



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

Inspections Performed for: FMC Technologies Completion	
Inspection Report for: LH-0010 Line Heater (Does Not Include The Coils)	
Date of this Report: 03/10/2014	Next Inspection Due Date: 03/10/2015

LINE HEATER EXTERNAL INSPECTION REPORT

SEE API 570 REPORT FOR INFORMATION ON 4.5" COILS (2)



Flame Arrested Burner: Is in good overall condition with no surface corrosion present.

Top Reservoir Tank: Is in good overall condition with no corrosion present.

Shell: Shell 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.

Ladder: Access ladder attachment welds appear sound and the ladder is in good overall condition.

Skid Decking: Skid Decking to heater attachment welds appear sound and overall 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.

Comments: Per Scott they have introduced a corrosion inhibitor into the glycol mixture to help mitigate against surface corrosion/scale build up.

Recommendations: None

API 510 Inspector Signature
Robert Menke- Eric A. Crandall

Date
3/10/2014

API 570 Piping External Inspection

Company Name: FMC Technologies Completion	Facility Name: Wyoming District
Line Name/Number: LH-0010 Coil #1	
Size/Sched. Of Pipe: 4.5"	Eq/Circ. ID: LH0010-C1
Service/System:	Piping Class ☐ 1 ☒ 2 ☐ 3 ☐ Other
Design Pressure: 1000 psi	Materials: ☒ CS ☐ SS ☐ Other
Design Temperature: 180°	Note Stamping (If Any)
P&ID#:	Flange Rating:

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:	Comments:
☐ Serviceable ☒ Not Insulated ☐ Missing/Damaged ☐ CUI Identification ☐ Corrosion Present (Describe) ☐ Other ☒ No Issues	Piping is not insulated

Coating Condition:	Comments:
☐ Good ☐ Fair, Some Blistering/Peeling ☒ Corrosion Present (Describe) ☒ Other ☒ No Issues	Coils have moderate surface corrosion present through the line as well as some pitting.

Loss of Containment:	Comments:
☐ 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	Line Heater was not in service during this inspection.

Condition of Welds:	Comments:
☒ 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	Welds are smooth with a good weld profile.

Relief Device:	Comments:
☒ 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	Over pressure protection is located on associated equipment.

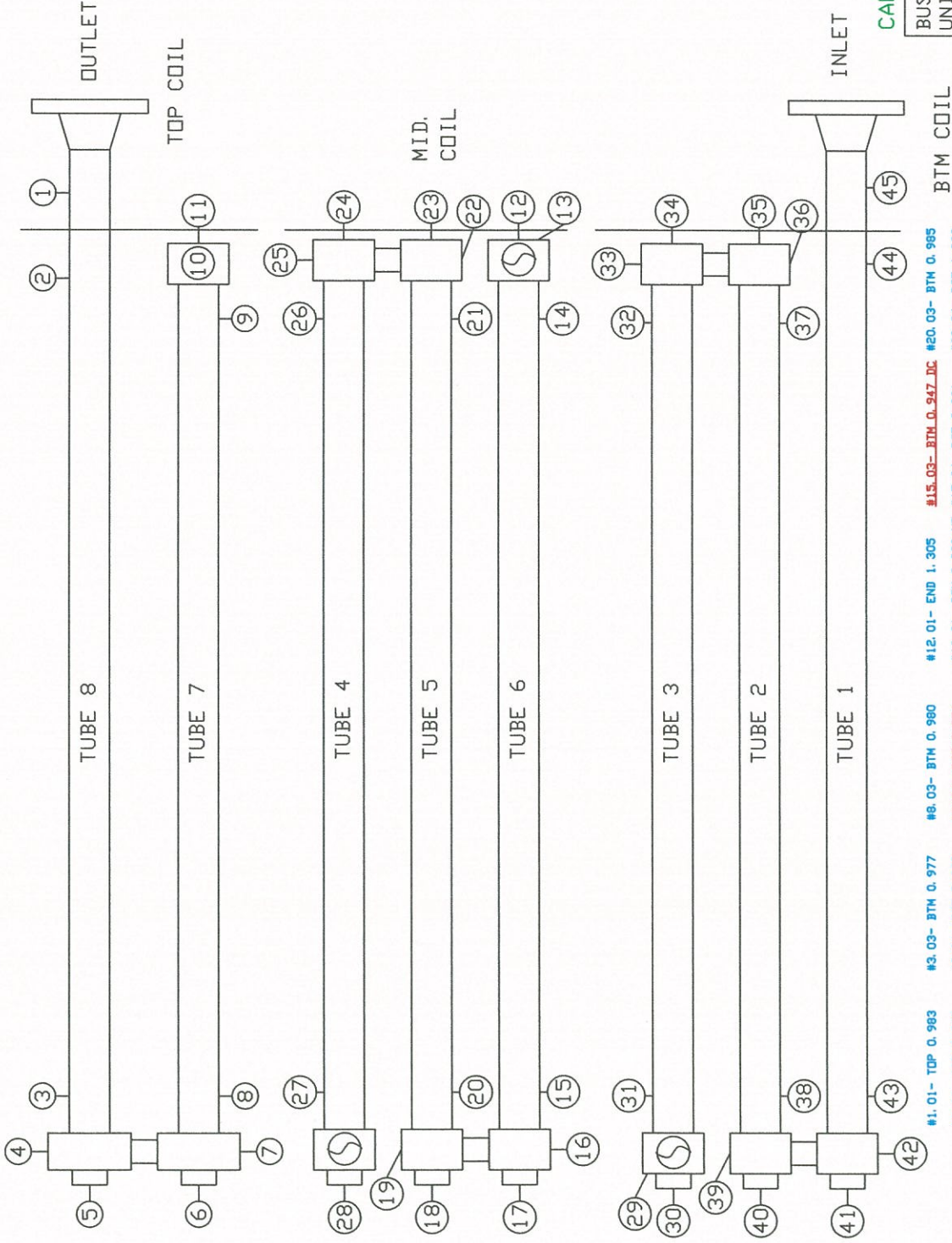
Supports/Hangers:	Comments:
☒ In Serviceable Condition ☐ Foundation Is Damaged ☐ Additional Support Needed ☐ Hanger/Support Is Distorted/Broken/Missing ☐ Pipe Slide Or Shoe Is Off Of The Support ☐ Makeshift Support ☐ Loose Support Needed To Be Tightened ☐ Fireproofing Missing Or Damaged ☐ Support/Hanger Is Corroded ☐ Other ☒ No Issues	Supports are in acceptable condition.

Flanged Connections:	Comments:
☐ 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	Flanges are in acceptable condition with minor surface corrosion present on flange faces. Bolting is not in place due to removing the coils.

Mechanical Observations:	Comments:
☐ 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	

EQUIP RETIREMENT DATE: 4/23/2017
NEXT INSPECTION IS DUE: 3/10/2015

NAMEPLATE INFO	
MFG	BLUESTAR WELDING
SERIAL NUMBER	BS10K4MM-05A
A NUMBER	514078
DATE BUILT	2005
DESIGN P & T	10,000 psi @ 180°F
NOTE	CRN # ALD-05-001



#24. 01- END 1.263	#35. 01- END 1.194 DC	DM-401
#25. 01- SIDE 1.856	#36. 01- SIDE 1.805	
#26. 01- TOP 0.998	#37. 01- TOP 0.966	
#26. 02- LFT 0.949 NT	#37. 02- LEFT 0.978	
#26. 03- BTM 1.019	#37. 03- BTM 0.986	
#26. 04- RGT 1.021	#37. 04- RGT 0.971	
#27. 01- TOP 0.977	#38. 01- TOP 0.968	
#27. 02- LFT 0.968	#38. 02- LFT 0.965	
#27. 04- RGT 0.979	#38. 03- BTM 1.021	
#28. 01- END 1.283	#38. 04- RGT 0.951	
#29. 01- TOP 1.904	#39. 01- SIDE 1.254	
#30. 01- END 1.299	#40. 01- END 1.788	
#31. 01- TOP 0.972	#41. 01- END 1.313	
#31. 02- LFT 0.972	#42. 01- SIDE 1.845	
#31. 03- BTM 0.970 DC	#43. 01- TOP 1.011	
#31. 04- RGT 0.967	#43. 02- LFT 1.038	
#32. 01- TOP 1.009	#43. 03- BTM 1.007	
#32. 02- LFT 0.977	#43. 04- RGT 0.972	
#32. 03- BTM 0.971	#44. 01- TOP 0.953	
#32. 04- RGT 0.967	#44. 02- LFT 0.979	
#33. 01- SIDE 1.346	#44. 03- BTM 0.994	
#34. 01- END 1.825	#44. 04- RGT 0.976	
	#45. 01- BTM 0.970	

CAL BLK=41°F
PIPE=41°F

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH0010-C1
EQUIP NAME	LINE HEATER (WITH 2 COILS)
DWG #	LH0010-C1

DESC: COIL 1 ON LINE HEATER 3
DWG#: LH0010-C1-1.01-45.01

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: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-C1
Eq Type: VESSEL
Class:
CM RBI:
Design Code: B31.8

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

Description: COIL 1 ON LINE HEATER 3, SN:BS10K4MM-05A

Summary:

Group Description:

Insp. Due Date = 03/10/2015
Pred. Ret. Date = 04/23/2017

RCR = 23.3 MPY
Rem. Life (from last survey 03/10/2014) = 3.1 yrs

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

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	TOP	N	0.998	06/14/2007	0.989	02/22/2013	0.983	03/10/2014	5.8	2.2	2.5	34.8	0.875 U	5.8	10/22/2032	03/10/2015
2.01	TOP	N	1.012	06/14/2007	0.980 RR	02/22/2013	0.995	03/10/2014	0	2.5	3.9	7.4	0.875 U	2.5	03/10/2062	03/10/2015
2.02	LFT	N	1.029	09/08/2009	1.000	02/22/2013	1.000 RR	03/10/2014	0	6.4	5.6	11.6	0.875 U	6.4	09/20/2033	03/10/2015
2.03	BTM	N	1.055	09/08/2009	1.021 RR	02/22/2013	1.011	03/10/2014	9.6	9.8	8.9	14.3	0.875 U	9.8	01/25/2028	03/10/2015
2.04	RGT	N	1.014	09/08/2009	0.992 RR	02/22/2013	1.002 RR	03/10/2014	0	2.7	3.8	16.0	0.875 U	2.7	03/23/2061	03/10/2015
3.01	TOP	N	1.002	06/14/2007	0.973	02/22/2013	0.973 RR	03/10/2014	0	4.3	3.9	13.3	0.875 U	4.3	12/23/2036	03/10/2015
3.02	LFT	Y *	1.035	09/08/2009	0.980 RR	02/22/2013	0.950 DC	03/10/2014	28.8	18.9	19.6	47.1	0.875 U	28.8	10/16/2016	03/10/2015
3.03	BTM	N	1.036	09/08/2009	0.972 RR	02/22/2013	0.977	03/10/2014	0	13.1	13.1	26.8	0.875 U	13.1	12/22/2021	03/10/2015
3.04	RGT	N	0.999	09/08/2009	0.980 RR	02/22/2013	0.986 RR	03/10/2014	0	2.9	4.1	17.9	0.875 U	2.9	06/18/2052	03/10/2015
4.01	SIDE	N	1.225	06/14/2007	1.271 RR	02/22/2013	1.271	03/10/2014	0	0	0	2.5	0.875 U	0.1	03/25/4014	03/10/2015
5.01	END	N	2.031	06/14/2007	2.003	02/22/2013	2.003 RR	03/10/2014	0	4.2	5.2	22.6	0.875 U	4.2	10/07/2282	03/10/2015
6.01	END	N	1.269	06/14/2007	1.306 RR	02/22/2013	1.311 RR	03/10/2014	0	0	0	0	0.875 U	0.1	03/25/4014	03/10/2015
7.01	SIDE	N	1.884	06/14/2007	1.913	02/22/2013	1.913 RR	03/10/2014	0	0	0	7.6	0.875 U	0.1	03/25/4014	03/10/2015
8.01	TOP	N	0.999	06/14/2007	0.998	02/22/2013	0.998 RR	03/10/2014	0	0.1	0	7.6	0.875 U	0.1	03/19/3244	03/10/2015
8.02	LFT	N	1.008	09/08/2009	1.001	02/22/2013	1.001 RR	03/10/2014	0	1.6	0.3	9.0	0.875 U	1.6	12/08/2092	03/10/2015
8.03	BTM	N	1.016	09/08/2009	0.989 RR	02/22/2013	0.980	03/10/2014	8.6	8.0	8.8	25.4	0.875 U	8.6	05/25/2026	03/10/2015
8.04	RGT	Y	1.058	09/08/2009	0.976	02/22/2013	0.974	03/10/2014	1.9	18.7	18.7	32.1	0.875 U	18.7	06/26/2019	03/10/2015
9.01	TOP	N	0.993	06/14/2007	0.992	02/22/2013	0.979	03/10/2014	12.5	2.1	1.3	12.5	0.875 U	12.5	07/05/2022	03/10/2015
9.02	LFT	N	1.009	09/08/2009	0.962	02/22/2013	0.962 RR	03/10/2014	0	10.4	10.9	25.7	0.875 U	10.4	07/21/2022	03/10/2015
9.03	BTM	N	0.995	09/08/2009	0.985 RR	02/22/2013	0.989 RR	03/10/2014	0	1.3	1.4	4.2	0.875 U	1.3	11/19/2101	03/10/2015

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: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-C1
Eq Type: VESSEL
Class:
CM RBI:
Design Code: B31.8

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

Description: COIL 1 ON LINE HEATER 3, SN:BS10K4MM-05A

Summary: Group Name: Insp. Due Date = 03/10/2015
Pred. Ret. Date = 04/23/2017

Group Description:
RCR = 23.3 MPY
Rem. Life (from last survey 03/10/2014) = 3.1 yrs

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

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
9.04	RGT	N	1.011	09/08/2009	0.983 RR	02/22/2013	0.986 RR	03/10/2014	0	5.6	7.0	26.4	0.875 U	5.6	01/04/2034	03/10/2015
10.01	TOP	N	1.333	06/14/2007	1.260	02/22/2013	1.260 RR	03/10/2014	0	10.8	13.2	18.9	0.875 U	10.8	11/01/2049	03/10/2015
11.01	END	N	1.801	06/14/2007	1.771 RR	02/22/2013	1.787	03/10/2014	0	2.1	4.0	22.6	0.875 U	2.1	06/25/2448	03/10/2015
12.01	END	N	1.306	06/14/2007	1.289 RR	02/22/2013	1.301 RR	03/10/2014	0	0.7	2.0	16.0	0.875 U	0.7	10/10/2622	03/10/2015
13.01	BTM	N	1.818	06/14/2007	1.820 RR	02/04/2012	1.996	02/22/2013	0	0	0	0	0.875 U	0.1	03/09/4013	02/22/2014
14.01	TOP	N	0.975	06/14/2007	0.980 RR	02/22/2013	1.004	03/10/2014	0	0	0	0	0.875 U	0.1	03/20/3304	03/10/2015
14.02	LFT	Y *	0.993	09/08/2009	0.994	02/22/2013	0.963	03/10/2014	29.7	6.7	5.1	29.7	0.875 U	29.7	02/24/2017	03/10/2015
14.03	BTM	Y	1.014	09/08/2009	0.996	02/22/2013	0.979	03/10/2014	16.3	7.8	7.8	16.3	0.875 U	16.3	07/26/2020	03/10/2015
14.04	RGT	N	1.018	09/08/2009	1.010	02/22/2013	1.010 RR	03/10/2014	0	1.8	2.2	7.5	0.875 U	1.8	03/10/2089	03/10/2015
15.01	TOP	N	0.979	06/14/2007	0.973	02/22/2013	0.973 RR	03/10/2014	0	0.9	1.0	4.8	0.875 U	0.9	01/30/2123	03/10/2015
15.02	LFT	N	1.021	09/08/2009	0.987 RR	02/22/2013	0.990 RR	03/10/2014	0	6.9	8.6	32.0	0.875 U	6.9	11/08/2030	03/10/2015
15.03	BTM	Y *	1.004	09/08/2009	0.978	02/22/2013	0.947 DC	03/10/2014	29.7	12.7	12.0	29.7	0.875 U	29.7	08/11/2016	03/10/2015
15.04	RGT	N	0.983	09/08/2009	0.981	02/22/2013	0.981 RR	03/10/2014	0	0.4	0.5	1.9	0.875 U	0.4	03/12/2279	03/10/2015
16.01	SIDE	N	1.297	06/14/2007	1.284	02/22/2013	1.269	03/10/2014	14.4	4.2	3.8	14.4	0.875 U	14.4	07/20/2041	03/10/2015
17.01	END	N	2.025	06/14/2007	1.966 RR	02/22/2013	1.961	03/10/2014	4.8	9.5	11.6	55.5	0.875 U	9.5	07/04/2128	03/10/2015
18.01	END	N	1.318	06/14/2007	1.256	02/04/2012	1.256 RR	02/22/2013	0	10.9	12.3	58.4	0.875 U	10.9	02/06/2048	02/22/2014
19.01	SIDE	Y	1.999	06/14/2007	1.969	02/22/2013	1.917	03/10/2014	49.9	12.2	10.4	49.9	0.875 U	49.9	01/26/2035	03/10/2015
20.01	TOP	N	1.016	06/14/2007	0.969	02/22/2013	0.967	03/10/2014	1.9	7.3	8.5	22.6	0.875 U	7.3	10/16/2026	03/10/2015
20.02	LFT	Y *	0.998	09/08/2009	0.993 RR	02/22/2013	0.965	03/10/2014	26.8	7.3	5.4	26.8	0.875 U	26.8	07/19/2017	03/10/2015
20.03	BTM	N	0.997	01/12/2011	0.972	02/22/2013	0.972 RR	03/10/2014	0	7.9	9.5	23.8	0.875 U	7.9	06/20/2026	03/10/2015
20.04	RGT	N	1.023	09/08/2009	0.989	02/22/2013	0.989 RR	03/10/2014	0	7.6	8.6	22.8	0.875 U	7.6	03/10/2029	03/10/2015

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-C1
Eq Type: VESSEL
Class:
CM RBI:
Design Code: B31.8

Description: COIL 1 ON LINE HEATER 3, SN:BS10K4MM-05A

Summary: Group Name:
Insp. Due Date = 03/10/2015
Pred. Ret. Date = 04/23/2017

Group Description:
RCR = 23.3 MPY
Rem. Life (from last survey 03/10/2014) = 3.1 yrs

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

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

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	TOP	N	1.004	06/14/2007	0.994	02/22/2013	0.994	RR	0	1.5	1.7	10.5	0.875	U	1.5	07/10/2093	03/10/2015
21.02	LFT	Y *	1.022	09/08/2009	1.008	02/22/2013	0.978	03/10/2014	28.8	9.8	7.5	28.8	0.875	U	28.8	10/06/2017	03/10/2015
21.03	BTM	Y *	1.000	09/08/2009	0.993	02/04/2012	0.972	02/22/2013	20.0	8.1	7.7	20.0	0.875	U	20.0	12/29/2017	02/22/2014
21.04	RGT	N	1.029	09/08/2009	0.987	02/22/2013	0.986	03/10/2014	1.0	9.6	10.6	16.9	0.875	U	9.6	10/01/2025	03/10/2015
22.01	SIDE	N	1.276	06/14/2007	1.246	02/22/2013	1.245	03/10/2014	1.0	4.6	4.7	36.1	0.875	U	4.6	08/16/2094	03/10/2015
23.01	END	N	1.844	06/14/2007	1.829	02/22/2013	1.838	RR	0	0.9	1.9	3.8	0.875	U	0.9	03/18/3084	03/10/2015
24.01	END	N	1.262	06/14/2007	1.240	02/22/2013	1.240	RR	0	3.3	3.6	17.1	0.875	U	3.3	10/18/2124	03/10/2015
25.01	SIDE	N	1.861	06/14/2007	1.863	02/22/2013	1.856	03/10/2014	6.7	0.7	0.5	6.7	0.875	U	6.7	08/10/2160	03/10/2015
26.01	TOP	N	0.988	06/14/2007	0.980	02/22/2013	0.987	RR	0	0.1	1.0	29.2	0.875	U	0.1	03/19/3134	03/10/2015
26.02	LFT	N	1.012	09/08/2009	0.987	02/04/2012	0.987	RR	0	7.2	8.6	23.5	0.875	U	7.2	09/13/2028	02/22/2014
26.03	BTM	N	1.014	09/08/2009	0.972	02/22/2013	0.980	RR	0	7.6	9.7	36.7	0.875	U	7.6	01/02/2028	03/10/2015
26.04	RGT	N	1.020	09/08/2009	0.983	02/22/2013	0.989	RR	0	6.9	7.2	15.4	0.875	U	6.9	09/17/2030	03/10/2015
27.01	TOP	N	0.986	06/14/2007	0.987	02/22/2013	0.977	03/10/2014	9.6	1.3	0.8	9.6	0.875	U	9.6	10/24/2024	03/10/2015
27.02	LFT	N	1.021	09/08/2009	0.957	02/22/2013	0.957	RR	0	14.2	13.5	19.8	0.875	U	14.2	12/18/2019	03/10/2015
27.04	RGT	N	1.008	09/08/2009	0.980	02/22/2013	0.979	03/10/2014	1.0	6.4	4.6	17.2	0.875	U	6.4	06/09/2030	03/10/2015
28.01	END	Y	1.932	06/14/2007	1.265	02/22/2013	1.274	RR	0	97.7	124.8	626.0	0.875	U	97.7	04/10/2018	03/10/2015
29.01	TOP	N	1.403	01/12/2011	1.897	02/22/2013	1.904	03/10/2014	0	0	0	0	0.875	U	0.1	03/25/4014	03/10/2015
30.01	END	N	1.296	06/14/2007	1.291	02/22/2013	1.299	03/10/2014	0	0	0.8	9.5	0.875	U	0.1	03/25/4014	03/10/2015
31.01	TOP	Y	1.002	06/14/2007	1.011	02/04/2012	0.977	03/10/2014	16.2	3.7	2.8	16.2	0.875	U	16.2	06/26/2020	03/10/2015
31.02	LFT	N	0.995	09/08/2009	0.930	02/22/2013	0.969	RR	0	5.8	9.2	43.3	0.875	U	5.8	05/25/2030	03/10/2015
31.03	BTM	Y	1.017	09/08/2009	1.007	02/04/2012	0.970	DC	17.7	10.4	10.2	17.7	0.875	U	17.7	07/22/2019	03/10/2015

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

Unit: LH-0010
Eq/Circ ID: LH0010-C1
Eq Type: VESSEL
Class:
CM RBI:
Design Code: B31.8

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

Description: COIL 1 ON LINE HEATER 3, SN:BS10K4MM-05A

Summary: Group Name: 03/10/2015
Insp. Due Date = 04/23/2017
Pred. Ret. Date =

Group Description:
RCR = 23.3 MPY
Rem. Life (from last survey 03/10/2014) = 3.1 yrs

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

TML 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	TML Retirement Date	TML Inspection Date
31.04	RGT	N	1.017	09/08/2009	0.964 RR	02/22/2013	0.967	03/10/2014	0	11.1	13.0	40.5	0.875 U	11.1	06/23/2022	03/10/2015
32.01	TOP	N	1.006	06/14/2007	0.967	02/22/2013	0.967 RR	03/10/2014	0	5.8	6.7	21.9	0.875 U	5.8	01/19/2030	03/10/2015
32.02	LFT	N	1.016	09/08/2009	0.989	02/22/2013	0.977	03/10/2014	11.5	8.7	9.2	29.5	0.875 U	11.5	01/22/2023	03/10/2015
32.03	BTM	N	1.009	09/08/2009	0.956	02/22/2013	0.956 RR	03/10/2014	0	11.8	14.2	26.4	0.875 U	11.8	01/19/2021	03/10/2015
32.04	RGT	N	0.984	09/08/2009	0.960	02/22/2013	0.960 RR	03/10/2014	0	5.3	6.3	25.7	0.875 U	5.3	03/24/2030	03/10/2015
33.01	SIDE	N	1.277	06/14/2007	1.314	02/22/2013	1.314 RR	03/10/2014	0	0	0	55.2	0.875 U	0.1	03/25/4014	03/10/2015
34.01	END	N	1.857	06/14/2007	1.835	02/22/2013	1.825	03/10/2014	9.6	4.7	4.6	17.1	0.875 U	9.6	02/24/2113	03/10/2015
35.01	END	Y	1.210	06/14/2007	1.214 RR	02/22/2013	1.194 DC	03/10/2014	19.2	2.4	1.2	19.2	0.875 U	19.2	10/20/2030	03/10/2015
36.01	SIDE	Y	1.910	06/14/2007	1.815	02/22/2013	1.805	03/10/2014	9.6	15.6	18.4	69.7	0.875 U	15.6	10/21/2073	03/10/2015
37.01	TOP	N	0.998	06/14/2007	0.957	02/22/2013	0.957 RR	03/10/2014	0	6.1	5.4	23.8	0.875 U	6.1	08/19/2027	03/10/2015
37.02	LEFT	N	1.012	09/08/2009	0.976	02/22/2013	0.976 RR	03/10/2014	0	8.0	8.7	12.4	0.875 U	8.0	10/24/2026	03/10/2015
37.03	BTM	N	1.004	09/08/2009	0.987	02/04/2012	0.986	03/10/2014	0.5	4.0	4.6	16.0	0.875 U	4.0	12/09/2041	03/10/2015
37.04	RGT	N	0.990	09/08/2009	0.981	02/22/2013	0.971	03/10/2014	9.6	4.2	4.0	9.6	0.875 U	9.6	03/09/2024	03/10/2015
38.01	TOP	N	1.015	06/14/2007	0.942	02/22/2013	0.942 RR	03/10/2014	0	10.8	12.3	36.1	0.875 U	10.8	05/23/2020	03/10/2015
38.02	LFT	N	0.969	09/08/2009	0.957 RR	02/04/2012	0.965	03/10/2014	0	0.9	0.5	5.2	0.875 U	0.9	03/11/2114	03/10/2015
38.03	BTM	N	1.000	01/12/2011	0.999	02/04/2012	0.999 RR	03/10/2014	0	0.3	0.3	0.9	0.875 U	0.3	07/13/2427	03/10/2015
38.04	RGT	N	0.981	09/08/2009	0.965	02/04/2012	0.951	03/10/2014	6.7	6.7	7.2	14.1	0.875 U	6.7	07/13/2025	03/10/2015
39.01	SIDE	N	1.253	06/14/2007	1.255	02/22/2013	1.254	03/10/2014	1.0	0	0	48.5	0.875 U	1.0	03/13/2393	03/10/2015
40.01	END	N	1.864	06/14/2007	1.774	02/22/2013	1.774 RR	03/10/2014	0	13.4	15.8	44.2	0.875 U	13.4	04/11/2081	03/10/2015
41.01	END	N	1.263	06/14/2007	1.297 RR	02/22/2013	1.313	03/10/2014	0	0	0	0	0.875 U	0.1	03/25/4014	03/10/2015

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: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-C1
Eq Type: VESSEL
Class:
CM RBI:
Design Code: B31.8

Description: COIL 1 ON LINE HEATER 3, SN:BS10K4MM-05A

Summary: Group Name: Insp. Due Date = 03/10/2015
Pred. Ret. Date = 04/23/2017
Group Description: RCR = 23.3 MPY
Rem. Life (from last survey 03/10/2014) = 3.1 yrs
0 C.A. Status: No
Total Caution TMLs = 15

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	SIDE	N	1.893	06/14/2007	1.856	02/22/2013	1.845	03/10/2014	10.5	7.1	7.7	10.5	0.875 U	10.5	07/28/2106	03/10/2015
43.01	TOP	N	1.003	06/14/2007	0.991	02/22/2013	0.991	03/10/2014	0	1.8	2.3	5.2	0.875 U	1.8	08/19/2078	03/10/2015
43.02	LFT	N	1.032	09/08/2009	0.999	02/22/2013	0.999	03/10/2014	0	7.3	5.0	21.1	0.875 U	7.3	03/05/2031	03/10/2015
43.03	BTM	N	1.038	09/08/2009	1.009	02/04/2012	1.007	03/10/2014	1.0	6.9	6.0	12.5	0.875 U	6.9	04/26/2033	03/10/2015
43.04	RGT	Y	1.016	09/08/2009	0.996	02/22/2013	0.977	03/10/2014	18.2	8.7	8.1	18.2	0.875 U	18.2	10/17/2019	03/10/2015
44.01	TOP	N	1.008	06/14/2007	0.964	02/22/2013	0.953	03/10/2014	10.5	8.2	9.3	32.0	0.875 U	10.5	08/13/2021	03/10/2015
44.02	LFT	N	1.023	09/08/2009	0.979	02/22/2013	0.979	03/10/2014	0	9.8	10.9	22.8	0.875 U	9.8	10/19/2024	03/10/2015
44.03	BTM	N	1.041	09/08/2009	0.994	02/22/2013	0.994	03/10/2014	0	10.4	11.7	26.6	0.875 U	10.4	08/18/2025	03/10/2015
44.04	RGT	N	1.022	09/08/2009	0.977	02/22/2013	0.976	03/10/2014	1.0	10.2	11.3	31.1	0.875 U	10.2	02/03/2024	03/10/2015
45.01	BTM	N	0.985	06/14/2007	0.969	02/22/2013	0.969	03/10/2014	0	2.4	2.8	6.7	0.875 U	2.4	05/10/2053	03/10/2015

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

Report Date: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-C1
Design Code: B31.8
Eq Type: VESSEL
Class:
CM RBI:

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

Description: COIL 1 ON LINE HEATER 3, SN:BS10K4MM-05A

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 : 9.5 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 23.3 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 10.8 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 23.3 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 = 3.1 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 04/23/2017

Recommended Eq/Circ UT/RT Inspection Date is 03/10/2015
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.

API 570 Piping External Inspection

Company Name: FMC Technologies Completion	Facility Name: Wyoming District
Line Name/Number: LH-0010 Coil #2	
Size/Sched. Of Pipe: 4.5"	Eq/Circ. ID: LH0010-C2
Service/System:	Piping Class ☐ 1 ☒ 2 ☐ 3 ☐ Other
Design Pressure: 1000 psi	Materials: ☒ CS ☐ SS ☐ Other
Design Temperature: 180°	Note Stamping (If Any)
P&ID#:	Flange Rating:

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:	Comments:
☐ Serviceable ☒ Not Insulated ☐ Missing/Damaged ☐ CUI Identification ☐ Corrosion Present (Describe) ☐ Other ☒ No Issues	Piping is not insulated

Coating Condition:	Comments:
☐ Good ☐ Fair, Some Blistering/Peeling ☒ Corrosion Present (Describe) ☒ Other ☒ No Issues	Coils have moderate surface corrosion present through the line as well as some pitting.

Loss of Containment:	Comments:
☐ 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	Line Heater was not in service during this inspection.

Condition of Welds:	Comments:
☒ 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	Welds are smooth with a good weld profile.

Relief Device:	Comments:
☒ 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	Over pressure protection is located on associated equipment.

Supports/Hangers:	Comments:
☒ 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 Needed To Be Tightened ☐ Fireproofing Missing Or Damaged ☐ Support/Hanger Is Corroded ☐ Other ☒ No Issues	Supports are in acceptable condition.

Flanged Connections:	Comments:
☐ 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	Flanges are in acceptable condition with minor surface corrosion present on flange faces. Bolting is not in place due to removing the coils.

Mechanical Observations:	Comments:
☐ 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	

EQUIP RETIREMENT DATE: 4/3/2016
NEXT INSPECTION IS DUE: 3/10/2015



NAMEPLATE INFO	
MFG	BLUESTAR WELDING
SERIAL NUMBER	BS10K4MM-05B
A NUMBER	514079
DATE BUILT	2005
DESIGN P & T	10,000 psi @ 180°F
NOTE	CRN # ALD-05-001

#25.01-SIDE 2.046	#36.01-SIDE 1.850	DM-401
#26.01-TOP 0.957	#37.01-TOP 0.965	
#26.02-LFT 0.963	#37.02-LFT 0.945	
#26.03-BTM 0.971	#37.03-BTM 0.983	
#26.04-RGT 0.989	#37.04-RGT 1.006	
#27.01-TOP 0.972	#38.01-TOP 0.975	
#27.02-LFT 1.002	#38.02-LFT 0.975	
#27.03-BTM 0.967 DC	#38.03-BTM 1.014	
#27.04-RGT 0.966	#38.04-RGT 0.987	
#28.01-END 1.963	#39.01-SIDE 0.911 DC	
#29.01-TOP 1.355	#40.01-END 1.894	
#30.01-END 1.201	#41.01-END 1.249 DC	
#31.01-TOP 0.985	#42.01-SIDE 1.806	
#31.02-LFT 0.946	#43.01-TOP 0.992	
#31.03-BTM 0.957	#43.02-LFT 0.960	
#31.04-RGT 0.992	#43.03-BTM 0.970	
#32.01-TOP 0.980	#43.04-RGT 0.970	
#32.02-LFT 0.987	#44.01-TOP 0.978	
#32.03-BTM 0.988	#44.02-LFT 0.980	
#32.04-RGT 0.988	#44.03-BTM 0.982	
#33.01-SIDE 1.281	#44.04-RGT 0.994	
#34.01-END 1.928	#45.01-BTM 0.984	
#35.01-END 1.288		

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH0010-C2
EQUIP NAME	LINE HEATER (WITH 2 COILS)
DWG #	LH0010-C2

DESC: COIL 2 ON LINE HEATER 3
DWG#: LH0010-C2-1.01-45.01

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: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-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 2 ON LINE HEATER 3, SN:BS10K4MM-05B

Summary: Group Name: Insp. Due Date = 03/10/2015
Pred. Ret. Date = 04/03/2016

Group Description:
RCR = 26.9 MPY
Rem. Life (from last survey 03/10/2014) = 2.1 yrs

0 C.A. Status: No
Total Caution TMLs = 19

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	0.991	06/14/2007	0.962	02/22/2013	0.962	RR	0	4.3	5.1	12.1	0.875	U	4.3	06/03/2034	03/10/2015
2.01	TOP	Y *	1.005	06/14/2007	0.979	RR	0.940	DC	37.4	9.6	8.4	37.4	0.875	U	37.4	12/05/2015	03/10/2015
2.02	LFT	N	1.005	09/08/2009	0.981	RR	0.988		0	3.8	3.9	17.1	0.875	U	3.8	12/04/2043	03/10/2015
2.03	BTM	N	1.012	09/08/2009	0.973		0.967		5.8	10.0	10.7	12.2	0.875	U	10.0	05/22/2023	03/10/2015
2.04	RGT	Y *	1.016	09/08/2009	0.982		0.948	DC	32.6	15.1	14.7	32.6	0.875	U	32.6	06/05/2016	03/10/2015
3.01	TOP	N	0.992	06/14/2007	0.979	RR	0.981		0	1.6	1.8	5.0	0.875	U	1.6	06/09/2080	03/10/2015
3.02	LFT	N	1.000	09/08/2009	0.979		0.979	RR	0	4.7	4.3	13.5	0.875	U	4.7	04/25/2036	03/10/2015
3.03	BTM	Y *	0.988	09/08/2009	0.979	RR	0.948	DC	29.7	8.9	7.4	29.7	0.875	U	29.7	08/24/2016	03/10/2015
3.04	RGT	Y	1.005	09/08/2009	0.987		0.967		19.2	8.4	8.0	19.2	0.875	U	19.2	12/24/2018	03/10/2015
4.01	SIDE	N	1.275	06/14/2007	1.273		1.273	RR	0	0.3	0.4	2.0	0.875	U	0.3	11/18/3340	03/10/2015
5.01	END	N	1.860	06/14/2007	1.842		1.836		5.8	3.6	3.8	5.8	0.875	U	5.8	11/18/2179	03/10/2015
6.01	END	N	1.555	06/14/2007	1.530	RR	1.535		0	3.0	3.9	17.8	0.875	U	3.0	03/12/2234	03/10/2015
7.01	SIDE	N	2.118	06/14/2007	2.098		2.098	RR	0	3.0	3.5	5.9	0.875	U	3.0	11/11/2421	03/10/2015
8.01	TOP	N	1.003	06/14/2007	0.971		0.971	RR	0	4.7	5.2	9.3	0.875	U	4.7	08/12/2034	03/10/2015
8.02	LFT	N	1.021	09/08/2009	0.995		0.995	RR	0	5.8	5.9	14.2	0.875	U	5.8	11/17/2034	03/10/2015
8.03	BTM	Y	0.993	09/08/2009	0.949		0.932	DC	16.3	13.6	13.5	23.4	0.875	U	16.3	09/07/2017	03/10/2015
8.04	RGT	N	1.007	09/08/2009	0.997	RR	0.999		0	1.8	1.5	7.1	0.875	U	1.8	01/29/2083	03/10/2015
9.01	TOP	N	1.008	06/14/2007	0.972		0.972	RR	0	5.3	5.3	8.3	0.875	U	5.3	06/28/2032	03/10/2015
9.02	LFT	N	0.992	09/08/2009	0.983		0.983	RR	0	2.0	2.9	7.8	0.875	U	2.0	03/09/2068	03/10/2015
9.03	BTM	N	0.986	09/08/2009	0.965		0.965	RR	0	4.7	5.4	6.8	0.875	U	4.7	05/03/2033	03/10/2015

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: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-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 2 ON LINE HEATER 3, SN:BS10K4MM-05B

Summary: Group Name: Insp. Due Date = 03/10/2015
Pred. Ret. Date = 04/03/2016

Group Description:
RCR = 26.9 MPY
Rem. Life (from last survey 03/10/2014) = 2.1 yrs

0 C.A. Status: No
Total Caution TMLs = 19

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	
9.04	RGT	N	0.977	09/08/2009	0.987	02/22/2013	0.987	RR	0	0	0	0	0.875	U	0.1	03/19/3134	03/10/2015
10.01	TOP	N	1.471	06/14/2007	1.413	RR	1.419	03/10/2014	0	7.7	9.6	41.2	0.875	U	7.7	11/02/2084	03/10/2015
11.01	END	N	1.580	06/14/2007	1.567	RR	1.567	RR	0	1.9	2.3	9.3	0.875	U	1.9	05/29/2378	03/10/2015
12.01	END	N	1.462	06/14/2007	1.482	RR	1.482	RR	0	0	0	3.6	0.875	U	0.1	03/25/4014	03/10/2015
13.01	BTM	N	2.026	06/14/2007	2.171	RR	2.170	03/10/2014	1.0	0	0	1.0	0.875	U	1.0	03/20/3309	03/10/2015
14.01	TOP	Y *	0.990	06/14/2007	1.033	RR	0.988	03/10/2014	43.1	0.3	0	43.1	0.875	U	43.1	10/23/2016	03/10/2015
14.02	LFT	N	1.009	09/08/2009	1.000	RR	0.989	03/10/2014	10.5	4.4	4.6	10.5	0.875	U	10.5	01/17/2025	03/10/2015
14.03	BTM	N	1.009	09/08/2009	0.997	RR	0.996	03/10/2014	1.0	2.9	3.1	5.7	0.875	U	2.9	11/30/2055	03/10/2015
14.04	RGT	N	1.005	09/08/2009	0.975	RR	0.979	03/10/2014	0	5.8	6.0	21.3	0.875	U	5.8	02/13/2032	03/10/2015
15.01	TOP	N	1.010	06/14/2007	0.979	RR	0.979	RR	0	4.6	5.1	8.5	0.875	U	4.6	10/18/2036	03/10/2015
15.02	LFT	N	1.023	09/08/2009	0.965	RR	0.967	RR	0	12.4	9.8	41.2	0.875	U	12.4	08/10/2021	03/10/2015
15.03	BTM	N	1.029	09/08/2009	0.965	RR	0.965	RR	0	14.2	14.1	39.1	0.875	U	14.2	07/11/2020	03/10/2015
15.04	RGT	Y	1.048	09/08/2009	0.972	RR	0.972	RR	0	16.9	16.7	47.6	0.875	U	16.9	12/05/2019	03/10/2015
16.01	SIDE	N	1.265	06/14/2007	1.203	RR	1.203	RR	0	9.2	11.0	35.5	0.875	U	9.2	11/03/2049	03/10/2015
17.01	END	N	1.966	06/14/2007	1.899	RR	1.899	RR	0	9.9	11.7	39.8	0.875	U	9.9	08/16/2117	03/10/2015
18.01	END	N	1.297	06/14/2007	1.245	RR	1.245	RR	0	7.7	9.2	33.4	0.875	U	7.7	03/29/2062	03/10/2015
19.01	SIDE	Y	1.959	06/14/2007	1.967	RR	1.925	03/10/2014	40.3	5.0	3.1	40.3	0.875	U	40.3	03/29/2040	03/10/2015
20.01	TOP	N	1.001	06/14/2007	0.984	RR	0.984	RR	0	2.5	3.0	5.4	0.875	U	2.5	10/15/2057	03/10/2015
20.02	LFT	N	1.027	09/08/2009	0.997	RR	0.990	03/10/2014	6.7	8.2	8.1	11.4	0.875	U	8.2	03/18/2028	03/10/2015
20.03	BTM	N	0.977	09/08/2009	0.939	RR	0.939	RR	0	8.4	9.8	12.2	0.875	U	8.4	10/22/2021	03/10/2015
20.04	RGT	N	1.019	09/08/2009	0.959	RR	0.963	03/10/2014	0	12.4	9.4	42.6	0.875	U	12.4	04/14/2021	03/10/2015

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: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-C2
Eq Type: VESSEL
Class:
CM RBI:
Design Code: S8/D1

Description: COIL 2 ON LINE HEATER 3, SN:BS10K4MM-05B

Summary: Group Name:
Insp. Due Date = 03/10/2015
Pred. Ret. Date = 04/03/2016

Group Description:
RCR = 26.9 MPY
Rem. Life (from last survey 03/10/2014) = 2.1 yrs

0 C.A. Status: No
Total Caution TMLs = 19

	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	TOP	N	1.032	06/14/2007	0.971	02/22/2013	0.971	RR	0	9.1	9.5	13.2	0.875	U	9.1	09/26/2024	03/10/2015
	21.02	LFT	N	1.026	09/08/2009	0.962	02/22/2013	0.962	RR	0	14.2	14.7	30.6	0.875	U	14.2	04/25/2020	03/10/2015
	21.03	BTM	N	0.988	09/08/2009	0.985	02/22/2013	0.985	RR	0	0.7	1.4	6.3	0.875	U	0.7	05/02/2171	03/10/2015
	21.04	RGT	N	1.026	09/08/2009	1.009	02/22/2013	1.008	03/10/2014	1.0	4.0	4.0	5.8	0.875	U	4.0	06/10/2047	03/10/2015
	22.01	SIDE	Y	1.562	06/14/2007	1.502	02/22/2013	1.477	03/10/2014	24.0	12.6	13.1	34.8	0.875	U	24.0	04/10/2039	03/10/2015
	23.01	END	N	1.985	06/14/2007	1.963	02/22/2013	1.963	RR	0	3.3	3.9	7.8	0.875	U	3.3	11/23/2343	03/10/2015
	24.01	END	N	1.476	06/14/2007	1.489	02/22/2013	1.476	03/10/2014	12.5	0	0	12.5	0.875	U	12.5	04/08/2062	03/10/2015
	25.01	SIDE	N	2.069	06/14/2007	2.037	02/22/2013	2.037	RR	0	4.7	5.7	14.9	0.875	U	4.7	06/05/2261	03/10/2015
	26.01	TOP	N	0.993	06/14/2007	0.965	02/22/2013	0.957	03/10/2014	7.7	5.3	5.8	18.5	0.875	U	7.7	11/02/2024	03/10/2015
	26.02	LFT	N	1.014	09/08/2009	0.959	02/22/2013	0.959	RR	0	12.2	12.9	32.7	0.875	U	12.2	01/27/2021	03/10/2015
	26.03	BTM	N	1.012	09/08/2009	0.962	02/22/2013	0.962	RR	0	11.1	11.7	24.2	0.875	U	11.1	01/10/2022	03/10/2015
	26.04	RGT	N	1.027	09/08/2009	0.987	02/22/2013	0.989	03/10/2014	0	8.4	6.6	28.4	0.875	U	8.4	10/05/2027	03/10/2015
	27.01	TOP	N	0.992	06/14/2007	0.966	02/22/2013	0.972	03/10/2014	0	3.0	4.0	18.5	0.875	U	3.0	07/10/2046	03/10/2015
	27.02	LFT	N	0.990	09/08/2009	0.999	02/22/2013	0.999	RR	0	0	0	0	0.875	U	0.1	03/19/3254	03/10/2015
	27.03	BMT	Y *	1.016	09/08/2009	1.002	02/22/2013	0.967	DC	33.6	10.9	9.2	33.6	0.875	U	33.6	12/04/2016	03/10/2015
	27.04	RGT	N	1.028	09/08/2009	0.961	02/22/2013	0.961	RR	0	14.9	15.5	41.9	0.875	U	14.9	12/17/2019	03/10/2015
	28.01	END	Y	2.062	06/14/2007	1.959	02/22/2013	1.959	RR	0	15.3	18.2	59.0	0.875	U	15.3	01/14/2085	03/10/2015
	29.01	TOP	Y	1.444	01/12/2011	1.342	02/22/2013	1.342	RR	0	32.3	19.6	48.3	0.875	U	32.3	08/24/2028	03/10/2015
	30.01	END	Y	1.390	06/14/2007	1.239	02/22/2013	1.201	03/10/2014	36.4	28.1	30.7	107.3	0.875	U	36.4	02/22/2023	03/10/2015
	31.01	TOP	N	1.012	06/14/2007	0.979	02/22/2013	0.979	RR	0	4.9	5.8	22.7	0.875	U	4.9	05/31/2035	03/10/2015

31.02	LFT	Y	1.022	09/08/2009	0.942	02/22/2013	0.942	RR	0	17.8	18.2	46.9	0.875	U	17.8	12/14/2017	03/10/2015
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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: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-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 2 ON LINE HEATER 3, SN:BS10K4MM-05B

Summary: Group Name: Insp. Due Date = 03/10/2015
Pred. Ret. Date = 04/03/2016
Group Description: RCR = 26.9 MPY
Rem. Life (from last survey 03/10/2014) = 2.1 yrs
0 C.A. Status: No
Total Caution TMLs = 19

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	
31.03	BTM	N	1.018		09/08/2009	0.951		02/22/2013	0.951	RR	03/10/2014	0	14.9	15.8	39.1	0.875	U	14.9	04/16/2019	03/10/2015
31.04	RGT	N	1.014		09/08/2009	0.988	RR	02/22/2013	0.992		03/10/2014	0	4.9	4.9	18.5	0.875	U	4.9	01/24/2038	03/10/2015
32.01	TOP	N	1.021		06/14/2007	0.979		02/22/2013	0.979	RR	03/10/2014	0	6.2	7.4	21.3	0.875	U	6.2	12/18/2030	03/10/2015
32.02	LFT	N	0.993		09/08/2009	0.992		02/22/2013	0.987		03/10/2014	4.8	1.3	1.5	4.8	0.875	U	4.8	07/10/2037	03/10/2015
32.03	BTM	N	1.044		09/08/2009	0.985	RR	02/22/2013	0.988		03/10/2014	0	12.4	12.4	41.9	0.875	U	12.4	04/20/2023	03/10/2015
32.04	RGT	N	1.028		09/08/2009	0.987		02/22/2013	0.987	RR	03/10/2014	0	9.1	10.0	12.2	0.875	U	9.1	06/30/2026	03/10/2015
33.01	SIDE	N	1.259		06/14/2007	1.242		02/22/2013	1.242	RR	03/10/2014	0	2.5	3.0	6.4	0.875	U	2.5	12/28/2160	03/10/2015
34.01	END	N	1.949		06/14/2007	1.917		02/22/2013	1.917	RR	03/10/2014	0	4.7	5.7	12.8	0.875	U	4.7	11/24/2235	03/10/2015
35.01	END	N	1.275		06/14/2007	1.281		02/22/2013	1.281	RR	03/10/2014	0	0	0	0	0.875	U	0.1	03/25/4014	03/10/2015
36.01	SIDE	Y	1.906		06/14/2007	1.878		02/22/2013	1.850		03/10/2014	26.8	8.3	7.9	26.8	0.875	U	26.8	07/27/2050	03/10/2015
37.01	TOP	N	0.998		06/14/2007	0.968	RR	02/22/2013	0.965		03/10/2014	2.9	4.9	5.6	21.3	0.875	U	4.9	07/22/2032	03/10/2015
37.02	LFT	Y	1.017		09/08/2009	0.942		02/22/2013	0.942	RR	03/10/2014	0	16.7	18.2	36.2	0.875	U	16.7	03/14/2018	03/10/2015
37.03	BTM	N	1.014		09/08/2009	0.982	RR	02/22/2013	0.983		03/10/2014	0	6.9	6.7	22.7	0.875	U	6.9	11/03/2029	03/10/2015
37.04	RGT	N	1.002		09/08/2009	1.003	RR	02/22/2013	1.006		03/10/2014	0	0	0	0.7	0.875	U	0.1	03/20/3324	03/10/2015
38.01	TOP	N	1.006		06/14/2007	0.968	RR	02/22/2013	0.971	RR	03/10/2014	0	5.2	6.4	27.0	0.875	U	5.2	08/25/2032	03/10/2015
38.02	LFT	N	0.988		09/08/2009	0.965		02/22/2013	0.965	RR	03/10/2014	0	5.1	6.5	11.2	0.875	U	5.1	11/02/2031	03/10/2015
38.03	BTM	N	1.034		09/08/2009	1.012		02/22/2013	1.012	RR	03/10/2014	0	4.9	6.1	9.8	0.875	U	4.9	02/23/2042	03/10/2015
38.04	RGT	N	1.014		09/08/2009	1.001	RR	02/22/2013	0.987		03/10/2014	13.4	6.0	5.3	13.4	0.875	U	13.4	07/19/2022	03/10/2015
39.01	SIDE	Y *	1.308		06/14/2007	0.952		02/22/2013	0.911	DC	03/10/2014	39.3	58.9	67.2	242.3	0.875	U	58.9	10/19/2014	03/10/2015
40.01	END	N	1.929		06/14/2007	1.871		02/22/2013	1.871	RR	03/10/2014	0	8.6	10.2	27.7	0.875	U	8.6	01/02/2130	03/10/2015

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: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-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 2 ON LINE HEATER 3, SN:BS10K4MM-05B

Summary: Group Name: Insp. Due Date = 03/10/2015 RCR = 26.9 MPY Group Description:
Pred. Ret. Date = 04/03/2016 Rem. Life (from last survey 03/10/2014) = 2.1 yrs 0 C.A. Status: No
Total Caution TMLs = 19

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
41.01	END	Y	1.284	06/14/2007	1.001	02/22/2013	1.001	RR	0	42.0	49.7	123.6	0.875	U	42.0	03/10/2017
42.01	SIDE	N	1.876	06/14/2007	1.783	02/22/2013	1.783	RR	0	13.8	16.4	44.8	0.875	U	13.8	12/26/2079
43.01	TOP	N	0.992	06/14/2007	0.959	02/22/2013	0.952		6.7	5.9	6.6	23.4	0.875	U	6.7	09/06/2025
43.02	LEFT	N	0.974	09/08/2009	0.959	02/22/2013	0.959	RR	0	3.3	4.0	5.4	0.875	U	3.3	08/23/2039
43.03	BTM	N	1.013	09/08/2009	0.962	02/22/2013	0.962	RR	0	11.3	12.8	19.9	0.875	U	11.3	11/20/2021
43.04	RGT	N	0.984	09/08/2009	0.963	02/22/2013	0.963	RR	0	4.7	5.8	9.3	0.875	U	4.7	11/29/2032
44.01	TOP	N	1.006	06/14/2007	0.954	02/22/2013	0.954	RR	0	7.7	8.3	12.1	0.875	U	7.7	06/12/2024
44.02	LFT	N	0.993	09/08/2009	0.962	02/22/2013	0.962	RR	0	6.9	6.3	15.2	0.875	U	6.9	10/18/2026
44.03	BTM	Y	1.024	09/08/2009	1.003	02/22/2013	0.982		20.1	9.3	7.8	20.1	0.875	U	20.1	07/06/2019
44.04	RGT	N	1.020	09/08/2009	0.998	02/22/2013	0.994		3.8	5.8	5.7	15.6	0.875	U	5.8	09/15/2034
45.01	BTM	N	1.027	06/14/2007	0.983	02/22/2013	0.984		0	6.4	7.6	31.3	0.875	U	6.4	03/22/2031

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

Report Date: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-C2
Design Code: S8/D1
Eq Type: VESSEL
Class:
CM RBI:

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

Description: COIL 2 ON LINE HEATER 3, SN:BS10K4MM-05B

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 : 11.0 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 26.9 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 12.5 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 26.9 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 = 2.1 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 04/03/2016

Recommended Eq/Circ UT/RT Inspection Date is 03/10/2015
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 19 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-0010 FGS-1	Date of this Report: 03/10/2014
Remaining Life: 19.1 YRS	Next Inspection Due Date: 03/10/2015
Average Corrosion Rate: 0.1 MPY	Mfg Serial #: BSFGS229
Manufacturer: Bluestar Welding	National Board Number: N/A
Date Built: 2004	Canadian Registration #: OH 6510.2

FMC Technologies Completion LH-0010-FGS-1 Fuel Gas Scrubber



PRESSURE VESSEL INVENTORY FORM

☒ 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 District
Field Name :
Equipment Number : LH-0010
Eq/Circ. ID : LH0010-FGS-1
Equipment Name/Service : (Line Heater) Fuel Gas Scrubber
Physical Location : On LH-0010
GPS Coordinates :

VESSEL DESCRIPTION AND SERVICE CONDITIONS

Type of Vessel: Vertical Fuel Gas Scrubber

Vessel Size: 8.625"

Operating Pressure Range (psig): N/A

Operating Temperature Range (°F): N/A

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): _____

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: _____

PRESSURE VESSEL INVENTORY FORM

ORIGINAL VESSEL NAMEPLATE/STAMPING INFORMATION

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

BLUESTAR
WELDING
GRANDE PRAIRIE, AB.
1-780-532-1160
YRW MANU 2004

A-NUMBER	
SERIAL NO.	15FUS 229
DESIGN PRESSURE	150 PSI
DESIGN TEMP.	200 F
SHELL THICKNESS	
HEAD THICKNESS	
REG. DESIGN NO.	
STRESS RELIEVED	
X-RAY	
DERATED	
HYDRO TEST	
INSPECTOR	
CRN NO.	

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: 02/04/2012

API 510 PRESSURE VESSEL EXTERNAL INSPECTION REPORT

Company Name: FMC Technologies Completion	
Field/Location: Wyoming District	
Equipment Number: LH-0010	Eq/Circ. ID: LH0010-FGS-1
Equipment Name/Service: Fuel Gas Scrubber	
Physical Location: In Evanston Yard	
Manufacturer: Bluestar Welding	Manufacturer Serial Number: BSFGS229
Year Built: 2004	CRN: OH 6510.2

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

Condition of Foundation and Anchor Bolts: Anchor bolts are in place and secure. The vessel is anchored to the heater skid. All (4) anchor bolt nuts are in place and secure.

Condition of Steel Supports, Saddles, and Bolting: All support structural welds appear sound.

Condition of Paint and/or Insulation: The paint is in good condition.

Condition of Nozzles, Flanges, Repads, and Weepholes: All threaded couplings. The threaded coupling attachment welds appear sound. 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

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? Set pressure was not verified.

Date PSV last tested (if there is a tag on the valve)

Comments: Per Scott the psv was sent in for recertification.

Recommendations:

Repairs Needed:

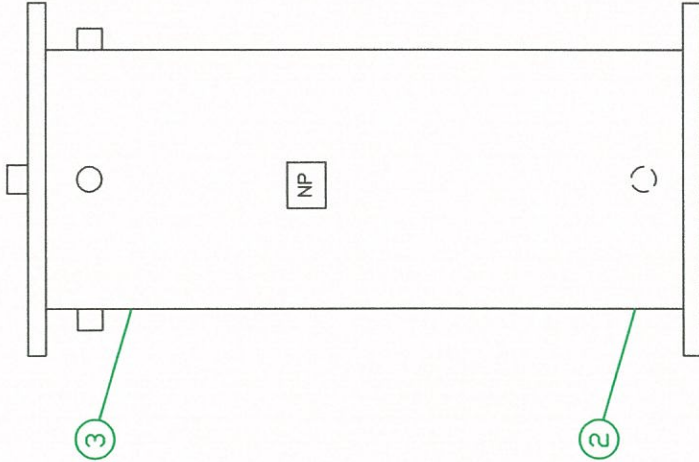
API 510 Inspector Signature
Robert W. Menke

API 510 Inspector Number
0131

Date
03/10/2014

EQUIP RETIREMENT DATE: 3/30/2033
NEXT INSPECTION IS DUE: 3/10/2015

- #2. 01- SH-FRONT 0. 323 TC
#2. 02- SH-LEFT 0. 312 TC
#2. 03- SH-BACK 0. 307 TC
#2. 04- SH-RIGHT 0. 313 TC
#3. 01- SH-FRONT 0. 312 TC
#3. 02- SH-LEFT 0. 319 TC
#3. 03- SH-BACK 0. 319 TC
#3. 04- SH-RIGHT 0. 318 TC



N1	N13
N2	N14
N3	N15
N4	N16
N5	N17
N6	N18
N7	N19
N8	N20
N9	N21
N10	N22
N11	N23
N12	N24

TC-560

NAMEPLATE INFO	
MFG	BLUESTAR WELDING
SERIAL NUMBER	BSFGS229
NATIONAL BOARD #	NONE
DATE BUILT	2004
DESIGN P & T	150 PSI @ 100°F
NOTE	NO "U" STAMP CRN QH-6510. 2

CAL BLK=44°F VESSEL=44°F

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH0010-FGS-1
EQUIP NAME	FUEL GAS SCRUBBER
LOCATION	ON LINE HEATER LH-0010
DWG #	LH0010-FGS-1

DESC: FUEL GAS SCRUBBER ON LH-0010
DWG#: LH0010-FGS-1-2.01-3.04

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: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-FGS-1
Eq Type: VESSEL
Class:
CM RBI:
Design Code: S8/D1

Flange Rating: 285 lb/in²
Design Pressure: 150 lb/in²
Design Temperature: 100 °F

Description: FUEL GAS SCRUBBER ON LH0010, SN:BSFGS229
(8.625" PIPE)-FLAT HEADS, SHELL UT ONLY

Summary: Group Name:
Insp. Due Date = 03/10/2015
Pred. Ret. Date = 03/30/2033

Group Description:
RCR = 0.1 MPY
Rem. Life (from last survey 03/10/2014) = 19.1 yrs

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

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
2.01	SH-FRONT	N *	0.330 TC	0.330 TC	09/11/2009	0.318 TC	0.318 TC	02/22/2013	0.323 TC	0.323 TC	03/10/2014	0	1.6	1.6	5.1	0.282 U	1.6	10/25/2039	03/10/2015
2.02	SH-LEFT	N *	0.316 TC	0.316 TC	09/11/2009	0.308 TC	0.308 TC	02/22/2013	0.312 TC	0.312 TC	03/10/2014	0	0.9	0.7	6.3	0.282 U	0.9	07/10/2047	03/10/2015
2.03	SH-BACK	N *	0.314 TC	0.314 TC	09/11/2009	0.306 TC	0.306 TC	02/22/2013	0.307 TC	0.307 TC	03/10/2014	0	1.6	1.2	3.9	0.282 U	1.6	10/24/2029	03/10/2015
2.04	SH-RIGHT	N *	0.322 TC	0.322 TC	09/11/2009	0.315 TC	0.315 TC	02/22/2013	0.313 TC	0.313 TC	03/10/2014	1.9	2.0	1.9	2.9	0.282 U	2.0	09/08/2029	03/10/2015
3.01	SH-FRONT	N *	0.326 TC	0.326 TC	09/11/2009	0.317 TC	0.317 TC	02/22/2013	0.312 TC	0.312 TC	03/10/2014	4.8	3.1	3.2	8.5	0.282 U	4.8	06/09/2020	03/10/2015
3.02	SH-LEFT	N	0.314 TC	0.314 TC	09/11/2009	0.314 TC	0.314 TC	02/22/2013	0.319 TC	0.319 TC	03/10/2014	0	0	0	6.6	0.282 U	0.1	03/13/2384	03/10/2015
3.03	SH-BACK	N	0.316 TC	0.316 TC	09/11/2009	0.317 TC	0.317 TC	02/22/2013	0.319 TC	0.319 TC	03/10/2014	0	0	0	4.7	0.282 U	0.1	03/13/2384	03/10/2015
3.04	SH-RIGHT	N *	0.327 TC	0.327 TC	09/11/2009	0.316 TC	0.316 TC	02/22/2013	0.318 TC	0.318 TC	03/10/2014	0	2.0	2.1	4.6	0.282 U	2.0	03/10/2032	03/10/2015

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

Report Date: 03/11/2014

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

Flange Rating: 285 lb/in²
Design Pressure: 150 lb/in²
Design Temperature: 100 °F

Unit: LH-0010
Eq/Circ ID: LH0010-FGS-1
Design Code: S8/D1
Eq Type: VESSEL
Class:
CM RBI:

Description: FUEL GAS SCRUBBER ON LH0010, SN:BSFGS229
(8.625" PIPE) -FLAT HEADS, SHELL UT ONLY

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 = 19.1 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 03/30/2033

Recommended Eq/Circ UT/RT Inspection Date is 03/10/2015
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.



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

Inspections Performed for: FMC Technologies Completion	
Inspection Report for: LH-0010 FGS-2	Date of this Report: 03/10/2014
Remaining Life: 20+YRS	Next Inspection Due Date: 03/10/2015
Average Corrosion Rate: 4.4 MPY	Mfg Serial #: BSFGS230
Manufacturer: Bluestar Welding	National Board Number: N/A
Date Built: 2004	Canadian Registration #: OH 6510.2

FMC Technologies Completion LH-0010-FGS-2 Fuel Gas Scrubber



PRESSURE VESSEL INVENTORY FORM

☒ 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 District
Field Name :
Equipment Number : LH-0010
Eq/Circ. ID : LH0010-FGS-2
Equipment Name/Service : (Line Heater) Fuel Gas Scrubber
Physical Location : On LH-0010
GPS Coordinates :

VESSEL DESCRIPTION AND SERVICE CONDITIONS

Type of Vessel: Vertical Fuel Gas Scrubber

Vessel Size: 8.625"

Operating Pressure Range (psig): N/A

Operating Temperature Range (°F): N/A

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): _____

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: _____

PRESSURE VESSEL INVENTORY FORM

ORIGINAL VESSEL NAMEPLATE/STAMPING INFORMATION

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

BLUESTAR	
WELDING	
GRANDE PRAIRIE, AB.	
1-780-532-1160	
	
® YR MANU 2004	
A-NUMBER	
SERIAL NO.	68F05 230
DESIGN PRESSURE	150 PSI
DESIGN TEMP.	-20°F to 100°F
SHELL THICKNESS	
HEAD THICKNESS	
REG. DESIGN NO.	
STRESS RELIEVED	NO
X-RAY	NO
DERATED	NO
HYDRO TEST	136 PSI
INSPECTOR	C.R.
CRN NO.	CR6510.2

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: Robert W. Menke Date: 02/04/2012

API 510 PRESSURE VESSEL EXTERNAL INSPECTION REPORT

Company Name: FMC Technologies Completion	
Field/Location: Wyoming District	
Equipment Number: LH-0010	Eq/Circ. ID: LH0010-FGS-2
Equipment Name/Service: Fuel Gas Scrubber	
Physical Location: Located in the Evanston Yard	
Manufacturer: Bluestar Welding	Manufacturer Serial Number: BSFGS230
Year Built: 2004	CRN: OH 6510.2

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

Condition of Foundation and Anchor Bolts: Anchor bolts are in place and secure. The vessel is anchored to the heater skid. All (4) anchor bolt nuts are in place and secure.

Condition of Steel Supports, Saddles, and Bolting: All support structural welds appear sound.

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

Condition of Nozzles, Flanges, Repads, and Weepholes: All threaded couplings. The threaded coupling attachment welds appear sound. 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

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? Set pressure was not verified.

Date PSV last tested (if there is a tag on the valve)

Comments: Per Scott the psv was sent in for recertification.

Recommendations:

Repairs Needed:

API 510 Inspector Signature
Robert W. Menke

API 510 Inspector Number
0131

Date
03/10/2014

EQUIP RETIREMENT DATE: 7/10/2027
NEXT INSPECTION IS DUE: 3/10/2015

- #2. 01- SH-FRONT 0. 319 TC
- #2. 02- SH-LEFT 0. 302 TC
- #2. 03- SH-BACK 0. 304 TC
- #2. 04- SH-RIGHT 0. 315 TC
- #3. 01- SH-FRONT 0. 317 TC
- #3. 02- SH-LEFT 0. 317 TC
- #3. 03- SH-BACK 0. 315 TC
- #3. 04- SH-RIGHT 0. 319 TC



N1		N13
N2		N14
N3		N15
N4		N16
N5		N17
N6		N18
N7		N19
N8		N20
N9		N21
N10		N22
N11		N23
N12		N24

TC-560

NAMEPLATE INFO	
MFG	BLUESTAR WELDING
SERIAL NUMBER	BSFGS230
NATIONAL BOARD #	NONE
DATE BUILT	2004
DESIGN P & T	150 PSI @ 100°F
NOTE	NO "U" STAMP CRN OH-6510. 2

CAL BLK=44°F	VESSEL=44°F
BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH0010-FGS-2
EQUIP NAME	FUEL GAS SCRUBBER
LOCATION	ON LINE HEATER LH-0010
DWG #	LH0010-FGS-2

DESC: FUEL GAS SCRUBBER ON LH-0010
DWG#: LH0010-FGS-2-2.01-3.04

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: 03/11/2014

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

Unit: LH-0010

Eq/Circ ID: LH0010-FGS-2

Eq Type: VESSEL

Class:

CM RBI:

Design Code: S8/D1

Flange Rating: 285 lb/in²
Design Pressure: 150 lb/in²
Design Temperature: 100 °F

Description: FUEL GAS SCRUBBER ON LH0010, SN:BSFGS230
(8.625" PIPE)-FLAT HEADS, SHELL UT ONLY

Summary: Group Name:

Insp. Due Date = 03/10/2015

Pred. Ret. Date = 07/10/2027

Group Description:

RCR = 0.1 MPY

Rem. Life (from last survey 03/10/2014) = 13.3 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	SH-FRONT	N	0.324 TC	09/11/2009	09/11/2009	0.319 TC	0.319 TC	02/22/2013	0.319 TC	0.319 TC	03/10/2014	0	1.1	0.6	3.5	0.282 U	1.1	10/29/2047	03/10/2015
2.02	SH-LEFT	N *	0.320 TC	09/11/2009	09/11/2009	0.306 TC	0.306 TC	02/22/2013	0.302 TC	0.302 TC	03/10/2014	3.8	4.0	3.7	4.7	0.282 U	4.0	03/10/2019	03/10/2015
2.03	SH-BACK	N *	0.328 TC	09/11/2009	09/11/2009	0.301 TC	0.301 TC	02/22/2013	0.304 TC	0.304 TC	03/10/2014	0	5.3	5.9	10.4	0.282 U	5.3	05/04/2018	03/10/2015
2.04	SH-RIGHT	N	0.319 TC	09/11/2009	09/11/2009	0.315 TC	0.315 TC	02/22/2013	0.315 TC	0.315 TC	03/10/2014	0	0.9	0	3.8	0.282 U	0.9	11/09/2050	03/10/2015
3.01	SH-FRONT	N *	0.325 TC	09/11/2009	09/11/2009	0.317 TC	0.317 TC	02/22/2013	0.317 TC	0.317 TC	03/10/2014	0	1.8	1.0	5.2	0.282 U	1.8	08/19/2033	03/10/2015
3.02	SH-LEFT	N *	0.331 TC	09/11/2009	09/11/2009	0.321 TC	0.321 TC	02/22/2013	0.317 TC	0.317 TC	03/10/2014	3.8	3.1	2.7	3.8	0.282 U	3.8	05/26/2023	03/10/2015
3.03	SH-BACK	N *	0.321 TC	09/11/2009	09/11/2009	0.313 TC	0.313 TC	02/22/2013	0.315 TC	0.315 TC	03/10/2014	0	1.3	1.2	3.0	0.282 U	1.3	07/29/2039	03/10/2015
3.04	SH-RIGHT	N *	0.329 TC	09/11/2009	09/11/2009	0.319 TC	0.319 TC	02/22/2013	0.319 TC	0.319 TC	03/10/2014	0	2.2	2.0	5.1	0.282 U	2.2	01/03/2031	03/10/2015

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

Report Date: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-FGS-2
Design Code: S8/D1
Eq Type: VESSEL
Class:
CM RBI:

Flange Rating: 285 lb/in²
Design Pressure: 150 lb/in²
Design Temperature: 100 °F

Description: FUEL GAS SCRUBBER ON LH0010, SN:BSFGS230
(8.625" PIPE)-FLAT HEADS, SHELL UT ONLY

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 = 13.3 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 07/10/2027

Recommended Eq/Circ UT/RT Inspection Date is 03/10/2015
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.

API 570 Piping External Inspection

Company Name: FMC Technologies Completion	Facility Name: Wyoming District
Line Name/Number: Associated Piping With LH-0010	
Size/Sched. Of Pipe: 3.5"	Eq/Circ. ID:
Service/System:	Piping Class ☐ 1 ☒ 2 ☐ 3 ☐ Other
Design Pressure: 1000 psi	Materials: ☒ CS ☐ SS ☐ Other
Design Temperature: 180°	Note Stamping (If Any)
P&ID#:	Flange Rating:

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:	Comments:
☐ Serviceable ☒ Not Insulated ☐ Missing/Damaged ☐ CUI Identification ☐ Corrosion Present (Describe) ☐ Other ☒ No Issues	Piping is not insulated.

Coating Condition:	Comments:
☒ Good ☐ Fair, Some Blistering/Peeling ☐ Corrosion Present (Describe) ☒ Other ☒ No Issues	Piping coating is in good overall condition.

Loss of Containment:	Comments:
☐ 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	LH-0010 was not in service during this inspection.

Condition of Welds:	Comments:
☒ 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	Welds are smooth with a good weld profile.

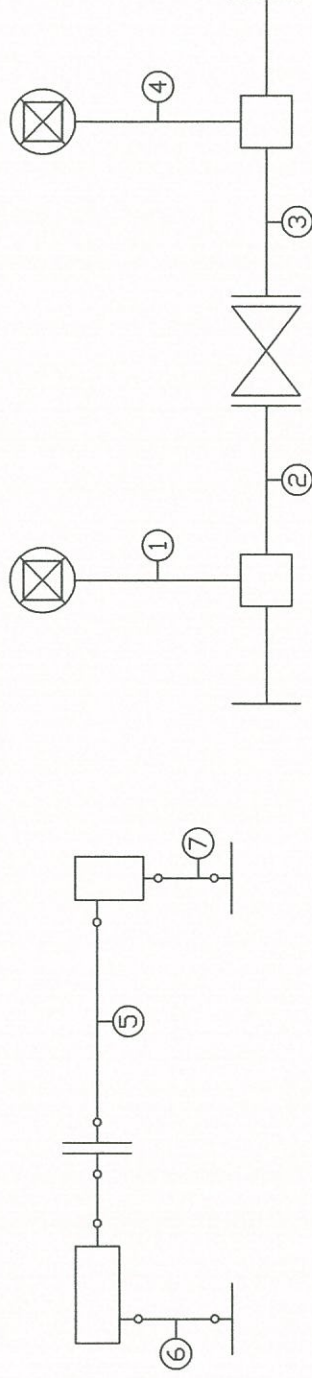
Relief Device:	Comments:
☐ PSV No PSV ☐ Rupture Disk ☐ Atmospheric ☐ No Relief Device Identified For This Equipment ☐ Tag Secure and Legible ☐ Set Pressure At Or Below MAWP ☐ Block Valve Not Locked/Car Sealed In Open Position ☐ Improper Drain Hole/Weather Cap On Atmos. Discharge ☐ Obstruction (i.e. Debris)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

Supports/Hangers:	Comments:
☒ 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 Needed To Be Tightened ☐ Fireproofing Missing Or Damaged ☐ Support/Hanger Is Corroded ☐ Other ☒ No Issues	Supports are in acceptable condition.

Flanged Connections:	Comments:
☐ 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	Bolting was missing due to removing the coils. Minor surface corrosion present on flange faces.

Mechanical Observations:	Comments:
☐ 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	

EQUIP RETIREMENT DATE: 11/24/2129
NEXT INSPECTION IS DUE: 3/10/2015



#1. 01- STR-F 0. 786
#1. 02- STR-L 0. 744
#1. 03- STR-BK 0. 747
#1. 04- STR-R 0. 745
#2. 01- STR-T 0. 760
#2. 02- STR-L 0. 744
#2. 03- STR-BTM 0. 760

#2. 04- STR-R 0. 794
#3. 01- STR-T 0. 763
#3. 02- STR-L 0. 760
#3. 03- STR-BTM 0. 755
#3. 04- STR-R 0. 755
#4. 01- STR-F 0. 766
#4. 02- STR-L 0. 757

#4. 03- STR-BK 0. 737
#4. 04- STR-R 0. 744
#5. 01- STR-T 0. 724
#5. 02- STR-F 0. 727
#5. 03- STR-BTM 0. 734
#5. 04- STR-BK 0. 733
#6. 01- STR-F 0. 743

#6. 02- STR-L 0. 750
#6. 03- STR-BK 0. 761
#6. 04- STR-R 0. 749
#7. 01- STR-F 0. 878
#7. 02- STR-L 0. 880
#7. 03- STR-BK 0. 868
#7. 04- STR-R 0. 871

CAL BLK=44° F PIPE=43° F

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH0010-P
EQUIP NAME	LH0010-P
DWG #	LH0010

FH2E-D

DESC: ASSOCIATED PIPING ON LINE HEATER 3
DWG#: LH0010-P-1.01-7.04

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: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-P
Eq Type: PIPING
Class:
CM RBI:
Design Code: B31.3

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

Description: ASSOCIATED PIPING ON LINE HEATER 3

Summary: Group Name: Insp. Due Date = 03/10/2015
Pred. Ret. Date = 11/24/2129

Group Description:
RCR = 4.4 MPY
Rem. Life (from last survey 03/10/2014) = 115.7 yrs

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

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	STR-F	N	0.767	06/17/2007	0.789	02/22/2013	0.786	03/10/2014	2.9	0	0	2.9	0.260 P	2.9	07/09/2195	03/10/2015
1.02	STR-L	N	0.753	09/11/2009	0.747	02/22/2013	0.744	03/10/2014	2.9	2.0	2.1	6.7	0.260 P	2.9	01/14/2181	03/10/2015
1.03	STR-BK	N	0.732	09/11/2009	0.732 RR	02/22/2013	0.739 RR	03/10/2014	0	0	0	0	0.260 P	0.1	03/25/4014	03/10/2015
1.04	STR-R	N *	0.756	09/11/2009	0.742	02/22/2013	0.742 RR	03/10/2014	0	3.1	3.7	8.6	0.260 P	3.1	08/17/2169	03/10/2015
2.01	STR-T	N *	0.781	06/17/2007	0.766	02/22/2013	0.760	03/10/2014	5.8	3.1	3.0	9.5	0.260 P	5.8	05/16/2100	03/10/2015
2.02	STR-L	N *	0.746	09/11/2009	0.731	02/22/2013	0.731 RR	03/10/2014	0	3.3	4.0	13.3	0.260 P	3.3	11/15/2156	03/10/2015
2.03	STR-BTM	N	0.750	09/11/2009	0.740 RR	02/22/2013	0.749 RR	03/10/2014	0	0.2	0	6.0	0.260 P	0.2	03/25/4014	03/10/2015
2.04	STR-R	N	0.780	09/11/2009	0.788 RR	02/22/2013	0.794	03/10/2014	0	0	0	0	0.260 P	0.1	03/25/4014	03/10/2015
3.01	STR-T	N	0.767	06/17/2007	0.762 RR	02/22/2013	0.763	03/10/2014	0	0.6	0.8	4.7	0.260 P	0.6	04/18/2852	03/10/2015
3.02	STR-L	N	0.756	09/11/2009	0.760	02/22/2013	0.760	03/10/2014	0	0	0	0	0.260 P	0.1	03/25/4014	03/10/2015
3.03	STR-BTM	N	0.753	09/11/2009	0.751	02/22/2013	0.751 RR	03/10/2014	0	0.4	0.5	1.9	0.260 P	0.4	05/07/3241	03/10/2015
3.04	STR-R	N	0.756	09/11/2009	0.750	02/22/2013	0.750 RR	03/10/2014	0	1.3	1.6	4.7	0.260 P	1.3	01/03/2391	03/10/2015
4.01	STR-F	N	0.765	06/17/2007	0.761 RR	02/22/2013	0.766	03/10/2014	0	0	0.3	2.0	0.260 P	0.1	03/25/4014	03/10/2015
4.02	STR-L	N	0.760	09/11/2009	0.750 RR	02/22/2013	0.757	03/10/2014	0	0.7	0.4	6.0	0.260 P	0.7	12/30/2723	03/10/2015
4.03	STR-BK	N *	0.760	09/11/2009	0.730	02/22/2013	0.730 RR	03/10/2014	0	6.7	7.4	19.0	0.260 P	6.7	04/25/2084	03/10/2015
4.04	STR-R	N *	0.755	09/11/2009	0.741	02/22/2013	0.741 RR	03/10/2014	0	3.1	3.3	8.6	0.260 P	3.1	04/21/2169	03/10/2015
5.01	STR-T	N	0.724	06/17/2007	0.711 RR	02/04/2012	0.715 RR	03/10/2014	0	1.3	0.8	3.3	0.260 P	1.3	02/01/2364	03/10/2015
5.02	STR-F	N	0.726	09/11/2009	0.723 RR	02/04/2012	0.724 RR	03/10/2014	0	0.4	0.3	1.3	0.260 P	0.4	11/06/3173	03/10/2015
5.03	STR-BTM	N	0.725	09/11/2009	0.724 RR	02/04/2012	0.727 RR	03/10/2014	0	0	0	0.4	0.260 P	0.1	03/25/4014	03/10/2015
5.04	STR-BK	N	0.715	09/11/2009	0.705	02/04/2012	0.705 RR	03/10/2014	0	2.2	2.4	7.5	0.260 P	2.2	05/26/2216	03/10/2015

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: 03/11/2014

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

Unit: LH-0010
Eq/Circ ID: LH0010-P
Eq Type: PIPING
Class:
CM RBI:
Design Code: B31.3

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

Description: ASSOCIATED PIPING ON LINE HEATER 3

Summary:

Group Name:
Insp. Due Date = 03/10/2015
Pred. Ret. Date = 11/24/2129

Group Description:
RCR = 4.4 MPY
Rem. Life (from last survey 03/10/2014) = 115.7 yrs

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

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
6.01	STR-F	N *	0.757	06/17/2007	0.761	01/12/2011	0.743	03/10/2014	5.7	2.1	2.0	5.7	0.260 P	5.7	11/25/2098	03/10/2015
6.02	STR-L	N	0.745	09/11/2009	0.741	01/12/2011	0.741	03/10/2014	0	0.9	0.7	3.0	0.260 P	0.9	06/25/2548	03/10/2015
6.03	STR-BK	N	0.761	09/11/2009	0.756	01/12/2011	0.756	03/10/2014	0	1.1	0.9	3.7	0.260 P	1.1	12/21/2464	03/10/2015
6.04	STR-R	N	0.742	09/11/2009	0.742	01/12/2011	0.749	03/10/2014	0	0	0	0	0.260 P	0.1	03/25/4014	03/10/2015
7.01	STR-F	N	0.749	06/17/2007	0.736	02/04/2012	0.736	03/10/2014	0	1.9	2.3	7.5	0.260 P	1.9	08/23/2264	03/10/2015
7.02	STR-L	N	0.747	09/11/2009	0.742	02/04/2012	0.748	03/10/2014	0	0	0	2.2	0.260 P	0.1	03/25/4014	03/10/2015
7.03	STR-BK	N	0.735	09/11/2009	0.752	02/04/2012	0.761	03/10/2014	0	0	0	0	0.260 P	0.1	03/25/4014	03/10/2015
7.04	STR-R	N	0.760	09/11/2009	0.759	02/04/2012	0.762	03/10/2014	0	0	0	0.4	0.260 P	0.1	03/25/4014	03/10/2015

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

Report Date: 03/11/2014

Unit: LH-0010
Eq/Circ ID: LH0010-P
Design Code: B31.3
Eq Type: PIPING
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: ASSOCIATED PIPING ON LINE HEATER 3

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 : 1.6 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 4.4 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 2.0 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 4.4 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 = 115.7 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 11/24/2129

Recommended Eq/Circ UT/RT Inspection Date is 03/10/2015
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.