspection Pictures

PHOTOS	
	
TYPICALPROCESS COIL SUPPORT TO SHELL WELD	TYPICAL PROCESS COIL/ PLATE INTERFACE
	
TYPICAL PROCESS COIL/ PLATE INTERFACE	TYPICAL WELD SEAM CONDITION
	
EXPANSION TANK NOZZLE	FUEL GAS COIL PIPING

Internal Inspection Pictures

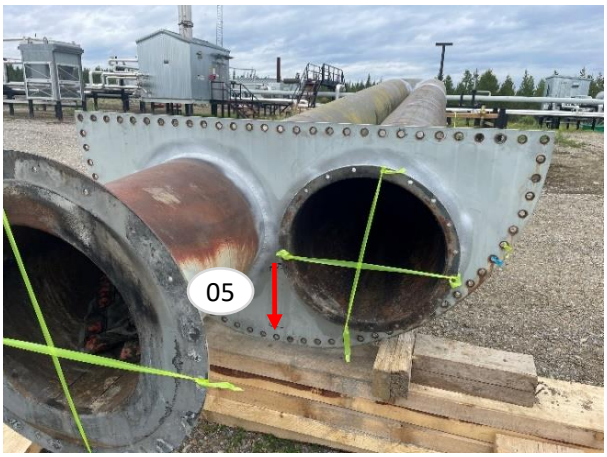
PHOTOS	
	
THERMOWELLS	BACK HEAD OVERVIEW
	
INTERNAL OVERVIEW FROM BACK END	2" DRAIN NOZZLE
	
FRONT END RETURN BENDS OVERVIEW	BACK END RETURN BENDS OVERVIEW

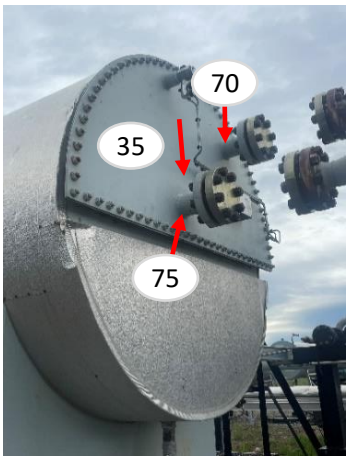
Internal Inspection Pictures

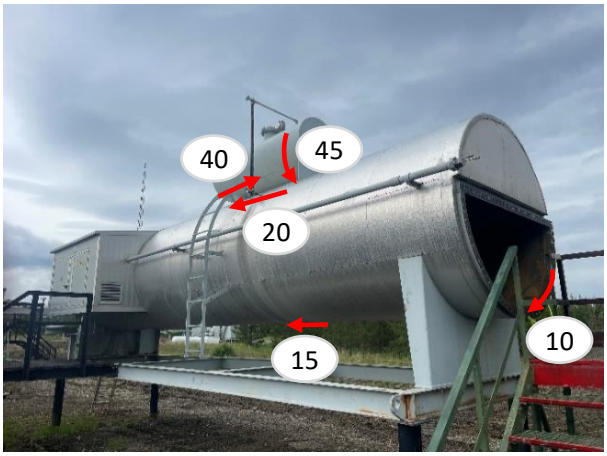
PHOTOS	
	
GENERAL CORROSION AT BACK END OVERVIEW	TYPICAL CORROSION CLOSE UP AT BACK END

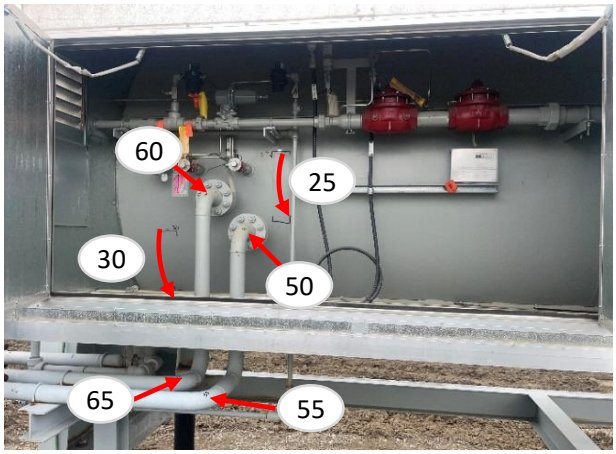
UT CORROSION SURVEY REPORT

STATIC DATA							
Date:	June 16, 2023		**Equip. Name:**	Line Heater			
Client/Owner:	CNRL		**Provincial #:**	A0506174	**Equip #:**	N/A	
District:	Hinton		**Manufacturer:**	Alco Gas & Oil	**CRN:**	D-3826.21	
Area:	Wildhay		**Year Built:**	2004	**S/N:**	2004-7184-02	
Facility:	Compressor		**RT (Joint Eff):**	N/A (Pipe)	**CA:**	N/A	in
Location/LSD:	SF:	10-15-056-27W5	UWI/DH:	10-15-056-27W5			
Notes:							









UT CORROSION SURVEY REPORT
READINGS

Date:	June 16, 2023	**Area:**	Wildhay	**Equip Name:**	Line Heater	**Equip #:**	N/A
Client:	CNRL	**LSD:**	SF: 10-15-056-27W5 / UWI: 10-15-056-27W5	**Prov #:**	A0506174	**S/N:**	2004-7184-02

VESSEL TMLS

	Baseline		Previous		Current												
	01-Jan-04		01-Jan-04		16-Jun-23												
TML ID	**LOW**	**AVG**	**LOW**	**AVG**	**LOW**	**AVG**	**SIZE (OD)**	**NOM**	**STCR (/YR)**	**LTCR (/YR)**	**Tmin**	**ST RL (YRS)**	**LT RL (YRS)**	**% Loss**	**Zone**	**Component / Type**	
05	0.375	0.375	0.375	0.375	0.372	0.375	72.000	0.375	0.0002	0.0002	0.216	50.0	50.0	0.80%	Shell Side	Head	Flat
10	0.250	0.250	0.250	0.250	0.247	0.253	72.000	0.250	0.0002	0.0002	0.032	50.0	50.0	1.20%	Shell Side	Shell	Plate
15	0.250	0.250	0.250	0.250	0.241	0.245	72.000	0.250	0.0005	0.0005	0.032	50.0	50.0	3.60%	Shell Side	Shell	Plate
20	0.250	0.250	0.250	0.250	0.219	0.233	72.000	0.250	0.0016	0.0016	0.032	50.0	50.0	12.40%	Shell Side	Shell	Plate
25	0.250	0.250	0.250	0.250	0.246	0.249	72.000	0.250	0.0002	0.0002	0.032	50.0	50.0	1.60%	Shell Side	Shell	Plate
30	0.250	0.250	0.250	0.250	0.243	0.247	72.000	0.250	0.0004	0.0004	0.032	50.0	50.0	2.80%	Shell Side	Shell	Plate
35	0.375	0.375	0.375	0.375	0.371	0.374	72.000	0.375	0.0002	0.0002	0.216	50.0	50.0	1.07%	Shell Side	Head	Flat
40	0.250	0.250	0.250	0.250	0.234	0.247	30.000	0.250	0.0008	0.0008	0.013	50.0	50.0	6.40%	Shell Side	Shell 2	Plate
45	0.250	0.250	0.250	0.250	0.245	0.247	30.000	0.250	0.0003	0.0003	0.013	50.0	50.0	2.00%	Shell Side	Shell 2	Plate

UT CORROSION SURVEY REPORT
READINGS

ATTACHMENT / PIPING / NOZZLE TMLS																		
	Baseline		Previous		Current													
	01-Jan-04		01-Jan-04		16-Jun-23													
TML ID	LOW	AVG	LOW	AVG	LOW	AVG	SIZE (OD)	NOM	STCR (/YR)	LTCR (/YR)	Tmin	ST RL (YRS)	LT RL (YRS)	% Loss	SCH	Zone	Shape	Type
50	0.154	0.154	0.154	0.154	0.149	0.164	2.375	0.154	0.0003	0.0003	0.085	50.0	50.0	3.25%	STD	Piping	90°	Piping
55	0.154	0.154	0.154	0.154	0.144	0.157	2.375	0.154	0.0005	0.0005	0.085	50.0	50.0	6.49%	STD	Piping	90°	Piping
60	0.154	0.154	0.154	0.154	0.141	0.150	2.375	0.154	0.0007	0.0007	0.085	50.0	50.0	8.44%	STD	Piping	90°	Piping
65	0.154	0.154	0.154	0.154	0.133	0.154	2.375	0.154	0.0011	0.0011	0.085	44.2	44.2	13.64%	STD	Piping	90°	Piping
70	0.337	0.337	0.337	0.337	0.337	0.343	4.5	0.337	0.0000	0.0000	0.195	50.0	50.0	0.00%	XS	Coil 1	360°	Piping
75	0.337	0.337	0.337	0.337	0.329	0.337	4.5	0.337	0.0004	0.0004	0.195	50.0	50.0	2.37%	XS	Coil 1	360°	Piping

Comments:	
	TML 20: Corrosion noted.
	TML 65: Erosion noted.

Disclaimer

Corrosion rates and remaining life calculations may not be accurate for any of the following reasons: i) year built and nominal used as baseline in calculations, ii) short time period between survey dates, iii) previous survey data was point readings instead of full scans. Client to perform follow up calculations as required.

Corrosion rates and remaining life calculations are not able to be performed in the following scenarios: i) baseline survey on new equipment, ii) when year built or in-service date is unknown, iii) Tmin is not able to be calculated, iv) no previous inspection history is available to provide previous date and readings needed for calculations.

If requested by client, the Tmin used for "Piping" Type is the greater of Pressure Design Thickness or API 574 – Table 7 Default Minimum Structural Thickness.

UT CORROSION SURVEY REPORT
READINGS

Notes:

**All readings are in:* inches

**Piping Tmin calculated:* Pressure Design Calcs

**RL maximum is 50 years.*

**% Wall loss is based on current low vs nominal.*

**Baseline is based off nominal if no previous readings available and started in year equipment was fabricated, unless other information is available to prove in-service date.*

**Previous readings taken from baseline if no past readings/survey data are available.*

** Day/Month used for Baseline and Previous readings is arbitrary if no dates are provided.*

** If no corrosion comments are made on piping, general low thickness was noted.*

UT EQUIPMENT & PROCEDURES					
Probe	**Wave**	**Freq.**	**Size**	**Manuf.**	**Serial #**
Dual	Long - 0°	5 Mhz	1/4"	Stresstel	23B00CR7
UT Set		**Serial #**		**Cal Date**	**Cal Block**
DMS GO+		GOPLS18010127		03-Jan-2023	1" C/S Step
Procedure(s):		UT-01		AI-CR-01	

TECHNICIAN SIGN-OFF		
Inspector:	Kyle Bruns	CGSB Certifications:
		10294 UT I / MT II / PT II / RT II
Signature:		

NDE REPORT

STATIC DATA							
Date:	June 16, 2023		**Equip. Name:**	Line Heater			
Client/Owner:	CNRL		**Provincial #:**	A0506174	**Equip #:**	N/A	
District:	Hinton		**Manufacturer:**	Alco Gas & Oil	**CRN:**	D-3826.21	
Area:	Wildhay		**Year Built:**	2004	**S/N:**	2004-7184-02	
Facility:	Compressor		**RT (Joint Eff):**	N/A (Pipe)	**CA:**	N/A	in
Location/LSD:	SF:	10-15-056-27W5	UWI/DH:	10-15-056-27W5			

CRITERIA / SURFACE CONDITION					
INSPECTION METHOD(S):	UT	MT		**ACCEPTANCE CRITERIA:**	CLIENT EVALUATION
PROCEDURE(S):	MT-2A	UT-01		**SPECIFICATION(S):**	AS PER CLIENT SPEC.
SURFACE CONDITION:	WIRE WHEEL CLEANED	AS WELDED		**MATERIAL / THICKNESS:**	CARBON STEEL 0.375"

MT/PT

MINIMUM LIGHT INTENSITY: ≥ 100 fc Visible, ≥ 1000 µW/cm2

LIGHTING TYPE:	Ambient Lighting				
EQUIPMENT TYPE	**SERIAL #**	**CALIBRATION DATE**		**MT CONSUMABLES**	
BLACKLIGHT				**MEDIUM:**	MAGNAFLUX 7HF (BWMPI)
LIGHT METER				**CONTRAST:**	MAGNAFLUX WCP-2
YOKE	N3177	June 16, 2023		**APPLICATION:**	SPRAY
YOKE TYPE	AC	CONTINUOUS	120 V	LEG SPACING: 3" - 8"	

PRODUCT	MFG / TYPE	BATCH #	DWELL (MIN)	APPLICATION METHOD	METHOD TYPE
PENETRANT:					
CLEANER:					
DEVELOPER:					

TEST RESULTS

MT SCOPE:

A WET BLACK ON WHITE MAGNETIC PARTICLE EXAMINATION WAS PERFORMED ON THE FOLLOWING LIST OF WELDS AS REQUESTED BY CLIENT. THE MT WAS DONE ON THE WELDS AS WELL AS A 1"-2" AREA TO EACH SIDE.

1- ATMOSPHERE SIDE TUBE TO TUBE SHEET FILLET WELDS
2- PRODUCT SIDE TUBE TO TUBE SHEET FILLET WELDS
3- ALL TUBE TO TUBE BUTT AND MITER SECTION WELDS
4- FIRETUBE SUPPORT BRACKET FILLET WELD

MT RESULTS:

NO VISIBLE RELEVANT SURFACE INDICATIONS NOTED AT TIME OF INSPECTION. SEE BELOW FOR LOCATIONS.

UT SCOPE:

ZERO DEGREE UT THICKNESS READINGS WERE TAKEN IN SELECT AREAS OF BOTH SIDES OF FIRETUBE AS WELL AS THE MITER SECTION. UT WAS ALSO COMPLETED ON ALL ACCESSIBLE RETURN BENDS OF THE 4" PROCESS COIL INSIDE OF THE LINE HEATER AS REQUESTED BY THE CLIENT.

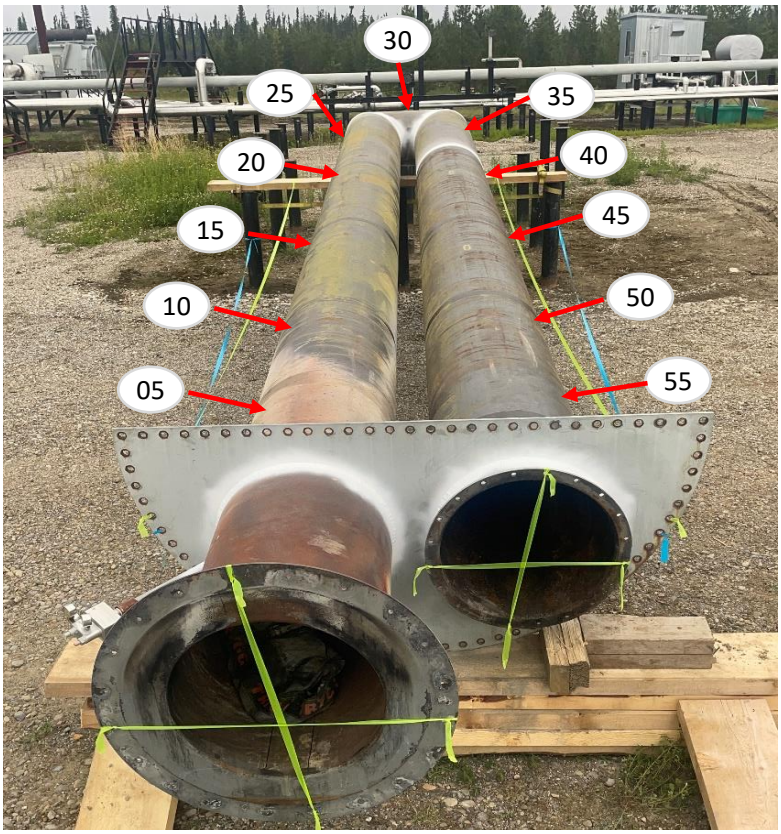
UT RESULTS:

MINOR INTERNAL CORROSION WAS NOTED THROUGHOUT THE 6 O'CLOCK POSITION OF THE STACK SIDE TUBE.
THERE WAS NO SIGNIFICANT WALL LOSS NOTED IN ANY OF THE INSPECTED RETURN BENDS.
SEE BELOW FOR LOCATIONS AND RESULTS.

TECHNICIAN:	Kyle Bruns	ASSISTANT:	Melissa Reeves
SIGNATURE:		CLIENT:	
CGSB/SNT CERTS:	10294 UT I / MT II / PT II / RT II	SIGNATURE:	

NDE REPORT

TEST RESULTS / PHOTOS



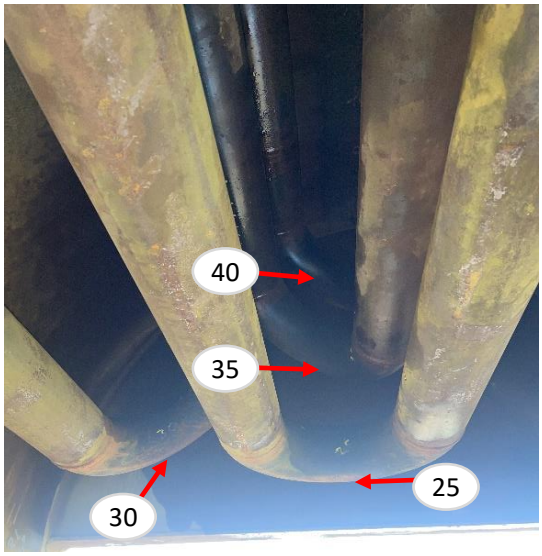
O.D	24"
LENGTH	28'
NOM.	0.375"

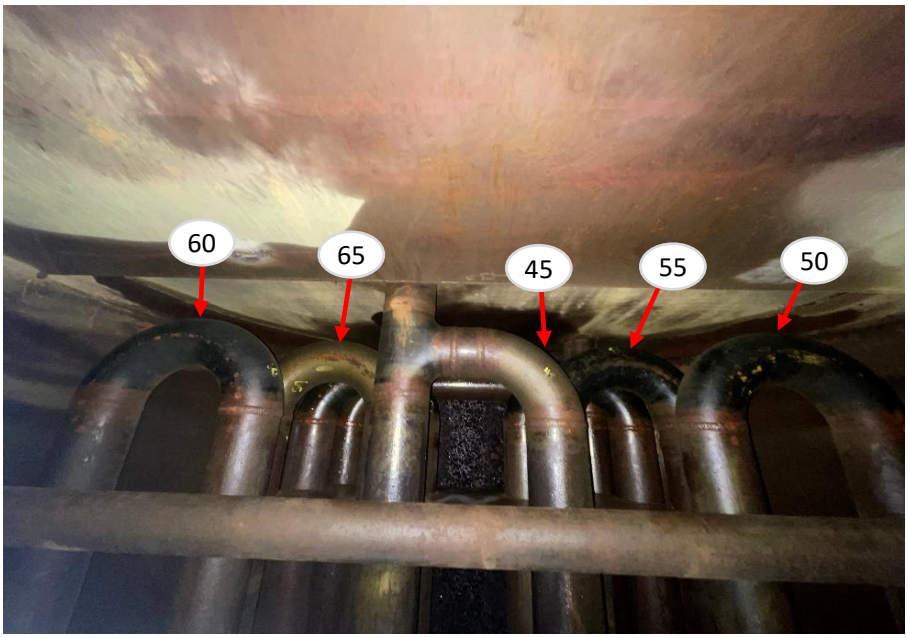
☑ ASSUMED

LOCATION	LOW	AVG
05	0.356"	0.367"
10	0.357"	0.366"
15	0.353"	0.366"
20	0.362"	0.369"
25	0.361"	0.377"
30	0.367"	0.372"
35	0.372"	0.381"
40	0.351"	0.373"
45	0.336"	0.364
50	0.341"	0.367"
55	0.351"	0.369"

NDE REPORT

TEST RESULTS / PHOTOS





LOCATION	LOW	AVG
05	0.309"	0.323"
10	0.317"	0.332"
15	0.327"	0.337"
20	0.339"	0.346"
25	0.304"	0.328"
30	0.319"	0.329"
35	0.321"	0.341"
40	0.321"	0.332"
45	0.346"	0.353"
50	0.302"	0.329"
55	0.328"	0.349"
60	0.321"	0.339"
65	0.328"	0.347"

4.5" O.D. - 0.337" ASSUMED NOMINAL