



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

Inspections Performed for: FMC Technologies Completion	
Inspection Report for: LH-0033 – Coil 1	
Remaining Life: 4.5 YRS	Date of this Report: 11/11/2017
Average Corrosion Rate: 78 MPY	Next UT: 11/11/2018 Next VT: 11/11/2018
Manufacturer: DynaCorp Fabricators	Mfg Serial #: 6J111050
Date Built: 2012	National Board #: None
Alberta registration #: 617901	Canadian Registration #: T9862.2

FMC Technologies Completion LH-0033 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-0033
Eq/Circ. ID : **LH0033-C1/ LH0033-C2**
Equipment Name/Service : LH0033 Line Heater (w/two coils)
Physical Location : Canonsburg Yard
GPS Coordinates :

VESSEL DESCRIPTION AND SERVICE CONDITIONS

Type of Vessel: Horizontal Line Heater

Vessel Size: N/A Coils = 4.500"

Operating Pressure Range (psig):

Operating Temperature Range (°F):

Does the vessel have Internal Access? Yes No

Specify type of internal access, if available: When coils are 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) _____

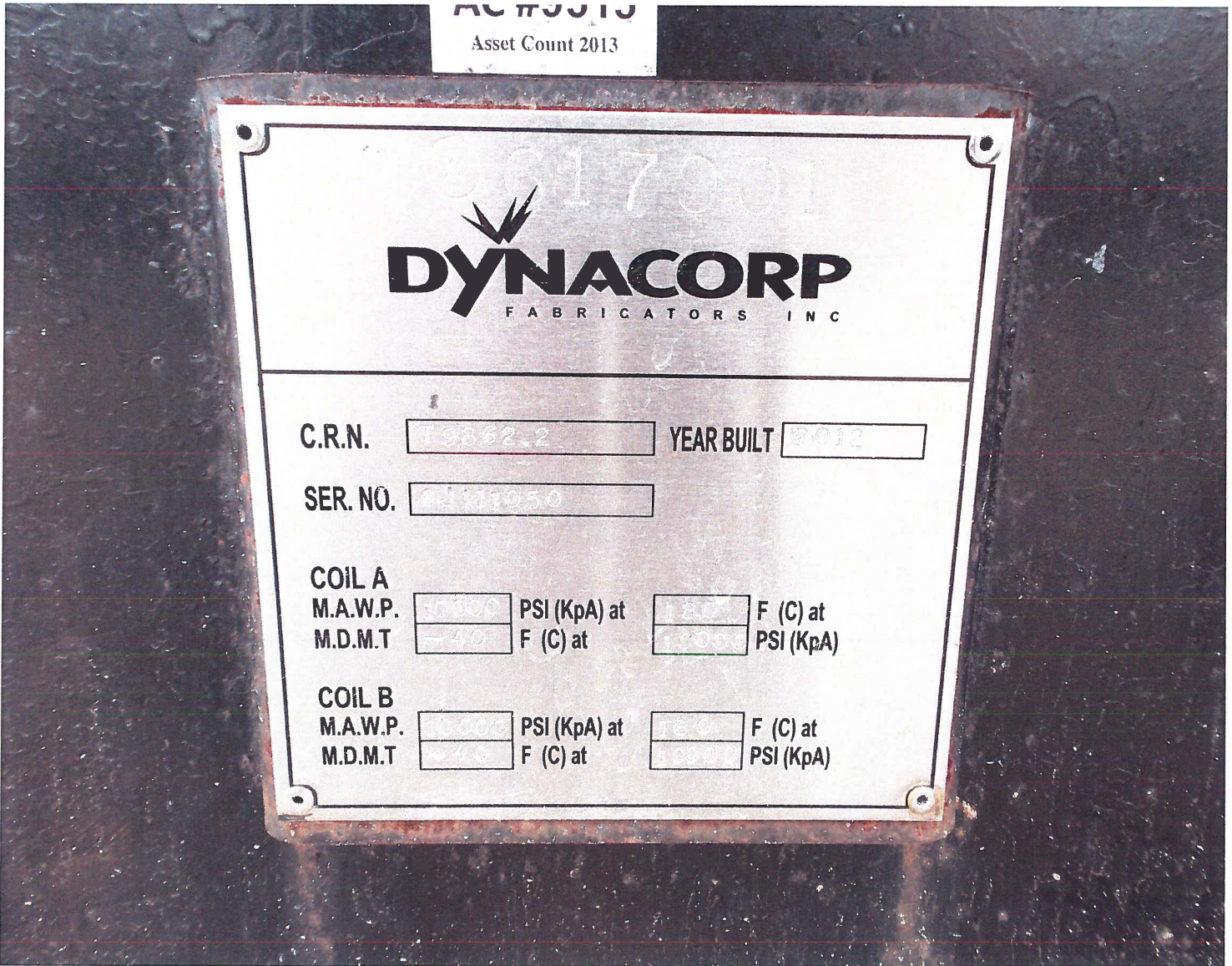
Approximate Date built or installed (check associated equipment or info at facility) _____

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



Asset Count 2013

DYNACORP
FABRICATORS INC

C.R.N. 19862.2 YEAR BUILT 2012

SER. NO. 2011050

COIL A
M.A.W.P. 10000 PSI (KpA) at 120 F (C) at 1000 PSI (KpA)
M.D.M.T. -40 F (C) at 1000 PSI (KpA)

COIL B
M.A.W.P. 10000 PSI (KpA) at 120 F (C) at 1000 PSI (KpA)
M.D.M.T. -40 F (C) at 1000 PSI (KpA)

Coil # 1 and Coil # 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-0033	Eq/Circ. ID: LH0033 C1
Equipment Name/Service: Line Heater	
Physical Location: FMC Yard	
Manufacturer: DynaCorp Fabricators, INC	Manufacturer Serial Number: 6J111050
Year Built: 2012	National Board Number: None
Alberta Registration #: 617901	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. The line heater was not in service at the time of this inspection.

Condition of Foundation and Anchor Bolts: Front plate is acceptable. The coil is removed from the Heater.

Condition of Steel Supports, Saddles, and Bolting: Angle iron supports have heavy corrosion/scaling buildup.

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

Condition of Nozzles, Flanges, Repads, and Weepholes: Nozzles and flanges are in good condition. The coil is removed from the Heater. There is no piping.

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: Access 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?

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 with no issues found during the inspection. There is heavy corrosion/scaling build up on the coils.



Recommendations:

Repairs Needed:

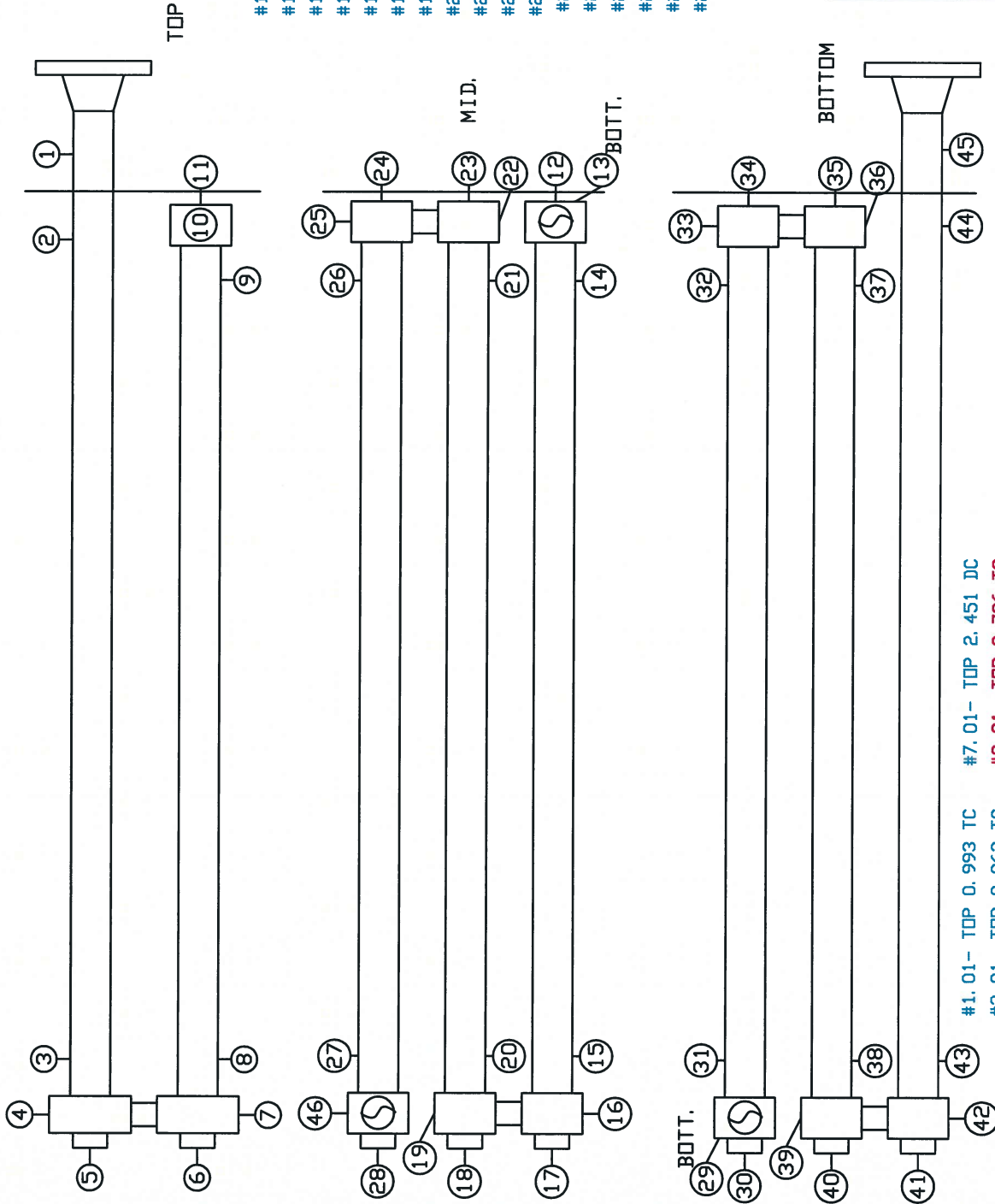
Robert W. Menke/JWW
API 510 Inspector Signature

0131
API 510 Inspector Number

11/11/2017
Date

EQUIP RETIREMENT DATE: 5/10/2022
NEXT INSPECTION IS DUE: 11/11/2018

NAMEPLATE INFO	
MFG	DYNACORP
SERIAL NUMBER	6J111050
A NUMBER	617901
DATE BUILT	2012
DESIGN P & T	10,000 psi @ 180°F
NOTE	CRN # T9862-2



- #13.01- MID 1.104 #30.01- BTM 1.570 TC
- #14.01- MID 9.640 TC #31.01- BIM 0.955 IC
- #15.01- MID 0.970 TC #32.01- BTM 0.942 TC
- #16.01- MID 1.627 TC #33.01- BTM 1.616 TC
- #17.01- MID 2.476 TC #34.01- BTM 2.475 TC
- #18.01- MID 1.577 TC #35.01- BTM 1.622 TC
- #19.01- MID 0.000 NT #36.01- BTM 0.000 NT
- #20.01- MID 0.970 TC #37.01- BTM 0.954 TC
- #21.01- MID 0.950 TC #38.01- BIM 0.955 IC
- #22.01- MID 1.674 #39.01- BTM 0.000 NT
- #23.01- MID 2.462 TC #40.01- BTM 2.485 DC
- #24.01- MID 1.591 TC #41.01- BIM 1.642 DC
- #25.01- MID 2.455 TC #42.01- BTM 2.487 DC
- #26.01- MID 0.955 TC #43.01- BTM 0.970 TC
- #27.01- MID 0.973 TC #44.01- BIM 0.987 DC
- #28.01- MID 2.479 TC #45.01- BTM 1.017 TC
- #29.01- BTM 2.457 DC #46.01- BTM 1.582 TC

CAL= 30°F PIPE= 17-22°F

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH0033-C1
EQUIP NAME	LINE HEATER (WITH 2 COILS)
DWG #	LH0033-C1

- #1.01- TOP 0.993 TC #7.01- TOP 2.451 DC
- #2.01- TOP 0.962 TC #8.01- TOP 0.796 IC
- #3.01- TOP 0.969 TC #9.01- TOP 0.956 TC
- #4.01- TOP 1.586 DC #10.01- TOP 1.560 IC
- #5.01- TOP 2.458 DC #11.01- TOP 2.476 TC
- #6.01- TOP 1.619 DC #12.01- MID 1.630 TC

DESC: COIL A ON LH-0033 LINE HTR; SN: 6J111050
DWG#: LH0033-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-0033
 Eq/Circ ID: LH0033-C1
 Eg Type: PIPING
 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:6J111050

Summary: Group Name: 11/11/2018
 Insp. Due Date = 05/10/2022
 Pred. Ret. Date =

Group Description:
 RCR = 78.0 MPY
 Rem. Life (from last survey 11/11/2017) = 4.5 yrs

0 C.A. Status: NO
 Total Caution TMLs = 8

TM L 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	TM L Retirement Date	TM L Inspection Date
1.01	TOP	N	1.000 NM	06/15/2012		N/A	0.993 TC	11/11/2017	N/A	1.3	N/A	1.3	0.750 U	1.3	10/16/2204	11/11/2018
2.01	TOP	N	1.000 NM	06/15/2012	1.014	08/27/2013	0.962 TC	11/11/2017	12.4	7.0	8.4	12.4	0.750 U	12.4	12/17/2034	11/11/2018
3.01	TOP	N	1.000 NM	06/15/2012	0.987	08/27/2013	0.969 TC	11/11/2017	4.3	5.7	5.4	10.8	0.750 U	5.7	04/13/2056	11/11/2018
4.01	TOP	Y *	1.625 NM	06/15/2012	2.516	08/27/2013	1.586 TC	11/11/2017	221.0	7.2	63.2	221.0	1.000 U	221.0	07/06/2020	11/11/2018
5.01	TOP	N	1.000 NM	06/15/2012	1.369	08/27/2013	1.369 RR	11/11/2017	0	0	0	0	0.750 U	0.1	11/26/4017	11/11/2018
6.01	TOP	Y	1.625 NM	06/15/2012	1.757	08/27/2013	1.619 TC	11/11/2017	32.8	1.1	9.4	32.8	1.000 U	32.8	09/25/2036	11/11/2018
7.01	TOP	N	1.625 NM	06/15/2012	1.625	08/27/2013	1.625 RR	11/11/2017	0	0	0	0	1.000 U	0.1	11/26/4017	11/11/2018
8.01	TOP	Y *	1.000 NM	06/15/2012	1.018	08/27/2013	0.796 TC	11/11/2017	52.8	37.7	41.7	52.8	0.750 U	52.8	09/25/2018	11/11/2018
9.01	TOP	N	1.000 NM	06/15/2012	1.012	08/27/2013	0.956 TC	11/11/2017	13.3	8.1	9.5	13.3	0.750 U	13.3	05/08/2033	11/11/2018
10.01	TOP	Y	1.625 NM	06/15/2012	1.653	08/27/2013	1.560 TC	11/11/2017	22.1	12.0	14.7	22.1	1.000 U	22.1	03/15/2043	11/11/2018
11.01	TOP	N	2.500 NM	06/15/2012	2.494	08/27/2013	2.476 TC	11/11/2017	4.3	4.4	4.4	5.0	1.000 U	4.4	04/29/2353	11/11/2018
12.01	MID	N	1.625 NM	06/15/2012	1.668	08/27/2013	1.630 TC	11/11/2017	9.0	0	1.7	9.0	1.000 U	9.0	11/11/2087	11/11/2018
13.01	MID	N	1.000 NM	06/15/2012		N/A	1.104	08/27/2013	N/A	0	N/A	0	0.750 U	0.1	09/11/4013	08/27/2014
14.01	MID	N	1.000 NM	06/15/2012	1.026	08/27/2013	1.026 RR	11/11/2017	0	0	0	0	0.750 U	0.1	11/26/4017	11/11/2018
15.01	MID	N	1.000 NM	06/15/2012	0.997	08/27/2013	0.970 TC	11/11/2017	6.4	5.5	5.8	6.4	0.750 U	6.4	03/27/2052	11/11/2018
16.01	MID	N	1.625 NM	06/15/2012	1.618	08/27/2013	1.618 RR	11/11/2017	0	1.3	1.0	5.8	1.000 U	1.3	04/03/2493	11/11/2018
17.01	MID	N	2.500 NM	06/15/2012	2.496	08/27/2013	2.476 TC	11/11/2017	4.8	4.4	4.5	4.8	1.000 U	4.8	05/15/2325	11/11/2018
18.01	MID	N	1.625 NM	06/15/2012	1.617	08/27/2013	1.577 TC	11/11/2017	9.5	8.9	9.0	9.5	1.000 U	9.5	08/07/2078	11/11/2018
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	0.970 TC	11/11/2017	6.4	5.5	5.8	6.4	0.750 U	6.4	03/27/2052	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-0033
 Eq/Circ ID: LH0033-C1
 Eq Type: PIPING
 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: 6J111050

Summary: Group Name: Insp. Due Date = 11/11/2018
 Pred. Ret. Date = 05/10/2022

Group Description: RCR = 78.0 MPY
 Rem. Life (from last survey 11/11/2017) = 4.5 yrs

0 C.A. Status: NO
 Total Caution TMLs = 8

TM 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	TM Retirement Date	TM Inspection Date	
21.01	MID	N	1.000	NM	06/15/2012	1.008		08/27/2013	0.950	TC	11/11/2017	13.8	9.2	10.4	13.8	0.750	U	13.8	05/09/2032	11/11/2018
22.01	MID	N	1.000	NM	06/15/2012			N/A	1.674		08/27/2013	N/A	0	N/A	0	0.750	U	0.1	09/11/4013	08/27/2014
23.01	MID	N	2.500	NM	06/15/2012	2.476		08/27/2013	2.462	TC	11/11/2017	3.3	7.0	6.1	20.0	1.000	U	7.0	09/22/2226	11/11/2018
24.01	MID	N	1.625	NM	06/15/2012	1.612		08/27/2013	1.591	TC	11/11/2017	5.0	6.3	5.9	10.8	1.000	U	6.3	09/04/2111	11/11/2018
25.01	MID	N	1.000	NM	06/15/2012	2.490		08/27/2013	2.455	TC	11/11/2017	8.3	0	0	8.3	0.750	U	8.3	04/16/2223	11/11/2018
26.01	MID	N	1.000	NM	06/15/2012	1.000		08/27/2013	0.955	TC	11/11/2017	10.7	8.3	8.9	10.7	0.750	U	10.7	01/08/2037	11/11/2018
27.01	MID	N	1.000	NM	06/15/2012	1.023		08/27/2013	0.973	TC	11/11/2017	11.9	5.0	6.8	11.9	0.750	U	11.9	08/08/2036	11/11/2018
28.01	MID	N	2.500	NM	06/15/2012	2.490		08/27/2013	2.479	TC	11/11/2017	2.6	3.9	3.6	8.3	1.000	U	3.9	02/06/2397	11/11/2018
29.01	BTM	N	1.625	NM	06/15/2012			N/A	2.457	TC	11/11/2017	N/A	0	N/A	0	1.000	U	0.1	11/26/4017	11/11/2018
30.01	BTM	N	1.625	NM	06/15/2012	1.629		08/27/2013	1.570	TC	11/11/2017	14.0	10.2	11.2	14.0	1.000	U	14.0	07/30/2058	11/11/2018
31.01	BTM	Y *	1.000	NM	06/15/2012	1.025		08/27/2013	0.955	TC	11/11/2017	16.6	8.3	10.5	16.6	0.750	U	16.6	03/19/2030	11/11/2018
32.01	BTM	N	1.000	NM	06/15/2012	1.003		08/27/2013	0.942	TC	11/11/2017	14.5	10.7	11.7	14.5	0.750	U	14.5	02/07/2031	11/11/2018
33.01	BTM	N	1.625	NM	06/15/2012	1.637		08/27/2013	1.616	TC	11/11/2017	5.0	1.7	2.5	5.0	1.000	U	5.0	01/24/2141	11/11/2018
34.01	BTM	N	2.500	NM	06/15/2012	2.511		08/27/2013	2.475	TC	11/11/2017	8.6	4.6	5.7	8.6	1.000	U	8.6	05/18/2189	11/11/2018
35.01	BTM	N	1.625	NM	06/15/2012	1.663		08/27/2013	1.622	TC	11/11/2017	9.7	0.6	3.0	9.7	1.000	U	9.7	12/26/2081	11/11/2018
36.01	BTM	N	2.500	NM	06/15/2012			N/A	2.535		08/27/2013	N/A	0	N/A	0	1.000	U	0.1	09/11/4013	08/27/2014
37.01	BTM	N	1.000	NM	06/15/2012	1.007		08/27/2013	0.954	TC	11/11/2017	12.6	8.5	9.6	12.6	0.750	U	12.6	01/20/2034	11/11/2018
38.01	BTM	Y *	1.000	NM	06/15/2012	1.062		08/27/2013	0.955	TC	11/11/2017	25.4	8.3	12.8	25.4	0.750	U	25.4	12/07/2025	11/11/2018
39.01	BTM	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
40.01	BTM	N	1.625	NM	06/15/2012	1.742		08/27/2013	1.742	RR	11/11/2017	0	0	0	0	1.000	U	0.1	11/26/4017	11/11/2018
41.01	BTM	Y *	2.500	NM	06/15/2012	2.520		08/27/2013	1.642	TC	11/11/2017	208.6	158.7	171.8	208.6	1.000	U	208.6	12/09/2020	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-0033
 Eq/Circ ID: LH0033-C1
 Eq Type: PIPING
 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:6J111050

Summary: Group Name:
 Insp. Due Date = 11/11/2018
 Pred. Ret. Date = 05/10/2022

Group Description:
 RCR = 78.0 MPY
 Rem. Life (from last survey 11/11/2017) = 4.5 yrs

0 C.A. Status: NO
 Total Caution TMLs = 8

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
42.01	BTM	N	1.625 NM	06/15/2012	1.648	08/27/2013	1.648 RR	11/11/2017	0	0	0	0	1.000 U	0.1	11/26/4017	11/11/2018
43.01	BTM	N	1.000 NM	06/15/2012	0.996	08/27/2013	0.970 TC	11/11/2017	6.2	5.5	5.7	6.2	0.750 U	6.2	05/06/2053	11/11/2018
44.01	BTM	Y *	1.625 NM	06/15/2012	1.982	08/27/2013	0.987 TC	11/11/2017	236.5	118.0	149.0	236.5	1.000 U	236.5	10/22/2017	11/11/2018
45.01	BTM	N	1.000 NM	06/15/2012	1.034	08/27/2013	1.017 TC	11/11/2017	4.0	0	0	4.0	0.750 U	4.0	08/11/2084	11/11/2018
46.01	BTM	N	1.000 NM	06/15/2012		N/A	1.582 TC	11/11/2017	N/A	0	N/A	0	0.750 S	0.1	11/26/4017	11/11/2018

Corrosion Monitoring Eq/Circ ID Analysis Report

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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-0033
Eq/Circ ID: LH0033-C1
Design Code: S8/D1
Eq Type: PIPING
Class:
CM REI:

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

Description: COIL A ON LINE HEATER; SN:6J111050

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 : 22.3 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 78.0 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 26.5 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 78.0 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 = 4.5 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 05/10/2022

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 8 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-0033 – Coil 2	
Remaining Life: 9.6 YRS	Date of this Report: 11/11/2017
Average Corrosion Rate: 45.1 MPY	Next UT: 11/11/2018 Next VT: 11/11/2018
Manufacturer: DynaCorp Fabricators	Mfg Serial #: 6J111050
Date Built: 2012	National Board #: None
Alberta registration #: 617901	Canadian Registration #: T9862.2

FMC Technologies Completion LH-0033 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-0033
Eq/Circ. ID : LH0033-C1/ **LH0033-C2**
Equipment Name/Service : LH0033 Line Heater (w/two coils)
Physical Location : Canonsburg Yard
GPS Coordinates :

VESSEL DESCRIPTION AND SERVICE CONDITIONS

Type of Vessel: Horizontal Line Heater

Vessel Size: N/A Coils = 4.500"

Operating Pressure Range (psig):

Operating Temperature Range (°F):

Does the vessel have Internal Access? Yes No

Specify type of internal access, if available: When coils are 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) _____

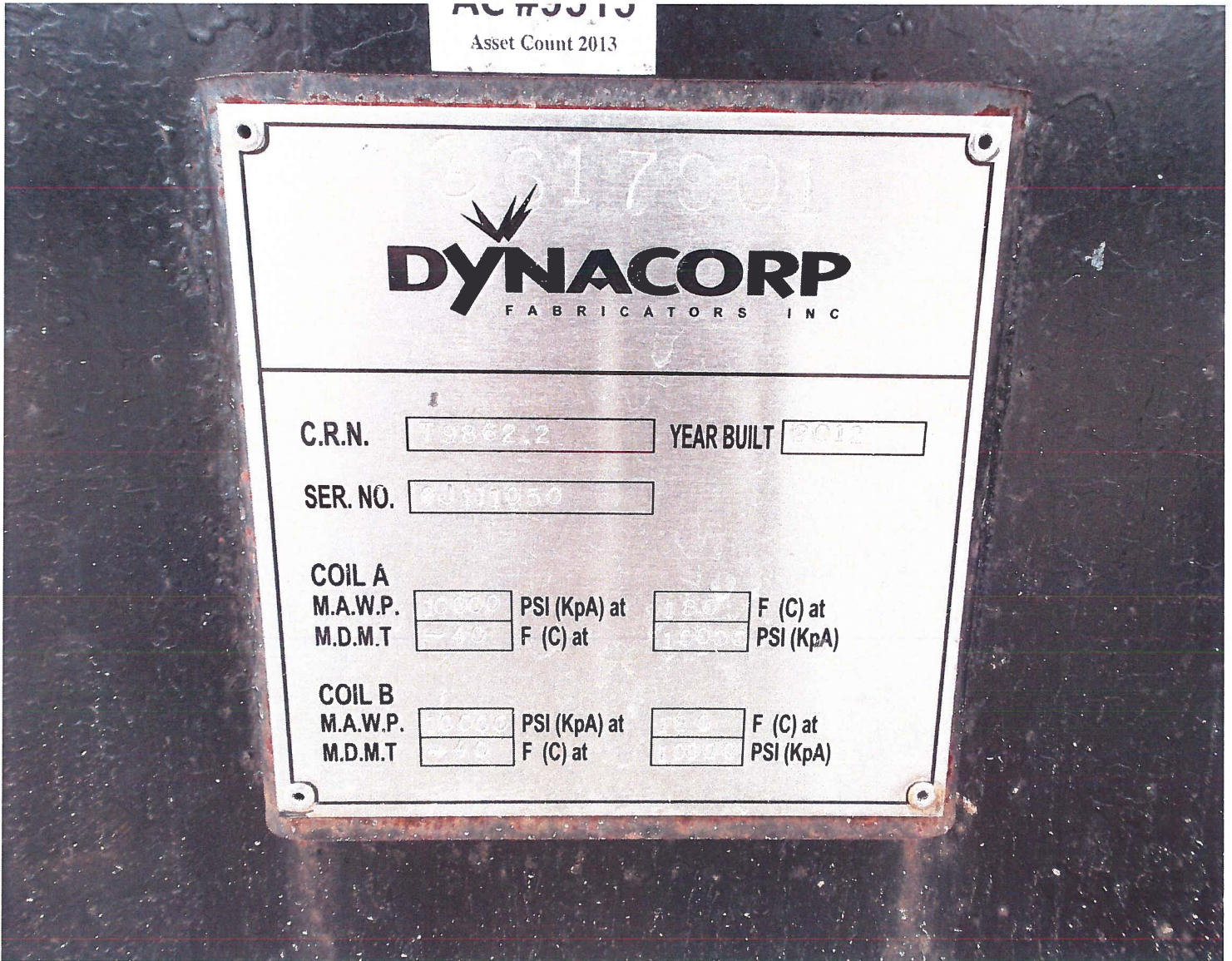
Approximate Date built or installed (check associated equipment or info at facility) _____

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



Coil # 1 and Coil # 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-0033	Eq/Circ. ID: LH0033-C2
Equipment Name/Service: Line Heater	
Physical Location: FMC Yard	
Manufacturer: DynaCorp Fabricators, INC	Manufacturer Serial Number: 6J111050
Year Built: 2012	National Board Number: None
Alberta Registration #: 617901	Canadian Registration # T9862.2

Is Vessel in-service: No.

Reason for Inspection: Scheduled API-510 External Inspection

Condition of Nameplate and/or Bracket: There is no nameplate on this coil bundle.

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: Front plate is acceptable. The coil is removed from the Heater.

Condition of Steel Supports, Saddles, and Bolting: Angle iron supports have heavy corrosion/scaling buildup.

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

Condition of Nozzles, Flanges, Repads, and Weepholes: Nozzles and flanges are in good condition. The coil is removed from the Heater. There is no piping.

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: Access 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?

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

Comments:

Piping is to be discarded. There is heavy corrosion/scaling build up on the coils.



Recommendations:

Repairs Needed:

Robert W. Menke/JWW
API 510 Inspector Signature

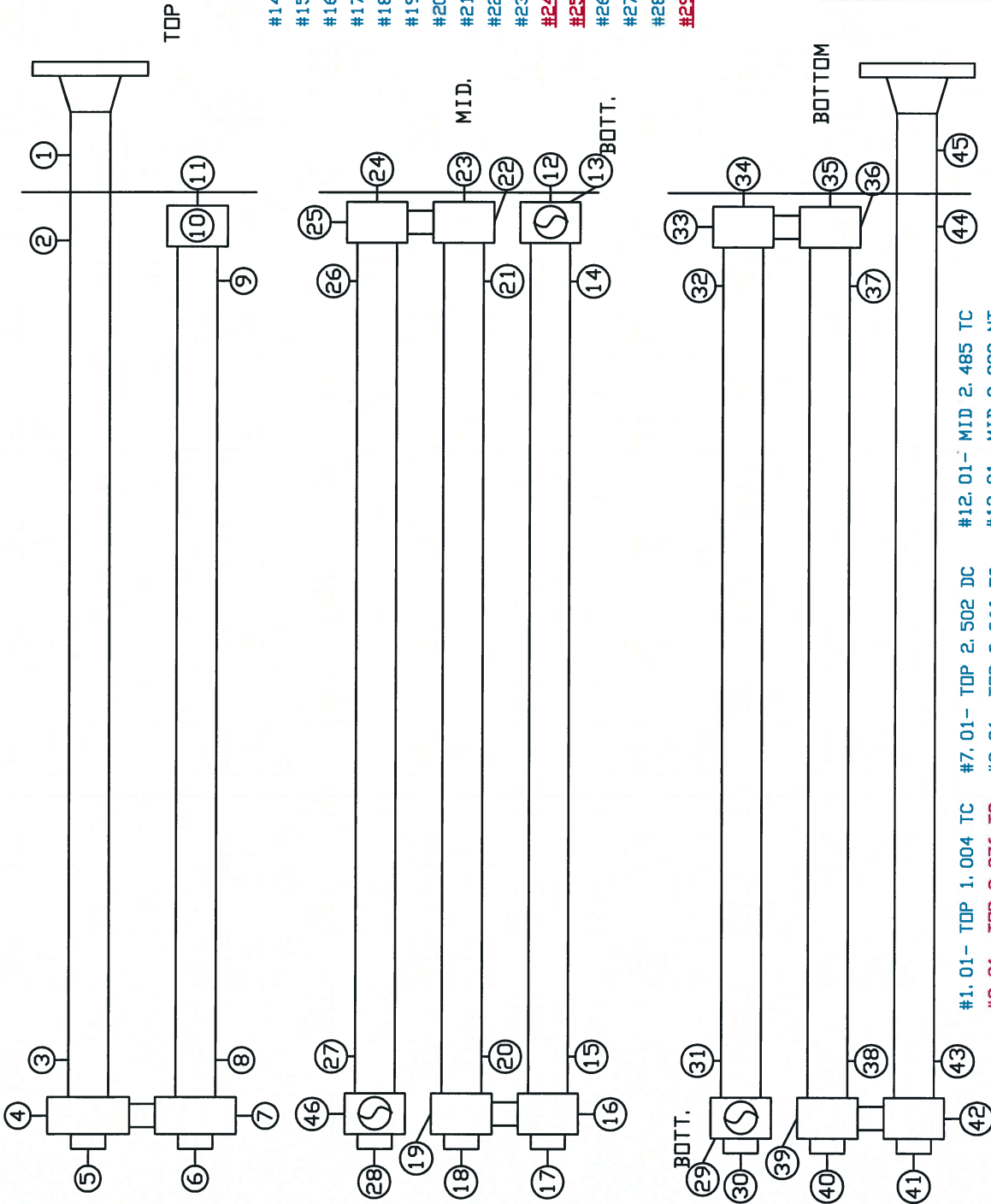
0131
API 510 Inspector Number

11/11/2017
Date

EQUIP RETIREMENT DATE: 6/15/2027
NEXT INSPECTION IS DUE: 11/11/2018

NAMEPLATE INFO

MFG	DYNACORP
SERIAL NUMBER	6J11050
A NUMBER	617901
DATE BUILT	2012
DESIGN P & T	10,000 psi @ 180°F
NOTE	CRN # T9862-2



- #14. 01- MID 0. 957 TC
- #15. 01- MID 0. 974 TC
- #16. 01- MID 2. 489 TC
- #17. 01- MID 1. 614 TC
- #18. 01- MID 2. 464 TC
- #19. 01- MID 0. 000 NT
- #20. 01- MID 0. 981 TC
- #21. 01- MID 0. 969 TC
- #22. 01- MID 0. 000 NT
- #23. 01- MID 1. 614 TC
- #24. 01- MID 2. 490 IC
- #25. 01- MID 1. 572 IC
- #26. 01- MID 0. 942 TC
- #27. 01- MID 0. 986 TC
- #28. 01- MID 1. 604 TC
- #29. 01- ~~BTM 1. 568 DC~~
- #30. 01- BTM 2. 486 TC
- #31. 01- BTM 0. 970 TC
- #32. 01- BTM 0. 964 TC
- #33. 01- BTM 2. 484 TC
- #34. 01- ~~BTM 1. 602 DC~~
- #35. 01- BTM 2. 489 TC
- #36. 01- BTM 0. 000 NT
- #37. 01- BTM 0. 965 TC
- #38. 01- ~~BTM 0. 972 IC~~
- #39. 01- BTM 0. 000 NT
- #40. 01- BTM 2. 475 DC
- #41. 01- ~~BTM 1. 610 DC~~
- #42. 01- BTM 2. 476 DC
- #43. 01- BTM 0. 983 TC
- #44. 01- ~~BTM 0. 979 IC~~
- #45. 01- BTM 0. 996 TC
- #46. 01- BTM 2. 492 TC

CAL= 25°F

PIPE= 21°F

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH0033-C2
EQUIP NAME	LINE HEATER (WITH 2 COILS)
DWG #	LH0033-C2

- #1. 01- TOP 1. 004 TC
- #2. 01- ~~TOP 0. 976 IC~~
- #3. 01- TOP 0. 987 TC
- #4. 01- TOP 1. 588 DC
- #5. 01- TOP 2. 441 DC
- #6. 01- TOP 1. 607 DC
- #7. 01- TOP 2. 502 DC
- #8. 01- TOP 0. 966 TC
- #9. 01- TOP 0. 963 TC
- #10. 01- TOP 2. 501 TC
- #11. 01- TOP 1. 581 TC
- #12. 01- MID 2. 485 TC
- #13. 01- MID 0. 000 NT

DESC: COIL B ON LH-0033 LINE HTR; SN: 6J111050
DWG#: LH0033-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-0033
 Eq/Circ ID: LH0033-C2
 Eq Type: PIPING
 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:6J1111050

Summary: Group Name: Group Description:
 Insp. Due Date = 11/11/2018 RCR = 45.1 MPY
 Pred. Ret. Date = 06/15/2027 Rem. Life (from last survey 11/11/2017) = 9.6 yrs

0 C.A. Status: NO
 Total Caution TMLs = 8

TM L 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	TOP	N	1.000	NM	06/15/2012		N/A	1.004	TC	N/A	0	N/A	0	0.750	U	0.1	11/26/4017	11/11/2018	
2.01	TOP	Y	*	1.000	NM	06/15/2012	1.059	0.976	TC	11/11/2017	19.7	4.4	8.4	0.750	U	19.7	05/02/2029	11/11/2018	
3.01	TOP	N	1.000	NM	06/15/2012	1.008	08/27/2013	0.987	TC	11/11/2017	5.0	2.4	3.1	0.750	U	5.0	04/06/2065	11/11/2018	
4.01	TOP	N	1.625	NM	06/15/2012	1.625	08/27/2013	1.588	TC	11/11/2017	8.8	6.8	7.4	1.000	U	8.8	09/05/2084	11/11/2018	
5.01	TOP	N	1.625	NM	06/15/2012	2.469	08/27/2013	2.441	TC	11/11/2017	6.7	0	0	1.000	U	6.7	12/10/2232	11/11/2018	
6.01	TOP	N	1.625	NM	06/15/2012	1.609	08/27/2013	1.607	TC	11/11/2017	0.5	3.3	2.6	1.000	U	3.3	10/22/2201	11/11/2018	
7.01	TOP	N	1.625	NM	06/15/2012	2.516	08/27/2013	2.502	TC	11/11/2017	3.3	0	0	1.000	U	3.3	01/08/2473	11/11/2018	
8.01	TOP	N	1.000	NM	06/15/2012	1.020	08/27/2013	0.966	TC	11/11/2017	12.8	6.3	8.0	0.750	U	12.8	09/27/2034	11/11/2018	
9.01	TOP	N	1.000	NM	06/15/2012	1.016	08/27/2013	0.963	TC	11/11/2017	12.6	6.8	8.3	0.750	U	12.6	10/07/2034	11/11/2018	
10.01	TOP	N	1.625	NM	06/15/2012	2.521	08/27/2013	2.501	TC	11/11/2017	4.8	0	0	1.000	U	4.8	07/31/2330	11/11/2018	
11.01	TOP	N	1.625	NM	06/15/2012	1.640	08/27/2013	1.581	TC	11/11/2017	14.0	8.1	9.7	1.000	U	14.0	05/13/2059	11/11/2018	
12.01	MID	N	2.500	NM	06/15/2012	2.501	08/27/2013	2.485	TC	11/11/2017	3.8	2.8	3.0	1.000	U	3.8	08/29/2408	11/11/2018	
13.01	MID	N	1.625	NM	06/15/2012		N/A	1.759		08/27/2013	N/A	0	N/A	0	1.000	U	0.1	09/11/4013	08/27/2014
14.01	MID	N	1.000	NM	06/15/2012	1.014	08/27/2013	0.957	TC	11/11/2017	13.5	8.0	9.4	0.750	U	13.5	03/12/2033	11/11/2018	
15.01	MID	N	1.000	NM	06/15/2012	0.983	08/27/2013	0.974	TC	11/11/2017	2.1	4.8	4.1	0.750	U	4.8	07/12/2064	11/11/2018	
16.01	MID	N	1.625	NM	06/15/2012	2.523	08/27/2013	2.489	TC	11/11/2017	8.1	0	0	1.000	U	8.1	09/11/2201	11/11/2018	
17.01	MID	N	1.625	NM	06/15/2012	1.623	08/27/2013	1.614	TC	11/11/2017	2.1	2.0	2.1	1.000	U	2.1	04/02/2310	11/11/2018	
18.01	MID	N	2.500	NM	06/15/2012	2.459	08/27/2013	2.459	RR	11/11/2017	0	7.6	5.6	1.000	U	7.6	11/03/2209	11/11/2018	
19.01	MID	N	1.625	NM	06/15/2012		N/A	1.620		08/27/2013	N/A	4.2	N/A	1.000	U	4.2	04/11/2161	08/27/2014	
20.01	MID	N	1.000	NM	06/15/2012	1.037	08/27/2013	0.981	TC	11/11/2017	13.3	3.5	6.1	0.750	U	13.3	03/26/2035	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-0033
 Eq/Circ ID: LH0033-C2
 Eq Type: PIPING
 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:6J111050

Summary: Group Name: Group Description:
 Insp. Due Date = 11/11/2018 RCR = 45.1 MPY
 Pred. Ret. Date = 06/15/2027 Rem. Life (from last survey 11/11/2017) = 9.6 yrs

0 C.A. Status: NO
 Total Caution TMLs = 8

TM 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	Retirement Date	TM Inspection Date
21.01	MID	N	1.000 NM	06/15/2012	1.009	08/27/2013	0.969 TC	11/11/2017	9.5	5.7	6.7	9.5	0.750 U	9.5	11/30/2040	11/11/2018
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	1.662	08/27/2013	1.614 TC	11/11/2017	11.4	2.0	4.5	11.4	1.000 U	11.4	09/21/2071	11/11/2018
24.01	MID	Y	2.500 NM	06/15/2012	2.593	08/27/2013	2.490 TC	11/11/2017	24.5	1.8	7.8	24.5	1.000 U	24.5	09/05/2078	11/11/2018
25.01	MID	Y	1.625 NM	06/15/2012	1.650	08/27/2013	1.572 TC	11/11/2017	18.5	9.8	12.1	18.5	1.000 U	18.5	10/12/2048	11/11/2018
26.01	MID	N *	1.000 NM	06/15/2012	1.003	08/27/2013	0.942 TC	11/11/2017	14.5	10.7	11.7	14.5	0.750 U	14.5	02/07/2031	11/11/2018
27.01	MID	N	1.000 NM	06/15/2012	1.034	08/27/2013	0.986 TC	11/11/2017	11.4	2.6	4.9	11.4	0.750 U	11.4	07/25/2038	11/11/2018
28.01	MID	N	1.625 NM	06/15/2012	1.609	08/27/2013	1.604 TC	11/11/2017	1.2	3.9	3.2	13.3	1.000 U	3.9	09/26/2172	11/11/2018
29.01	BTM	Y *	1.625 NM	06/15/2012	1.893	08/27/2013	1.568 TC	11/11/2017	77.2	10.5	28.0	77.2	1.000 U	77.2	03/21/2025	11/11/2018
30.01	BTM	N	2.500 NM	06/15/2012	2.503	08/27/2013	2.486 TC	11/11/2017	4.0	2.6	3.0	4.0	1.000 U	4.0	05/15/2389	11/11/2018
31.01	BTM	N	1.000 NM	06/15/2012	1.002	08/27/2013	0.970 TC	11/11/2017	7.6	5.5	6.1	7.6	0.750 U	7.6	10/23/2046	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	7.6	0.750 U	7.6	01/08/2046	11/11/2018
33.01	BTM	N	2.500 NM	06/15/2012	2.494	08/27/2013	2.484 TC	11/11/2017	2.4	3.0	2.8	5.0	1.000 U	3.0	07/16/2512	11/11/2018
34.01	BTM	Y *	1.625 NM	06/15/2012	1.895	08/27/2013	1.602 TC	11/11/2017	69.6	4.3	21.4	69.6	1.000 U	69.6	07/06/2026	11/11/2018
35.01	BTM	N	2.500 NM	06/15/2012	2.520	08/27/2013	2.489 TC	11/11/2017	7.4	2.0	3.4	7.4	1.000 U	7.4	01/31/2219	11/11/2018
36.01	BTM	N	1.625 NM	06/15/2012		N/A	1.859	08/27/2013	N/A	0	N/A	0	1.000 U	0.1	09/11/4013	08/27/2014
37.01	BTM	N	1.000 NM	06/15/2012	0.977	08/27/2013	0.965 TC	11/11/2017	2.9	6.5	5.5	19.2	0.750 U	6.5	12/09/2050	11/11/2018
38.01	BTM	Y *	1.000 NM	06/15/2012	1.039	08/27/2013	0.972 TC	11/11/2017	15.9	5.2	8.0	15.9	0.750 U	15.9	10/29/2031	11/11/2018
39.01	BTM	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
40.01	BTM	N	1.625 NM	06/15/2012	1.613	08/27/2013	1.613 RR	11/11/2017	0	2.2	1.6	10.0	1.000 U	2.2	07/03/2296	11/11/2018
41.01	BTM	Y *	2.500 NM	06/15/2012	2.506	08/27/2013	1.610 TC	11/11/2017	212.9	164.6	177.2	212.9	1.000 U	212.9	09/23/2020	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-0033
 Eq/Circ ID: LH0033-C2
 Eq Type: PIPING
 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:6J111050

Summary: Group Name: Insp. Due Date = 11/11/2018
 Pred. Ret. Date = 06/15/2027

Group Description: RCR = 45.1 MPY
 Rem. Life (from last survey 11/11/2017) = 9.6 yrs

O C.A. Status: NO
 Total Caution TMLs = 8

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	1.625	NM	06/15/2012	1.634		08/27/2013	1.634	RR	11/11/2017	0	0	0	0	1.000	U	0.1	11/26/4017	11/11/2018
43.01	BTM	N	1.000	NM	06/15/2012	1.030		08/27/2013	0.983	TC	11/11/2017	11.2	3.1	5.2	11.2	0.750	U	11.2	09/01/2038	11/11/2018
44.01	BTM	Y	1.000	NM	06/15/2012	1.047		08/27/2013	0.979	TC	11/11/2017	16.2	3.9	7.1	16.2	0.750	U	16.2	12/31/2031	11/11/2018
45.01	BTM	N	1.000	NM	06/15/2012	1.031		08/27/2013	0.996	TC	11/11/2017	8.3	0.7	2.7	8.3	0.750	U	8.3	07/02/2047	11/11/2018
46.01	BTM	N	1.000	NM	06/15/2012			N/A	2.492	TC	11/11/2017	N/A	0	N/A	0	0.750	U	0.1	11/26/4017	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-0033
Eq/Circ ID: LH0033-C2
Design Code: S8/D1
Eq Type: PIPING
Class:
CM RFI:

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

Description: COIL B ON LINE HEATER; SN:6J111050

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

Representative Corrosion Rate is the Maximum of:
(A) -- Average Corrosion Rate x 1.00 : 15.1 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 45.1 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 17.9 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 45.1 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 = 9.6 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 05/15/2027

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 8 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-0033 Fuel Gas Scrubber	
Remaining Life: 15.9 YRS	Date of this Report: 11/11/2017
Representative Corrosion Rate: 3.8 MPY	Next UT: 11/11/2018 Next VT: 11/11/2018
Manufacturer: LoTech Mfg.	Mfg Serial #: 1006.5889
Date Built: 2011	National Board #: None
Alberta registration #:	Canadian Registration #: OH7154.21345

FMC Technologies Completion - LH-0033 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-0033
Eq/Circ. ID : LH0033-FGS
Equipment Name/Service : (Line Heater) Fuel Gas Scrubber
Physical Location : On LH-0033 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) _____

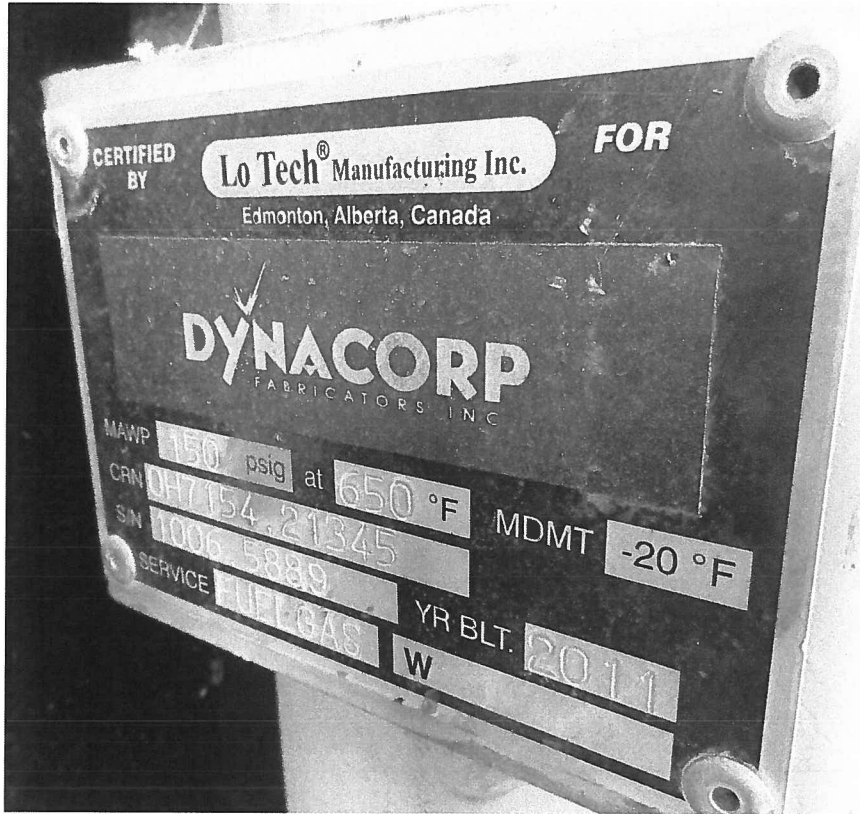
Approximate Date built or installed (check associated equipment or info at facility) 2011

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-0033	Eq/Circ. ID: LH0033-FGS
Equipment Name/Service: Fuel Gas Scrubber	
Physical Location: In PA Yard	
Manufacturer: LoTech Mfg., Inc.	Manufacturer Serial Number: 1006.5889
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 light 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

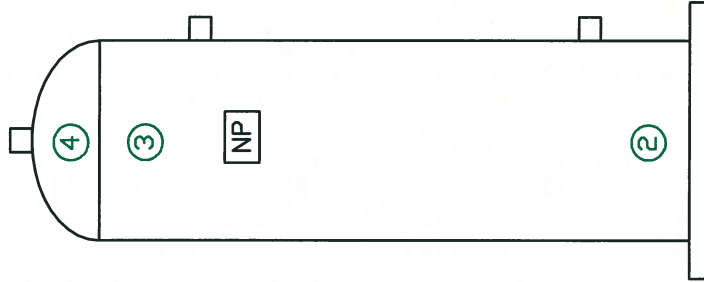
Robert W. Menke/JWW
API 510 Inspector Signature

0131
API 510 Inspector Number

11/11/2017
Date

EQUIP RETIREMENT DATE: 10/17/2033
NEXT INSPECTION IS DUE: 11/11/2018

- #2. 01- SH BTM - F 0. 273 TC
- #2. 02- SH BTM - L 0. 260 TC
- #2. 03- SH BTM - BK 0. 271 TC
- #2. 04- SH BTM - R 0. 276 TC
- #3. 01- SH TOP - F 0. 267 TC
- #3. 02- SH TOP - L 0. 267 TC
- #3. 03- SH TOP - BK 0. 278 TC
- #3. 04- SH TOP - R 0. 277 TC
- #4. 01- HD TOP - F 0. 254 TC
- #4. 02- HD TOP - L 0. 254 TC
- #4. 03- HD TOP - BK 0. 258 TC
- #4. 04- HD TOP - R 0. 259 TC



TC-560

NAMEPLATE INFO

MFG	LOTECH MANUFACTURING, INC.
SERIAL NUMBER	1006. 5889
NATIONAL BOARD #	NONE
DATE BUILT	2011
DESIGN P & T	150 PSIG @ 650°F
NOTE	CRN # DH 7154, 21345 NO "U" STAMP

CAL BLK=35°F

VESSEL=28°F

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH0033-FGS
EQUIP NAME	FUEL GAS SCRUBBER
LOCATION	WITH LINE HEATER LH-0033
DWG #	LH0033-FGS

DESC: FUEL GAS SCRUBBER; SN:1006.5889

DWG#: LH0033-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-0033
 Eq/Circ ID: LH0033-FGS
 Eq Type: PIPING
 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:1006.5889

Summary: Group Name: 11/11/2018
 Insp. Due Date = 10/17/2033
 Pred. Ret. Date =

Group Description:
 RCR = 3.8 MPY
 Rem. Life (from last survey 11/11/2017) = 15.9 yrs

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

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
2.01	SH BTM - F	N	0.280 NM	06/01/2011		N/A	0.273 TC	11/11/2017	N/A	1.1	N/A	1.1	0.210 U	1.1	02/19/2075	11/11/2018
2.02	SH BTM - L	N *	0.280 NM	06/01/2011		N/A	0.260 TC	11/11/2017	N/A	3.1	N/A	3.1	0.210 S	3.1	12/28/2033	11/11/2018
2.03	SH BTM - BK	N	0.280 NM	06/01/2011		N/A	0.271 TC	11/11/2017	N/A	1.4	N/A	1.4	0.210 S	1.4	06/07/2061	11/11/2018
2.04	SH BTM - R	N	0.280 NM	06/01/2011		N/A	0.276 TC	11/11/2017	N/A	0.6	N/A	0.6	0.210 S	0.6	11/13/2127	11/11/2018
3.01	SH TOP - F	N *	0.280 NM	06/01/2011		N/A	0.267 TC	11/11/2017	N/A	2.0	N/A	2.0	0.210 S	2.0	05/13/2046	11/11/2018
3.02	SH TOP - L	N *	0.280 NM	06/01/2011		N/A	0.267 TC	11/11/2017	N/A	2.0	N/A	2.0	0.210 S	2.0	05/13/2046	11/11/2018
3.03	SH TOP - BK	N	0.280 NM	06/01/2011		N/A	0.278 TC	11/11/2017	N/A	0.3	N/A	0.3	0.210 S	0.3	07/14/2244	11/11/2018
3.04	SH TOP - R	N	0.280 NM	06/01/2011		N/A	0.277 TC	11/11/2017	N/A	0.5	N/A	0.5	0.210 S	0.5	11/13/2151	11/11/2018
4.01	HD TOP - F	N *	0.280 NM	06/01/2011		N/A	0.254 TC	11/11/2017	N/A	4.0	N/A	4.0	0.210 S	4.0	11/11/2028	11/11/2018
4.02	HD TOP - L	N *	0.280 NM	06/01/2011		N/A	0.254 TC	11/11/2017	N/A	4.0	N/A	4.0	0.210 S	4.0	11/11/2028	11/11/2018
4.03	HD TOP - BK	N *	0.280 NM	06/01/2011		N/A	0.258 TC	11/11/2017	N/A	3.4	N/A	3.4	0.210 S	3.4	12/24/2031	11/11/2018
4.04	HD TOP - R	N *	0.280 NM	06/01/2011		N/A	0.259 TC	11/11/2017	N/A	3.3	N/A	3.3	0.210 S	3.3	09/16/2032	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-0033
Eq/Circ ID: LH0033-FGS
Design Code: S8/D1
Eq Type: PIPING
Class:
CM RBI:

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

Description: FUEL GAS SCRUBBER; SN:1006.5889

TML Corrosion Rates are each the Maximum of:
(A) -- Calculated Corrosion Rates x 1.00 :
(B) -- Default Corrosion Rate : 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 : 3.8 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 2.9 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 3.8 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 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 = 15.9 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 10/17/2033

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.