



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

Inspections Performed for: FMC Technologies Completion	
Inspection Report for: LH-0004	
Remaining Life: 9 YRS	Date of this Report: 08/27/2013
Average Corrosion Rate: 72 MPY	Next Inspection Due Date: 08/27/2014
Manufacturer: Blue Star Welding	Mfg Serial #: BS10K2MM-03A/B
Date Built: 2005	National Board #: None
Alberta registration #: 514075/ 514076	Canadian Registration #: ALD-05-001

FMC Technologies Completion LH-0004 Line Heater



PRESSURE VESSEL INVENTORY

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

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

VESSEL ID INFORMATION

Company Name : Pure Energy Services (USA) Inc.
Facility/Location Name : Grand Junction District
Field Name :
Equipment Number : LH-0004
Eq/Circ. ID : LH0004-C1/C2
Equipment Name/Service : Line Heater
Physical Location : In Grand Junction Yard
GPS Coordinates :

VESSEL DESCRIPTION AND SERVICE CONDITIONS

Type of Vessel: Horizontal Line Heater

Vessel Size:

Operating Pressure Range (psig):

Operating Temperature Range (°F):

Does the vessel have Internal Access? ☐ Yes ☐ No

Specify type of internal access, if available:

Vessel is located: ☐ Inside ☒ Outside ☐ Under Roof

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

Is there a Long Seam? ☐ Yes ☐ No

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

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

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

ORIGINAL VESSEL NAMEPLATE/STAMPING INFORMATION

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

Nameplate Coil #1

RTI W HT		MANUFACTURED & CERTIFIED BY: BLUESTAR WELDING 	
GRANDE PRAIRIE, AB., CANADA  1-780-532-1160			
A-NUMBER	(A) 514075		
SERIAL No.	BS10K2MM-Q3A		
JOB No.	10252-P		
DESIGN PRESSURE	10000 PSI		
M.A.W.P.	10000 PSI		
DESIGN TEMP. MINIMUM	-40°F		
CORROSION ALLOWANCE	0.125 IN.		
DESIGN TEMP. MAXIMUM	150°F		
CRN No.	ALD-05-001		
YEAR BUILT	2005		
STEAM COIL M.A.W.P.	@ °F		

Coil #1



Coil # 2



Nameplate Coil #2

RTI W HT	MANUFACTURED & CERTIFIED BY: BLUESTAR WELDING 
GRANDE PRAIRIE, AB., CANADA  1-780-532-1160	
A-NUMBER	0514076
SERIAL No.	ESC10K2MM-03B
JOB No.	10252-P
DESIGN PRESSURE	10000 PSI
M.A.W.P.	10000 PSI
DESIGN TEMP. MINIMUM	-40°F
CORROSION ALLOWANCE	0.025 IN.
DESIGN TEMP. MAXIMUM	350°F
CRN No.	FLD-05-001
YEAR BUILT	2005
STEAM COIL M.A.W.P.	@ °F

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: Canonsburg Yard	
Equipment Number: LH-0004	Eq/Circ. ID: LH0004-C1/C2
Equipment Name/Service: Line Heater	
Physical Location: In Grand Junction Yard	
Manufacturer: Blue Star Welding	Manufacturer Serial Number: BS10K2MM-03A/B
Year Built: 2005	National Board#: None
Alberta Reg. Number: 514075/514076	Canadian Registration#: ALD-05-001

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. Nameplate and bracket are in acceptable condition.

Internal Access: Yes, when coils removed (only internal access)

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

Condition of Foundation and Anchor Bolts: There are no anchor bolts. Line heater is welded directly to the skid attachment welds are smooth with a good weld profile.

Condition of Steel Supports, Saddles, and Bolting: N/A

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

Condition of Nozzles, Flanges, Repads, and Weepholes: Nozzles and flanges are in good condition. All Line Heater flanges are in acceptable condition.

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? Overpressure protection is on the associated piping

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

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

Comments:

Fire tube is in acceptable condition with light surface corrosion present

Recommendations:

Repairs Needed:

API 510 Inspector Signature
Robert W. Menke/EAC

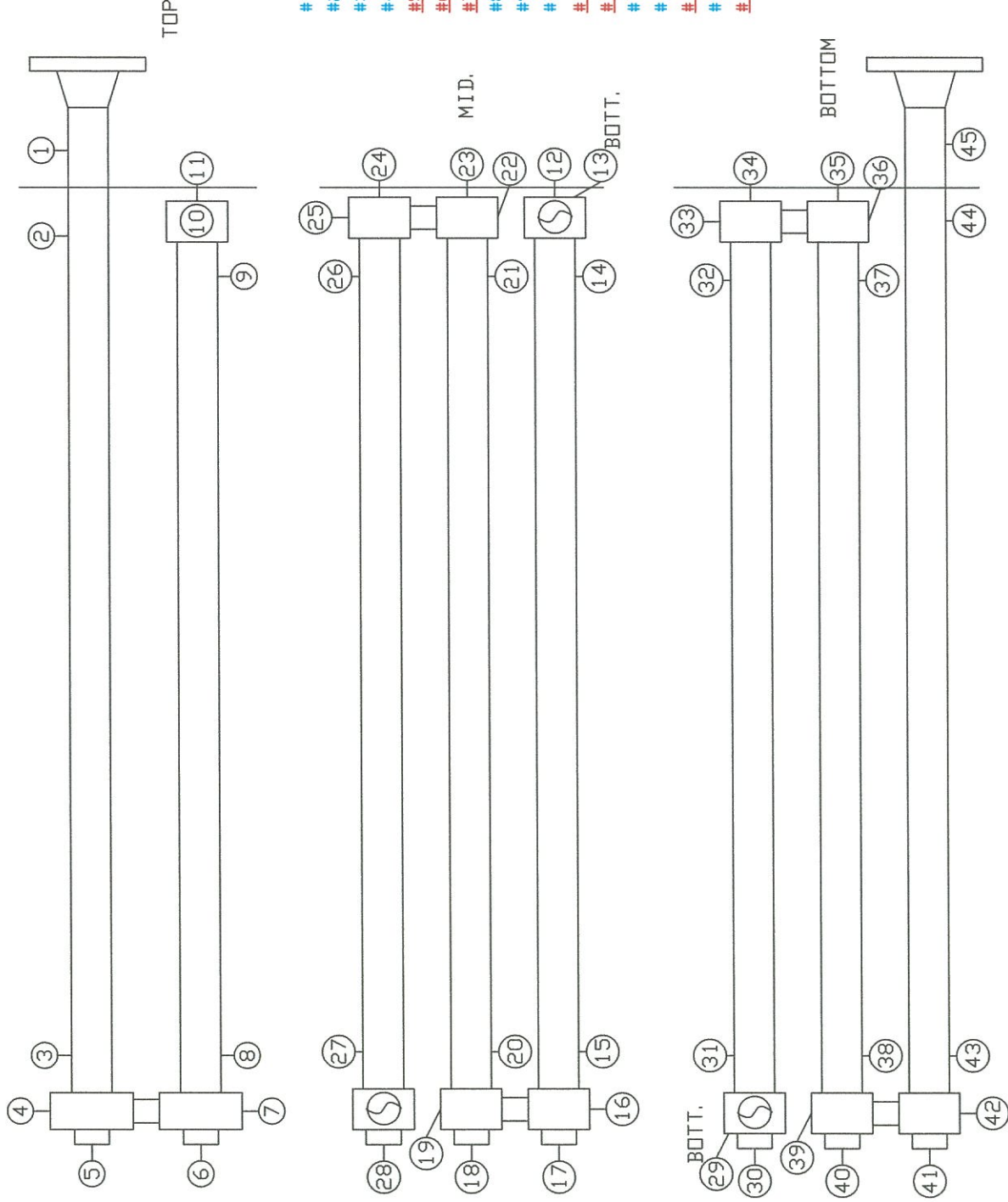
API 510 Inspector Number
0131

Date
08/27/2013

EQUIP RETIREMENT DATE: 9/5/2022
NEXT INSPECTION IS DUE: 8/27/2014

NAME PLATE INFO	
MFG	BLUESTAR WELDING
SERIAL NUMBER	BS10K2MM-03A
A NUMBER	514075
DATE BUILT	2005
DESIGN P & T	10,000 psi @ 180°F
NOTE	CRN # ALD-05-001

DM-401



- | | |
|----------------------|------------------------|
| #1. 01- TOP-T 1.006 | #20. 01- MID-T 1.011 |
| #2. 01- TOP-T 0.986 | #21. 01- MID-BTM 0.993 |
| #3. 01- TOP-T 1.000 | #22. 01- MID 0.000 NT |
| #4. 01- TOP 2.368 | #23. 01- MID 3.298 |
| #5. 01- TOP 2.758 | #24. 01- MID 2.673 |
| #6. 01- TOP 2.667 | #25. 01- MID 2.123 |
| #7. 01- TOP 2.777 | #26. 01- MID 1.017 |
| #8. 01- TOP-T 1.022 | #27. 01- MID-T 0.996 |
| #9. 01- TOP-T 1.009 | #31. 01- BTM-R 1.006 |
| #10. 01- TOP 1.590 | #32. 01- BTM-T 1.006 |
| #11. 01- TOP 3.179 | #33. 01- BTM 1.641 |
| #12. 01- MID 2.734 | #37. 01- BTM-R 1.031 |
| #14. 01- MID-R 1.031 | #38. 01- BTM-T 1.003 |
| #15. 01- MID-T 0.982 | #41. 01- BTM 2.702 |
| #16. 01- MID 1.504 | #43. 01- BTM-R 1.009 |
| #17. 01- MID 3.370 | #44. 01- BTM 1.018 |
| #18. 01- MID 2.667 | #45. 01- BTM-BTM 1.007 |

CAL=

PIPE=

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH0004-C1
EQUIP NAME	LINE HEATER (WITH 2 COILS)
DWG #	LH0004-C1

DESC: COIL 1 ON LINE HEATER 1
DWG#: LH0004-C1-1.01-45.01

Corrosion Monitoring Eq. -rc 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: 10/21/2013

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

Unit: LH-0004
Eq/Circ ID: LH0004-C1
Eq Type: VESSEL
Class:
CM RBI:
Design Code: S8/D1

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

Description: COIL 1 ON LINE HEATER 1, SN:BS10K2MM-03A

Summary: Group Name: Insp. Due Date = 08/27/2014
Pred. Ret. Date = 09/05/2022

Group Description:
RCR = 63.0 MPY
Rem. Life (from last survey 08/27/2013) = 9.0 yrs

0 C.A. Status: No
Total Caution TMLs = 10

TML No	Location	Ctn TML	First Survey Thick	First Survey Nt	First Date	Previous Survey Thick	Previous Survey Nt	Previous Date	Last Survey Thick	Last Survey Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
1.01	TOP-T	N	1.032		06/14/2007	1.016		02/04/2012	1.006		08/27/2013	6.4	4.2	4.0	6.4	0.875 U	6.4	02/14/2034	08/27/2014
2.01	TOP-T	N *	1.034		06/14/2007	0.995		02/04/2012	0.986		08/27/2013	5.8	7.7	7.9	7.9	0.875 U	7.7	01/26/2028	08/27/2014
3.01	TOP-T	N	0.995		06/14/2007	0.995	RR	02/04/2012	1.000		08/27/2013	0	0	0	0	0.875 U	0.1	09/06/3263	08/27/2014
4.01	TOP	N	2.391		06/14/2007	2.385		02/04/2012	2.368		08/27/2013	10.9	3.7	3.2	10.9	2.000 U	10.9	06/01/2047	08/27/2014
5.01	TOP	Y	2.821		06/14/2007	2.801		02/04/2012	2.758		08/27/2013	27.6	10.2	8.8	27.6	2.000 U	27.6	02/12/2041	08/27/2014
6.01	TOP	Y *	3.413		06/14/2007	2.998		02/04/2012	2.667		08/27/2013	212.1	120.2	113.2	212.1	2.000 U	212.1	10/19/2016	08/27/2014
7.01	TOP	Y *	2.863		06/14/2007	2.310		02/04/2012	2.310	RR	08/27/2013	0	89.1	96.0	96.0	2.000 U	89.1	02/18/2017	08/27/2014
8.01	TOP-T	N	1.029		06/14/2007	1.022		02/04/2012	1.022		08/27/2013	0	1.1	1.2	1.2	0.875 U	1.1	04/18/2147	08/27/2014
9.01	TOP-T	N	1.020		06/14/2007	1.012		02/04/2012	1.009		08/27/2013	1.9	1.8	1.8	1.9	0.875 U	1.9	03/07/2084	08/27/2014
10.01	TOP	N	1.000	NM	02/24/2005	1.598		02/04/2012	1.590		08/27/2013	5.1	0	0	5.1	0.875 U	5.1	11/08/2153	08/27/2014
11.01	TOP	Y	3.224		06/14/2007	3.224	RR	02/04/2012	3.179		08/27/2013	28.8	7.3	5.6	28.8	2.000 U	28.8	08/04/2054	08/27/2014
12.01	MID	Y	2.762		06/14/2007	2.762	RR	02/04/2012	2.734		08/27/2013	17.9	4.5	3.5	17.9	2.000 U	17.9	08/29/2054	08/27/2014
14.01	MID-R	N	1.031		06/14/2007	1.031	RR	02/04/2012	1.031		08/27/2013	0	0	0	0	0.875 U	0.1	09/08/3573	08/27/2014
15.01	MID-T	N *	0.998		06/14/2007	0.998	RR	02/04/2012	0.982		08/27/2013	10.3	2.6	2.0	10.3	0.875 U	10.3	01/16/2024	08/27/2014
16.01	MID	Y	1.563		06/14/2007	1.563	RR	02/04/2012	1.504		08/27/2013	37.8	9.5	7.3	37.8	0.875 U	37.8	04/18/2030	08/27/2014
17.01	MID	N	3.328		06/14/2007	3.328	RR	02/04/2012	3.370		08/27/2013	0	0	0	0	2.000 U	0.1	09/11/4013	08/27/2014
18.01	MID	Y	2.726		06/14/2007	2.726	RR	02/04/2012	2.667		08/27/2013	37.8	9.5	7.3	37.8	2.000 U	37.8	04/20/2031	08/27/2014
20.01	MID-T	N	1.043		06/14/2007	1.012		02/04/2012	1.011		08/27/2013	0.6	5.2	5.5	5.5	0.875 U	5.2	10/23/2039	08/27/2014
21.01	MID-BTM	N	1.013		06/14/2007	0.993		02/04/2012	0.993		08/27/2013	0	3.2	3.5	3.5	0.875 U	3.2	07/13/2050	08/27/2014
22.01	MID	N	2.500	NM	02/24/2005			N/A	2.817		06/14/2007	N/A	0	N/A	0	2.000 U	0.1	06/29/4007	06/13/2008

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

Report Date: 10/21/2013

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

Unit: LH-0004

Eq/Circ ID: LH0004-C1

Eq Type: VESSEL

Class:

CM RBI:

Design Code: S8/D1

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

Description: COIL 1 ON LINE HEATER 1, SN:BS10K2MM-03A

Summary: Group Name:

Insp. Due Date = 08/27/2014

Pred. Ret. Date = 09/05/2022

Group Description:

RCR = 63.0 MPY

Rem. Life (from last survey 08/27/2013) = 9.0 yrs

O C.A. Status: No

Total Caution TMLs = 10

TM# 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	TM# Retirement Date	TM# Inspection Date	
23.01	MID	N	3.352		06/14/2007	3.287		02/04/2012	3.287	RR	08/27/2013	0	10.5	11.3	11.3	2.000	U	10.5	03/24/2136	08/27/2014
24.01	MID	Y	2.687		06/14/2007	2.554		02/04/2012	2.554	RR	08/27/2013	0	21.4	23.1	23.1	2.000	U	21.4	07/18/2039	08/27/2014
25.01	MID	N	2.123		06/14/2007	2.123	RR	02/04/2012	2.123		08/27/2013	0	0	0	0	2.000	U	0.1	09/06/3243	08/27/2014
26.01	MID	N	0.990		06/14/2007	0.990	RR	02/04/2012	1.017		08/27/2013	0	0	0	0	0.875	U	0.1	09/07/3433	08/27/2014
27.01	MID-T	N	1.026		06/14/2007	0.996		02/04/2012	0.996		08/27/2013	0	4.8	5.2	5.2	0.875	U	4.8	11/11/2038	08/27/2014
31.01	BTM-R	N *	1.053		06/14/2007	1.003		02/04/2012	1.003	RR	08/27/2013	0	8.1	8.7	8.7	0.875	U	8.1	06/16/2029	08/27/2014
32.01	BTM-T	N	1.000		06/14/2007	1.000	RR	02/04/2012	1.006		08/27/2013	0	0	0	0	0.875	U	0.1	09/07/3323	08/27/2014
33.01	BTM	Y *	1.724		06/14/2007	1.718		02/04/2012	1.641		08/27/2013	49.3	13.4	10.6	49.3	1.300	U	49.3	07/27/2020	08/27/2014
37.01	BTM-R	N	1.026		06/14/2007	1.026		02/04/2012	1.026	RR	08/27/2013	0	0	0	0	0.875	U	0.1	09/09/3523	08/27/2014
38.01	BTM-T	N	1.031		06/14/2007	1.007		02/04/2012	1.003		08/27/2013	2.6	4.5	4.7	4.7	0.875	U	4.5	02/05/2042	08/27/2014
41.01	BTM	Y	2.829		06/14/2007	2.719		02/04/2012	2.702		08/27/2013	10.9	20.5	21.2	21.2	2.000	U	20.5	11/25/2047	08/27/2014
43.01	BTM-R	N	1.013		06/14/2007	1.009		02/04/2012	1.009		08/27/2013	0	0.6	0.7	0.7	0.875	U	0.6	12/28/2236	08/27/2014
44.01	BTM	N	1.045		06/14/2007	1.013		02/04/2012	1.013	RR	08/27/2013	0	5.2	5.6	5.6	0.875	U	5.2	03/11/2040	08/27/2014
45.01	BTM-BTM	N	1.026		06/14/2007	1.012		02/04/2012	1.007		08/27/2013	3.2	3.1	3.1	3.2	0.875	U	3.2	11/27/2054	08/27/2014

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

Report Date: 10/21/2013

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

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

Unit: LH-0004
Eq/Circ ID: LH0004-C1
Design Code: S8/D1
Eq Type: VESSEL
Class:
CM RBI:

Description: COIL 1 ON LINE HEATER 1, SN:BS10K2MM-03A

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 : 18.6 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 63.0 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 22.7 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 63.0 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 = 9.0 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 09/05/2022

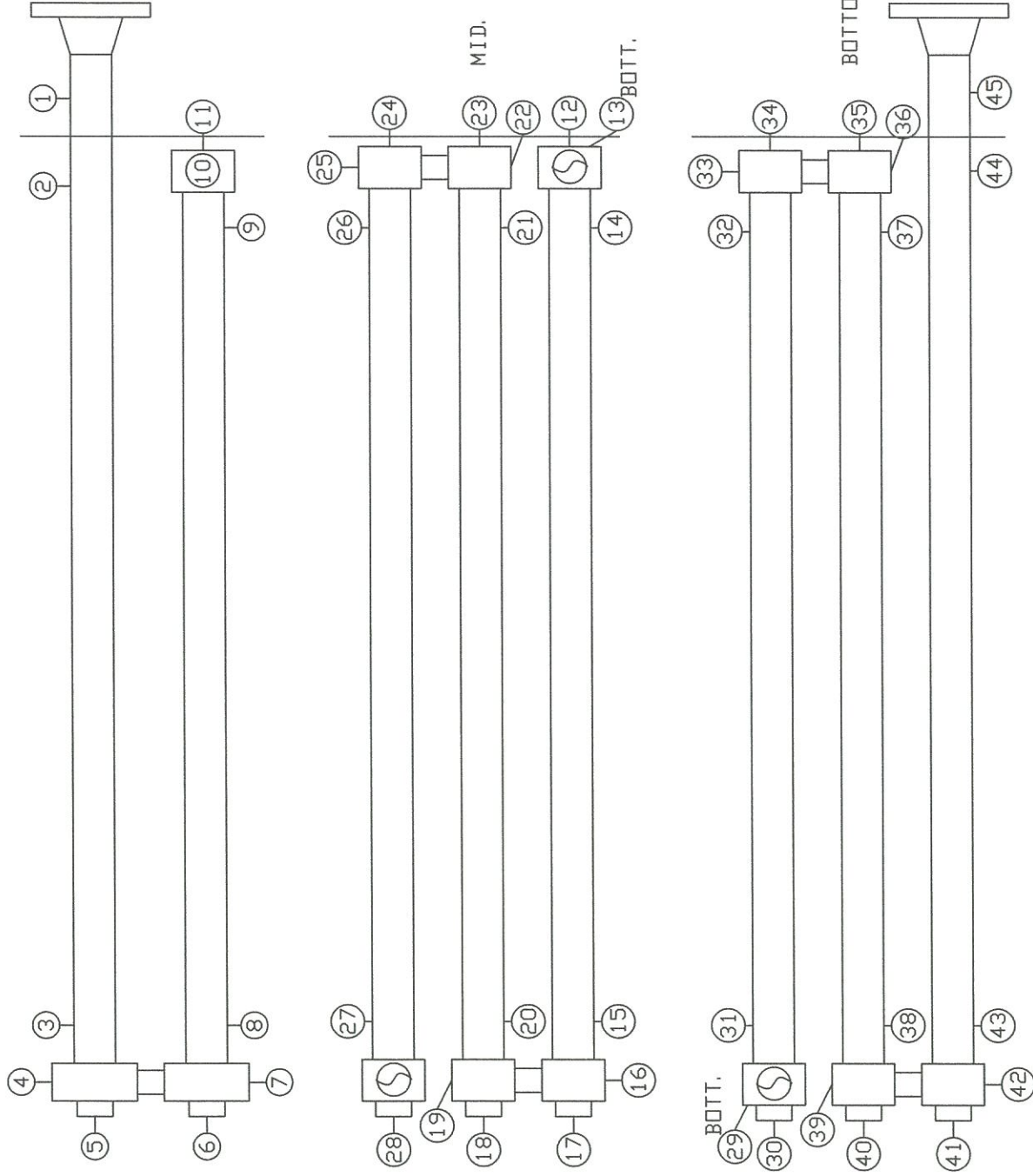
Recommended Eq/Circ UT/RT Inspection Date is 08/27/2014
UT/RT Inspection Interval is 1.00 years.

Caution TML Logic: TML Corrosion Rate > 15.0 MPY .OR. TML Remaining Life < 3.00 Years.
There are 10 Caution TMLs in this Eq/Circ ID.

EQUIP RETIREMENT DATE: 11/1/2022
NEXT INSPECTION IS DUE: 8/27/2014

NAMEPLATE INFO	
MFG	BLUESTAR WELDING
SERIAL NUMBER	BS10K2MM-03B
A NUMBER	514076
DATE BUILT	2005
DESIGN P & T	10,000 psi @ 180°F
NOTE	CRN # ALD-05-001

DM-401



CAL=

PIPE=

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH0004-C2
EQUIP NAME	LINE HEATER (WITH 2 COILS)
DWG #	LH0004-C2

DESC: COIL 2 ON LINE HEATER 1
DWG#: LH0004-C2-1.01-45.01

Corrosion Monitoring Eq. Loc 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: 10/21/2013

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

Unit: LH-0004
Eq/Circ ID: LH0004-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 1, SN:BS10K2MM-03B

Summary: Group Name: Insp. Due Date = 08/27/2014
Pred. Ret. Date = 11/01/2022

Group Description:
RCR = 80.8 MPY
Rem. Life (from last survey 08/27/2013) = 9.2 yrs

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

TML No	Location	Ctn TML	First Survey Thick	First Survey Nt	First Date	Previous Survey Thick	Previous Survey Nt	Previous Date	Last Survey Thick	Last Survey Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
1.01	TOP-B	N	1.019		06/14/2007	1.019 RR	1.019 RR	02/04/2012	1.019		08/27/2013	0	0	0	0	0.875 U	0.1	09/07/3453	08/27/2014
2.01	TOP-T	N	1.006		06/14/2007	1.006 RR	1.006 RR	02/04/2012	1.006		08/27/2013	0	0	0	0	0.875 U	0.1	09/07/3323	08/27/2014
3.01	TOP-L	N	1.004		06/14/2007	1.004 RR	1.004 RR	02/04/2012	1.004		08/27/2013	0	0	0	0	0.875 U	0.1	09/07/3303	08/27/2014
4.01	TOP	N	2.325		06/14/2007	2.314	2.314	02/04/2012	2.314	RR	08/27/2013	0	1.8	1.9	1.9	2.000 U	1.8	02/07/2188	08/27/2014
5.01	TOP	Y *	2.837		06/14/2007	2.837 RR	2.837 RR	02/04/2012	2.417		08/27/2013	269.1	67.7	52.2	269.1	2.000 U	269.1	03/16/2015	08/27/2014
6.01	TOP	Y *	3.300		06/14/2007	2.702	2.702	02/04/2012	2.698		08/27/2013	2.6	97.0	104.3	104.3	2.000 U	97.0	11/06/2020	08/27/2014
7.01	TOP	Y *	2.827		06/14/2007	2.373	2.373	02/04/2012	2.373		08/27/2013	0	73.2	78.8	78.8	2.000 U	73.2	10/01/2018	08/27/2014
8.01	TOP-T	N	1.002		06/14/2007	1.002 RR	1.002 RR	02/04/2012	0.994		08/27/2013	5.1	1.3	1.0	5.1	0.875 U	5.1	12/27/2036	08/27/2014
9.01	TOP-T	N	0.995		06/14/2007	0.995 RR	0.995 RR	02/04/2012	0.994		08/27/2013	0.6	0.2	0.1	0.6	0.875 U	0.6	12/29/2211	08/27/2014
10.01	TOP	N	1.615		06/14/2007	1.615 RR	1.615 RR	02/04/2012	1.615		08/27/2013	0	0	0	0	1.300 U	0.1	09/11/4013	08/27/2014
11.01	TOP	N	2.500 NM		02/24/2005	3.325	3.325	06/14/2007	3.278		08/27/2013	7.6	0	0	7.6	2.000 U	7.6	10/25/2181	08/27/2014
12.01	MID	Y	2.500 NM		02/24/2005	2.766	2.766	06/14/2007	2.634		02/04/2012	28.4	0	0	28.4	2.000 U	28.4	06/02/2034	02/03/2013
14.01	MID-T	N	1.032		06/14/2007	1.013	1.013	02/04/2012	1.005		08/27/2013	5.1	4.4	4.3	5.1	0.875 U	5.1	02/22/2039	08/27/2014
15.01	MID-L	N	1.023		06/14/2007	0.997	0.997	02/04/2012	0.997		08/27/2013	0	4.2	4.5	4.5	0.875 U	4.2	09/14/2042	08/27/2014
16.01	MID	Y *	1.674		06/14/2007	1.598	1.598	02/04/2012	1.538		08/27/2013	38.4	21.9	20.6	38.4	0.875 U	38.4	12/02/2030	08/27/2014
17.01	MID	Y	3.447		06/14/2007	3.297	3.297	02/04/2012	3.278		08/27/2013	12.2	27.2	28.4	28.4	1.300 U	27.2	05/17/2086	08/27/2014
18.01	MID	Y	2.723		06/14/2007	2.723 RR	2.723 RR	02/04/2012	2.691		08/27/2013	20.5	5.2	4.0	20.5	2.000 U	20.5	05/13/2047	08/27/2014
19.01	MID	N	3.248		06/14/2007	3.248 RR	3.248 RR	02/04/2012	3.351		08/27/2013	0	0	0	0	2.000 U	0.1	09/11/4013	08/27/2014
20.01	MID-L	N	1.015		06/14/2007	1.015 RR	1.015 RR	02/04/2012	1.030		08/27/2013	0	0	0	0	0.875 U	0.1	09/09/3563	08/27/2014
21.01	MID-T	N	1.012		06/14/2007	1.012 RR	1.012 RR	02/04/2012	1.012		08/27/2013	0	0	0	0	0.875 U	0.1	09/07/3383	08/27/2014

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

Report Date: 10/21/2013

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

Unit: LH-0004
Eq/Circ ID: LH0004-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 1, SN:BS10K2MM-03B

Summary: Group Name: Insp. Due Date = 08/27/2014
Pred. Ret. Date = 11/01/2022

Group Description:
RGR = 80.8 MPY
Rem. Life (from last survey 08/27/2013) = 9.2 yrs

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

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
25.01	MID	Y	2.188		06/14/2007	2.152		02/04/2012	2.117		08/27/2013	22.4	11.4	10.6	22.4	1.300	22.4	02/16/2050	08/27/2014
26.01	MID-R	N *	1.023		06/14/2007	1.019		02/04/2012	1.004		08/27/2013	9.6	3.1	2.6	9.6	0.875	9.6	02/03/2027	08/27/2014
27.01	MID-R	N	1.005		06/14/2007	1.000		02/04/2012	1.000		08/27/2013	0	0.8	0.9	0.9	0.875	0.8	11/27/2169	08/27/2014
28.01	MID	Y *	3.253		06/14/2007	2.800		02/04/2012	2.789		08/27/2013	7.0	74.8	80.0	80.0	2.000	74.8	03/15/2024	08/27/2014
30.01	BTM	Y	2.944		06/14/2007	2.757		02/04/2012	2.707		08/27/2013	32.0	38.2	38.7	38.7	2.000	38.2	02/29/2032	08/27/2014
31.01	BTM-L	N	1.016		06/14/2007	1.013		02/04/2012	1.013		08/27/2013	0	0.5	0.5	0.5	0.875	0.5	08/29/2289	08/27/2014
32.01	BTM-T	N	1.006		06/14/2007	1.002		02/04/2012	0.998		08/27/2013	2.6	1.3	1.2	2.6	0.875	2.6	12/17/2060	08/27/2014
37.01	BTM-T	N	1.017		06/14/2007	1.001		02/04/2012	1.001		08/27/2013	0	2.6	2.8	2.8	0.875	2.6	02/12/2062	08/27/2014
38.01	BTM-T	N	1.023		06/14/2007	1.005		02/04/2012	1.003		08/27/2013	1.3	3.2	3.4	3.4	0.875	3.2	08/27/2053	08/27/2014
41.01	BTM	Y	2.851		06/14/2007	2.720		02/04/2012	2.702		08/27/2013	11.5	24.0	25.0	25.0	2.000	24.0	11/27/2042	08/27/2014
42.01	BTM	N	2.225		06/14/2007	2.225	RR	02/04/2012	2.278		08/27/2013	0	0	0	0	2.000	0.1	09/11/4013	08/27/2014
43.01	BTM-T	N	0.998		06/14/2007	0.998	RR	02/04/2012	1.015		08/27/2013	0	0	0	0	0.875	0.1	09/07/3413	08/27/2014
44.01	BTM-R	N	1.002		06/14/2007	1.002	RR	02/04/2012	1.012		08/27/2013	0	0	0	0	0.875	0.1	09/07/3383	08/27/2014
45.01	BTM-L	N	1.035		06/14/2007	1.027		02/04/2012	1.027		08/27/2013	0	1.3	1.4	1.4	0.875	1.3	07/31/2130	08/27/2014

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

Report Date: 10/21/2013

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

Unit: LH-0004
Eq/Circ ID: LH0004-C2
Design Code: S8/D1
Eq Type: VESSEL
Class:
CM RBI:

Description: COIL 2 ON LINE HEATER 1, SN:BS10K2MM-03B

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 : 22.3 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 80.8 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 27.2 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 80.8 MPY

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

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

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

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

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

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

Eq/Circ ID Estimated life = 9.2 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 11/01/2022

Recommended Eq/Circ UT/RT Inspection Date is 08/27/2014
UT/RT Inspection Interval is 1.00 years.

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



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

Inspections Performed for: FMC Technologies Completion	
Inspection Report for: LH-0004	
Remaining Life: 20+ YRS	Date of this Report: 08/26/2013
Average Corrosion Rate: .1 MPY	Next Inspection Due Date: 08/26/2014
Manufacturer: Blue Star Welding	Mfg Serial #: BSFGS227
Date Built: 2004	National Board #: None
Alberta registration #: None	Canadian Registration #: OH6510.2

FMC Technologies Completion LH-0004 Line Heater Fuel Gas Scrubber



PRESSURE VESSEL INVENTORY

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

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

VESSEL ID INFORMATION

Company Name : Pure Energy Services (USA) Inc.
Facility/Location Name : Grand Junction District
Field Name :
Equipment Number : LH-0004
Eq/Circ. ID : LH0004-FGS
Equipment Name/Service : (Line Heater) Fuel Gas Scrubber
Physical Location : On LH-0004 in Grand Junction Yard
GPS Coordinates :

VESSEL DESCRIPTION AND SERVICE CONDITIONS

Type of Vessel: Vertical Fuel Gas Scrubber

Vessel Size: 8.625" O.D.

Operating Pressure Range (psig): N/A

Operating Temperature Range (°F): N/A

Does the vessel have Internal Access? ☐ Yes ☒ No

Specify type of internal access, if available:

Vessel is located: ☐ Inside ☒ Outside ☐ Under Roof

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

Is there a Long Seam? ☐ Yes ☐ No

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

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

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

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
R MANU 2004
A-NUMBER
SERIAL NO. BSFGS 227
DESIGN PRESSURE 150 PSI
DESIGN TEMP. -20°F / 100°F
SHELL THICKNESS
HEAD THICKNESS
REG. DESIGN NO.
STRESS RELIEVED NO
X-RAY NO
DERATED NO
HYDRO TEST NO
INSPECTOR
CRN NO.

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: Eric Crandall Date: 02/04/2012

API 510 PRESSURE VESSEL EXTERNAL INSPECTION REPORT

Company Name: FMC Technologies Completion	
Field/Location: PA District	
Equipment Number: LH-0004	Eq/Circ. ID: LH0004-FGS
Equipment Name/Service: Fuel Gas Scrubber	
Physical Location: Canonsburg Yard	
Manufacturer: Blue Star Welding	Manufacturer Serial Number: BSFGS227
Year Built: 2004	National board #: None
Alberta Registration #: None	Canadian Registration # : 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. Nameplate is in acceptable condition.

Internal Access?: No

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

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

Condition of Foundation and Anchor Bolts: Anchor bolts are in place and secure. Vessel has a flat bottom head which also serves as a baseplate anchored to another baseplate welded to the skid. All Attachment welds appear sound.

Condition of Steel Supports, Saddles, and Bolting: The vessel baseplate/ flat bottom head has light surface corrosion but free from distortion.

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

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

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

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

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

Is There a PSV on the Vessel? Yes

If Yes, is it set at or below the MAWP? Yes, Set at 150 psi

Date PSV last tested (if there is a tag on the valve): On 1/30/13 - Tested by Well mark

Comments:

None.

Recommendations:

None.

Repairs Needed:

None.

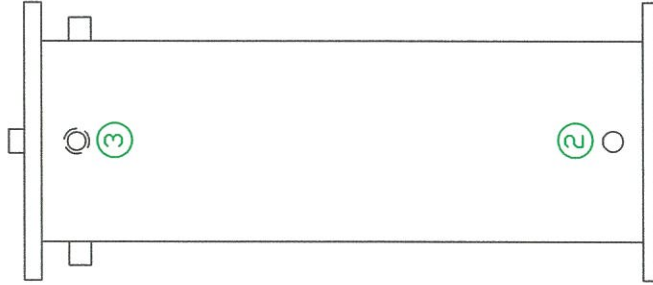
API 510 Inspector Signature
Robert W. Menke/EAC

API 510 Inspector Number
0131

Date
08/26/2013

EQUIP RETIREMENT DATE: 11/19/2039
NEXT INSPECTION IS DUE: 8/27/2014

- #2. 01- BTM SH-FRONT 0. 313 TC
- #2. 02- BTM SH-LEFT 0. 319 TC
- #2. 03- BTM SH-BACK 0. 326 TC
- #2. 04- BTM SH-RIGHT 0. 330 TC
- #3. 01- TOP SH-FRONT 0. 325 TC
- #3. 02- TOP SH-LEFT 0. 304 TC
- #3. 03- TOP SH-BACK 0. 306 TC
- #3. 04- TOP SH-RIGHT 0. 327 TC



TC-560

NAMEPLATE INFO

MFG	BLUESTAR WELDING
SERIAL NUMBER	BSFGS227
NATIONAL BOARD #	NONE
DATE BUILT	2004
DESIGN P & T	150 PSIG @ 100°F
NOTE	CRN # DH 6510.2 NO "U" STAMP

CAL= VESSEL=

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH0004-FGS
EQUIP NAME	FUEL GAS SCRUBBER
LOCATION	DN LH-0004 IN YARD
DWG #	LH0004-FGS

DESC: FUEL GAS SCRUBBER
DWG#: LH0004-FGS-2.01-3.04

Corrosion Monitoring Equipment ID Analysis Report

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

Report Date: 10/21/2013

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

Unit: LH-0004
Eq/Circ ID: LH0004-FGS
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 LH0004, SN:BSFGS227
(8.625" PIPE)-FLAT HEADS, SHELL UT ONLY

Summary: Group Name: Insp. Due Date = 08/27/2014
Pred. Ret. Date = 11/19/2039

Group Description:
RCR = 0.1 MPY
Rem. Life (from last survey 08/27/2013) = 26.2 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	BTM SH-FRONT	N *	0.322 NM	0.322 NM	06/01/2004	0.313 TC	0.313 TC	02/04/2012	0.313 TC	0.313 TC	08/27/2013	0	1.0	1.0	1.2	0.282 U	1.0	08/27/2044	08/27/2014
2.02	BTM SH-LEFT	N *	0.322 NM	0.322 NM	06/01/2004	0.320 TC	0.320 TC	02/04/2012	0.319 TC	0.319 TC	08/27/2013	0.6	0.3	0.3	0.6	0.282 U	0.6	04/28/2075	08/27/2014
2.03	BTM SH-BACK	N *	0.322 NM	0.322 NM	06/01/2004	0.331 TC	0.331 TC	02/04/2012	0.326 TC	0.326 TC	08/27/2013	3.2	0	0	3.2	0.282 U	3.2	05/28/2027	08/27/2014
2.04	BTM SH-RIGHT	N *	0.322 NM	0.322 NM	06/01/2004	0.333 TC	0.333 TC	02/04/2012	0.330 TC	0.330 TC	08/27/2013	1.9	0	0	1.9	0.282 U	1.9	12/01/2038	08/27/2014
3.01	TOP SH-FRONT	N	0.322 NM	0.322 NM	06/01/2004	0.325 TC	0.325 TC	02/04/2012	0.325 TC	0.325 TC	08/27/2013	0	0	0	0	0.282 U	0.1	08/31/2443	08/27/2014
3.02	TOP SH-LEFT	N *	0.322 NM	0.322 NM	06/01/2004	0.305 TC	0.305 TC	02/04/2012	0.304 TC	0.304 TC	08/27/2013	0.6	1.9	2.0	2.2	0.282 U	1.9	03/26/2025	08/27/2014
3.03	TOP SH-BACK	N *	0.322 NM	0.322 NM	06/01/2004	0.306 TC	0.306 TC	02/04/2012	0.306 TC	0.306 TC	08/27/2013	0	1.7	1.8	2.1	0.282 U	1.7	10/09/2027	08/27/2014
3.04	TOP SH-RIGHT	N	0.322 NM	0.322 NM	06/01/2004	0.327 TC	0.327 TC	02/04/2012	0.327 TC	0.327 TC	08/27/2013	0	0	0	0	0.282 U	0.1	08/31/2463	08/27/2014

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

Report Date: 10/21/2013

(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-0004
Eq/Circ ID: LH0004-FGS
Design Code: S8/D1
Eq Type: VESSEL
Class:
CM RBI:

Description: FUEL GAS SCRUBBER ON LH0004, SN:BSFGS227
(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 = 26.2 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 11/19/2039

Recommended Eq/Circ UT/RT Inspection Date is 08/27/2014
UT/RT Inspection Interval is 1.00 years.

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

API 570 Piping External Inspection

Company Name: FMC Technologies Completion	Facility Name: PA District
Line Name/Number: Coil # 1 & 2 LH-0004 Alberta # 514075	
Size/Sched. Of Pipe: 4.500"	Eq/Circ. ID:
Service/System:	Piping Class ☐ 1 ☒ 2 ☐ 3 ☐ Other
Design Pressure: 10,000 psi Design Temperature: 180° F	Materials: ☒ CS ☐ SS ☐ Other Note Stamping (If Any)
P&ID#:	Flange Rating: 1000 #

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

☒ Scheduled API-570 External Inspection. ☐ Other:

Testing Performed:

☒ Visual ☒ UT ☐ PT ☐ MT ☐ Other:

Comments:

Insulation Observations:

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

Comments:

Coating Condition:

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

Comments:

Heavy surface corrosion to the point of scale build up. Light pitting present as well.

Loss of Containment:

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

Comments:

Line heater was no in service during this inspection.

Condition of Welds:

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

Comments:

All associated welds appear sound.

Relief Device:

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

Comments:**Supports/Hangers:**

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

Comments:

All supports are in acceptable condition. All tubesheets are in acceptable condition.

Flanged Connections:

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

Comments:

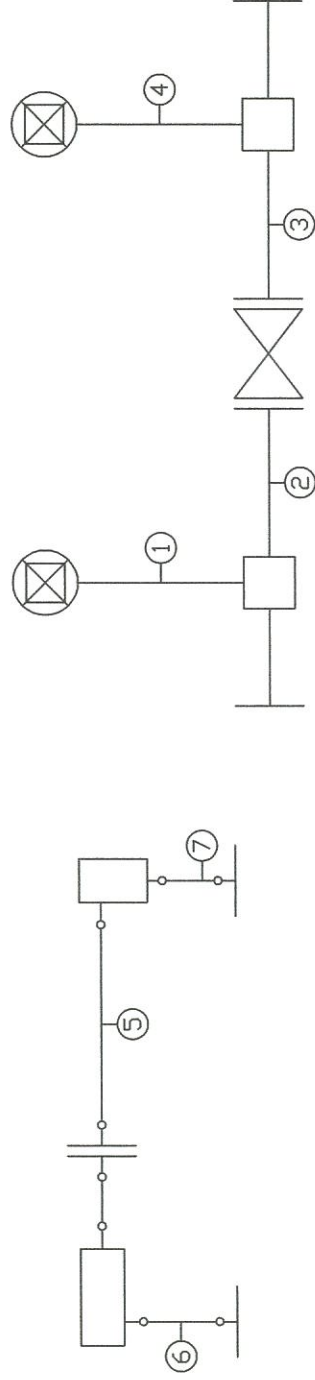
Flanges are in good condition with no surface corrosion.

Mechanical Observations:

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

Comments:

EQUIP RETIREMENT DATE: 12/28/2129
NEXT INSPECTION IS DUE: 8/27/2014



- #1. 01- STR-R 0. 738
- #2. 01- STR-BTM 0. 724
- #3. 01- STR-TOP 0. 761
- #4. 01- STR-L 0. 709
- #5. 01- STR-BK 0. 707
- #6. 01- STR 0. 731
- #7. 01- STR-F 0. 723

CAL= PIPE=

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	LH-0004
EQUIP NAME	LH0004-P
DWG #	LH0004-P

FH2E-D

DESC: ASSOCIATED PIPING ON LINE HEATER 1
DWG#: LH0004-P-1.01-7.01

Corrosion Monitoring Equipment ID Analysis Report

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

Report Date: 10/21/2013

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

Unit: LH-0004
Eq/Circ ID: LH0004-P
Eq Type: VESSEL
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 1

Summary: Group Name: Insp. Due Date = 08/27/2014
Pred. Ret. Date = 12/28/2129

Group Description:
RCR = 9.6 MPY
Rem. Life (from last survey 08/27/2013) = 116.3 yrs

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

TML No	Location	Ctn	First Survey Thick	First Survey Nt	First Date	Previous Survey Thick	Previous Survey Nt	Previous Date	Last Survey Thick	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
1.01	STR-R	N *	0.761		06/14/2007	0.751		02/04/2012	0.738	08/27/2013	8.3	3.7	3.4	8.3	0.260	P	8.3 03/24/2071	08/27/2014
2.01	STR-BTM	N *	0.768		06/14/2007	0.741		02/04/2012	0.724	08/27/2013	10.9	7.1	6.8	10.9	0.260	P	10.9 03/17/2056	08/27/2014
3.01	STR-TOP	N *	0.774		06/14/2007	0.765		02/04/2012	0.761	08/27/2013	2.6	2.1	2.1	2.6	0.260	P	2.6 04/18/2206	08/27/2014
4.01	STR-L	N *	0.718		06/14/2007	0.718		02/04/2012	0.709	08/27/2013	5.8	1.5	1.1	5.8	0.260	P	5.8 01/16/2091	08/27/2014
5.01	STR-BK	N *	0.724		06/14/2007	0.709		02/04/2012	0.707	08/27/2013	1.3	2.7	2.9	3.2	0.260	P	2.7 02/27/2179	08/27/2014
6.01	STR	N *	0.749		06/14/2007			N/A	0.731	08/27/2013	N/A	2.9	N/A	2.9	0.260	P	2.9 01/08/2176	08/27/2014
7.01	STR-F	N	0.732		06/14/2007	0.724		02/04/2012	0.723	08/27/2013	0.6	1.5	1.5	1.7	0.260	P	1.5 03/26/2322	08/27/2014

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

Report Date: 10/21/2013

Unit: LH-0004
 Eq/Circ ID: LH0004-P
 Design Code: B31.3
 Eq Type: VESSEL
 Class:
 CM RBI:

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

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

Description: ASSOCIATED PIPING ON LINE HEATER 1

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 : 5.0 MPY
 (B) -- Average Max 25.0% of TMLs, Min of 2 : 9.6 MPY
 (C) -- Formula Corrosion Rate (Sigma = 1.28) : 7.4 MPY
 (D) -- Default Corrosion Rate : 0.1 MPY
 Representative Corrosion Rate = 9.6 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 = 116.3 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 12/28/2129

Recommended Eq/Circ UT/RT Inspection Date is 08/27/2014
 UT/RT Inspection Interval is 1.00 years.

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