



1595 So. Hwy 150, Suite F
Evanston, WY 82930

Inspections Performed for: FMC Technologies Completion	
Inspection Report for: LH-0011-C1/C2 Line Heater	
Remaining Life: 7.7 YRS	Date last Inspected: 11/18/2013
Representative Corrosion Rate: .1 MPY	Next Inspection Due Date: 11/18/2014
Manufacturer: Tara Oilfield Services, LTD.	Mfg Serial #: 05-129C
Date Built: 2006	National Board #: N/A
Alberta registration #: 537501	Canadian Registration #: T5045.2



PRESSURE VESSEL INVENTORY

☒ Code ☐ Code-invalidated ☐ Non-Code ☐ Unknown ☐ Code-Exempt

☐ High Consequence (HCO) ☐ Medium Consequence (MCO) ☐ Low Consequence (LCO)

VESSEL ID INFORMATION

Company Name : FMC Technologies
Facility/Location Name : Grand Junction, CO
Field Name :
Equipment Number : LH-0011
Eq/Circ. ID : LH0011-C1/C2
Equipment Name/Service : Line Heater
Physical Location : In Grand Junction Yard
GPS Coordinates :

VESSEL DESCRIPTION AND SERVICE CONDITIONS

Type of Vessel: Horizontal Line Heater

Vessel Size: 3.5" O.D. Coils

Operating Pressure Range (psig): Not in service

Operating Temperature Range (°F): Not in service

Does the vessel have Internal Access? ☒ Yes ☐ No

Specify type of internal access, if available: Into Heater shell will coil bundle removed.

Vessel is located: ☐ Inside ☒ Outside ☐ Under Roof

MISCELLANEOUS VESSEL INFORMATION: (IF VESSEL HAS NO NAMEPLATE, PLEASE OBTAIN AS MUCH OF THE FOLLOWING AS POSSIBLE FOR WORST CASE TMIN CALCULATIONS, may have to check with operations personnel).

Is there a Long Seam? ☐ Yes ☐ No

Any stamping pertaining to materials of construction? ☐ Yes ☐ No

****Diameter****(strap equipment): _____

Pressure (highest the equip. sees in the process and/or check PSV setting if available) _____psi

Temperature (highest the equipment would ever see in the process) _____

Approximate Date built or installed (check associated equipment or info at facility) _____2006_____

Any other pertinent information: _____Design data with mfg. data reports provided._____

PRESSURE VESSEL INVENTORY

ORIGINAL VESSEL NAMEPLATE/STAMPING INFORMATION

Code stamp: ☐ U stamp ☐ U2 stamp ☐ UM stamp ☐ API-ASME ☒ No stamp



SUPPLEMENTAL VESSEL NAMEPLATE/STAMPING INFORMATION

Repair stamp: ☐ R stamp ☐ Other Stamp ☐ No stamp

Repaired By _____ Date of Repair _____

Nat'l Bd. R-Certification No. _____

Other Stamping Information: _____

VESSEL DOCUMENTATION

Manufacturer Data Sheets: ☐ ASME U-1 or U-1A Forms ☐ U2 or U4 Supplemental Forms

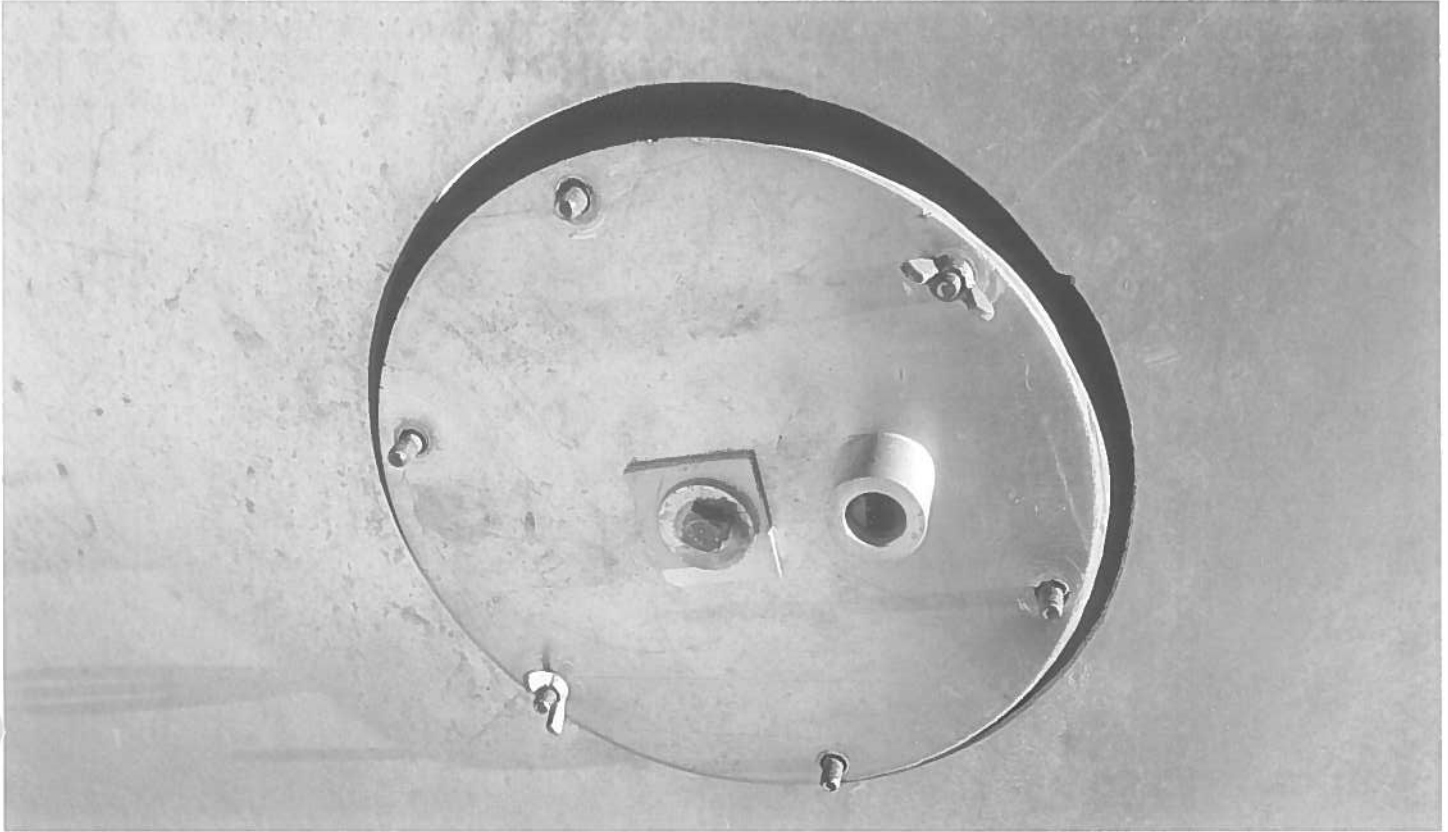
☐ Documentation relating to repair/alteration/rerating work: (R-1 form, calculations, revised drawings, inspection reports, etc.)

Name: Robert W. Menke Date: 03/22/2012

LINE HEATER EXTERNAL INSPECTION REPORT

SEE API 570 REPORT FOR INFORMATION ON 3.5" COILS (2)

Flame Arrested Burner: Is in good overall condition with no surface corrosion present. There are (4) wing nuts missing on burner, as well as a broken gasket.



Top Reservoir Tank: Hatch is missing a bolt.

Shell: Shell to shell attachment welds appear sound.

Heads: Head to shell attachment welds appear sound.

Threaded coupling: Attachment welds appear sound.

Flanged Head: Gasket is free from pitting or surface corrosion. Coating is in good condition.

Internal: Internal supports appear to be in good condition with no reformation. There is light surface corrosion present. Welds not observed.

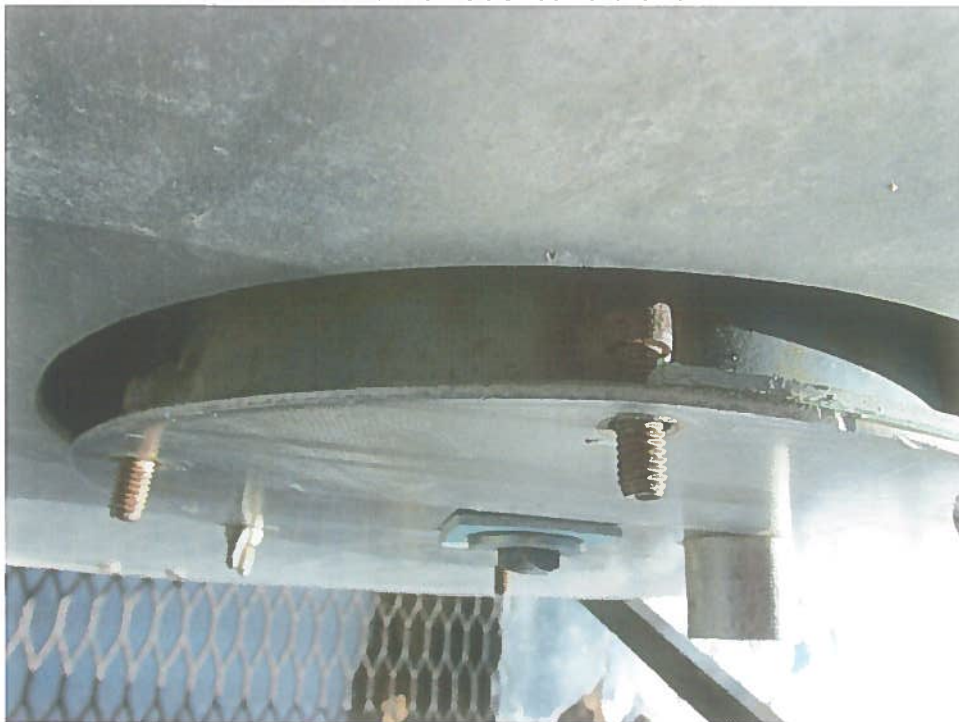
Fire tube: Appears to be in good condition (no access). Welds not observed. Moderate surface corrosion and scale present.

Shell Internal: Has minor scale build up as well as light surface corrosion.

Top Reservoir hatch missing bolt and nuts.



Flame Burner Gasket is broken.



Recommendations:

- 1) Replace the wing nuts and the gasket on flame arrested burner.
- 2) Replace the missing bolt and nut on the top reservoir hatch.

API 510 Inspector Signature
Eric A. Crandall

Date
11/18/2013





the pressure equipment safety authority

MANUFACTURER'S DATA REPORT FOR INDIRECT FIRED HEATER COILS

AB-28 2005-12

TIAL ☐

A# 537501.

Manufactured By: TARA Oilfield Services Ltd. P.O. Box 1389 Didsbury, AB T0M 0W0
Manufactured For: Canadian Sub-Surface Energy Services #600, 505 - 8th Avenue S.W. Calgary, AB T2P 1G2
Ultimate Owner: Canadian Sub-Surface Energy Services #600, 505 - 8th Ave. S.W. Calgary AB
Location of Installation: Portable

Manufacturer's Serial No.	Construction Drawing No.	CODE: ASME B31.3			Year Built
05-129C	05-129-BDLS-1 Rev.1	Edition	2004	Addenda	2006
				N/A	

CONSTRUCTION

Coil ID/Purpose	Design Pressure	Design Temp	Design Minimum Temp	Corrosion Allowance	Registered Drawing No.	CRN
a UPSTREAM COIL	34,475 kPa	200° C	-29° C	0.0625"	05-129-BDLS-1 Rev.1	T5045.2
b DOWNSTREAM COIL	34,475 kPa	200° C	-29° C	0.0625"	05-129-BDLS-1 Rev.1	T5045.2
c						
d						
e						

COIL

Tubes			End Closures				Openings		
Mat'l Spec.	Diameter	Thickness	Return Bend	Mat'l Spec.	Thickness	Flanges	Mat'l Spec.	Size/Type	Rating
a SA333-6 / SA106-B	3" NPS	.600"	SA234 GR. WPB	.600"	N/A	Rating			
b SA333-6 / SA106-B	3" NPS	.600"	SA234 GR. WPB	.600"	N/A	Rating			
c									
d									
e									

HEADERS/MANIFOLDS

HEADERS/MANIFOLDS									
f	Purpose	Size	Shell	Thickness	Ends		Openings		
			Mat'l Spec.		Mat'l Spec.	Thickness	No	Mat'l Spec	Size/Type
g									

TEST PRESSURE, NDE, POSTWELD HEAT TREATMENT AND SIZE

Hydrostatic Test Pressure	Radiography (100% or % Random)	Other NDE (MT) (PT) (UT)	Postweld Heat Treatment		Overall Length	Heating Surface	Volume
			Temp.	Time			
a 51,710 kPa	100%	-	621° C	1 Hour	18 ft 7 in	-	0.4 m3
b 51,710 kPa	100%	-	621° C	1 Hour	18 ft 7 in	-	0.4 m3
c							
d							
e							
f							
g							

IMPACT TESTING: N/A

REMARKS: INDIRECT HEATER COIL SPECIFICATIONS ONLY UP TO HEAD PLATE. FLANGES NOT INCLUDED IN THIS DESIGN.

TOTAL VOLUME: 0.8 m3 FABRICATION DRAWING 05-129C-BDLS-1. REV 2

CERTIFICATE OF COMPLIANCE

We certify that the statements in this report are correct and that all details of design, material, construction, and workmanship of this coil bundle are in accordance with the above Provincial Registered Design.

Date March 1, 2006 Signed

(Representative)

For

TARA OILFIELD SERVICES LTD.

(Manufacturer)

CERTIFICATE OF SHOP INSPECTION

The undersigned, a duly authorized Safety Codes Officer employed by ABSA has inspected the above Heater Coils and state that, to the best of my knowledge and if, the construction is in accordance with the Alberta Safety Codes Act and Regulations.

Date March 1, 2006

Signed

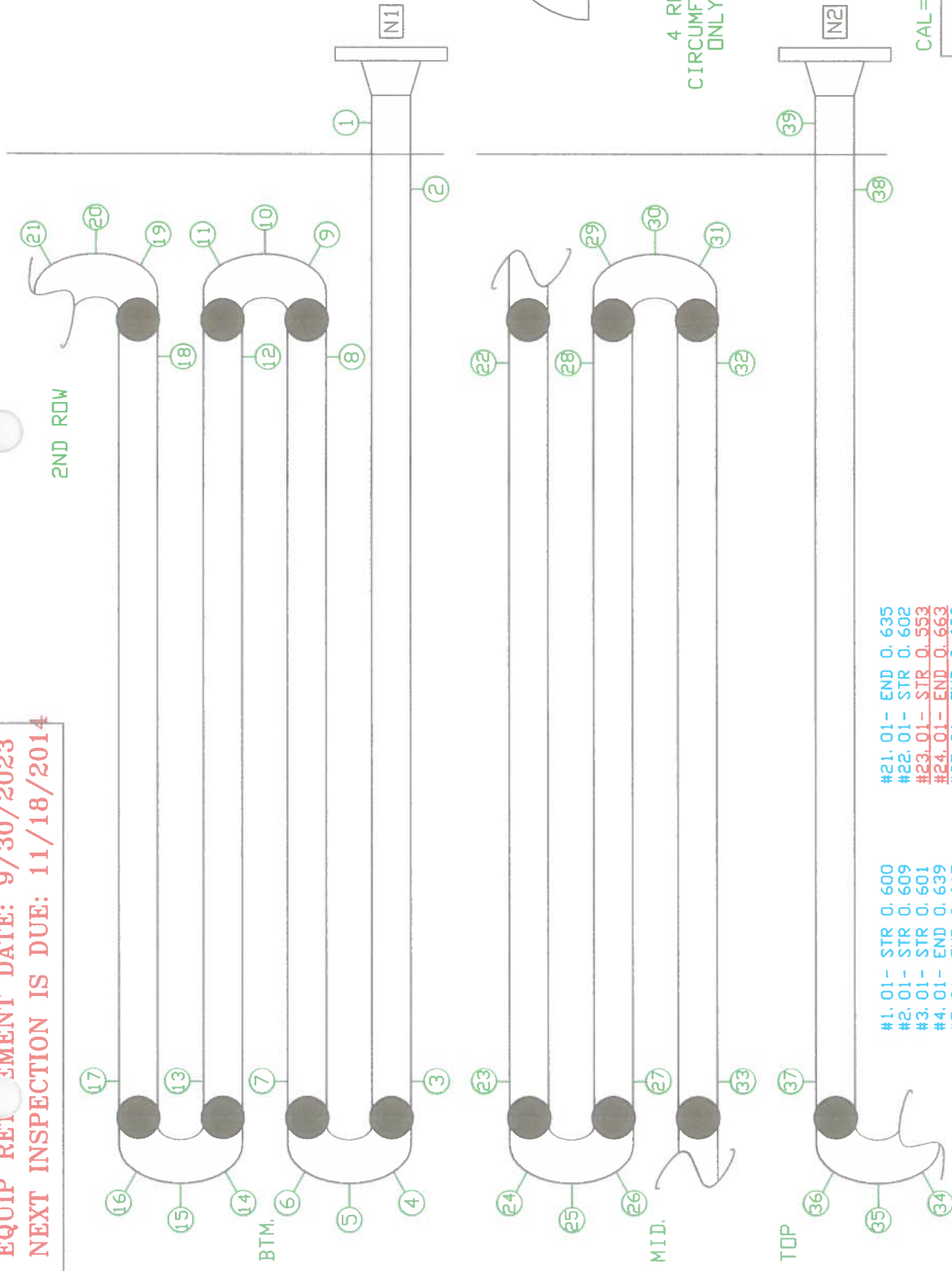
ABS

ALTA #58

EQUIP RETIREMENT DATE: 9/30/2023
NEXT INSPECTION IS DUE: 11/18/2014

NAME/DATE INFO	
MFG	TARA GILFIELD SERVICES LTD.
SERIAL NUMBER	05-129C
ALBERTA REG. #	537501
DATE BUILT	2006
DESIGN P & T	5000 psi @ 392°F
NOTE	CRN # T5045.2

DM-401



4 READINGS TAKEN AROUND THE CIRCUMFERENCE OF THE STRAIGHT PIPE. ONLY THE LOWEST WAS RECORDED.

#1. 01- STR 0.600	#21. 01- END 0.635
#2. 01- STR 0.609	#22. 01- STR 0.602
#3. 01- STR 0.601	#23. 01- STR 0.553
#4. 01- END 0.639	#24. 01- END 0.663
#5. 01- END 0.617	#25. 01- END 0.622
#6. 01- END 0.656	#26. 01- END 0.665
#7. 01- STR 0.607	#27. 01- STR 0.581
#8. 01- STR 0.610	#28. 01- STR 0.581
#9. 01- END 0.619	#29. 01- END 0.671
#10. 01- END 0.615	#30. 01- END 0.606
#11. 01- END 0.656	#31. 01- END 0.621
#12. 01- STR 0.600	#32. 01- STR 0.580
#13. 01- STR 0.564	#33. 01- STR 0.593
#14. 01- END 0.644	#34. 01- END 0.600
#15. 01- END 0.629	#35. 01- END 0.619
#16. 01- END 0.645	#36. 01- END 0.704
#17. 01- STR 0.587	#37. 01- STR 0.580
#18. 01- STR 0.572	#38. 01- STR 0.591
#19. 01- END 0.662	#39. 01- STR 0.587

CAL - 2 PT .500 - .750'
VESSEL =

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH-0011-C1
EQUIP NAME	LINE HEATER (WITH 2 COILS)
DWG #	LH-0011-C1

DESC: COIL 1 ON LINE HEATER
DWG. LHM011-C1-1 01-20 01

Corrosion Monitoring Equipment ID Analysis Report

Eaton Inspection Services
1595 So Hwy 150, Suite F, Evanston, WY 82930
Phone 307-789-3540 FAX 307-789-2822

Unit: LH-0011
Eq/Circ ID: LH0011-C1
Eq Type: VESSEL
Class:
CM RBI:
Design Code: B31.3

Summary: Group Name: Insp. Due Date = 11/18/2014
Pred. Ret. Date = 09/30/2023

Group Description:
RCR = 0.1 MPY
Rem. Life (from last survey 11/18/2013) = 9.9 yrs

0 C.A. Status: No
Total Caution TMLs = 11

Report Date: 12/11/2013

(Report in Inches, Corrosion Rates in MPY)
Analysis: Straight Line

Flange Rating: 5295 lb/in²
Design Pressure: 5000 lb/in²
Design Temperature: 392 °F

Description: LH-0011 COIL 1; SN:05-129C

TML No	Location	Ctn TML	First Survey Thick Nt	First Date	Previous Survey Thick Nt	Previous Date	Last Survey Thick Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
1.01	STR	N	0.602	03/08/2011	0.599	09/28/2012	0.600	11/18/2013	0	0.7	0	0.7	0.401 P	0.7	01/16/2298	11/18/2014
2.01	STR	N	0.576	03/08/2011	0.612	09/28/2012	0.609	11/18/2013	2.6	0	0	2.6	0.401 P	2.6	11/05/2093	11/18/2014
3.01	STR	N	0.580	03/08/2011	0.570	09/28/2012	0.601	11/18/2013	0	0	0	0	0.401 P	0.1	01/05/4013	11/18/2014
4.01	END	N	0.672	03/08/2011	0.632	09/28/2012	0.639	11/18/2013	0	12.2	12.5	12.5	0.401 P	12.2	05/20/2033	11/18/2014
5.01	END	N	0.631	03/08/2011	0.634	09/28/2012	0.617	11/18/2013	14.9	5.2	4.3	14.9	0.401 P	14.9	05/16/2028	11/18/2014
6.01	END	Y *	0.712	03/08/2011	0.646	09/28/2012	0.656	11/18/2013	0	20.7	19.6	20.7	0.401 P	20.7	03/13/2026	11/18/2014
7.01	STR	N	0.579	03/08/2011	0.593	09/28/2012	0.607	11/18/2013	0	0	0	0	0.401 P	0.1	12/03/4013	11/18/2014
8.01	STR	N	0.597	03/08/2011	0.596	09/28/2012	0.610	11/18/2013	0	0	0	0	0.401 P	0.1	12/03/4013	11/18/2014
9.01	END	Y *	0.706	03/08/2011	0.625	09/28/2012	0.619	11/18/2013	5.3	32.2	32.1	32.2	0.401 P	32.2	08/25/2020	11/18/2014
10.01	END	N	0.623	03/08/2011	0.606	09/28/2012	0.615	11/18/2013	0	3.0	3.5	3.5	0.401 P	3.0	03/08/2085	11/18/2014
11.01	END	N	0.689	03/08/2011	0.645	09/28/2012	0.656	11/18/2013	0	12.2	10.6	12.2	0.401 P	12.2	10/11/2034	11/18/2014
12.01	STR	N	0.589	03/08/2011	0.540	09/28/2012	0.600	11/18/2013	0	0	0	0	0.401 P	0.1	01/05/4003	11/18/2014
13.01	STR	Y *	0.609	03/08/2011	0.550	09/28/2012	0.564	11/18/2013	0	16.7	16.7	16.7	0.401 P	16.7	08/21/2023	11/18/2014
14.01	END	Y *	0.693	03/08/2011	0.643	09/28/2012	0.644	11/18/2013	0	18.2	15.7	18.2	0.401 P	18.2	03/25/2027	11/18/2014
15.01	END	N	0.653	03/08/2011	0.612	09/28/2012	0.629	11/18/2013	0	8.9	8.6	8.9	0.401 P	8.9	06/28/2039	11/18/2014
16.01	END	Y *	0.705	03/08/2011	0.622	09/28/2012	0.645	11/18/2013	0	22.2	21.9	22.2	0.401 P	22.2	11/13/2024	11/18/2014
17.01	STR	N	0.596	03/08/2011	0.585	09/28/2012	0.587	11/18/2013	0	3.3	4.0	4.0	0.401 P	3.3	03/21/2070	11/18/2014
18.01	STR	N	0.595	03/08/2011	0.584	09/28/2012	0.572	11/18/2013	10.5	8.5	8.4	10.5	0.401 P	10.5	02/27/2030	11/18/2014
19.01	END	Y *	0.727	03/08/2011	0.640	09/28/2012	0.662	11/18/2013	0	24.1	22.6	24.1	0.401 P	24.1	09/15/2024	11/18/2014
20.01	END	N	0.630	03/08/2011	0.618	09/28/2012	0.627	11/18/2013	0	1.1	0.2	1.1	0.401 P	1.1	04/05/2219	11/18/2014

Eaton Inspection Services
1595 So Hwy 150, Suite F, Evanston, WY 82930
Phone 307-789-3540 FAX 307-789-2822

Report Date: 12/11/2013

(Report in Inches, Corrosion Rates in MPY)
Analysis: Straight Line

Unit: LH-0011
Eq/Circ ID: LH0011-C1
Eq Type: VESSEL
Class:
CM RBI:
Design Code: B31.3

Flange Rating: 5295 lb/in²
Design Pressure: 5000 lb/in²
Design Temperature: 392 °F

Description: LH-0011 COIL 1; SN:05-129C

Summary: Group Name: Insp. Due Date = 11/18/2014
Pred. Ret. Date = 09/30/2023
Group Description: RCR = 0.1 MPY
Rem. Life (from last survey 11/18/2013) = 9.9 yrs
0 C.A. Status: No
Total Caution TMLs = 11

TML No	Location	Ctn	First Survey Thick	First Date	Previous Survey Thick	Previous Date	Last Survey Thick	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
21.01	END	N	0.659	03/08/2011	0.639	09/28/2012	0.635	11/18/2013	3.5	8.9	8.0	8.9	0.401 P	8.9	02/29/2040	11/18/2014
22.01	STR	N	0.576	03/08/2011	0.581	09/28/2012	0.602	11/18/2013	0	0	0	0	0.401 P	0.1	12/03/4013	11/18/2014
23.01	STR	Y *	0.587	03/08/2011	0.585	09/28/2012	0.553	11/18/2013	28.1	12.6	11.5	28.1	0.401 P	28.1	04/16/2019	11/18/2014
24.01	END	Y *	0.719	03/08/2011	0.647	09/28/2012	0.663	11/18/2013	0	20.7	19.2	20.7	0.401 P	20.7	07/14/2026	11/18/2014
25.01	END	N	0.607	03/08/2011	0.625	09/28/2012	0.622	11/18/2013	2.6	0	0	2.6	0.401 P	2.6	11/05/2098	11/18/2014
26.01	END	N	0.657	03/08/2011	0.667	09/28/2012	0.665	11/18/2013	1.8	0	0	1.8	0.401 P	1.8	07/02/2160	11/18/2014
27.01	STR	N	0.560	03/08/2011	0.570	09/28/2012	0.581	11/18/2013	0	0	0	0	0.401 P	0.1	01/04/3813	11/18/2014
28.01	STR	N	0.551	03/08/2011	0.580	09/28/2012	0.581	11/18/2013	0	0	0	0	0.401 P	0.1	01/04/3813	11/18/2014
29.01	END	N	0.693	03/08/2011	0.672	09/28/2012	0.671	11/18/2013	0.9	8.1	5.8	8.1	0.401 P	8.1	03/16/2047	11/18/2014
30.01	END	N	0.627	03/08/2011	0.612	09/28/2012	0.606	11/18/2013	5.3	7.8	6.4	7.8	0.401 P	7.8	02/25/2040	11/18/2014
31.01	END	Y	0.643	03/08/2011	0.639	09/28/2012	0.621	11/18/2013	15.8	8.1	7.2	15.8	0.401 P	15.8	10/20/2027	11/18/2014
32.01	STR	N *	0.597	03/08/2011	0.597	09/28/2012	0.580	11/18/2013	14.9	6.3	5.5	14.9	0.401 P	14.9	11/21/2025	11/18/2014
33.01	STR	N	0.567	03/08/2011	0.585	09/28/2012	0.593	11/18/2013	0	0	0	0	0.401 P	0.1	01/05/3933	11/18/2014
34.01	END	Y *	0.717	03/08/2011	0.608	09/28/2012	0.600	11/18/2013	7.0	43.3	41.0	43.3	0.401 P	43.3	06/23/2018	11/18/2014
35.01	END	Y	0.661	03/08/2011	0.633	09/28/2012	0.619	11/18/2013	12.3	15.6	12.9	15.6	0.401 P	15.6	11/07/2027	11/18/2014
36.01	END	N	0.670	03/08/2011	0.687	09/28/2012	0.704	11/18/2013	0	0	0	0	0.401 P	0.1	12/03/4013	11/18/2014
37.01	STR	N	0.588	03/08/2011	0.588	09/28/2012	0.580	11/18/2013	7.0	3.0	1.6	7.0	0.401 P	7.0	06/10/2039	11/18/2014
38.01	STR	N	0.594	03/08/2011	0.590	09/28/2012	0.591	11/18/2013	0	1.1	0.8	1.1	0.401 P	1.1	07/12/2186	11/18/2014
39.01	STR	N	0.610	03/08/2011	0.594	09/28/2012	0.587	11/18/2013	6.1	8.5	7.3	8.5	0.401 P	8.5	10/03/2035	11/18/2014

Eaton Inspection Services
1595 So Hwy 150, Suite F, Evanston, WY 82930
Phone 307-789-3540 FAX 307-789-2822

Report Date: 12/11/2013

(Report in Inches, Corrosion Rates in MPY)
Analysis: Straight Line

Flange Rating: 5295 lb/in²
Design Pressure: 5000 lb/in²
Design Temperature: 392 °F

Unit: LH-0011
Eq/Circ ID: LH0011-C1
Design Code: B31.3
Eq Type: VESSEL
Class:
CM RBT:

Description: LH-0011 COIL 1; SN:05-129C

TML Corrosion Rates are each the Maximum of:

(A) -- Calculated Corrosion Rates x 1.00 :
(B) -- Default Corrosion Rate : Varies
0.1 MPY

Representative Corrosion Rate is the Maximum of:

(A) -- Average Corrosion Rate x 1.10 : Not Used.
(B) -- Average Max 25.0% of TMLs, Min of 2 : Not Used.
(C) -- Formula Corrosion Rate (Sigma = 1.28) : Not Used.
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 0.1 MPY

TML thickness readings have not been compensated for high Temperatures.
TML thickness readings have not been compensated for growths.

TML Life calculations are based on the Representative TML Corrosion Rate using Short
Term and Long Term Corrosion Rates.

Nominal thickness is used for TML corrosion rate calculations with less than 3 surveys.

Minimum time between inspections required for corrosion rate calculation is 3 months.

TML Inspection Interval is:
(A) -- 1.00 years.

Eq/Circ ID Last Survey Date is based on the LAST of the last 0% of TML survey dates (Min 1).

Eq/Circ ID Estimated life = 9.9 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 25% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 09/30/2023

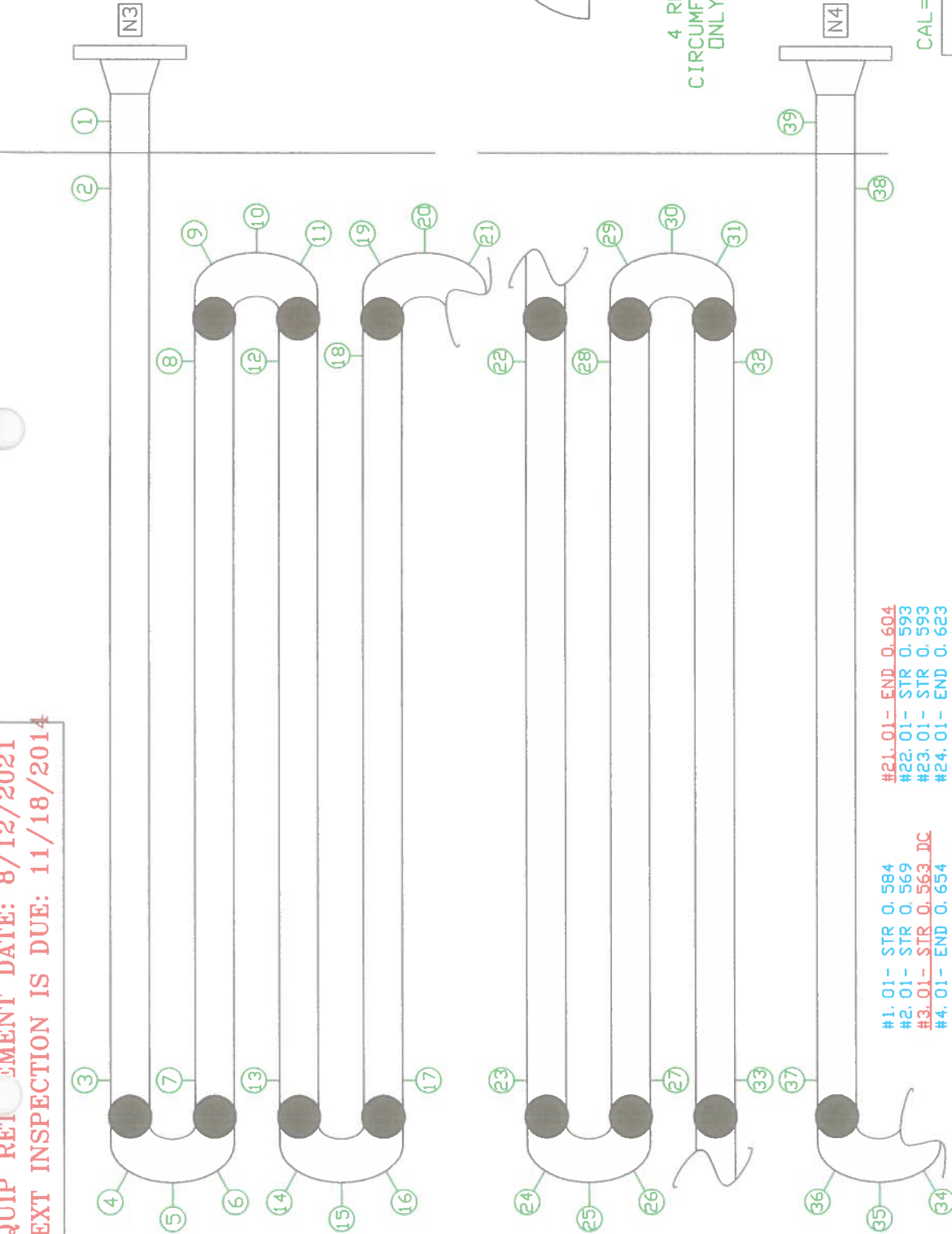
Recommended Eq/Circ UT/RT Inspection Date is 11/18/2014
UT/RT Inspection Interval is 1.00 years.

Caution TML Logic: TML Corrosion Rate > 15.0 MPY .OR. TML Remaining Life < 3.00 Years.
There are 11 Caution TMLs in this Eq/Circ ID.

EQUIP RETIREMENT DATE: 8/12/2021
NEXT INSPECTION IS DUE: 11/18/2014

NAME/DATE INFO	
MFG	TARA GILFIELD SERVICES LTD.
SERIAL NUMBER	05-129C
ALBERTA REG. #	537501
DATE BUILT	2006
DESIGN P & T	5000 psi @ 392°F
NOTE	CRN # T5045.2

DM-401



COIL #2

4 READINGS TAKEN AROUND THE CIRCUMFERENCE OF THE STRAIGHT PIPE. ONLY THE LOWEST WAS RECORDED.

- #1. 01- STR 0.584
- #2. 01- STR 0.569
- #3. 01- STR 0.563 DC
- #4. 01- END 0.654
- #5. 01- END 0.579 DC
- #6. 01- END 0.611 DC
- #7. 01- STR 0.589
- #8. 01- STR 0.599
- #9. 01- END 0.593
- #10. 01- END 0.581
- #11. 01- END 0.564
- #12. 01- STR 0.610
- #13. 01- STR 0.559
- #14. 01- END 0.605
- #15. 01- END 0.578
- #16. 01- END 0.588
- #17. 01- STR 0.593 DC
- #18. 01- STR 0.596
- #19. 01- END 0.595
- #21. 01- END 0.604
- #22. 01- STR 0.593
- #23. 01- STR 0.593
- #24. 01- END 0.623
- #25. 01- END 0.578
- #26. 01- END 0.624
- #27. 01- STR 0.571 DC
- #28. 01- STR 0.591
- #29. 01- END 0.610
- #30. 01- END 0.579
- #31. 01- END 0.580 DC
- #32. 01- STR 0.619
- #33. 01- STR 0.580
- #34. 01- END 0.562
- #35. 01- END 0.570
- #36. 01- END 0.589
- #37. 01- STR 0.580 DC
- #38. 01- STR 0.593
- #39. 01- STR 0.598 DC

CAL - 2 PT .500 - .750'
VESSEL =

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH-0011-C2
EQUIP NAME	LINE HEATER (WITH 2 COILS)
DWG #	LH-0011-C2

DESC: COIL 2 ON LINE HEATER
nwc-4. 100011-C2-1 01-20 01

Corrosion Monitoring Equipment ID Analysis Report

Eaton Inspection Services
1595 So Hwy 150, Suite F, Evanston, WY 82930
Phone 307-789-3540 FAX 307-789-2822

Report Date: 12/11/2013

(Report in Inches, Corrosion Rates in MPY)
Analysis: Straight Line

Unit: LH-0011
Eq/Circ ID: LH0011-C2
Eq Type: VESSEL
Class:
CM RBI:
Design Code: B31.3

Flange Rating: 5295 lb/in²
Design Pressure: 5000 lb/in²
Design Temperature: 392 °F

Description: LH-0011 COIL 2; SN:05-129C

Summary: Group Name:
Insp. Due Date = 11/18/2014
Pred. Ret. Date = 08/12/2021

Group Description:
RCR = 0.1 MPY
Rem. Life (from last survey 11/18/2013) = 7.7 yrs

0 C.A. Status: No
Total Caution TMLs = 13

TML No	Location	Ctn	First Survey Thick	First Nt	First Date	Previous Survey Thick	Previous Nt	Previous Date	Last Survey Thick	Last Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
1.01	STR	N	0.585		03/08/2011	0.585		09/28/2012	0.584		11/18/2013	0.9	0.4	0.4	0.9	0.401 P	0.9	02/13/20217	11/18/2014
2.01	STR	N	0.570		03/08/2011	0.556		09/28/2012	0.569		11/18/2013	0	0.4	0	0.4	0.401 P	0.4	08/30/2433	11/18/2014
3.01	STR	Y *	0.568		03/08/2011	0.581		09/28/2012	0.563 DC		11/18/2013	15.8	1.9	0	15.8	0.401 P	15.8	02/17/2024	11/18/2014
4.01	END	N	0.660		03/08/2011	0.640		09/28/2012	0.654		11/18/2013	0	2.2	3.2	3.2	0.401 P	2.2	11/04/2128	11/18/2014
5.01	END	Y *	0.588		03/08/2011	0.601		09/28/2012	0.579 DC		11/18/2013	19.3	3.3	2.5	19.3	0.401 P	19.3	02/06/2023	11/18/2014
6.01	END	Y *	0.622		03/08/2011	0.654		09/28/2012	0.611 DC		11/18/2013	37.8	4.1	1.5	37.8	0.401 P	37.8	06/08/2019	11/18/2014
7.01	STR	N	0.602		03/08/2011	0.578		09/28/2012	0.589		11/18/2013	0	4.8	3.9	4.8	0.401 P	4.8	01/11/2053	11/18/2014
8.01	STR	N	0.605		03/08/2011	0.596		09/28/2012	0.599		11/18/2013	0	2.2	2.1	2.2	0.401 P	2.2	11/04/2103	11/18/2014
9.01	END	Y *	0.648		03/08/2011	0.585		09/28/2012	0.593		11/18/2013	0	20.4	17.9	20.4	0.401 P	20.4	04/16/2023	11/18/2014
10.01	END	N	0.599		03/08/2011	0.580		09/28/2012	0.581		11/18/2013	0	6.7	5.6	6.7	0.401 P	6.7	09/25/2040	11/18/2014
11.01	END	Y *	0.632		03/08/2011	0.567		09/28/2012	0.564		11/18/2013	2.6	25.2	24.6	25.2	0.401 P	25.2	05/06/2020	11/18/2014
12.01	STR	N	0.590		03/08/2011	0.591		09/28/2012	0.610		11/18/2013	0	0	0	0	0.401 P	0.1	12/03/4013	11/18/2014
13.01	STR	N	0.557		03/08/2011	0.548		09/28/2012	0.559		11/18/2013	0	0	2.9	2.9	0.401 P	0.1	01/02/3593	11/18/2014
14.01	END	Y *	0.737		03/08/2011	0.590		09/28/2012	0.605		11/18/2013	0	48.9	45.7	48.9	0.401 P	48.9	01/19/2018	11/18/2014
15.01	END	N	0.593		03/08/2011	0.564		09/28/2012	0.578		11/18/2013	0	5.6	7.5	7.5	0.401 P	5.6	06/22/2045	11/18/2014
16.01	END	Y *	0.653		03/08/2011	0.575		09/28/2012	0.588		11/18/2013	0	24.1	21.7	24.1	0.401 P	24.1	08/21/2021	11/18/2014
17.01	STR	Y	0.597		03/08/2011	0.613		09/28/2012	0.593 DC		11/18/2013	17.6	1.5	0	17.6	0.401 P	17.6	10/14/2024	11/18/2014
18.01	STR	N	0.600		03/08/2011	0.588		09/28/2012	0.596		11/18/2013	0	1.5	1.9	1.9	0.401 P	1.5	10/28/2143	11/18/2014
19.01	END	Y	0.640		03/08/2011	0.580		09/28/2012	0.595		11/18/2013	0	16.7	18.9	18.9	0.401 P	16.7	06/29/2025	11/18/2014
20.01	END	N	0.609		03/08/2011	0.576		09/28/2012	0.572		11/18/2013	3.5	13.7	13.5	13.7	0.401 P	13.7	05/11/2026	11/18/2014

Corrosion Monitoring Equipment ID Analysis Report

Eaton Inspection Services
1595 So Hwy 150, Suite F, Evanston, WY 82930
Phone 307-789-3540 FAX 307-789-2822

Report Date: 12/11/2013

(Report in Inches, Corrosion Rates in MPY)
Analysis: Straight Line

Unit: LH-0011
Eq/Circ ID: LH0011-C2
Eq Type: VESSEL
Class:
CM RBI:
Design Code: B31.3

Flange Rating: 5295 lb/in²
Design Pressure: 5000 lb/in²
Design Temperature: 392 °F

Description: LH-0011 COIL 2; SN:05-129C

Summary: Group Name:
Insp. Due Date = 11/18/2014
Pred. Ret. Date = 08/12/2021

Group Description:
RCR = 0.1 MPY
Rem. Life (from last survey 11/18/2013) = 7.7 yrs

0 C.A. Status: No
Total Caution TMLs = 13

TML No	Location	Ctn TML	First Survey TML Thick	First Date	Previous Survey TML Thick	Previous Date	Last Survey TML Thick	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement TML Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
21.01	END	Y *	0.656	03/08/2011	0.606	09/28/2012	0.604	11/18/2013	1.8	19.3	18.2	19.3	0.401 P	19.3	05/24/2024	11/18/2014
22.01	STR	N	0.579	03/08/2011	0.580	09/28/2012	0.593	11/18/2013	0	0	0	0	0.401 P	0.1	01/05/3933	11/18/2014
23.01	STR	N	0.597	03/08/2011	0.610	09/28/2012	0.593	11/18/2013	14.9	1.5	0	14.9	0.401 P	14.9	10/05/2026	11/18/2014
24.01	END	N	0.622	03/08/2011	0.613	09/28/2012	0.623	11/18/2013	0	0	0	0	0.401 P	0.1	12/03/4013	11/18/2014
25.01	END	N	0.603	03/08/2011	0.570	09/28/2012	0.578	11/18/2013	0	9.3	8.4	9.3	0.401 P	9.3	11/26/2032	11/18/2014
26.01	END	N	0.661	03/08/2011	0.610	09/28/2012	0.624	11/18/2013	0	13.7	10.2	13.7	0.401 P	13.7	02/25/2030	11/18/2014
27.01	STR	N	0.574	03/08/2011	0.554	09/28/2012	0.571	DC	0	1.1	0.5	1.1	0.401 P	1.1	05/07/2168	11/18/2014
28.01	STR	N	0.580	03/08/2011	0.585	09/28/2012	0.591	11/18/2013	0	0	0	0	0.401 P	0.1	01/05/3913	11/18/2014
29.01	END	N	0.602	03/08/2011	0.594	09/28/2012	0.610	11/18/2013	0	0	0	0	0.401 P	0.1	12/03/4013	11/18/2014
30.01	END	N	0.611	03/08/2011	0.568	09/28/2012	0.579	11/18/2013	0	11.9	12.0	12.0	0.401 P	11.9	10/31/2028	11/18/2014
31.01	END	Y	0.622	03/08/2011	0.567	09/28/2012	0.580	DC	0	15.6	16.1	16.1	0.401 P	15.6	05/08/2025	11/18/2014
32.01	STR	N	0.603	03/08/2011	0.605	09/28/2012	0.619	11/18/2013	0	0	0	0	0.401 P	0.1	12/03/4013	11/18/2014
33.01	STR	N	0.593	03/08/2011	0.559	09/28/2012	0.580	11/18/2013	0	4.8	4.2	4.8	0.401 P	4.8	02/26/2051	11/18/2014
34.01	END	Y *	0.684	03/08/2011	0.566	09/28/2012	0.569	11/18/2013	0	42.6	40.0	42.6	0.401 P	42.6	10/28/2017	11/18/2014
35.01	END	N	0.595	03/08/2011	0.570	09/28/2012	0.570	11/18/2013	0	9.3	8.5	9.3	0.401 P	9.3	01/17/2032	11/18/2014
36.01	END	N	0.596	03/08/2011	0.600	09/28/2012	0.589	11/18/2013	9.7	2.6	1.8	9.7	0.401 P	9.7	04/03/2033	11/18/2014
37.01	STR	Y *	0.628	03/08/2011	0.508	09/28/2012	0.580	DC	0	17.8	23.0	23.0	0.401 P	17.8	12/07/2023	11/18/2014
38.01	STR	N	0.596	03/08/2011	0.587	09/28/2012	0.593	11/18/2013	0	1.1	0	1.1	0.401 P	1.1	05/07/2188	11/18/2014
39.01	STR	N	0.599	03/08/2011	0.570	09/28/2012	0.598	DC	0	0.4	1.6	1.6	0.401 P	0.4	03/02/2506	11/18/2014

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Phone 307-789-3540 FAX 307-789-2822

Report Date: 12/11/2013

(Report in Inches, Corrosion Rates in MPY)
Analysis: Straight Line

Unit: LH-0011
Eq/Circ ID: LH0011-C2
Design Code: B31.3
Eq Type: VESSEL
Class:
CM RBI:

Flange Rating: 5295 lb/in²
Design Pressure: 5000 lb/in²
Design Temperature: 392 °F

Description: LH-0011 COIL 2; SN:05-129C

TML Corrosion Rates are each the Maximum of:

(A) -- Calculated Corrosion Rates x 1.00 : Varies
(B) -- Default Corrosion Rate : 0.1 MPY

Representative Corrosion Rate is the Maximum of:

(A) -- Average Corrosion Rate x 1.10 : Not Used.
(B) -- Average Max 25.0% of TMLs, Min of 2 : Not Used.
(C) -- Formula Corrosion Rate (Sigma = 1.28) : Not Used.
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 0.1 MPY

TML thickness readings have not been compensated for high Temperatures.
TML thickness readings have not been compensated for growths.

TML Life calculations are based on the Representative TML Corrosion Rate using Short
Term and Long Term Corrosion Rates.

Nominal thickness is used for TML corrosion rate calculations with less than 3 surveys.

Minimum time between inspections required for corrosion rate calculation is 3 months.

TML Inspection Interval is:

(A) -- 1.00 years.

Eq/Circ ID Last Survey Date is based on the LAST of the last 0% of TML survey dates (Min 1).

Eq/Circ ID Estimated life = 7.7 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 25% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 08/12/2021

Recommended Eq/Circ UT/RT Inspection Date is 11/18/2014
UT/RT Inspection Interval is 1.00 years.

Caution TML Logic: TML Corrosion Rate > 15.0 MPY .OR. TML Remaining Life < 3.00 Years.
There are 13 Caution TMLs in this Eq/Circ ID.



1595 So. Hwy 150, Suite F
Evanston, WY 82930

Inspections Performed for: FMC Technologies Completion	
Inspection Report for: LH-0011	
Remaining Life: YRS	Date of this Report: 11/18/2013
Average Corrosion Rate: MPY	Next Inspection Due Date:
Manufacturer: Lo Tech Manufacturing, Inc.	Mfg Serial #: 8285.26
Date Built: 2005	National Board #: None
Alberta registration #: None	Canadian Registration #: OH5148.21345

FMC Technologies Completion LH-0011 Line Heater Fuel Gas Scrubber



PRESSURE VESSEL INVENTORY

☒ Code ☐ Code-invalidated ☐ Non-Code ☐ Unknown ☐ Code-Exempt

☐ High Consequence (HCO) ☐ Medium Consequence (MCO) ☐ Low Consequence (LCO)

VESSEL ID INFORMATION

Company Name : Pure Energy Services (USA) Inc.
Facility/Location Name : Grand Junction, CO
Field Name :
Equipment Number : LH-0011
Eq/Circ. ID : LH0011-FGS
Equipment Name/Service : (Line Heater) Fuel Gas Scrubber
Physical Location : In Grand Junction Yard
GPS Coordinates :

VESSEL DESCRIPTION AND SERVICE CONDITIONS

Type of Vessel: Vertical Scrubber

Vessel Size: 8.625" O.D.

Operating Pressure Range (psig): Not in service

Operating Temperature Range (°F): Not in service

Does the vessel have Internal Access? ☐ Yes ☒ No

Specify type of internal access, if available:

Vessel is located: ☐ Inside ☒ Outside ☐ Under Roof

MISCELLANEOUS VESSEL INFORMATION: (IF VESSEL HAS NO NAMEPLATE, PLEASE OBTAIN AS MUCH OF THE FOLLOWING AS POSSIBLE FOR WORST CASE TMIN CALCULATIONS, *may have to check with operations personnel*).

Is there a Long Seam? ☐ Yes ☒ No

Any stamping pertaining to materials of construction? ☐ Yes ☐ No

****Diameter****(strap equipment): 8.625"

Pressure (highest the equip. sees in the process and/or check PSV setting if available) n/a psi

Temperature (highest the equipment would ever see in the process)

Approximate Date built or installed (check associated equipment or info at facility) 2005

Any other pertinent information:

ORIGINAL VESSEL NAMEPLATE/STAMPING INFORMATION

Code stamp: ☐ U stamp ☐ U2 stamp ☐ UM stamp ☐ API-ASME ☒ No stamp



SUPPLEMENTAL VESSEL NAMEPLATE/STAMPING INFORMATION

Repair stamp: ☐ R stamp ☐ Other Stamp ☐ No stamp

Repaired By _____

Date of Repair _____

Nat'l Bd. R-Certification No. _____

Other Stamping Information: _____

VESSEL DOCUMENTATION

Manufacturer Data Sheets: ☐ ASME U-1 or U-1A Forms ☐ U2 or U4 Supplemental Forms

☐ Documentation relating to repair/alteration/rerating work: (R-1 form, calculations, revised drawings, inspection reports, etc.)

Name: Robert W. Menke

Date: 03/22/2012

API 510 PRESSURE VESSEL EXTERNAL INSPECTION REPORT

Company Name: FMC Technologies Completion	
Field/Location: Evanston District	
Equipment Number: LH-0011	Eq/Circ. ID: LH0011-FGS
Equipment Name/Service: Fuel Gas Scrubber	
Physical Location: in Evanston Yard	
Manufacturer: Lo Tech Manufacturing, Inc.	Manufacturer Serial Number: 8285.26
Year Built: 2005	National board #: None
Alberta Registration #: None	Canadian Registration # : OH 5148.21345

Reason for Inspection: Scheduled API-510 External Inspection

Condition of Nameplate and/or Bracket: Nameplate is intact and legible. Nameplate is in good overall condition.

Internal Access: No

Corrosion Monitoring Locations (CMLs) and baseline thickness data established: Yes.

Grounding Device in Place and Secure?: N/A. The equipment is grounded through the skid. The line heater was not in service at the time of this inspection.

Condition of Foundation and Anchor Bolts: All (4) anchor bolts and nuts are in place and secure. The vessel has a flat bottom head which also serves as a baseplate. Baseplate has light surface corrosion present.

Condition of Steel Supports, Saddles, and Bolting: Shell to head attachment weld is smooth with a good weld profile.

Condition of Paint and/or Insulation: The paint is in good condition with no chipping or peeling. Vessel coating is in acceptable condition.

Condition of Nozzles, Flanges, Repads, and Weepholes: There is no evidence of flange leaks or leaks at any of the threaded connections. All threaded connections. Threaded coupling attachment welds are smooth with a good weld profile.

Condition of Welds; Head and Shell Metal Surfaces: All (exposed) metal surfaces are painted. There is no distortion or indication of corrosion beneath the paint coating. The pressure boundary welds have no visual weld defects.

Condition of Ladders, Stairways, and Brackets: N/A

If Equipment has Anomalous Data, did the Inspector check it? N/A

Is There a PSV on the Vessel? Yes

If yes, is it set at or below the MAWP? Yes

Date PSV last tested (if there is a tag on the valve): No, test tag present

Comments:

PSV had no test tag present. Per Hunter, the PSV is going in to get re-tested as of 11-18-2013

Recommendations:

None.

Repairs Needed:

None.

API 510 Inspector Signature
Robert W. Menke/EAC

API 510 Inspector Number
0131

Date
11/18/2013

EQUIP RETIREMENT DATE: 4/6/2045
NEXT INSPECTION IS DUE: 3/22/2013



- #2. 01- BTM SHELL-FRONT 0. 313 TC
- #2. 02- BTM SHELL-LEFT 0. 315 TC
- #2. 03- BTM SHELL-BACK 0. 310 TC
- #2. 04- BTM SHELL-RIGHT 0. 323 TC
- #3. 01- TOP SHELL-FRONT 0. 313 TC
- #3. 02- TOP SHELL-LEFT 0. 307 TC
- #3. 03- BTM SHELL-BACK 0. 313 TC
- #3. 04- TOP SHELL-RIGHT 0. 312 TC
- #4. 01- TOP HD-FRONT 0. 328 TC
- #4. 02- TOP HD-LEFT 0. 318 TC
- #4. 03- TOP HD-BACK 0. 323 TC
- #4. 04- TOP HD-RIGHT 0. 315 TC

TC-560

NAMEPLATE INFO	
MFG	LOTECH MANUFACTURING, INC.
SERIAL NUMBER	8285. 26
NATIONAL BOARD #	NONE
DATE BUILT	2005
DESIGN P & T	285 PSIG @ 650°F
NOTE	CRN # OH 5148. 21345 NO "U" STAMP

CAL=VESSEL=

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH-0011-FGS
EQUIP NAME	FUEL GAS SCRUBBER
LOCATION	WITH LINE HEATER LH-0011
DWG #	LH0011-FGS

Corrosion Monitoring Equipment ID Analysis Report

Eaton Inspection Services
1595 So Hwy 150, Suite F, Evanston, WY 82930
Phone 307-789-3540 FAX 307-789-2822

Report Date: 12/10/2013

(Report in Inches, Corrosion Rates in MPY)

Analysis: Straight Line

Unit: LH-0011
Eq/Circ ID: LH0011-FGS
Eq Type: VESSEL
Class:
CM REL:
Design Code: S8/D1

Flange Rating: 535 lb/in²
Design Pressure: 285 lb/in²
Design Temperature: 650 °F

Description: LH-0011 FUEL GAS SCRUBBER; SN: 8285.47

Summary: Group Name: Group Description:
Insp. Due Date = 11/18/2014 RCR = 5.4 MPY
Pred. Ret. Date = 10/26/2408 Rem. Life (from last survey 11/18/2013) = 394.9 yrs

0 C.A. Status: No
Total Caution TMLs = 0

TML No	Location	Ctn TML	First Survey Thick	First Nt	First Date	Previous Survey Thick	Previous Nt	Previous Date	Last Survey Thick	Last Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
2.01	BTM SHELL-FRONT	N	0.311 TC	03/08/2011	0.311 RR	0.313 RR	03/22/2012	0.313 RR	11/18/2013	0	0	0	0	0	1.7	0.197 U	0.1	11/27/3173	11/18/2014
2.02	BTM SHELL-LEFT	N	0.310 TC	03/08/2011	0.310 RR	0.312	03/22/2012	0.312	11/18/2013	0	0	0	0	0	1.9	0.197 U	0.1	11/27/3163	11/18/2014
2.03	BTM SHELL-BACK	N *	0.309 TC	03/08/2011	0.309 RR	0.303	03/22/2012	0.303	11/18/2013	3.6	2.2	2.4	3.6	0.197 U	3.6	0.197 U	3.6	04/30/2043	11/18/2014
2.04	BTM SHELL-RIGHT	N	0.323 TC	03/08/2011	0.323 TC	0.323 RR	03/22/2012	0.323 RR	11/18/2013	0	0	0	0	0	0	0.197 U	0.1	11/27/3273	11/18/2014
3.01	TOP SHELL-FRONT	N	0.308 TC	03/08/2011	0.308 RR	0.313 RR	03/22/2012	0.313 RR	11/18/2013	0	0	0	0	0	2.2	0.197 U	0.1	11/27/3173	11/18/2014
3.02	TOP SHELL-LEFT	N *	0.302 TC	03/08/2011	0.302 RR	0.304	03/22/2012	0.304	11/18/2013	0	0	0	0	0	3.1	0.197 U	0.1	11/26/3083	11/18/2014
3.03	BTM SHELL-BACK	N	0.308 TC	03/08/2011	0.308 RR	0.310	03/22/2012	0.310	11/18/2013	0	0	0	0	0	2.2	0.197 U	0.1	11/27/3143	11/18/2014
3.04	TOP SHELL-RIGHT	N *	0.306 TC	03/08/2011	0.306 RR	0.308	03/22/2012	0.308	11/18/2013	0	0	0	0	0	2.5	0.197 U	0.1	11/27/3123	11/18/2014
4.01	TOP HD-FRONT	N *	0.331 TC	03/08/2011	0.328 TC	0.328 RR	03/22/2012	0.328 RR	11/18/2013	0	1.1	1.0	1.1	7.5	19.2	0.197 U	1.1	12/22/2132	11/18/2014
4.02	TOP HD-LEFT	N *	0.338 TC	03/08/2011	0.318 TC	0.316	03/22/2012	0.316	11/18/2013	1.2	8.1	7.5	8.1	0	0	0.197 U	8.1	07/28/2028	11/18/2014
4.03	TOP HD-BACK	N	0.323 TC	03/08/2011	0.323 TC	0.323 RR	03/22/2012	0.323 RR	11/18/2013	0	0	0	0	0	0	0.197 U	0.1	11/27/3273	11/18/2014
4.04	TOP HD-RIGHT	N *	0.325 TC	03/08/2011	0.315 TC	0.313	03/22/2012	0.313	11/18/2013	1.2	4.4	4.1	4.4	0	9.6	0.197 U	4.4	03/30/2040	11/18/2014

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Analysis: Straight Line

Unit: LH-0011
Eq/Circ ID: LH0011-FGS
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Eq Type: VESSEL
Class:
CM RBI:

Flange Rating: 535 lb/in²
Design Pressure: 285 lb/in²
Design Temperature: 650 °F

Description: LH-0011 FUEL GAS SCRUBBER; SN: 8285.47

TML Corrosion Rates are each the Maximum of:

(A) -- Calculated Corrosion Rates x 1.00
(B) -- Default Corrosion Rate

:
: Varies
: 0.1 MPY

Representative Corrosion Rate is the Maximum of:

(A) -- Average Corrosion Rate x 1.00
(B) -- Average Max 25.0% of TMLs, Min of 2
(C) -- Formula Corrosion Rate (Sigma = 1.28)
(D) -- Default Corrosion Rate
Representative Corrosion Rate = 5.4 MPY

: 1.5 MPY
: 5.4 MPY
: 2.1 MPY
: 0.1 MPY

TML thickness readings have not been compensated for high Temperatures.
TML thickness readings have been compensated for growths.

TML Life calculations are based on the Representative TML Corrosion Rate using Short
Term and Long Term Corrosion Rates.

Nominal thickness is used for TML corrosion rate calculations with less than 3 surveys.

Minimum time between inspections required for corrosion rate calculation is 3 months.

TML Inspection Interval is:
(A) -- 1.00 years.

Eq/Circ ID Last Survey Date is based on the LAST of the last 0% of TML survey dates (Min 1).

Eq/Circ ID Estimated life = 394.9 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 10/26/2408

Recommended Eq/Circ UT/RT Inspection Date is 11/18/2014
UT/RT Inspection Interval is 1.00 years.

Caution TML Logic: TML Corrosion Rate > 15.0 MPY .OR. TML Remaining Life < 3.00 Years.
There are 0 Caution TMLs in this Eq/Circ ID.

Lo Tech Manufacturing Inc.

Fuel Gas Scrubbers • Desiccant Dehydrators • Check Valves

7719 - 69 Street
Edmonton, Alberta T6B 1V4
Phone: (780) 440-5064
Fax: (780) 440-5172

Certificate Of Compliance

I Hereby Certify That The Below Registered Category "H" Pressure Fitting Has Been Designed, Manufactured, and Pressure Tested In Accordance With The Alberta Safety Codes Act, CSA B51 And ASME Section VIII, Division 1, 2004 Edition.

CRN	0H5148.21345		
S/N	8285.47		
Diameter	8.625	Inches	Overall Length 36 Inches
Year Built	2005		
MAWP	285	PSIG	@ 650 °F
MDMT	-20	°F	
C.A.	0.125	Inches	
Radiography	N/A		
PWHT : Time	N/A	min.	Temp. N/A °F
Hydro Tested @	430	PSIG	

	Material	Thickness
Shell	SA-106 Gr. B	Sch 40 - 0.322"
Head 1	SA-234-WPB	Sch 40 - 0.322"
Head 2	SA-516 Gr. 70N	0.75"



Quality Control Manager
Dennis Klokocki

December 8, 2010

API 570 Piping External Inspection

Company Name: FMC Technologies Completion	Facility Name: WY District
Line Name/Number: LH-0011 coils and associated piping	
Size/Sched. Of Pipe: 3.500" O.D	Eq/Circ. ID:
Service/System: N/A	Piping Class ☐ 1 ☒ 2 ☐ 3 ☐ Other
Design Pressure: 5,000 psi	Materials: ☒ CS ☐ SS ☐ Other
Design Temperature: 392° F	Note Stamping (If Any)
P&ID#: N/A	Flange Rating: API 3.125" x 5000 XXH

Reason for Inspection: ☐ Initial API-570 on Stream Inspection.

☒ Scheduled API-570 External Inspection. ☐ Other:

Testing Performed:

☒ Visual ☒ UT ☐ PT ☐ MT ☐ Other:

Comments:

Insulation Observations:

- ☐ Serviceable
- ☒ Not Insulated
- ☐ Missing/Damaged
- ☐ CUI Identification
- ☐ Corrosion Present (Describe)
- ☐ Other
- ☒ No Issues

Comments:

Coating Condition:

- ☐ Good
- ☒ Fair, Some Blistering/Peeling
- ☒ Corrosion Present (Describe)
- ☒ Other
- ☐ No Issues

Comments: Line heater coils have moderate surface blistering and peeling, as well as surface corrosion. Line heater associated piping coating is in good condition with no corrosion present. Light pitting present on coils.

Loss of Containment:

- ☐ Fluid Loss (Indicate How Much)
- ☐ Seeping or Evidence of Past Leakage
- ☐ Dripping (Size of Drops/Drops Per Minute)
- ☐ Leaking (Size of Stream, Noise Level, etc.)
- ☐ Clamps
- ☒ Other
- ☒ None Identified

Comments:

Line heater is not in service during this inspection. Bundles are pulled for our inspection purposes.

Condition of Welds:

- ☒ Welds Are Full, Smooth and Well Profiled
- ☐ Incomplete Fusion/Penetration
- ☐ Crack Located Near Weld Seam
- ☐ Weld Does Not Appear to Be Original
- ☐ Joints-Misaligned
- ☐ Undercut
- ☒ Other
- ☒ No Issues

Comments:

Welds are smooth and well profiled. Some welds not observed due to surface corrosion present.

Relief Device:

- ☐ PSV ☐ No PSV
- ☐ Rupture Disk
- ☐ Atmospheric
- ☐ No Relief Device Identified For This Equipment
- ☐ Tag Secure and Legible
- ☐ Set Pressure At Or Below MAWP
- ☐ Block Valve Not Locked/Car Sealed In Open Position
- ☐ Improper Drain Hole/Weather Cap On Atmos. Discharge
- ☐ Obstruction (i.e. Debris)
- ☐ Relief Installed In A Position Other Than Horiz. Or Upright
- ☒ Other
- ☒ No Issues

Comments:

PSV is located on associated equipment (when it is in service).

Supports/Hangers:

- ☐ In Serviceable Condition
- ☐ Foundation Is Damaged
- ☐ Additional Support Needed
- ☐ Hanger/Support Is Distorted/Broken/Missing
- ☐ Pipe Slide Or Shoe Is Off Of The Support
- ☐ Makeshift Support
- ☐ Loose Support Needs To Be Tightened
- ☐ Fireproofing Missing Or Damaged
- ☐ Support/Hanger Is Corroded
- ☒ Other
- ☒ No Issues

Comments:

Coils have (2) support tubesheets present. Welds are smooth with a good profile. Light surface corrosion with peeling is present.
In acceptable condition.

Flanged Connections:

- ☒ Bolting Serviceable
- ☐ Short, Missing Or Damaged Bolting
- ☐ Nuts Lack Full Engagement
- ☒ Flanges Serviceable
- ☐ Flange Material Or Rating Inconsistent For System
- ☐ Flanges Deformed Or Damaged
- ☒ Corrosion Present (Describe)
- ☐ Gaskets
- ☐ Flange Rating Issues
- ☐ Other
- ☒ No Issues

Comments:

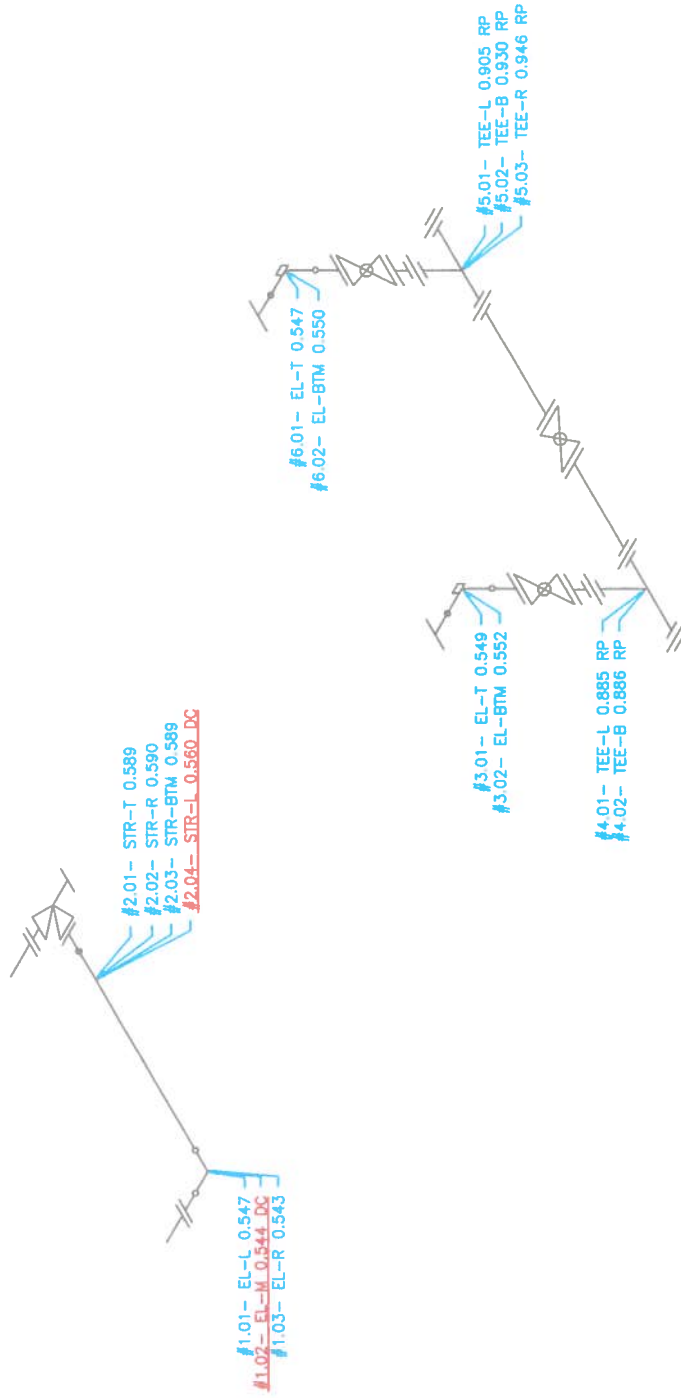
On associated piping there is light surface corrosion present on bolting.
In acceptable condition.

Mechanical Observations:

- ☐ Deadleg
- ☐ Damaged Flex Hose
- ☐ Crack
- ☐ Biological Growth
- ☐ Threaded Exposed
- ☐ Threaded Connections Not Seal Welded
- ☐ Expansion Joint Issues
- ☐ Low Point Without Drain
- ☐ Open Ended
- ☐ Vibration (Excessive)
- ☐ Weephole
- ☐ Other
- ☒ No Issues

Comments:

EQUIP RETIREMENT DATE: 6/6/2024
NEXT INSPECTION IS DUE: 11/18/2014



LH0011-P

DESC: ASSOCIATED PIPING ON LINE HEATER

DWG. NO. LH0011-D-1 01-00

TEMP-

Eaton Inspection Services
1595 So Hwy 150, Suite F, Evanston, WY 82930
Phone 307-789-3540 FAX 307-789-2822

Report Date: 12/11/2013

(Report in Inches, Corrosion Rates in MPY)
Analysis: Straight Line

Unit: LH-0011
Eq/Circ ID: LH0011-P
Eq Type: PIPING
Class:
CM RBI:
Design Code: B31.3

Flange Rating: 5295 lb/in²
Design Pressure: 5000 lb/in²
Design Temperature: 392 °F

Description: LH-0011 ASSOCIATED PIPING

Summary: Group Name:
Insp. Due Date = 11/18/2014
Pred. Ret. Date = 06/06/2024

Group Description:
RCR = 12.8 MPY
Rem. Life (from last survey 11/18/2013) = 10.6 yrs

0 C.A. Status: No
Total Caution TMLs = 2

TM L No	Location	Ctn TML	First Survey Thick	First Date	Previous Survey Thick	Previous Date	Last Survey Thick	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TM L Retirement Date	TM L Inspection Date
1.01	EL-L	N *	0.565	03/08/2011	0.557	09/28/2012	0.547	11/18/2013	8.8	6.7	6.7	8.8	0.455 P	8.8	05/21/2024	11/18/2014
1.02	EL-M	Y *	0.564	03/08/2011	0.563	09/28/2012	0.544 DC	11/18/2013	16.7	7.4	7.2	16.7	0.455 P	16.7	03/19/2019	11/18/2014
1.03	EL-R	N *	0.557	03/08/2011	0.553 RR	09/28/2012	0.543	11/18/2013	8.8	5.2	5.1	8.8	0.455 P	8.8	11/19/2023	11/18/2014
2.01	STR-T	N	0.595	03/08/2011	0.588 RR	09/28/2012	0.589	11/18/2013	0	2.2	2.1	6.4	0.455 P	2.2	10/16/2074	11/18/2014
2.02	STR-R	N	0.591	03/08/2011	0.592 RR	09/28/2012	0.590	11/18/2013	1.8	0.4	0.3	1.8	0.455 P	1.8	11/18/2088	11/18/2014
2.03	STR-BTM	N	0.586	03/08/2011	0.591 RR	09/28/2012	0.589	11/18/2013	1.8	0	0	1.8	0.455 P	1.8	04/29/2088	11/18/2014
2.04	STR-L	Y *	0.588	03/08/2011	0.579 RR	09/28/2012	0.560 DC	11/18/2013	16.7	10.4	10.1	16.7	0.455 P	16.7	03/12/2020	11/18/2014
3.01	EL-T	N *	0.554	03/08/2011	0.540	09/28/2012	0.540 RR	11/18/2013	0	5.2	5.2	10.0	0.455 P	5.2	03/24/2030	11/18/2014
3.02	EL-BTM	N *	0.546	03/08/2011	0.532	09/28/2012	0.532 RR	11/18/2013	0	5.2	5.7	23.9	0.455 P	5.2	09/09/2028	11/18/2014
4.01	TEE-L	N		N/A		N/A	0.885 RP	11/18/2013	N/A	N/A	N/A	50.9	0.455 P	0.1	12/03/4013	11/18/2014
4.02	TEE-B	N		N/A		N/A	0.886 RP	11/18/2013	N/A	N/A	N/A	0	0.455 P	0.1	12/03/4013	11/18/2014
5.01	TEE-L	N		N/A		N/A	0.905 RP	11/18/2013	N/A	N/A	N/A	20.0	0.455 P	0.1	12/03/4013	11/18/2014
5.02	TEE-B	N		N/A		N/A	0.930 RP	11/18/2013	N/A	N/A	N/A	50.0	0.455 P	0.1	12/03/4013	11/18/2014
5.03	TEE-R	N		N/A		N/A	0.946 RP	11/18/2013	N/A	N/A	N/A	30.0	0.455 P	0.1	12/03/4013	11/18/2014
6.01	EL-T	N	0.537	03/08/2011	0.532	09/28/2012	0.532 RR	11/18/2013	0	1.9	2.1	10.9	0.455 P	1.9	08/25/2054	11/18/2014
6.02	EL-BTM	N	0.541	03/08/2011	0.536 RR	09/28/2012	0.539 RR	11/18/2013	0	0.7	0.7	4.5	0.455 P	0.7	07/14/2134	11/18/2014

Eaton Inspection Services
1595 So Hwy 150, Suite F, Evanston, WY 82930
Phone 307-789-3540 FAX 307-789-2822

Report Date: 12/11/2013

Unit: LH-0011
Eq/Circ ID: LH0011-P
Design Code: B31.3
Eq Type: PIPING
Class:
CM RBI:

(Report in Inches, Corrosion Rates in MPY)
Analysis: Straight Line

Flange Rating: 5295 lb/in²
Design Pressure: 5000 lb/in²
Design Temperature: 392 °F

Description: LH-0011 ASSOCIATED PIPING

TML Corrosion Rates are each the Maximum of:
(A) -- Calculated Corrosion Rates x 1.00 : Varies
(B) -- Default Corrosion Rate : 0.1 MPY

Representative Corrosion Rate is the Maximum of:
(A) -- Average Corrosion Rate x 1.00 : 4.4 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 12.8 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 5.8 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 12.8 MPY

TML thickness readings have not been compensated for high Temperatures.
TML thickness readings have been compensated for growths.

TML Life calculations are based on the Representative TML Corrosion Rate using Short Term and Long Term Corrosion Rates.

Nominal thickness is used for TML corrosion rate calculations with less than 3 surveys.

Minimum time between inspections required for corrosion rate calculation is 3 months.

TML Inspection Interval is:
(A) -- 1.00 years.

Eq/Circ ID Last Survey Date is based on the LAST of the last 0% of TML survey dates (Min 1).

Eq/Circ ID Estimated life = 10.6 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 06/06/2024

Recommended Eq/Circ UT/RT Inspection Date is 11/18/2014
UT/RT Inspection Interval is 1.00 years.

Caution TML Logic: TML Corrosion Rate > 15.0 MPY .OR. TML Remaining Life < 3.00 Years.
There are 2 Caution TMLs in this Eq/Circ ID.