



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

Inspections Performed for: FMC Technologies Completion	
Inspection Report for: LH-0032 – Coil 1	
Remaining Life: 5.5 YRS	Date of this Report: 11/11/2017
Average Corrosion Rate: 76.1 MPY	Next UT: 11/11/2018 Next VT: 11/11/2018
Manufacturer: DynaCorp Fabricators, INC.	Mfg Serial #: 6J111049
Date Built: 2012	National Board #: None
Alberta registration #: 617015	Canadian Registration #: T9862.2

FMC Technologies Completion LH-0032 Line Heater



PRESSURE VESSEL INVENTORY

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

VESSEL ID INFORMATION

Company Name : FMC Technologies Completion
Facility/Location Name : PA District
Field Name : N/A
Equipment Number : LH-0032
Eq/Circ. ID : LH0032-C1/ LH032-C2
Equipment Name/Service : LH032 Line Heater (w/two coils)
Physical Location : Canonsburg Yard
GPS Coordinates :

VESSEL DESCRIPTION AND SERVICE CONDITIONS

Type of Vessel: Horizontal Line Heater

Vessel Size: Coils are 4.500"

Operating Pressure Range (psig): Not in service

Operating Temperature Range (°F): Not on service

Does the vessel have Internal Access? ☒ Yes ☐ No

Specify type of internal access, if available: When coils removed (only internal access).

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) _____

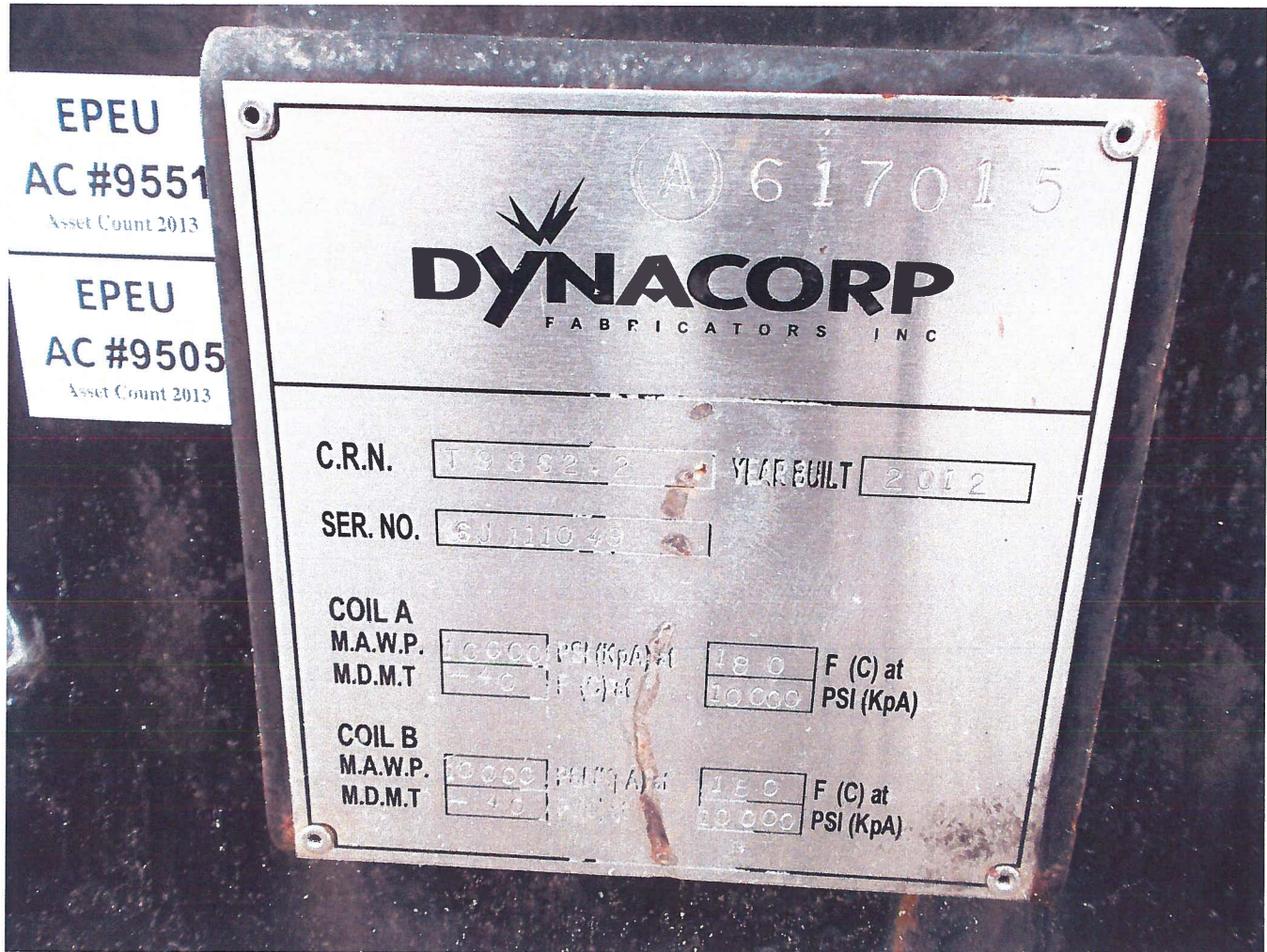
Approximate Date built or installed (check associated equipment or info at facility) _____

Any other pertinent information: _____

ORIGINAL VESSEL NAMEPLATE/STAMPING INFORMATION

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

Nameplate Coils # 1 and Coils # 2



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: Eric Crandall

Date: 8/27/2013

API 510 PRESSURE VESSEL EXTERNAL INSPECTION

Company Name: FMC Technologies Completion	
Facility/Location Name: PA District	
Equipment Number: LH-0032	Eq/Circ. ID: LH0032-C1
Equipment Name/Service: Line Heater	
Physical Location: FMC Yard	
Manufacturer: DynaCorp Fabricators, INC.	Manufacturer Serial Number: 6J111049
Year Built: 2012	National Board Number: None
Alberta Registration #: 617015	Canadian Registration # T9862.2

Is Vessel in-service?: No

Reason for Inspection: Scheduled API-510 External Inspection

Condition of Nameplate and/or Bracket: Nameplate is intact and legible. The nameplate bracket is securely attached.

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. Line Heater was not in service at the time of this inspection.

Condition of Foundation and Anchor Bolts: Front plate is in acceptable condition. Bundle was removed from Heater.

Condition of Steel Supports, Saddles, and Bolting: Iron supports have heavy corrosion/scale buildup.

Condition of Paint and/or Insulation: The paint is in good condition with no chipping or peeling. Coils have heavy corrosion with scaling.

Condition of Nozzles, Flanges, Repads, and Weepholes: Nozzles and flanges are in good condition. Coil was removed from Heater. No piping bolted.

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: Ladders and stairways are in acceptable condition.

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

Is There a PSV on the Vessel? No.

If yes, is it set at or below the MAWP? N/A

Date PSV last tested (if there is a tag on the valve): N/A

Comments:

Piping is to be discarded. Fired tubes were hammer tested and no issues were found.

Heavy corrosion/scale buildup on coils.



Recommendations:

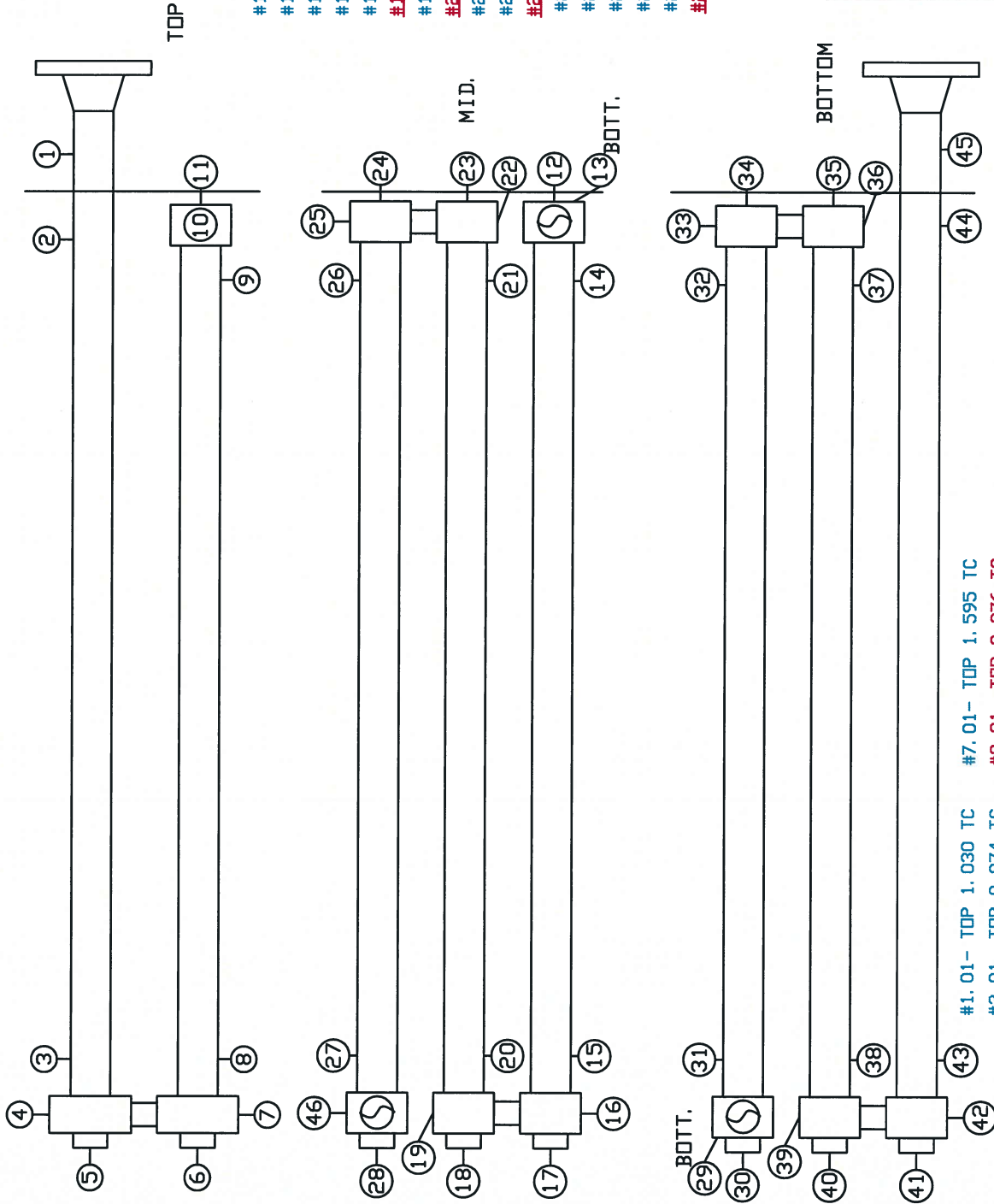
Repairs Needed:

Robert W. Menke/JWW
API 510 Inspector Signature

0131
API 510 Inspector Number

11/10/2017
Date

EQUIP RETIREMENT DATE: 5/2/2023
NEXT INSPECTION IS DUE: 11/11/2018



#1. 01- TOP 1.030 TC
#2. 01- TOP 0.974 TC
#3. 01- TOP 0.959 TC
#4. 01- TOP 2.481 TC
#5. 01- TOP 1.160 IC
#6. 01- TOP 2.472 TC
#7. 01- TOP 1.595 TC
#8. 01- TOP 0.976 IC
#9. 01- TOP 0.994 TC
#10. 01- TOP 1.607 IC
#11. 01- TOP 2.487 DC
#12. 01- MID 1.604 IC

TC-560

#13. 01- MID 0.000 NT #30. 01- BTM 2.470 TC
#14. 01- MID 0.943 TC #31. 01- BTM 0.947 TC
#15. 01- MID 0.963 TC #32. 01- BTM 0.964 TC
#16. 01- MID 2.464 DC #33. 01- BTM 2.484 TC
#17. 01- MID 1.616 DC #34. 01- BTM 1.621 TC
#18. 01- MID 1.602 DC #35. 01- BTM 0.000 NT
#19. 01- MID 0.000 NT #36. 01- BTM 1.587 IC
#20. 01- MID 0.968 IC #37. 01- BTM 0.963 IC
#21. 01- MID 0.986 TC #38. 01- BTM 0.943 TC
#22. 01- MID 1.773 DC #39. 01- BTM 1.601 IC
#23. 01- MID 1.574 IC #40. 01- BTM 0.000 NT
#24. 01- MID 2.477 DC #41. 01- BTM 1.575 IC
#25. 01- MID 2.458 DC #42. 01- BTM 2.040 IC
#26. 01- MID 0.962 TC #43. 01- BTM 0.980 TC
#27. 01- MID 0.984 TC #44. 01- BTM 0.963 TC
#28. 01- MID 2.486 DC #45. 01- BTM 0.981 TC
#29. 01- BTM 1.505 IC #46. 01- BTM 1.596 TC

CAL BLK=40°F

PIPE=37-44°F

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH0032-C1
EQUIP NAME	LINE HEATER (WITH 2 COILS)
DWG #	LH0032-C1

DESC: COIL 1 ON LH-0032 HTR, SN:6J111049
DWG#: LH0032-C1-1.01-46.01

Corrosion Monitoring Eq/Circ 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: 12/08/2017

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

Unit: LH-0032
Eq/Circ ID: LH0032-C1
Eq Type: VESSEL
Class:
CM RBI:
Design Code: S8/D1

Flange Rating: 5734 lb/in²
Design Pressure: 10000 lb/in²
Design Temperature: 180 °F

Description: COIL A ON LINE HEATER; SN: 6J111049

Summary: Group Name: 11/11/2018
Insp. Due Date = 05/02/2023
Pred. Ret. Date =

Group Description:
RCR = 76.1 MPY
Rem. Life (from last survey 11/11/2017) = 5.5 yrs

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

TML No	Location	Ctn TML	First Survey Thick	First Survey Nt	First Date	Previous Survey Thick	Previous Survey Nt	Previous Date	Last Survey Thick	Last Survey 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	TOP	N	1.000 NM		06/15/2012	1.014		08/27/2013	1.014 RR		11/11/2017	0	0	0	0	0.750 U	0.1	11/26/4017	11/11/2018
2.01	TOP	N	1.000 NM		06/15/2012	1.022		08/27/2013	0.974 TC		11/11/2017	11.4	4.8	6.5	11.4	0.750 U	11.4	07/06/2037	11/11/2018
3.01	TOP	N	1.000 NM		06/15/2012	1.013		08/27/2013	0.959 TC		11/11/2017	12.8	7.6	9.0	12.8	0.750 U	12.8	03/11/2034	11/11/2018
4.01	TOP	N	2.500 NM		06/15/2012	2.502		08/27/2013	2.481 TC		11/11/2017	5.0	3.5	3.9	5.0	1.000 U	5.0	01/26/2314	11/11/2018
5.01	TOP	Y *	1.625 NM		06/15/2012	1.614		08/27/2013	1.160 TC		11/11/2017	107.9	86.0	91.7	107.9	1.000 U	107.9	05/07/2019	11/11/2018
6.01	TOP	N	2.500 NM		06/15/2012	2.503		08/27/2013	2.472 TC		11/11/2017	7.4	5.2	5.8	72.5	1.000 U	7.4	10/14/2216	11/11/2018
7.01	TOP	N	1.625 NM		06/15/2012	1.637		08/27/2013	1.595 TC		11/11/2017	10.0	5.5	6.7	10.0	1.000 U	10.0	05/12/2077	11/11/2018
8.01	TOP	Y	1.000 NM		06/15/2012	1.043		08/27/2013	0.976 TC		11/11/2017	15.9	4.4	7.4	15.9	0.750 U	15.9	01/29/2032	11/11/2018
9.01	TOP	N	1.000 NM		06/15/2012	0.999		08/27/2013	0.994 TC		11/11/2017	1.2	1.1	1.1	11.1	0.750 U	1.2	03/15/2221	11/11/2018
10.01	TOP	Y	1.625 NM		06/15/2012	1.765		08/27/2013	1.607 TC		11/11/2017	37.5	3.3	12.3	37.5	1.000 U	37.5	01/18/2034	11/11/2018
11.01	TOP	N	1.625 NM		06/15/2012	1.892		08/27/2013	1.892 RR		11/11/2017	0	0	0	507.0	1.000 U	0.1	11/26/4017	11/11/2018
12.01	MID	Y *	2.500 NM		06/15/2012	2.522		08/27/2013	1.604 TC		11/11/2017	218.2	165.7	179.4	218.2	1.000 U	218.2	08/18/2020	11/11/2018
13.01	MID	N	1.625 NM		06/15/2012			N/A	1.633		08/27/2013	N/A	0	N/A	723.0	1.000 U	0.1	09/11/4013	08/27/2014
14.01	MID	N	1.000 NM		06/15/2012	0.997		08/27/2013	0.943 TC		11/11/2017	12.8	10.5	11.1	252.0	0.750 U	12.8	12/09/2032	11/11/2018
15.01	MID	N	1.000 NM		06/15/2012	0.997		08/27/2013	0.963 TC		11/11/2017	8.1	6.8	7.2	8.1	0.750 U	8.1	02/28/2044	11/11/2018
16.01	MID	N	2.500 NM		06/15/2012	2.526		08/27/2013	2.464 TC		11/11/2017	14.7	6.7	8.8	14.7	1.000 U	14.7	06/16/2117	11/11/2018
17.01	MID	N	1.625 NM		06/15/2012	1.662		08/27/2013	1.616 TC		11/11/2017	10.9	1.7	4.1	10.9	1.000 U	10.9	05/18/2074	11/11/2018
18.01	MID	Y *	2.500 NM		06/15/2012	2.487		08/27/2013	1.602 TC		11/11/2017	210.3	166.1	177.6	723.8	1.000 U	210.3	09/22/2020	11/11/2018
19.01	MID	N	1.625 NM		06/15/2012			N/A	1.700		08/27/2013	N/A	0	N/A	0	1.000 U	0.1	09/11/4013	08/27/2014
20.01	MID	Y *	1.000 NM		06/15/2012	1.039		08/27/2013	0.968 TC		11/11/2017	16.9	5.9	8.8	1253.4	0.750 U	16.9	10/06/2030	11/11/2018

Corrosion Monitoring Eq/Circ 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: 12/08/2017

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

Unit: LH-0032
Eq/Circ ID: LH0032-C1

Eq Type: VESSEL

Class:

CM RBI:

Design Code: S8/D1

Flange Rating: 5734 lb/in²
Design Pressure: 10000 lb/in²
Design Temperature: 180 °F

Description: COIL A ON LINE HEATER; SN:6J111049

Summary:

Group Description:

Insp. Due Date = 11/11/2018

RCR = 76.1 MPY

Pred. Ret. Date = 05/02/2023

Rem. Life (from last survey 11/11/2017) = 5.5 yrs

0 C.A. Status: NO

Total Caution TMLs = 13

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
21.01	MTD	N	1.000 NM	06/15/2012	1.002	08/27/2013	0.986 TC	11/11/2017	3.8	2.6	2.9	3.8	0.750 U	3.8	12/20/2079	11/11/2018
22.01	MTD	N	1.000 NM	06/15/2012		N/A	1.773 TC	11/11/2017	N/A	0	N/A	0	0.750 U	0.1	11/26/4017	11/11/2018
23.01	MTD	Y	1.625 NM	06/15/2012	1.646	08/27/2013	1.574 TC	11/11/2017	17.1	9.4	11.4	17.1	1.000 U	17.1	06/06/2051	11/11/2018
24.01	MTD	N	1.625 NM	06/15/2012	2.498	08/27/2013	2.477 TC	11/11/2017	5.0	0	0	5.0	1.000 U	5.0	04/09/2313	11/11/2018
25.01	MTD	N	1.000 NM	06/15/2012	1.618	08/27/2013	1.618 RR	11/11/2017	0	0	0	0	0.750 U	0.1	11/26/4017	11/11/2018
26.01	MTD	N	1.000 NM	06/15/2012	0.992	08/27/2013	0.962 TC	11/11/2017	4.8	7.0	6.4	536.2	0.750 U	7.0	02/24/2048	11/11/2018
27.01	MTD	N	1.000 NM	06/15/2012	1.013	08/27/2013	0.984 TC	11/11/2017	6.9	3.0	4.0	510.3	0.750 U	6.9	10/11/2051	11/11/2018
28.01	MTD	N	1.625 NM	06/15/2012	1.619	08/27/2013	1.619 RR	11/11/2017	0	1.1	0.8	5.0	1.000 U	1.1	08/07/2580	11/11/2018
29.01	BTM	Y	1.625 NM	06/15/2012	1.620	08/27/2013	1.505 TC	11/11/2017	27.3	22.2	23.5	27.3	1.000 U	27.3	05/11/2036	11/11/2018
30.01	BTM	N	2.500 NM	06/15/2012	2.493	08/27/2013	2.470 TC	11/11/2017	5.5	5.5	5.5	58.4	1.000 U	5.5	02/20/2285	11/11/2018
31.01	BTM	N	1.000 NM	06/15/2012	0.994	08/27/2013	0.947 TC	11/11/2017	11.2	9.8	10.2	1253.4	0.750 U	11.2	06/14/2035	11/11/2018
32.01	BTM	N	1.000 NM	06/15/2012	0.996	08/27/2013	0.964 TC	11/11/2017	7.6	6.7	6.9	1254.2	0.750 U	7.6	01/08/2046	11/11/2018
33.01	BTM	N	2.500 NM	06/15/2012	2.497	08/27/2013	2.484 TC	11/11/2017	3.1	3.0	3.0	3.1	1.000 U	3.1	07/31/2496	11/11/2018
34.01	BTM	N	1.625 NM	06/15/2012	1.612	08/27/2013	1.612 RR	11/11/2017	0	2.4	1.8	118.4	1.000 U	2.4	11/13/2272	11/11/2018
35.01	BTM	N	2.500 NM	06/15/2012		N/A	2.484	08/27/2013	N/A	13.3	N/A	174.3	1.000 U	13.3	03/27/2125	08/27/2014
36.01	BTM	Y	1.625 NM	06/15/2012	1.657	08/27/2013	1.587 TC	11/11/2017	16.6	7.0	9.5	16.6	1.000 U	16.6	03/23/2053	11/11/2018
37.01	BTM	Y *	1.000 NM	06/15/2012	1.035	08/27/2013	0.963 TC	11/11/2017	17.1	6.8	9.5	496.2	0.750 U	17.1	04/27/2030	11/11/2018
38.01	BTM	N	1.000 NM	06/15/2012	0.994	08/27/2013	0.943 TC	11/11/2017	12.1	10.5	11.0	12.1	0.750 U	12.1	10/24/2033	11/11/2018
39.01	BTM	Y	1.000 NM	06/15/2012	1.824	08/27/2013	1.601 TC	11/11/2017	53.0	0	0	53.0	0.750 U	53.0	12/02/2033	11/11/2018
40.01	BTM	N	1.625 NM	06/15/2012		N/A	2.491	08/27/2013	N/A	0	N/A	5.8	1.000 U	0.1	09/11/4013	08/27/2014
41.01	BTM	Y	1.625 NM	06/15/2012	1.656	08/27/2013	1.575 TC	11/11/2017	19.2	9.2	11.9	703.8	1.000 U	19.2	10/23/2047	11/11/2018

Corrosion Monitoring Eq/Circ 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: 12/08/2017

(Report in Inches, Corrosion Rates in MPY)

Analysis: Straight Line

Unit: LH-0032

Eq/Circ ID: LH0032-C1

Eq Type: VESSEL

Class:

CM RBI:

Design Code: S8/D1

Flange Rating: 5734 lb/in²
Design Pressure: 10000 lb/in²
Design Temperature: 180 °F

Description: COIL A ON LINE HEATER; SN: 6J111049

Summary: Group Name:

Insp. Due Date = 11/11/2018

Pred. Ret. Date = 05/02/2023

Group Description:

RCR = 76.1 MPY

Rem. Life (from last survey 11/11/2017) = 5.5 yrs

0 C.A. Status: NO

Total Caution TMLs = 13

TML No	Location	Ctn TML	First Survey Thick	First Survey Nt	First Date	Previous Survey Thick	Previous Survey Nt	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
42.01	BTM	Y *	2.500 NM		06/15/2012	2.516		08/27/2013	2.040 TC	11/11/2017	113.1	85.1	92.4	1220.8	2.000 U	113.1	03/20/2018	11/11/2018
43.01	BTM	N	1.000 NM		06/15/2012	1.020		08/27/2013	0.980 TC	11/11/2017	9.5	3.7	5.2	9.5	0.750 U	9.5	01/27/2042	11/11/2018
44.01	BTM	N	1.000 NM		06/15/2012	1.025		08/27/2013	0.963 TC	11/11/2017	14.7	6.8	8.9	14.7	0.750 U	14.7	05/08/2032	11/11/2018
45.01	BTM	N	1.000 NM		06/15/2012	1.028		08/27/2013	0.981 TC	11/11/2017	11.2	3.5	5.5	11.2	0.750 U	11.2	06/27/2038	11/11/2018
46.01	BTM	N	1.000 NM		06/15/2012			N/A	1.596 TC	11/11/2017	N/A	0	N/A	0	0.750 U	0.1	11/26/4017	11/11/2018

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

Report Date: 12/08/2017

Unit: LH-0032
Eq/Circ ID: LH0032-C1
Design Code: S8/D1
Eq Type: VESSEL
Class:
CM RBI:

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

Flange Rating: 5734 lb/in²
Design Pressure: 10000 lb/in²
Design Temperature: 180 °F

Description: COIL A ON LINE HEATER; SN:6J111049

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 : 23.5 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 76.1 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 27.9 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 76.1 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 = 5.5 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 05/02/2023

Recommended Eq/Circ UT/RT Inspection Date is 11/11/2018
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-0032 – Coil 2	
Remaining Life: 3.5 YRS	Date of this Report: 11/11/2017
Average Corrosion Rate: 111.9 MPY	Next UT: 11/11/2018 Next VT: 11/11/2018
Manufacturer: DynaCorp Fabricators, INC.	Mfg Serial #: 6J111049
Date Built: 2012	National Board #: None
Alberta registration #: 617015	Canadian Registration #: T9862.2

FMC Technologies Completion LH-0032 Line Heater



PRESSURE VESSEL INVENTORY

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

VESSEL ID INFORMATION

Company Name : FMC Technologies Completion
Facility/Location Name : PA District
Field Name : N/A
Equipment Number : LH-0032
Eq/Circ. ID : LH0032-C1/ **LH032-C2**
Equipment Name/Service : LH032 Line Heater (w/two coils)
Physical Location : Canonsburg Yard
GPS Coordinates :

VESSEL DESCRIPTION AND SERVICE CONDITIONS

Type of Vessel: Horizontal Line Heater

Vessel Size: Coils are 4.500"

Operating Pressure Range (psig): Not in service

Operating Temperature Range (°F): Not on service

Does the vessel have Internal Access? ☒ Yes ☐ No

Specify type of internal access, if available: When coils removed (only internal access).

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) _____

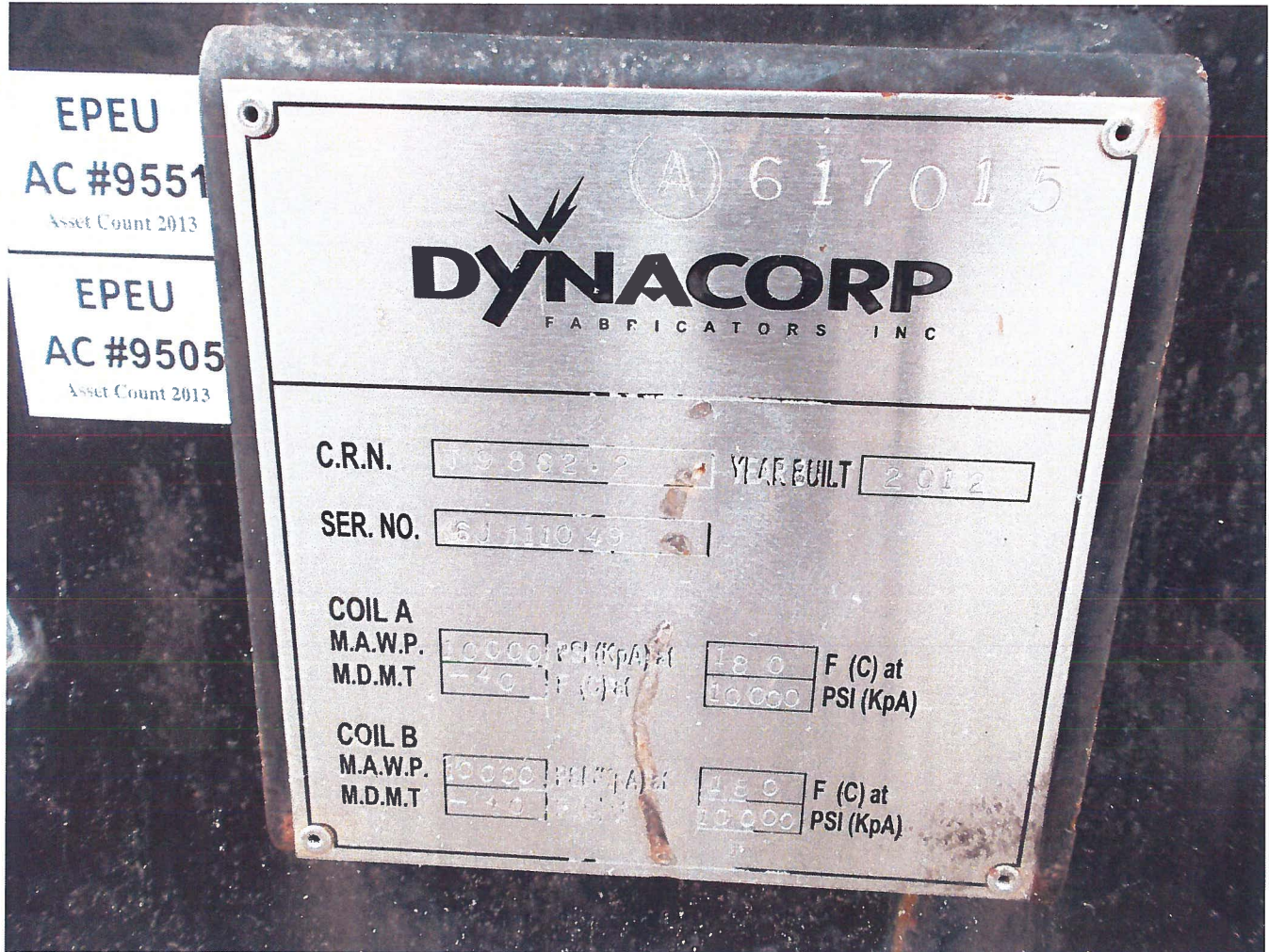
Approximate Date built or installed (check associated equipment or info at facility) _____

Any other pertinent information: _____

ORIGINAL VESSEL NAMEPLATE/STAMPING INFORMATION

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

Nameplate Coils # 1 and Coils # 2



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: Eric Crandall

Date: 08/27/2013

API 510 PRESSURE VESSEL EXTERNAL INSPECTION

Company Name: FMC Technologies Completion	
Facility/Location Name: PA District	
Equipment Number: LH-0032	Eq/Circ. ID: LH0032-C2
Equipment Name/Service: Line Heater	
Physical Location: FMC Yard	
Manufacturer: DynaCorp Fabricators, INC.	Manufacturer Serial Number: 6J111049
Year Built: 2012	National Board Number: None
Alberta Registration #: 617015	Canadian Registration # T9862.2

Is Vessel in-service?: No

Reason for Inspection: Scheduled API-510 External Inspection

Condition of Nameplate and/or Bracket: Nameplate is intact and legible. The nameplate bracket is securely attached.

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. Line Heater was not in service at the time of this inspection.

Condition of Foundation and Anchor Bolts: Front plate is in acceptable condition. Bundle was removed from Heater.

Condition of Steel Supports, Saddles, and Bolting: Iron supports have heavy corrosion/scale buildup.

Condition of Paint and/or Insulation: The paint is in good condition with no chipping or peeling. Coils have heavy corrosion with scaling.

Condition of Nozzles, Flanges, Repads, and Weepholes: Nozzles and flanges are in good condition. Coil was removed from Heater. No piping bolted.

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: Ladders and stairways are in acceptable condition.

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

Is There a PSV on the Vessel? No.

If yes, is it set at or below the MAWP? N/A

Date PSV last tested (if there is a tag on the valve): N/A

Comments:

Piping is to be discarded.

Heavy corrosion/scale buildup on coils.



Recommendations:

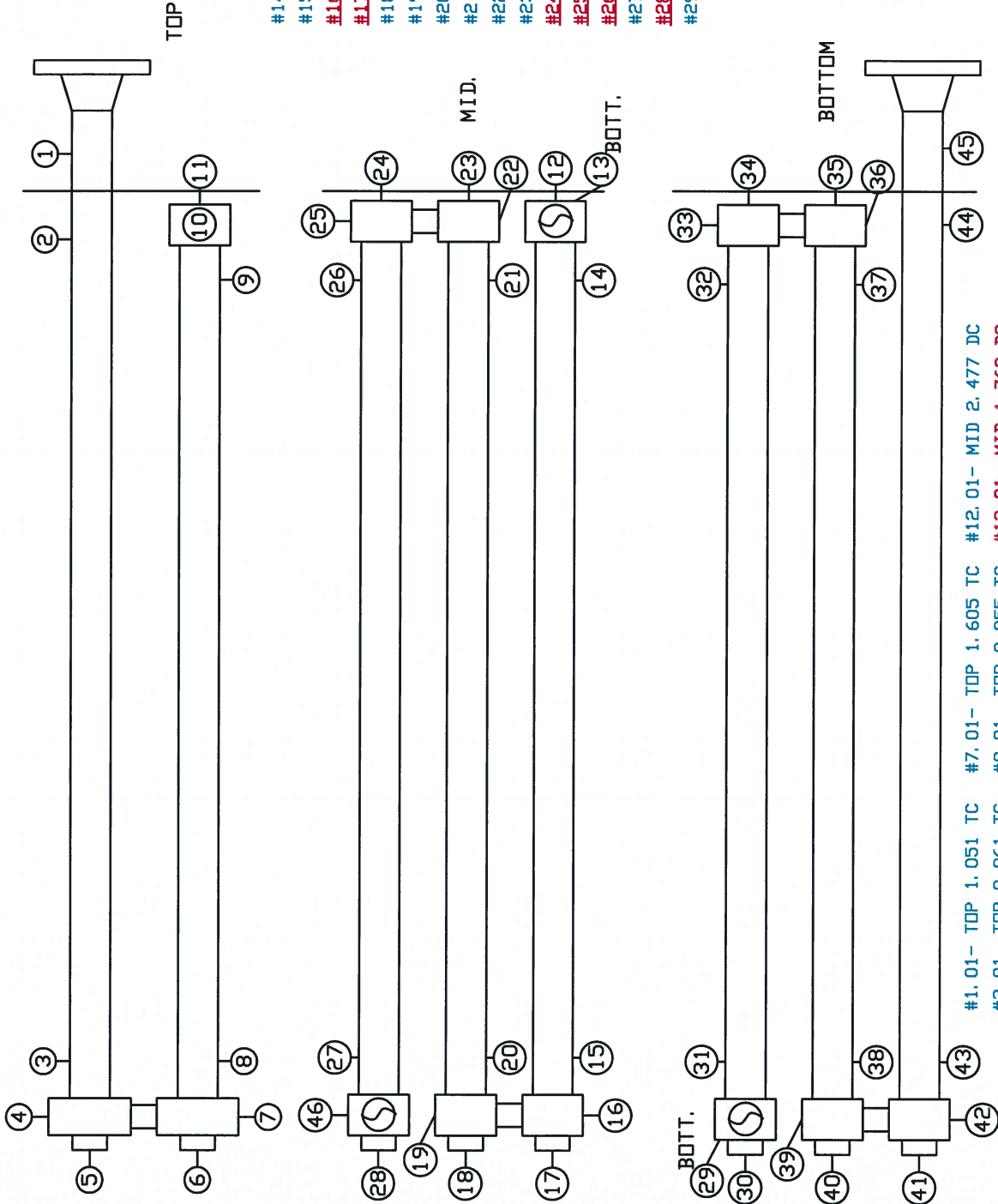
Repairs Needed:

Robert W. Menke/TWW
API 510 Inspector Signature

0131
API 510 Inspector Number

11/10/2017
Date

EQUIP RETIREMENT DATE: 5/15/2021
NEXT INSPECTION IS DUE: 11/10/2018



#14, 01- MID 0. 959 TC #30, 01- BTM 2. 475 TC
#15, 01- MID 0. 980 TC #31, 01- BTM 0. 966 IC
#16, 01- MID 2. 474 IC #32, 01- BTM 0. 959 TC
#17, 01- MID 1. 562 IC #33, 01- BTM 2. 473 DC
#18, 01- MID 2. 421 TC #34, 01- BTM 1. 627 DC
#19, 01- MID 0. 000 NT #35, 01- BTM 2. 476 DC
#20, 01- MID 0. 987 TC #36, 01- BTM 0. 000 NT
#21, 01- MID 0. 955 TC #37, 01- BTM 0. 950 IC
#22, 01- MID 0. 000 NT #38, 01- BTM 0. 964 TC
#23, 01- MID 1. 664 TC #39, 01- BTM 0. 000 NT
#24, 01- MID 0. 248 DC #40, 01- BTM 1. 988 DC
#25, 01- MID 1. 631 DC #41, 01- BTM 2. 488 TC
#26, 01- MID 0. 962 IC #42, 01- BTM 1. 644 DC
#27, 01- MID 0. 977 TC #43, 01- BTM 0. 965 TC
#28, 01- MID 1. 570 IC #44, 01- BTM 0. 990 TC
#29, 01- BTM 1. 603 DC #45, 01- BTM 0. 994 TC
#46, 01- BTM 2. 485 TC

CAL BLK=42°F

PIPE=38°F

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH0032-C2
EQUIP NAME	LINE HEATER (WITH 2 COILS)
DWG #	LH0032-C2

DESC: COIL 2 ON LH-0032 HTR, SN:6J111049
DWG#: LH0032-C2-1.01-46.01

Corrosion Monitoring Eq/Circ 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:12/08/2017

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

Unit: LH-0032

Eq/Circ ID: LH0032-C2

Eq Type: VESSEL

Class:

CM RBI:

Design Code: S8/D1

Flange Rating: 5734 lb/in²
Design Pressure: 10000 lb/in²
Design Temperature: 180 °F

Description: COIL B ON LINE HEATER; SN:6J111049

Summary: Group Name:

Insp. Due Date = 11/10/2018

Pred. Ret. Date = 05/15/2021

Group Description:

RCR = 111.9 MPY

Rem. Life (from last survey 11/10/2017) = 3.5 yrs

0 C.A. Status: No

Total Caution TMLs = 15

TML No	Location	Ctn	First Survey Thick	First Survey Nt	First Date	Previous Survey Thick	Previous Survey Nt	Previous Date	Last Survey Thick	Last Survey 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	TOP	N	1.000 NM		06/15/2012	1.053		08/27/2013	1.051 TC		11/10/2017	0.5	0	0	0.5	0.750 U	0.5	11/15/2619	11/10/2018
2.01	TOP	N	1.000 NM		06/15/2012	1.016		08/27/2013	0.961 TC		11/10/2017	13.1	7.2	8.7	13.1	0.750 U	13.1	12/19/2033	11/10/2018
3.01	TOP	Y	1.000 NM		06/15/2012	1.044		08/27/2013	0.968 TC		11/10/2017	18.1	5.9	9.1	18.1	0.750 U	18.1	11/26/2029	11/10/2018
4.01	TOP	N	2.500 NM		06/15/2012	2.500		08/27/2013	2.485 TC		11/10/2017	3.6	2.8	3.0	3.6	1.000 U	3.6	05/15/2430	11/10/2018
5.01	TOP	N	1.625 NM		06/15/2012	1.611		08/27/2013	1.611 RR		11/10/2017	0	2.6	1.9	11.7	1.000 U	2.6	11/12/2252	11/10/2018
6.01	TOP	N	2.500 NM		06/15/2012	2.483		08/27/2013	2.451 TC		11/10/2017	7.6	9.1	8.7	72.5	1.000 U	9.1	04/24/2177	11/10/2018
7.01	TOP	N	1.625 NM		06/15/2012	1.642		08/27/2013	1.605 TC		11/10/2017	8.8	3.7	5.0	8.8	1.000 U	8.8	08/11/2086	11/10/2018
8.01	TOP	N	1.000 NM		06/15/2012	1.004		08/27/2013	0.955 TC		11/10/2017	11.7	8.3	9.2	11.7	0.750 U	11.7	05/20/2035	11/10/2018
9.01	TOP	N	1.000 NM		06/15/2012	1.002		08/27/2013	0.983 TC		11/10/2017	4.5	3.1	3.5	11.1	0.750 U	4.5	08/21/2069	11/10/2018
10.01	TOP	Y	1.625 NM		06/15/2012	1.743		08/27/2013	1.611 TC		11/10/2017	31.4	2.6	10.1	31.4	1.000 U	31.4	04/26/2037	11/10/2018
11.01	TOP	N	2.500 NM		06/15/2012	2.494		08/27/2013	2.494 TC		11/10/2017	0	1.1	0.8	5.0	1.000 U	1.1	01/26/3376	11/10/2018
12.01	MID	N	1.000 NM		06/15/2012	1.506		08/27/2013	1.506 RR		11/10/2017	0	0	0	0	0.750 U	0.1	11/25/4017	11/10/2018
13.01	MID	Y *	2.500 NM		06/15/2012	2.534		08/27/2013	1.768 TC		11/10/2017	182.1	135.4	147.7	182.1	1.000 U	182.1	01/28/2022	11/10/2018
14.01	MID	N	1.000 NM		06/15/2012	0.991		08/27/2013	0.959 TC		11/10/2017	7.6	7.6	7.6	252.0	0.750 U	7.6	05/11/2045	11/10/2018
15.01	MID	N	1.000 NM		06/15/2012	1.003		08/27/2013	0.980 TC		11/10/2017	5.5	3.7	4.2	5.5	0.750 U	5.5	09/05/2059	11/10/2018
16.01	MID	Y	2.500 NM		06/15/2012	2.541		08/27/2013	2.474 TC		11/10/2017	15.9	4.8	7.7	15.9	1.000 U	15.9	07/26/2110	11/10/2018
17.01	MID	Y	1.625 NM		06/15/2012	1.682		08/27/2013	1.562 TC		11/10/2017	28.5	11.7	16.1	28.5	1.000 U	28.5	07/30/2037	11/10/2018
18.01	MID	N	1.625 NM		06/15/2012	1.632		08/27/2013	1.632 RR		11/10/2017	0	0	0	80.0	1.000 U	0.1	11/25/4017	11/10/2018
19.01	MID	N			N/A			N/A	1.625 NM		06/15/2012	N/A	N/A	N/A	0	1.000 U	0.1	06/30/4012	06/15/2013
20.01	MID	N	1.000 NM		06/15/2012	0.997		08/27/2013	0.987 TC		11/10/2017	2.4	2.4	2.4	278.6	0.750 U	2.4	08/11/2116	11/10/2018

Corrosion Monitoring Eq/Circ 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: 12/08/2017

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

Unit: LH-0032
Eq/Circ ID: LH0032-C2
Eq Type: VESSEL
Class:
CM RBI:
Design Code: S8/D1

Flange Rating: 5734 lb/in²
Design Pressure: 10000 lb/in²
Design Temperature: 180 °F

Description: COIL B ON LINE HEATER; SN: 6J111049

Summary: Group Name:
Insp. Due Date = 11/10/2018
Pred. Ret. Date = 05/15/2021

Group Description:
RCR = 111.9 MPY
Rem. Life (from last survey 11/10/2017) = 3.5 yrs

0 C.A. Status: NO
Total Caution TMLs = 15

TML No	Location	Ctn	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
21.01	MID	N	1.000 NM	06/15/2012	1.001	08/27/2013	0.955 TC	11/10/2017	10.9	8.3	9.0	10.9	0.750 U	10.9	08/31/2036	11/10/2018
22.01	MID	N		N/A		N/A	1.000 NM	06/15/2012	N/A	N/A	N/A	0	0.750 U	0.1	06/30/4012	06/15/2013
23.01	MID	N	1.625 NM	06/15/2012	1.673	08/27/2013	1.664 TC	11/10/2017	2.1	0	0	2.1	1.000 U	2.1	01/22/2334	11/10/2018
24.01	MID	Y *	1.625 NM	06/15/2012	1.674	08/27/2013	0.248 TC	11/10/2017	339.1	254.8	276.9	339.1	0.750 S	339.1	05/18/2016	11/10/2018
25.01	MID	Y	1.625 NM	06/15/2012	1.747	08/27/2013	1.631 TC	11/10/2017	27.6	0	6.4	27.6	1.000 U	27.6	09/20/2040	11/10/2018
26.01	MID	Y *	1.625 NM	06/15/2012	0.993	08/27/2013	0.962 TC	11/10/2017	7.4	122.7	92.5	527.0	1.000 U	122.7	07/20/2017	11/10/2018
27.01	MID	N	1.000 NM	06/15/2012	1.032	08/27/2013	0.977 TC	11/10/2017	13.1	4.3	6.6	13.1	0.750 U	13.1	03/10/2035	11/10/2018
28.01	MID	Y	1.625 NM	06/15/2012	1.698	08/27/2013	1.570 TC	11/10/2017	30.4	10.2	15.5	30.4	1.000 U	30.4	08/10/2036	11/10/2018
29.01	BTM	N	1.000 NM	06/15/2012	1.035	08/27/2013	1.035 RR	11/10/2017	0	0	0	0	0.750 U	0.1	11/25/4017	11/10/2018
30.01	BTM	N	2.500 NM	06/15/2012	2.430	08/27/2013	2.430 RR	11/10/2017	0	13.0	9.6	58.4	1.000 U	13.0	11/12/2127	11/10/2018
31.01	BTM	Y *	2.500 NM	06/15/2012	0.997	08/27/2013	0.966 TC	11/10/2017	7.4	283.8	211.5	1253.4	1.000 U	283.8	09/27/2017	11/10/2018
32.01	BTM	N	1.000 NM	06/15/2012	1.021	08/27/2013	0.959 TC	11/10/2017	14.7	7.6	9.5	14.7	0.750 U	14.7	01/29/2032	11/10/2018
33.01	BTM	Y	1.000 NM	06/15/2012	2.579	08/27/2013	2.473 TC	11/10/2017	25.2	0	0	25.2	0.750 U	25.2	03/26/2086	11/10/2018
34.01	BTM	Y	1.625 NM	06/15/2012	1.483	08/27/2013	1.483 RR	11/10/2017	0	26.3	19.4	118.4	1.000 U	26.3	03/23/2036	11/10/2018
35.01	BTM	Y	2.500 NM	06/15/2012	2.291	08/27/2013	2.291 RR	11/10/2017	0	38.7	28.6	174.3	1.000 U	38.7	03/21/2051	11/10/2018
36.01	BTM	N	2.500 NM	06/15/2012		N/A	2.560	08/27/2013	N/A	0	N/A	0	1.000 U	0.1	09/11/4013	08/27/2014
37.01	BTM	Y *	1.000 NM	06/15/2012	1.030	08/27/2013	0.950 TC	11/10/2017	19.0	9.3	11.8	19.0	0.750 U	19.0	05/21/2028	11/10/2018
38.01	BTM	N	1.000 NM	06/15/2012	1.020	08/27/2013	0.964 TC	11/10/2017	13.3	6.7	8.4	13.3	0.750 U	13.3	12/13/2033	11/10/2018
39.01	BTM	N	1.000 NM	06/15/2012		N/A	1.783	08/27/2013	N/A	0	N/A	0	0.750 U	0.1	09/11/4013	08/27/2014
40.01	BTM	Y *	2.500 NM	06/15/2012	2.493	08/27/2013	1.988 TC	11/10/2017	120.1	94.7	101.4	120.1	1.000 U	120.1	02/01/2026	11/10/2018
41.01	BTM	N	2.500 NM	06/15/2012	2.524	08/27/2013	2.488 TC	11/10/2017	8.6	2.2	3.9	8.6	1.000 U	8.6	11/20/2190	11/10/2018

Corrosion Monitoring Eq/Circ 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: 12/08/2017

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

Unit: LH-0032
Eq/Circ ID: LH0032-C2
Eq Type: VESSEL
Class:
CM RBI:
Design Code: S8/D1

Flange Rating: 5734 lb/in²
Design Pressure: 10000 lb/in²
Design Temperature: 180 °F

Description: COIL B ON LINE HEATER; SN: 6J111049

Summary: Group Name:
Insp. Due Date = 11/10/2018
Pred. Ret. Date = 05/15/2021

Group Description:
RCR = 111.9 MPY
Rem. Life (from last survey 11/10/2017) = 3.5 yrs

0 C.A. Status: NO
Total Caution TMLs = 15

TML No	Location	Ctn	First Survey Thick	First Survey Nt	First Date	Previous Survey Thick	Previous Survey Nt	Previous Date	Last Survey Thick	Last Survey 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	
42.01	BTM	N	1.000	NM	06/15/2012	1.036		08/27/2013	1.036	RR	11/10/2017	0	0	0	0	0.750	U	0.1	11/25/4017	11/10/2018
43.01	BTM	N	1.000	NM	06/15/2012	1.019		08/27/2013	0.965	TC	11/10/2017	12.8	6.5	8.1	12.8	0.750	U	12.8	08/28/2034	11/10/2018
44.01	BTM	N	1.000	NM	06/15/2012	1.028		08/27/2013	0.990	TC	11/10/2017	9.0	1.9	3.7	9.0	0.750	U	9.0	07/11/2044	11/10/2018
45.01	BTM	N	1.000	NM	06/15/2012	1.013		08/27/2013	0.994	TC	11/10/2017	4.5	1.1	2.0	4.5	0.750	U	4.5	01/31/2072	11/10/2018
46.01	BTM	N	1.625	NM	06/15/2012			N/A	2.485	TC	11/10/2017	N/A	0	N/A	0	0.750	S	0.1	11/25/4017	11/10/2018

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

Report Date: 12/08/2017

Unit: LH-0032
Eq/Circ ID: LH0032-C2
Design Code: S8/D1
Eq Type: VESSEL
Class:
CM REI:

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

Flange Rating: 5734 lb/in²
Design Pressure: 10000 lb/in²
Design Temperature: 180 °F

Description: COIL B ON LINE HEATER; SN:6J111049

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 : 32.2 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 111.9 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 38.3 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 111.9 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 = 3.5 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 05/15/2021

Recommended Eq/Circ UT/RT Inspection Date is 11/10/2018
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 15 Caution TMLs in this Eq/Circ ID.



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

Inspections Performed for: FMC Technologies Completion – PA District	
Inspection Report for: LH-0032 Fuel Gas Scrubber	
Remaining Life: 18.8 YRS	Date of this Report: 11/10/2017
Representative Corrosion Rate: 3.4 MPY	Next UT: 11/10/2018 Next VT: 11/10/2018
Manufacturer: LoTech Mfg.	Mfg Serial #: 1006.5890
Date Built: 2011	National Board #: None
Alberta registration #:	Canadian Registration #: OH7154.21345

FMC Technologies Completion - LH-0032 Line Heater Fuel Gas Scrubber



PRESSURE VESSEL INVENTORY

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

VESSEL ID INFORMATION

Company Name : Technip FMC
Facility/Location Name : Pennsylvania District
Field Name :
Equipment Number : LH-0032
Eq/Circ. ID : LH0032-FGS
Equipment Name/Service : (Line Heater) Fuel Gas Scrubber
Physical Location : On LH-0032 in FMC Yard
GPS Coordinates :

VESSEL DESCRIPTION AND SERVICE CONDITIONS

Type of Vessel: Vertical Fuel Gas Scrubber

Vessel Size: 6.625" O.D.

Operating Pressure Range (psig): Not in-service

Operating Temperature Range (°F): Not in-service

Does the vessel have Internal Access? No

Specify type of internal access, if available:

Vessel is located: Outside

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?

Any stamping pertaining to materials of construction?

****Diameter****(strap equipment): 6.625 O.D.

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) _____

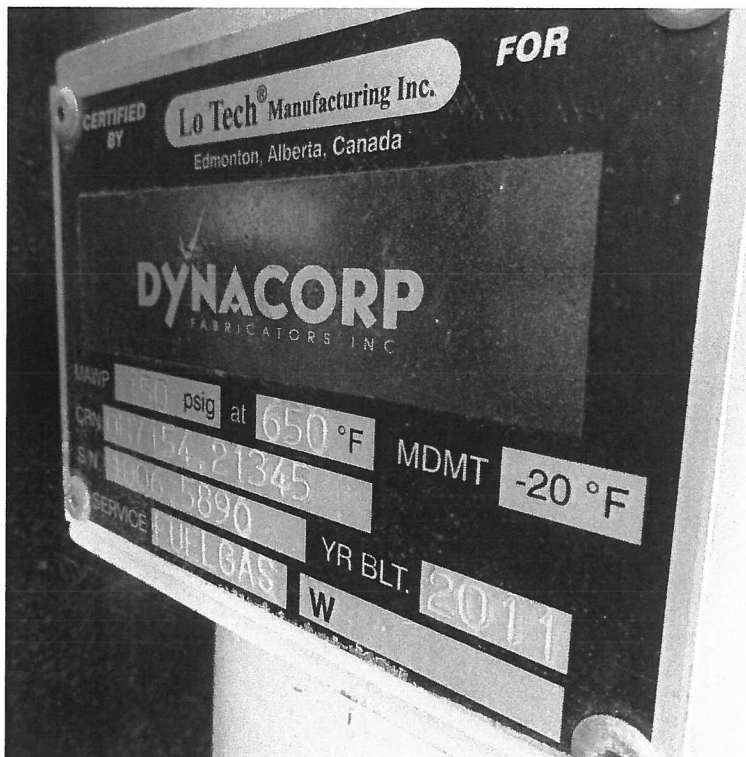
Approximate Date built or installed (check associated equipment or info at facility) 2011

Any other pertinent information: _____

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: Jeff Wall Date: 11/11/2017

API 510 PRESSURE VESSEL EXTERNAL INSPECTION REPORT

Company Name: FMC Technologies Completion	
Field/Location: PA District	
Equipment Number: LH-0032	Eq/Circ. ID: LH0032-FGS
Equipment Name/Service: Fuel Gas Scrubber	
Physical Location: In PA Yard	
Manufacturer: LoTech Mfg., Inc.	Manufacturer Serial Number: 1006.5890
Year Built: 2011	National board #: None
Alberta Registration #: None	Canadian Registration # : OH 7154.21345

Is Vessel in-service? No

Reason for Inspection: Initial API-510 on Stream Inspection

Condition of Nameplate and/or Bracket: Nameplate is intact and legible. The nameplate bracket is securely attached.

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 unit was not in service at the time of this inspection.

Condition of Foundation and Anchor Bolts: There are no anchor bolts. The vessel is welded to a baseplate which is welded to the skid deck/frame. Baseplate-to-deck/frame attachment welds appear sound. There is minor peeling and surface corrosion on the baseplate.

Condition of Steel Supports, Saddles, and Bolting: All support structural welds appear sound. Vessel is welded to baseplate. There is minor peeling and surface corrosion.

Condition of Paint and/or Insulation: The paint is in acceptable condition with minor localized chipping and peeling.

Condition of Nozzles, Flanges, Repads, and Weepholes: All threaded connections. There is no evidence of leaks at any of the threaded connections.

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. Vessel sits in a steel box.

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. 150 psi.

Date PSV last tested (if there is a tag on the valve): 03/2016

Comments:

Recommendations:

None

Repairs Needed:

None

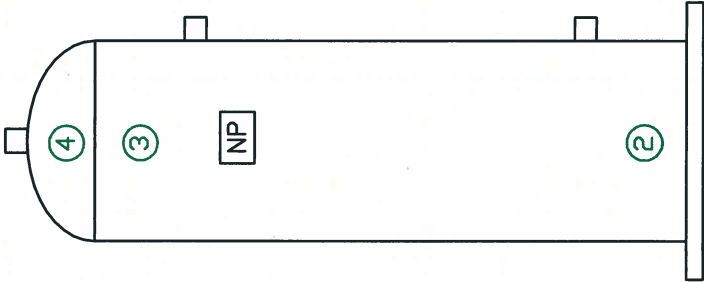
Robert W. Menke/JWW
API 510 Inspector Signature

0131
API 510 Inspector Number

11/11/2017
Date

EQUIP RETIREMENT DATE: 8/21/2036
NEXT INSPECTION IS DUE: 11/11/2018

- #2. 01- SH BTM - F 0. 265 TC
- #2. 02- SH BTM - L 0. 273 TC
- #2. 03- SH BTM - BTM 0. 262 TC
- #2. 04- SH BTM - R 0. 281 TC
- #3. 01- SH TOP -F 0. 266 TC
- #3. 02- SH TOP - L 0. 256 TC
- #3. 03- SH TOP - BK 0. 261 TC
- #3. 04- SH TOP - R 0. 274 TC
- #4. 01- HD TOP - F 0. 269 TC
- #4. 02- HD TOP - L 0. 262 TC
- #4. 03- HD TOP - BK 0. 270 TC
- #4. 04- HD TOP - R 0. 264 TC



TC-560

NAMEPLATE INFO	
MFG	LOTECH MANUFACTURING, INC.
SERIAL NUMBER	1006. 5890
NATIONAL BOARD #	NONE
DATE BUILT	2011
DESIGN P & T	150 PSIG @ 650°F
NOTE	CRN # DH 7154. 21345 ND 'U' STAMP

CAL BLK=35°F	VESSEL=30°F
BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH0032-FGS
EQUIP NAME	FUEL GAS SCRUBBER
LOCATION	WITH LINE HEATER LH-0032
DWG #	LH0032-FGS

DESC: FUEL GAS SCRUBBER; SN: 1006.5890
DWG#: LH0032-FGS-2.01-4.04

Corrosion Monitoring Eq/Circ 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: 12/08/2017

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

Unit: LH-0032
Eq/Circ ID: LH0032-FGS
Eq Type: VESSEL
Class:
CM RBI:
Design Code: S8/D1

Flange Rating: 0 lb/in²
Design Pressure: 150 lb/in²
Design Temperature: 650 °F

Description: FUEL GAS SCRUBBER; SN: 1006.5890

Summary: Group Name:
Insp. Due Date = 11/11/2018
Pred. Ret. Date = 08/21/2036

Group Description:
RCR = 3.1 MPY
Rem. Life (from last survey 11/11/2017) = 18.8 yrs

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

TML No	Location	Ctn	First Survey Thick	First Survey Nt	First Date	Previous Survey Thick	Previous Survey Nt	Previous Date	Last Survey Thick	Last Survey 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	SH BTM - F	N *	0.280 NM		06/01/2011			N/A	0.255 TC	TC	11/11/2017	N/A	2.3	N/A	2.3	0.210 S	2.3	10/10/2041	11/11/2018
2.02	SH BTM - L	N	0.280 NM		06/01/2011			N/A	0.273 TC	TC	11/11/2017	N/A	1.1	N/A	1.1	0.210 S	1.1	02/19/2075	11/11/2018
2.03	SH BTM - BTM	N *	0.280 NM		06/01/2011			N/A	0.262 TC	TC	11/11/2017	N/A	2.8	N/A	2.8	0.210 S	2.8	06/07/2036	11/11/2018
2.04	SH BTM - R	N	0.280 NM		06/01/2011			N/A	0.281 TC	TC	11/11/2017	N/A	0	N/A	0	0.210 S	0.1	11/18/2727	11/11/2018
3.01	SH TOP - F	N	0.280 NM		06/01/2011			N/A	0.266 TC	TC	11/11/2017	N/A	2.2	N/A	2.2	0.210 S	2.2	04/26/2043	11/11/2018
3.02	SH TOP - L	N *	0.280 NM		06/01/2011			N/A	0.256 TC	TC	11/11/2017	N/A	3.7	N/A	3.7	0.210 S	3.7	04/18/2030	11/11/2018
3.03	SH TOP - BK	N *	0.280 NM		06/01/2011			N/A	0.261 TC	TC	11/11/2017	N/A	2.9	N/A	2.9	0.210 S	2.9	06/13/2035	11/11/2018
3.04	SH TOP - R	N	0.280 NM		06/01/2011			N/A	0.274 TC	TC	11/11/2017	N/A	0.9	N/A	0.9	0.210 S	0.9	12/21/2088	11/11/2018
4.01	HD TOP - F	N	0.280 NM		06/01/2011			N/A	0.269 TC	TC	11/11/2017	N/A	1.7	N/A	1.7	0.210 S	1.7	07/26/2052	11/11/2018
4.02	HD TOP - L	N *	0.280 NM		06/01/2011			N/A	0.262 TC	TC	11/11/2017	N/A	2.8	N/A	2.8	0.210 S	2.8	06/07/2036	11/11/2018
4.03	HD TOP - BK	N	0.280 NM		06/01/2011			N/A	0.270 TC	TC	11/11/2017	N/A	1.6	N/A	1.6	0.210 S	1.6	05/13/2055	11/11/2018
4.04	HD TOP - R	N *	0.280 NM		06/01/2011			N/A	0.264 TC	TC	11/11/2017	N/A	2.5	N/A	2.5	0.210 S	2.5	06/18/2039	11/11/2018

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

Report Date: 12/08/2017

Unit: LH-0032
Eq/Circ ID: LH0032-FGS
Design Code: S8/D1
Eq Type: VESSEL
Class:
CM REI:

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

Flange Rating: 0 lb/in²
Design Pressure: 150 lb/in²
Design Temperature: 650 °F

Description: FUEL GAS SCRUBBER; SN: 1006.5890

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 : 2.1 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 3.1 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 2.9 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 3.1 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 6 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 = 18.8 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 08/21/2036

Recommended Eq/Circ UT/RT Inspection Date is 11/11/2018
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.