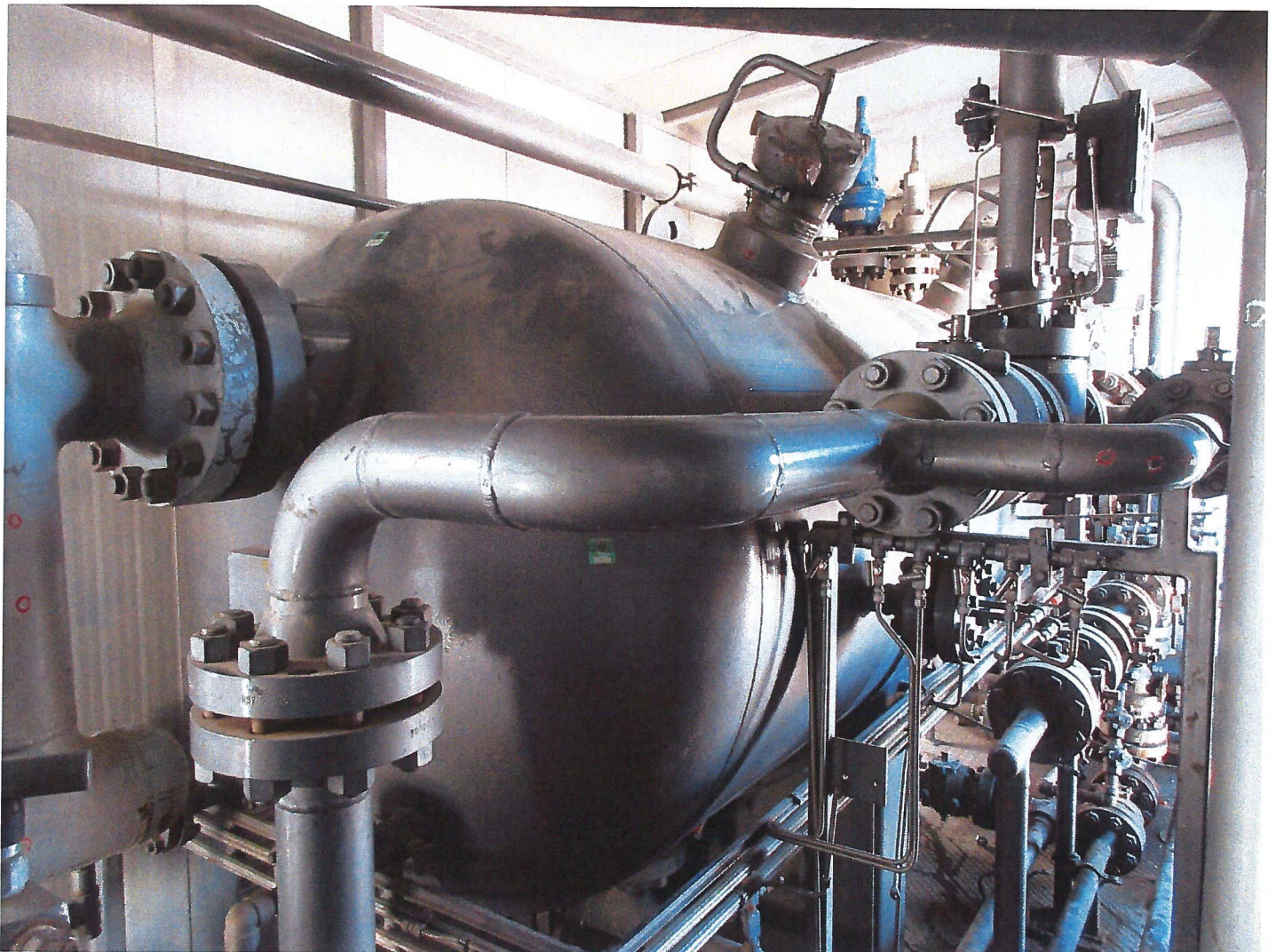




1595 So. Hwy 150, Suite F  
Evanston, WY 82930

<b>Inspections Performed for:</b> FMC Technologies Completion – Grand Junction	
<b>Inspection Report for:</b> HS-0026 Separator	
<b>Remaining Life:</b> 19 YRS	<b>Date Last Inspected:</b> 09/25/2018
<b>Representative Corrosion Rate:</b> 8.3 MPY	<b>Next UT:</b> 09/25/2019 <b>Next VT:</b> 09/25/2019
<b>Manufacturer:</b> Micoda Process Systems	<b>Manufacturer Serial #:</b> 1182
<b>Year Built:</b> 2005	<b>National Board #:</b> 6
<b>Alberta Registration #:</b> 524558	<b>Canadian Registration #:</b> R9975.2

**HS-0026 Separator**



## PRESSURE VESSEL INVENTORY

Code                       Code-invalidated                       Non-Code                       Unknown                       Code-Exempt

### VESSEL ID INFORMATION

Company Name : Pure Energy Services (USA) Inc.  
Facility/Location Name : Grand Junction, CO  
Field Name :  
Equipment Number : HS-0026  
Eq/Circ. ID : HS0026-SEP  
Equipment Name/Service : Horizontal Separator  
Physical Location : In Grand Junction Yard  
GPS Coordinates :

### VESSEL DESCRIPTION AND SERVICE CONDITIONS

**Type of Vessel:** Horizontal Separator

**Vessel Size:** 50"

**Operating Pressure Range (psig):** 650 psi

**Operating Temperature Range (°F):** No gauge

**Does the vessel have Internal Access?** Yes

**Specify type of internal access, if available:** Manway

**Vessel is located:** Inside

**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

## ORIGINAL VESSEL NAMEPLATE/STAMPING INFORMATION

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

		<i>Manufactured and Certified by</i>			
				<i>Process Systems</i> <i>Nisku, AB, Canada</i>	
MAWP	INTERNAL	285	PSI @	100	
SERIAL NUMBER	1226	MDMT	-20	°F @	285
YEAR	2005	MAWP		PSI @	
EXTERNAL					
DESCRIPTION	F.G. SCRUBBER			VOL	104
SHELL MATERIAL	SA 106-B	THICKNESS	0.322		
HEAD MATERIAL	SA 516-70N	THICKNESS	0.625		
	011 4373.2	CA	0.0625		

**SUPPLEMENTAL VESSEL NAMEPLATE/STAMPING INFORMATION**

Repair stamp:

R stamp

Other Stamp

No stamp



**Coil Nameplate**

**VESSEL DOCUMENTATION**

- ASME U-1 or U-1A Forms
- U2 & U4 Supplemental Forms

Name: Robert W. Menke

Date: 03/23/2012

**\*Revised 2/2016**

## API 510 PRESSURE VESSEL EXTERNAL INSPECTION FORM

<b>Company Name:</b> FMC Technologies Completion	
<b>Field/Location:</b> Grand Junction	
<b>Equipment Number:</b> HS-0026	<b>Eq/Circ. ID:</b> HS0026-SEP
<b>Equipment Name/Service:</b> Horizontal Separator	
<b>Physical Location:</b> GR 14-28 Pad	
<b>Manufacturer:</b> Micoda Process Systems Inc.	<b>Manufacturer Serial #:</b> 1182
<b>Year Built:</b> 2005	<b>National Board #:</b> 6
<b>Alberta Registration #:</b> 524558	<b>Canadian Registration #:</b> R9975.2

**Reason for Inspection:** Scheduled API-510 External Inspection.

**Condition of Nameplate and/or Bracket:** The nameplate is intact. Nameplate bracket is securely attached. The stamping is legible but the painted wording has completely worn off.

**Internal Access?** Yes

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

**Grounding Device in Place and Secure?** N/A

**Condition of Foundation and Anchor Bolts:** There are no anchor bolts. The (2) vertical support baseplates are welded to the skid/trailer. Baseplate-to-deck/frame attachment welds appear sound. (2) support saddles are welded to skid and deck plate.

**Condition of Steel Supports, Saddles, and Bolting:** The support structural welds appear sound. The accessible support saddle-to-shell attachment welds have no visual weld defects. All welds appear full and uniform. There is light chipping and peeling on (2) saddles.

**Condition of Paint and/or Insulation:** The paint is in acceptable condition with minor localized chipping and peeling. There is no insulation.

**Condition of Nozzles, Flanges, Repads, and Weepholes:** Nozzles and flanges are in good condition. All flange bolting is in place and secure. Light chipping and peeling on multiple flanges and nozzles. There are no threaded connections. Vessel is not in service. There is light surface corrosion on the bolts.

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

**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?** There are (2) PSVs **Settings** 2000/ 2160 psi

**Date PSV last tested (if there is a tag on the valve):** 11/2015

**Comments:**

There are (2) PSVs.

**Recommendations:**

The vessel appears to be in acceptable condition.

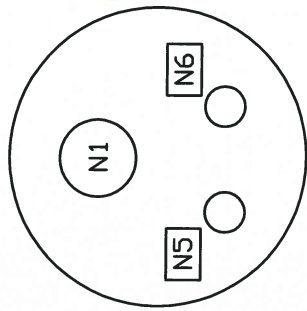
**Repairs Needed:**

Robert W. Menke/BGW/MK  
**API 510 Inspector Signature**

0131  
**API 510 Inspector Number**

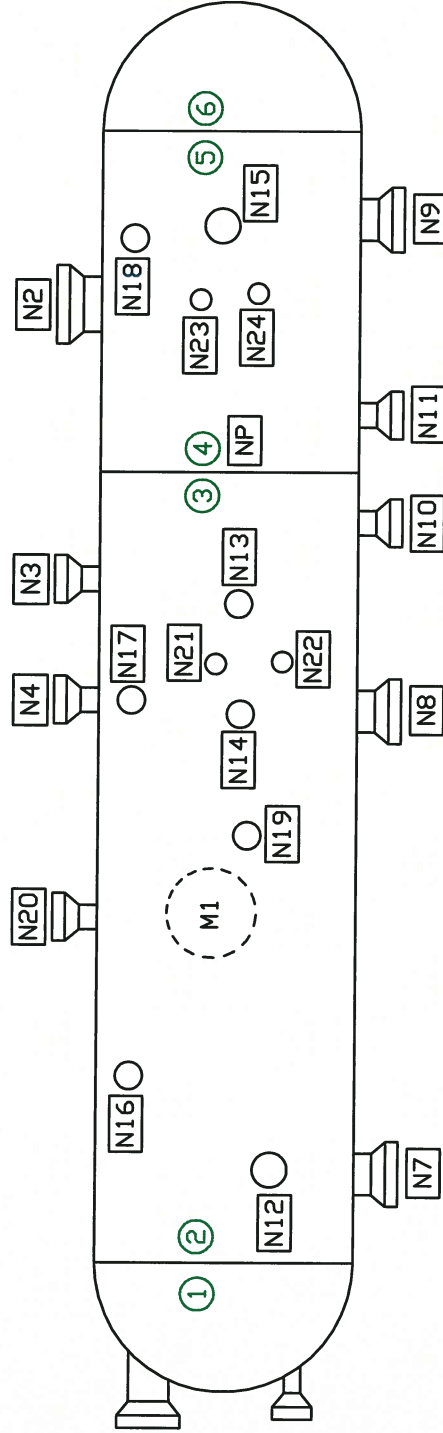
09/25/2018  
**Date**

**EQUIP RETIREMENT DATE: 9/28/2037**  
**NEXT INSPECTION IS DUE: 9/25/2019**



LEFT HEAD

- #1. 01- NZ END-FRONT 2. 970 TC #3. 01- SHELL-FRONT 3. 013 TC #5. 01- SHELL-FRONT 3. 013 TC
- #1. 02- NZ END-BOTTOM 2. 969 TC #3. 02- SHELL-BOTTOM 3. 010 TC #5. 02- SHELL-BOTTOM 3. 024 TC
- #1. 03- NZ-END-BACK 2. 959 TC #3. 03- SHELL-BACK 3. 016 TC #5. 04- SHELL-TOP 3. 000 TC
- #1. 04- NZ-END-TOP 3. 007 TC #3. 04- SHELL-TOP 3. 020 TC #6. 01- END-FRONT 2. 959 TC
- #2. 01- SHELL-FRONT 3. 014 TC #4. 01- SHELL-FRONT 3. 020 TC #6. 02- END-BOTTOM 2. 984 TC
- #2. 02- SHELL-BOTTOM 3. 023 TC #4. 02- SHELL-BOTTOM 3. 017 TC #6. 03- END-BACK 2. 972 TC
- #2. 03- SHELL-BACK 3. 020 TC #4. 03- SHELL-BACK 3. 020 TC #6. 04- END-TOP 2. 950 TC
- #2. 04- SHELL-TOP 3. 034 TC #4. 04- SHELL-TOP 3. 011 TC



TC-560

NAMEPLATE INFO	
MFG	MICODDA PROCESS SYSTEMS
SERIAL NUMBER	1182
NATIONAL BOARD #	6
DATE BUILT	2005
DESIGN P & T	2000 psi @ 200°F
NOTE	ALBERTA REG # 524558 CRN # R9975.2

- #101. 01- N-1 INLET-TOP 2. 455 TC
- #101. 02- N-1 INLET-LEFT 2. 458 TC
- #101. 03- N-1 INLET-BTM 2. 455 TC
- #101. 04- N-1 INLET-RIGHT 2. 453 TC
- #102. 01- N-2 OUTLET-FRONT 2. 430 DC
- #102. 02- N-2 OUTLET-LEFT 2. 457 DC
- #102. 03- N-2 OUTLET-BACK 2. 470 DC
- #102. 04- N-2 OUTLET-RIGHT 2. 441 DC
- #103. 01- N-3 PSV-1-FRONT 0. 308 DC
- #103. 02- N-3 PSV-1-BACK 0. 323 TC
- #103. 03- N-3 PSV-2-FRONT 0. 306 TC
- #104. 01- N-4 PSV-2-BACK 0. 314 TC
- #105. 01- N-5STMCOIL-F-TOP 0. 415 TC
- #105. 02- N-5STMCOIL-F-BTM 0. 410 TC
- #106. 01- N-6STMCOIL-BK-T 0. 404 TC
- #106. 02- N-6STMCOIL-BK-B 0. 420 TC
- #107. 01- N-7SLDSDRAIN-F 1. 772 DC
- #107. 02- N-7SLDSDRAIN-L 1. 775 DC
- #107. 03- N-7SLDSDRAIN-R 1. 780 DC
- #107. 04- N-7SLDSDRAIN-R 1. 780 DC
- #108. 01- N-8 H2ODRAIN-BK 1. 555 TC
- #108. 02- N-8 H2ODRAIN-RGT 1. 532 TC

- #109. 01- N-9-OIL DUT-FR 1. 540 TC
- #110. 02- N-10 H2O DUT-L 0. 304 TC
- #110. 03- N-10 H2O DUT-BK 0. 286 TC
- #110. 04- N-10 H2O DUT-R 0. 309 TC
- #111. 02- N-11-OILDR-L 0. 335 TC
- #111. 03- N-11-OILDR-BK 0. 316 TC
- #112. 01- N-12-SPARGE-TOP 0. 333 TC
- #112. 02- N-12-SPARGE-BTM 0. 307 DC
- #113. 01- N-13-TOP 0. 295 DC
- #113. 02- N-13-BTM 0. 322 DC
- #114. 01- N-14-WATER LC-T 1. 562 TC
- #114. 02- N-14-WATER LC-L 1. 507 TC
- #114. 03- N-14-WATER LC-R 1. 562 TC
- #115. 01- N-15-OIL-LC-TOP 1. 545 TC
- #115. 02- N-15-OIL-LC-L 1. 532 TC
- #115. 03- N-15-OIL-LC-BTM 1. 540 TC
- #115. 04- N-15-OIL-LC-R 1. 540 TC
- #116. 01- N-16-CLEANING-F 2. 084 DC
- #116. 02- N-16-CLEANING-L 2. 076 DC
- #116. 03- N-16-CLEANING-BK 2. 078 DC
- #116. 04- N-16-CLEANING-R 2. 079 DC
- #117. 01- N-17-CLEANING-F 2. 082 DC
- #117. 02- N-17-CLEANING-L 2. 082 DC
- #117. 03- N-17-CLEANING-BK 2. 084 DC
- #117. 04- N-17-CLEANING-R 2. 082 DC

- #118. 01- N-18-CLEANING-F 2. 082 DC
- #118. 02- N-18-CLEANING-L 2. 079 DC
- #118. 03- N-18-CLEANING-BK 2. 080 DC
- #118. 04- N-18-CLEANING-R 2. 080 DC
- #119. 01- N-19 TI-TOP 0. 334 TC
- #119. 02- N-19 TI-BTM 0. 324 TC
- #120. 01- N-20 PI-FRONT 0. 332 TC
- #120. 02- N-20 PI-BACK 0. 334 TC
- #121. 01- N-21-H2OLG-TOP 0. 320 TC
- #121. 02- N-21-H2OLG-BTM 0. 327 TC
- #122. 01- N-22-H2OLG-TOP 0. 330 DC
- #122. 02- N-22-H2OLG-BTM 0. 330 DC
- #123. 01- N-23-OIL-LG-TOP 0. 336 TC
- #123. 02- N-23-OIL-LG-BTM 0. 309 TC
- #124. 01- N-24-OIL-LG-TOP 0. 333 TC
- #124. 02- N-24-OIL-LG-BTM 0. 327 TC
- #125. 01- MW-1-TOP 2. 992 TC
- #125. 02- MW-1-LEFT 2. 988 TC
- #125. 03- MW-1-BTM 2. 984 TC
- #125. 04- MW-1-RIGHT 2. 988 TC

CAL BLK 81°F

VESSEL 70°F

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	HS0026-SEP
EQUIP NAME	SEPARATOR
LOCATION	DN SKID HS-0026
DWG #	HS0026-SEP

DESC: HORIZONTAL SEPARATOR-SN:1182

DWG#: HS0026-SEP-1.01-125.04

**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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: HS0026-SEP  
 Eq Type: VESSEL  
 Class:  
 CM RBI:  
 Design Code: S8/D1

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 2000 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 HORIZONTAL SEPARATOR; SN: 1182

Summary: Group Name: Insp. Due Date = 09/25/2019  
 Pred. Ret. Date = 09/28/2037

Group Description: RCR = 8.3 MPY  
 Rem. Life (from last survey 09/25/2018) = 19.0 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	NZ END-FRONT	N	2.971	08/14/2006	2.956 RR	02/15/2016	2.970 TC	09/25/2018	0	0.1	0.8	10.0	2.844 S	0.1	10/04/3278	09/25/2019
1.02	NZ END-BOTTOM	N	2.981	08/14/2006	2.971 RR	02/15/2016	2.969 TC	09/25/2018	0.8	1.0	1.1	7.0	2.844 S	1.0	09/26/2143	09/25/2019
1.03	NZ-END-BACK	N	2.966	08/14/2006	2.966 RR	02/15/2016	2.959 TC	09/25/2018	2.7	0.6	0.4	4.5	2.844 S	2.7	04/29/2061	09/25/2019
1.04	NZ-END-TOP	N	3.011	08/14/2006	3.005 RR	02/15/2016	3.007 TC	09/25/2018	0	0.3	0.5	5.6	2.844 S	0.3	01/29/2562	09/25/2019
2.01	SHELL-FRONT	N	3.023	08/14/2006	3.022 RR	02/15/2016	3.014 TC	09/25/2018	3.1	0.7	0.5	3.3	2.875 S	3.1	07/28/2063	09/25/2019
2.02	SHELL-BOTTOM	N	3.033	08/14/2006	3.026 RR	02/15/2016	3.023 TC	09/25/2018	1.1	0.8	1.0	6.7	2.875 S	1.1	04/13/2153	09/25/2019
2.03	SHELL-BACK	N	3.034	08/14/2006	3.021 RR	02/15/2016	3.020 TC	09/25/2018	0.4	1.2	1.3	6.0	2.875 S	1.2	07/27/2139	09/25/2019
2.04	SHELL-TOP	N	3.046	08/14/2006	3.043 RR	02/15/2016	3.034 TC	09/25/2018	3.4	1.0	0.7	6.7	2.875 S	3.4	07/01/2065	09/25/2019
3.01	SHELL-FRONT	N	3.023	08/14/2006	3.020 RR	02/15/2016	3.013 TC	09/25/2018	2.7	0.8	0.6	2.7	2.875 S	2.7	11/04/2069	09/25/2019
3.02	SHELL-BOTTOM	N	3.022	08/14/2006	3.022 RR	02/15/2016	3.010 TC	09/25/2018	4.6	1.0	0.5	4.6	2.875 S	4.6	01/30/2048	09/25/2019
3.03	SHELL-BACK	N	3.019	08/14/2006	3.017 RR	02/15/2016	3.016 TC	09/25/2018	0.4	0.2	0.3	2.0	2.875 S	0.4	03/30/2371	09/25/2019
3.04	SHELL-TOP	N *	3.034	08/14/2006	3.037 TC	02/15/2016	3.020 TC	09/25/2018	6.5	1.2	0.2	6.5	2.875 S	6.5	01/15/2041	09/25/2019
4.01	SHELL-FRONT	N	3.031	08/14/2006	3.027 RR	02/15/2016	3.020 TC	09/25/2018	2.7	0.9	0.7	3.3	2.875 S	2.7	06/08/2072	09/25/2019
4.02	SHELL-BOTTOM	N	3.024	08/14/2006	3.018 RR	02/15/2016	3.017 TC	09/25/2018	0.4	0.6	0.6	3.0	2.875 S	0.6	05/28/2255	09/25/2019
4.03	SHELL-BACK	N	3.029	08/14/2006	3.025 RR	02/15/2016	3.020 TC	09/25/2018	1.9	0.7	0.6	2.2	2.875 S	1.9	01/18/2095	09/25/2019
4.04	SHELL-TOP	N *	3.023	08/14/2006	3.030 RR	02/15/2016	3.011 TC	09/25/2018	7.3	1.0	0.1	7.3	2.875 S	7.3	05/13/2037	09/25/2019
5.01	SHELL-FRONT	N	3.022	08/14/2006	3.017 RR	02/15/2016	3.013 TC	09/25/2018	1.5	0.7	0.5	2.0	2.875 S	1.5	09/26/2110	09/25/2019
5.02	SHELL-BOTTOM	N	3.037	08/14/2006	3.035 RR	02/15/2016	3.024 TC	09/25/2018	4.2	1.1	0.6	4.2	2.875 S	4.2	03/18/2054	09/25/2019
5.04	SHELL-TOP	N	3.015	08/14/2006	3.011 TC	02/15/2016	3.000 TC	09/25/2018	4.2	1.2	0.6	11.2	2.875 S	4.2	06/30/2048	09/25/2019
6.01	END-FRONT	N	2.969	08/14/2006	2.971 RR	02/15/2016	2.959 TC	09/25/2018	4.6	0.8	0.2	4.6	2.844 S	4.6	09/25/2043	09/25/2019



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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: HS0026-SEP  
 Eq Type: VESSEL  
 Class: CM RBI:  
 Design Code: S8/D1

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 2000 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 HORIZONTAL SEPARATOR; SN: 1182

Summary: Group Name: Insp. Due Date = 09/25/2019  
 Pred. Ret. Date = 09/28/2037

Group Description: RCR = 8.3 MPY  
 Rem. Life (from last survey 09/25/2018) = 19.0 yrs

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

TM L 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	TM L Retirement Date	TM L Inspection Date
6.02	END-BOTTOM	N	2.989	08/14/2006	2.991 RR	02/15/2016	2.984 TC	09/25/2018	2.7	0.4	0.1	2.7	2.844 S	2.7	08/02/2070	09/25/2019
6.03	END-BACK	N	2.980	08/14/2006	2.973 RR	02/15/2016	2.972 TC	09/25/2018	0.4	0.7	0.6	5.0	2.844 S	0.7	08/06/2201	09/25/2019
6.04	END-TOP	N *	2.959	08/14/2006	2.965 TC	02/15/2016	2.950 TC	09/25/2018	5.7	0.7	0	5.7	2.844 S	5.7	04/30/2037	09/25/2019
101.01	N-1 INLET-TOP	N	2.462	08/14/2006	2.456 RR	02/15/2016	2.455 TC	09/25/2018	0.4	0.6	0.5	1113.6	2.031 U	0.6	06/01/2725	09/25/2019
101.02	N-1 INLET-LEFT	N	2.470	08/14/2006	2.463 RR	02/15/2016	2.458 TC	09/25/2018	1.9	1.0	0.7	1105.8	2.031 U	1.9	06/23/2243	09/25/2019
101.03	N-1 INLET-BTM	N	2.473	08/14/2006	2.462 RR	02/15/2016	2.455 TC	09/25/2018	2.7	1.5	1.2	1115.8	2.031 U	2.7	10/10/2175	09/25/2019
101.04	N-1 INLET-RIGHT	N	2.462	08/14/2006	2.457 RR	02/15/2016	2.453 TC	09/25/2018	1.5	0.7	0.7	1119.1	2.031 U	1.5	01/27/2300	09/25/2019
102.01	N-2 OUTLET-FRONT	N	2.446	08/14/2006	2.445 RR	02/15/2016	2.430 TC	09/25/2018	5.7	1.3	0.9	5.7	2.031 U	5.7	09/25/2088	09/25/2019
102.02	N-2 OUTLET-LEFT	N	2.473	08/14/2006	2.470 RR	02/15/2016	2.457 TC	09/25/2018	5.0	1.3	0.9	5.0	2.031 U	5.0	12/08/2103	09/25/2019
102.03	N-2 OUTLET-BACK	N	2.484	08/14/2006	2.455 RR	02/15/2016	2.470 TC	09/25/2018	0	1.2	2.1	25.1	2.031 U	1.2	07/29/2384	09/25/2019
102.04	N-2 OUTLET-RIGHT	N	2.457	08/14/2006	2.460 RR	02/15/2016	2.441 TC	09/25/2018	7.3	1.3	0.4	7.3	2.031 U	7.3	11/24/2074	09/25/2019
103.01	N-3 PSV-1-FRONT	N	0.319 AR	08/14/2006	0.320 TC	02/15/2016	0.308 TC	09/25/2018	4.6	0.9	0.4	4.6	0.176 U	4.6	06/06/2047	09/25/2019
103.03	N-3 PSV-1-BACK	N	0.320 AR	08/14/2006	0.323 RR	02/15/2016	0.323 TC	09/25/2018	0	0	0	1.0	0.176 U	0.1	10/06/3488	09/25/2019
104.01	N-4 PSV-2-FRONT	N	0.328 AR	08/14/2006	0.312 RR	02/15/2016	0.306 TC	09/25/2018	2.3	1.8	1.8	2.8	0.176 U	2.3	04/04/2075	09/25/2019
104.03	N-4 PSV-2-BACK	N	0.331 AR	08/14/2006	0.326 RR	02/15/2016	0.314 TC	09/25/2018	4.6	1.4	0.9	5.6	0.176 U	4.6	09/25/2048	09/25/2019
105.01	N-5STMCOIL-F-TOP	N	0.439 AR	08/14/2006	0.410 RR	02/15/2016	0.415 TC	09/25/2018	0	2.0	2.7	22.3	0.257 U	2.0	09/25/2097	09/25/2019
105.03	N-5STMCOIL-F-BTM	N	0.425 AR	08/14/2006	0.413 RR	02/15/2016	0.410 TC	09/25/2018	1.1	1.2	1.1	8.5	0.257 U	1.2	03/27/2146	09/25/2019
106.01	N-6STMCOIL-BK-T	N	0.420 AR	08/14/2006	0.410 RR	02/15/2016	0.404 TC	09/25/2018	2.3	1.3	1.3	4.8	0.257 U	2.3	08/24/2082	09/25/2019
106.03	N-6STMCOIL-BK-B	N	0.435 AR	08/14/2006	0.420 RR	02/15/2016	0.420 TC	09/25/2018	0	1.2	1.6	6.7	0.257 U	1.2	07/27/2154	09/25/2019
107.01	N-7SLDSDRAIN-F	N	1.806 TC	03/23/2012	1.796 RR	02/15/2016	1.772 TC	09/25/2018	9.2	5.2	4.9	9.2	1.454 U	9.2	04/19/2053	09/25/2019
107.02	N-7SLDSDRAIN-L	N	1.810 TC	03/23/2012	1.799 RR	02/15/2016	1.775 TC	09/25/2018	9.2	5.4	5.2	11.7	1.454 U	9.2	08/16/2053	09/25/2019

**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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: HS0026-SEP  
 Eq Type: VESSEL  
 Class:  
 CM RBI:  
 Design Code: S8/D1

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 2000 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 HORIZONTAL SEPARATOR; SN: 1182

Summary: Group Name: Insp. Due Date = 09/25/2019  
 Pred. Ret. Date = 09/28/2037

Group Description: RCR = 8.3 MPY  
 Rem. Life (from last survey 09/25/2018) = 19.0 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
107.03	N-7SLDSDRAIN-BK	N	1.808 TC	03/23/2012	1.804 RR	02/15/2016	1.780 TC	09/25/2018	9.2	4.3	3.5	809.6	1.454 U	9.2	03/03/2054	09/25/2019
107.04	N-7SLDSDRAIN-R	N	1.802	08/14/2006	1.801 RR	02/15/2016	1.780 TC	09/25/2018	8.0	1.8	1.3	8.0	1.454 U	8.0	06/26/2059	09/25/2019
108.03	N-8 H2ODRAIN-BK	N	1.580	08/14/2006	1.558 RR	02/15/2016	1.555 TC	09/25/2018	1.1	2.1	2.5	20.0	1.194 U	2.1	08/22/2190	09/25/2019
108.04	N-8 H2ODRAIN-RGT	N	1.557	08/14/2006	1.549 RR	02/15/2016	1.532 TC	09/25/2018	6.5	2.1	1.7	12.2	1.194 U	6.5	09/25/2070	09/25/2019
109.01	N9-OIL OUT-FR	N	1.550	08/14/2006	1.543 RR	02/15/2016	1.540 TC	09/25/2018	1.1	0.8	0.9	5.0	1.194 U	1.1	04/15/2333	09/25/2019
110.02	N-10 H2O OUT-L	N	0.326 TC	03/09/2011	0.317 RR	02/15/2016	0.304 TC	09/25/2018	5.0	2.9	2.9	5.0	0.176 U	5.0	05/01/2044	09/25/2019
110.03	N-10 H2O OUT-BK	N	0.313 AR	08/14/2006	0.290 RR	02/15/2016	0.286 TC	09/25/2018	1.5	2.2	2.5	10.0	0.176 U	2.2	09/24/2068	09/25/2019
110.04	N-10 H2O OUT-R	N	0.325 TC	03/09/2011	0.318 TC	02/15/2016	0.309 TC	09/25/2018	3.4	2.1	1.8	14.5	0.176 U	3.4	11/07/2057	09/25/2019
111.02	N-11-OILDR-L	N	0.309 TC	03/09/2011	0.323 RR	02/15/2016	0.335 TC	09/25/2018	0	0	0	5.5	0.176 U	0.1	10/07/3608	09/25/2019
111.03	N-11-OILDR-BK	N	0.339 AR	08/14/2006	0.300 RR	02/15/2016	0.316 TC	09/25/2018	0	1.9	3.1	8.4	0.176 U	1.9	06/01/2092	09/25/2019
112.01	N-12-SPARGE-TOP	N	0.354 AR	08/14/2006	0.328 RR	02/15/2016	0.333 TC	09/25/2018	0	1.7	2.4	12.2	0.176 U	1.7	02/02/2111	09/25/2019
112.03	N-12-SPARGE-BTM	N *	0.328 AR	08/14/2006	0.327 TC	02/15/2016	0.307 TC	09/25/2018	7.7	1.7	1.2	7.7	0.176 U	7.7	09/30/2035	09/25/2019
113.01	N13-TOP	N	0.349 AR	08/14/2006	0.305 RR	02/15/2016	0.335 TC	09/25/2018	0	1.2	3.2	30.1	0.176 U	1.2	03/28/2151	09/25/2019
113.03	N13-BTM	N *	0.335 AR	08/14/2006	0.316 RR	02/15/2016	0.292 TC	09/25/2018	9.2	3.5	2.9	15.0	0.176 U	9.2	05/05/2031	09/25/2019
114.01	N-14-WATER LC-T	N	1.583 AR	08/14/2006	1.568 RR	02/15/2016	1.562 TC	09/25/2018	2.3	1.7	1.8	10.0	1.194 U	2.3	09/26/2178	09/25/2019
114.02	N-14-WATER LC-L	N	1.538 AR	08/14/2006	1.519 RR	02/15/2016	1.507 TC	09/25/2018	4.6	2.6	2.5	10.0	1.194 U	4.6	10/11/2086	09/25/2019
114.04	N-14-WATER LC-R	N	1.581 AR	08/14/2006	1.560 RR	02/15/2016	1.562 TC	09/25/2018	0	1.6	1.8	7.0	1.194 U	1.6	09/27/2248	09/25/2019
115.01	N-15-OIL-LC-TOP	N	1.562 AR	08/14/2006	1.542 TC	02/15/2016	1.542 RR	09/25/2018	0	1.7	1.5	11.2	1.194 U	1.7	06/12/2223	09/25/2019
115.02	N-15-OIL-LC-L	N	1.546 AR	08/14/2006	1.535 RR	02/15/2016	1.532 TC	09/25/2018	1.1	1.2	1.2	3.3	1.194 U	1.2	05/29/2300	09/25/2019
115.03	N-15-OIL-LC-BTM	N	1.554 AR	08/14/2006	1.556 RR	02/15/2016	1.540 TC	09/25/2018	6.1	1.2	0.4	6.1	1.194 U	6.1	06/15/2075	09/25/2019

**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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: HS0026-SEP  
 Eq Type: VESSEL  
 Class:  
 CM RBI:  
 Design Code: S8/D1

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 2000 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 HORIZONTAL SEPARATOR; SN: 1182

Summary: Group Name: Insp. Due Date = 09/25/2019  
 Pred. Ret. Date = 09/28/2037

Group Description: RCR = 8.3 MPY  
 Rem. Life (from last survey 09/25/2018) = 19.0 yrs

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

TML No	Location	Ctn TML	First Survey Thick Nt	First Date	Previous Survey Thick Nt	Previous Date	Last Survey Thick Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
115.04	N-15-OIL-LC-R	N	1.561 AR	08/14/2006	1.546 RR	02/15/2016	1.540 TC	09/25/2018	2.3	1.7	1.6	3.4	1.194 U	2.3	03/03/2169	09/25/2019
116.01	N-16-CLEANING-F	N	2.100	08/14/2006	2.101 RR	02/15/2016	2.084 TC	09/25/2018	6.5	1.3	0.8	6.5	1.651 U	6.5	05/07/2085	09/25/2019
116.02	N-16-CLEANING-L	N	2.096	08/14/2006	2.104 TC	02/15/2016	2.076 TC	09/25/2018	10.7	1.7	0.9	10.7	1.651 U	10.7	06/15/2058	09/25/2019
116.03	N-16-CLEANING-BK	N	2.099	08/14/2006	2.102 RR	02/15/2016	2.078 TC	09/25/2018	9.2	1.7	1.1	9.2	1.651 U	9.2	02/22/2065	09/25/2019
116.04	N-16-CLEANING-R	N	2.098	08/14/2006	2.103 TC	02/15/2016	2.079 TC	09/25/2018	9.2	1.6	0.9	9.2	1.651 U	9.2	04/03/2065	09/25/2019
117.01	N-17-CLEANING-F	N	2.099	08/14/2006	2.103 TC	02/15/2016	2.082 TC	09/25/2018	8.0	1.4	0.8	8.0	1.651 U	8.0	08/10/2072	09/25/2019
117.02	N-17-CLEANING-L	N	2.088	08/14/2006	2.097 RR	02/15/2016	2.087 TC	09/25/2018	3.8	0.1	0	3.8	1.651 U	3.8	06/22/2133	09/25/2019
117.03	N-17-CLEANING-BK	N	2.098	08/14/2006	2.098 RR	02/15/2016	2.084 TC	09/25/2018	5.4	1.2	0.7	5.4	1.651 U	5.4	12/02/2098	09/25/2019
117.04	N-17-CLEANING-R	N	2.095	08/14/2006	2.099 RR	02/15/2016	2.082 TC	09/25/2018	6.5	1.1	0.7	6.7	1.651 U	6.5	01/15/2085	09/25/2019
118.01	N-18-CLEANING-F	N	2.091	08/14/2006	2.100 TC	02/15/2016	2.082 TC	09/25/2018	6.9	0.7	0.1	6.9	1.651 U	6.9	03/13/2081	09/25/2019
118.02	N-18-CLEANING-L	N	2.092	08/14/2006	2.102 TC	02/15/2016	2.079 TC	09/25/2018	8.8	1.1	0.2	8.8	1.651 U	8.8	05/15/2067	09/25/2019
118.03	N-18-CLEANING-BK	N	2.091	08/14/2006	2.097 RR	02/15/2016	2.080 TC	09/25/2018	6.5	0.9	0.3	6.5	1.651 U	6.5	09/25/2084	09/25/2019
118.04	N-18-CLEANING-R	N	2.090	08/14/2006	2.099 TC	02/15/2016	2.080 TC	09/25/2018	7.3	0.8	0.1	7.3	1.651 U	7.3	07/02/2077	09/25/2019
119.01	N-19-TI-TOP	N	0.355 AR	08/14/2006	0.346 RR	02/15/2016	0.334 TC	09/25/2018	4.6	1.7	2.1	29.9	0.188 U	4.6	06/22/2050	09/25/2019
119.03	N-19-TI-BTM	N	0.337 AR	08/14/2006	0.334 TC	02/15/2016	0.324 TC	09/25/2018	3.8	1.1	0.8	29.0	0.188 U	3.8	07/10/2054	09/25/2019
120.01	N-20-PI-FRONT	N	0.349 AR	08/14/2006	0.336 RR	02/15/2016	0.332 TC	09/25/2018	1.5	1.4	1.3	4.2	0.188 U	1.5	09/26/2114	09/25/2019
120.03	N-20-PI-BACK	N	0.355 AR	08/14/2006	0.339 RR	02/15/2016	0.334 TC	09/25/2018	1.9	1.7	1.8	5.6	0.188 U	1.9	07/30/2095	09/25/2019
121.01	N-21-H2OLG-TOP	N	0.335 AR	08/14/2006	0.329 TC	02/15/2016	0.320 TC	09/25/2018	3.4	1.2	1.4	13.9	0.188 U	3.4	07/22/2057	09/25/2019
121.03	N-21-H2OLG-BTM	N	0.353 AR	08/14/2006	0.325 RR	02/15/2016	0.327 TC	09/25/2018	0	2.1	2.9	10.6	0.188 U	2.1	12/03/2084	09/25/2019
122.01	N-22-H2OLG-TOP	N	0.338 AR	08/14/2006	0.341 RR	02/15/2016	0.330 TC	09/25/2018	4.2	0.7	0	4.2	0.188 U	4.2	07/17/2052	09/25/2019
122.03	N-22-H2OLG-BTM	N *	0.352 AR	08/14/2006	0.345 RR	02/15/2016	0.330 TC	09/25/2018	5.7	1.8	1.4	5.7	0.188 U	5.7	08/24/2043	09/25/2019

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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: HS0026-SEP  
 Eq Type: VESSEL  
 Class:  
 CM RBI:  
 Design Code: S8/D1

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 2000 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 HORIZONTAL SEPARATOR; SN: 1182

Summary: Group Name: Insp. Due Date = 09/25/2019  
 Pred. Ret. Date = 09/28/2037

Group Description: RCR = 8.3 MPY  
 Rem. Life (from last survey 09/25/2018) = 19.0 yrs

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

TML No	Location	Ctn TML	First Survey Thick Nt	First Date	Previous Survey Thick Nt	Previous Date	Last Survey Thick Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
123.01	N-23-OIL- LG-TOP	N	0.350 AR	08/14/2006	0.345 RR	02/15/2016	0.336 TC	09/25/2018	3.4	1.2	0.8	3.4	0.188 U	3.4	04/06/2062	09/25/2019
123.03	N-23-OIL- LG-BTM	N	0.335 AR	08/14/2006	0.310 TC	02/15/2016	0.309 TC	09/25/2018	0.4	2.1	2.5	6.7	0.188 U	2.1	05/08/2076	09/25/2019
124.01	N-24-OIL- LG-TOP	N	0.355 AR	08/14/2006	0.331 RR	02/15/2016	0.333 TC	09/25/2018	0	1.8	2.2	12.8	0.188 U	1.8	04/16/2099	09/25/2019
124.03	N-24-OIL- LG-BTM	N	0.350 AR	08/14/2006	0.328 RR	02/15/2016	0.327 TC	09/25/2018	0.4	1.9	2.1	8.0	0.188 U	1.9	11/22/2091	09/25/2019
125.01	MW-1-TOP	N	3.030 NM	07/10/2005	3.013 TC	02/15/2016	2.992 TC	09/25/2018	8.0	2.9	2.5	8.0	2.526 U	8.0	12/25/2076	09/25/2019
125.02	MW-1-LEFT	N	3.003	08/14/2006	2.998 RR	02/15/2016	2.988 TC	09/25/2018	3.8	1.2	0.9	4.0	2.526 U	3.8	04/25/2140	09/25/2019
125.03	MW-1-BTM	N	3.030 NM	07/10/2005	3.020 TC	02/15/2016	2.984 TC	09/25/2018	13.8	3.5	2.7	13.8	2.526 U	13.8	12/03/2051	09/25/2019
125.04	MW-1-RIGHT	N	3.024	08/14/2006	3.000 RR	02/15/2016	2.988 TC	09/25/2018	4.6	3.0	2.0	4.6	2.526 U	4.6	03/04/2119	09/25/2019

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: 11/01/2018

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

Unit: HS-0026  
Eq/Circ ID: HS0026-SEP  
Design Code: S8/D1  
Eq Type: VESSEL  
Class:  
CM RBI:

Flange Rating: 2025 lb/in.  
Design Pressure: 2000 lb/in.  
Design Temperature: 200 °F

Description: HS-0026 HORIZONTAL SEPARATOR; SN: 1182

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

Representative Corrosion Rate is the Maximum of:  
(A) -- Average Corrosion Rate x 1.00 : 4.0 MPY  
(B) -- Average Max 25.0% of TMLs, Min of 2 : 8.3 MPY  
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 4.5 MPY  
(D) -- Default Corrosion Rate : 0.1 MPY  
Representative Corrosion Rate = 8.3 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 = 19.0 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 09/28/2037

Recommended Eq/Circ UT/RT Inspection Date is 09/25/2019  
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 510 PRESSURE VESSEL INTERNAL INSPECTION

Operations Center: FMC Technologies Completion	Field Name: Grand Junction
Facility/Location Name: Grand Junction	
Equipment Number: HS-0026	Eq/Circ. ID: HS-0026
Equipment Name/Service: High Stage Separator	
Physical Location: RDI Yard	
Manufacturer: Micoda Process Systems	Manufacturer Serial Number: 1182
Year Built: 2005	National Board Number: 6
Alberta Registration #: 524558	Canadian Registration #: R9975.2

**Reason for Inspection:** Scheduled API Inspection.

**Type and quality of cleaning:** (Hot water wash suitable for inspection). Fairly clean. Packed residue and sand present.

**Manway entrance and gasket seating area:**  N/A. Minor chipped coating with light surface corrosion present. Minor pitting in entrance and flange face (face pitting .050").

**Shell** (note pitting, corrosion, laminations, blisters, etc. - size and location): Chipped and missing coating with light surface corrosion as well as pitting is present. Large pits located along bottom of shell (.050" to .200").

**Heads** (note pitting, corrosion, laminations, blisters, etc. - size and location): Chipped and missing coating with light surface corrosion and pitting present. (Pitting is not measurable).

**Internal Circumferential and Long seam Welds:** (include type and condition welds). Welds are visually acceptable with no visible corrosion or pitting.

**Internal Nozzle Welds:** (include type and condition welds) Majority of nozzle welds are visually acceptable. 2" & 4" nozzles have heavy pitting around the welds and also inside of nozzles.

**Condition of Internal Attachments and Welds:** Internal attachments and brackets are secure. Welds are visually acceptable.

# API 510 PRESSURE VESSEL INTERNAL INSPECTION

## **Comments:**

Steam lines with chipped coating and minor pitting present. (Nothing measurable). Diffuser and demister both have moderate scaling and surface corrosion.

## **Recommendations:**

Sand blast and clean vessel. Locate pitting/damage that is not acceptable and make repairs as required. Re-coat vessel internals. Clean sealing surface area of the manway.

## **Repairs Needed:**

Repair large pitting at bottom of shell and heavy preferential corroded oil drain; solids drain and also the drain nozzle welds.

See attached photos.

*Mike York /BGW*

\_\_\_\_\_  
**API 510 Inspector Signature**

66475

\_\_\_\_\_  
**API 510 Inspector Number**

09/26/2018

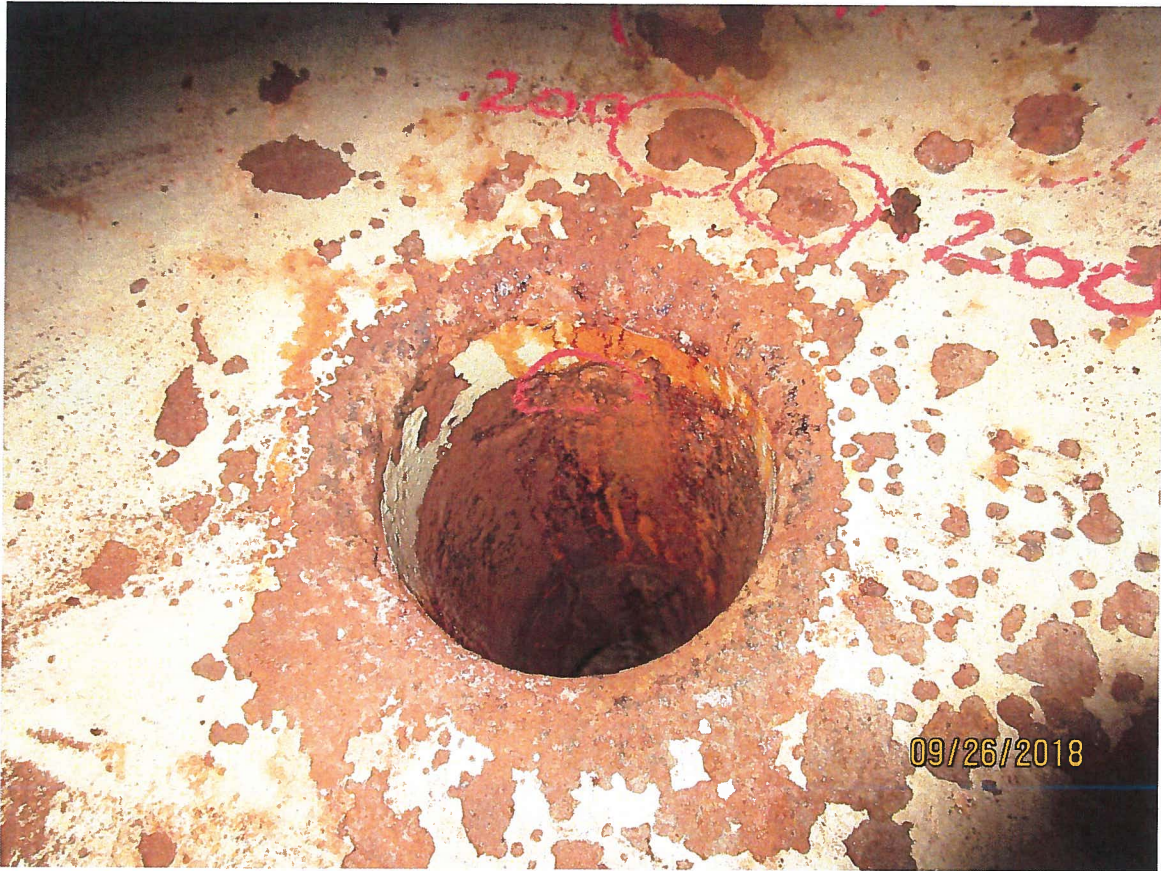
**Date**

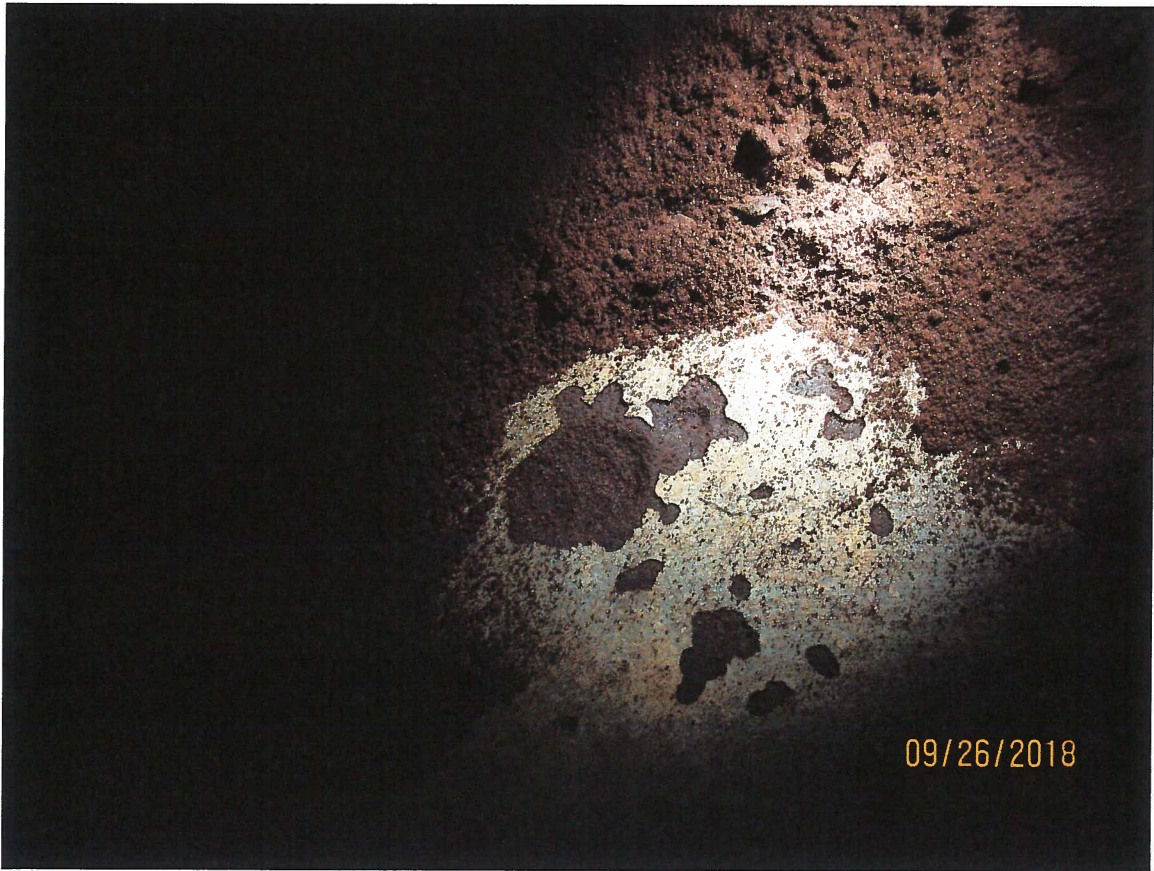
HS-0026

09/26/2018



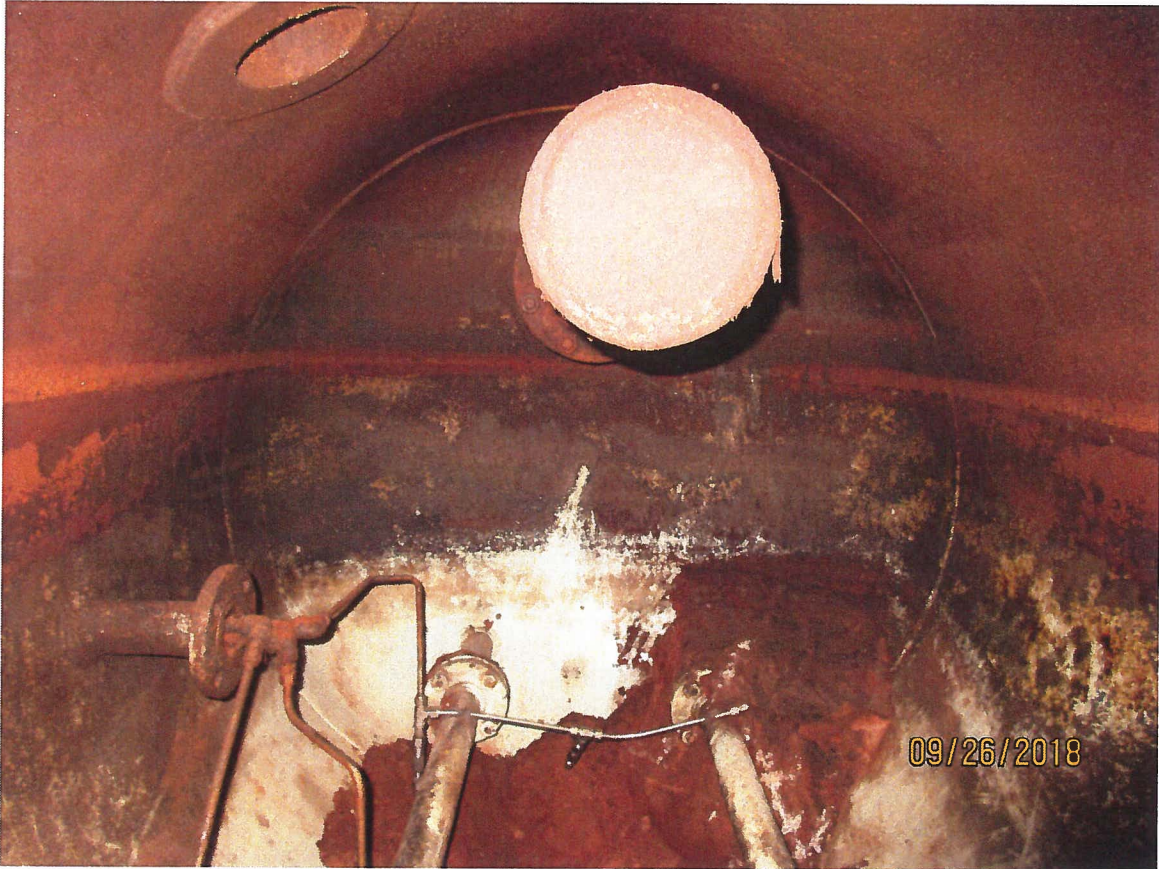
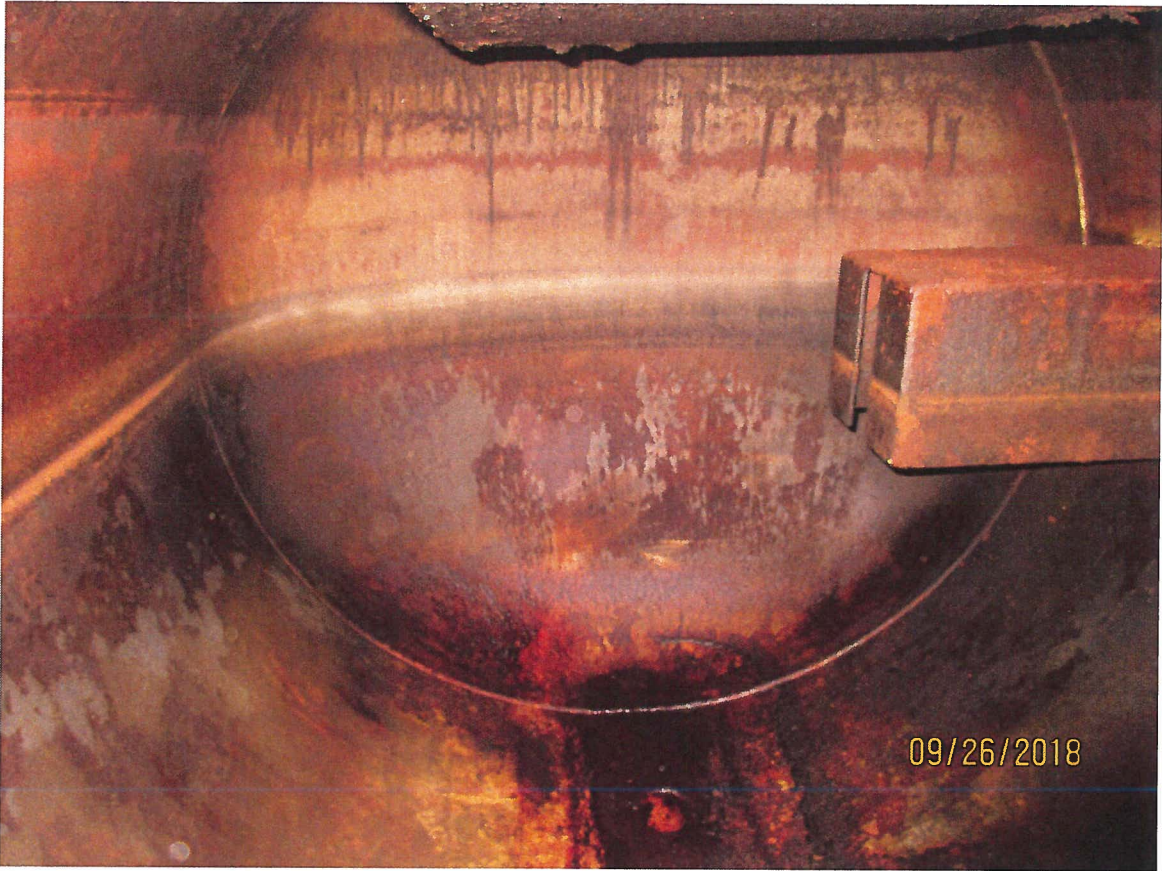














524558

FORM U-1 MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

1. Manufactured and certified by MICODA PROCESS SYSTEMS INC. 1211 - 8A STREET NISKU, ALBERTA T9E 7R3 CANADA
(Name and address of Manufacturer)

2. Manufactured for Pure Energy Services LTD. #300, 1010-1st S.W. Calgary Alberta, Canada T2K-1KA
(Name and address of Purchaser)

3. Location of installation Portable
(Name and address)

4. Type: Horizontal Separator 1182 R 9975.2 HV 44 Rev 2 6 2005
(Horiz., vert., or sphere) (Tank, separator, jkt. vessel, heat exh., etc.) (Mfg's serial No.) (CRN) (Drawing No.) (Nat'l. Bd. No.) (Year built)

5. ASME Code, Section VIII, Div. 1 2001 Edition, 2003 Addenda N/A N/A
Edition and Addenda (date) Code Case No. Special Service per UG-120(d)

Items 6 - 11 incl. to be completed for single wall vessels, jackets of jacketed vessels, shell of heat exchangers, or chamber of multi-chamber vessels.
6. Shell (a) No. of course(s): 2 (b) Overall length (ft & in.): 14'-0" s/s

Table with columns: Course(s), Material, Thickness, Long. Joint (Cat. A), Circum. Joint (Cat. A, B & C), Heat Treatment. Rows 1 and 2.

7. Heads: (a) SA 516-70N 1150F For 2.25Hr. (b) SA 516-70N 1150F For 2.25Hr.
(Mat'l Spec. No., Grade or Type) H.T. - Time & Temp

Table with columns: Location (Top, Bottom, Ends), Thickness, Radius, Elliptical Ratio, Conical Apex Angle, Hemispherical Radius, Flat Diameter, Side to Pressure, Category A. Rows (a) and (b).

If removable, bolts used (describe other fastening)
(Mat'l Spec. No., Grade, size, No.)

8. Type of jacket Jacket closure
(Describe as ogee & weld, bar, etc.)

If bar, give dimensions
MAWP 2000 N/A psi at max. temp. 200 N/A °F Min. design metal temp. -40 °F at 2000 psi.

10. Impact test Yes: Heads and Shells No: Remaining Components per UCS-66(g) at test temperature of -50 °F
(Indicate yes or no and the component(s) impact tested)

11. Hydro., pneu., or other test press. 2600 Proof test N/A

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: Stationary (Mat'l Spec. No.) Dia., in. (subject to press.) Nom. thk., in. Corr. Allow., in. Attachment (welded or bolted)

Floating (Mat'l Spec. No.) Dia., in. Nom. thk., in. Corr. Allow., in. Attachment

13. Tubes: Mat'l Spec. No., Grade or Type O.D., in. Nom. thk., in. or gauge Number Type (Straight or U)

Items 14 - 18 incl. to be completed for inner chambers of jacketed vessels or channels of heat exchangers.

14. Shell (a) No. of course(s): 1 (b) Overall length (ft & in.): 20'-4" s/s

Table with columns: Course(s), Material, Thickness, Long. Joint (Cat. A), Circum. Joint (Cat. A, B & C), Heat Treatment. Row 1.

15. Heads: (a) (b)
(Mat'l Spec. No., Grade or Type) H.T. - Time & Temp

Table with columns: Location (Top, Bottom, Ends), Thickness, Radius, Elliptical Ratio, Conical Apex Angle, Hemispherical Radius, Flat Diameter, Side to Pressure, Category A. Rows (a) and (b).

If removable, bolts used (describe other fastening) (8) 0.625" OD x 3.75" Lg. Studs B7M, (16) 0.625" OD Nuts 2HM
(Mat'l Spec. No., Grade, Size, No.)

16. MAWP 150 2000 psi at max. temp. 400 200 °F Min. design metal temp. -40 °F at 150 psi.  
 (internal) (external) (internal) (external)

17. Impact test No; Per UCS-66(a) at test temperature of -1 °F  
 (Indicate yes or no and the component(s) impact tested)

18. Hydro. ~~###~~ test press. 195 Proof test N/A

19. Nozzles, inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc.)	No.	Diameter or Size	Flange Type	Material		Nozzle Thickness		Reinforcement Material	How Attached		Location (Insp. Open.)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
-	-	-	-	See Attached	U-4 Form	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

20. Supports: Skirt No Lugs No Legs No Others Saddles Attached Welded to Shell  
 (Yes or No) (No.) (No.) (Describe) (Where and How)

21. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report:

(List the name of part, item number, mfg's. name and identifying number)

In-Line Closures S/N 08387(N16), 08384(N17), 08383(N18) CRN OH4712.231

22. Remarks: Construction dwg. 04-472-V Rev 1

RT per UW-11(a)

Volume: 217.5 cu./ft.

PSV to be installed in the piping system

**CERTIFICATE OF SHOP COMPLIANCE**

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1,

U Certificate of Authorization No. 32693 Expires 7/10/2007

Date 1/22/2005 Name MICODA PROCESS SYSTEMS INC. Signed [Signature]  
 (Manufacturer) (Representative)

**CERTIFICATE OF SHOP INSPECTION**

I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of Alberta and employed by ABSA of Alberta have inspected the pressure vessel described in this Manufacturer's Data Report on 1/22/2005, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 1/22/2005 Signed [Signature] Commissions NB#12369A  
 (Authorized Inspector) (Nat'l Board incl. endorsement, State, Province and No.)

**CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE**

We certify that the statements on this report are correct and that the field assembly construction of all parts of this vessel conforms with the requirements of ASME Code, Section VIII, Division 1,

U Certificate of Authorization No. \_\_\_\_\_ Expires \_\_\_\_\_

Date \_\_\_\_\_ Name \_\_\_\_\_ Signed \_\_\_\_\_  
 (Assembler) (Representative)

**CERTIFICATE OF FIELD ASSEMBLY INSPECTION**

I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of \_\_\_\_\_ and employed by \_\_\_\_\_ of \_\_\_\_\_ have compared the statements in this Manufacturer's Data Report with the described pressure vessel and state that parts referred to as data items \_\_\_\_\_, not included in the certificate of shop inspection, have been inspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel in accordance with ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of \_\_\_\_\_ psi. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date \_\_\_\_\_ Signed \_\_\_\_\_ Commissions \_\_\_\_\_  
 (Authorized Inspector) (Nat'l Board incl. endorsement, State, Province and No.)



**FORM U-2A MANUFACTURER'S PARTIAL DATA REPORT (ALTERNATIVE FORM)  
A Part of a Pressure Vessel Fabricated by One Manufacturer for Another Manufacturer  
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1**

1. Manufactured and certified by In-Line Flow Products Limited, 1417-70 Avenue, Edmonton, Alberta, Canada  
(Name and address of Manufacturer)

2. Manufactured for Stock  
(Name and address of Purchaser)

3. Location of installation Unknown  
(Name and address)

4. Type: NPS6 ANSI 900 Sch 160 In-Line Horizontal Closure 08382 to 08402 Inclusive OH4712.231  
(Description of vessel part (shell, two-piece head, tube bundle)) (Mfg's serial No.) (CRN)  
CL01011 Rev 4 In-Line Flow Products Limited 2004  
(Nat'l. Bd. No.) (Drawing No.) (Drawing prepared by) (Year built)

5. ASME Code, Section VIII, Div. 1 2001 Edition - 2003 Addenda N/A N/A  
(Edition and Addenda (date)) (Code Case No.) (Special Service per UG-120(d))

6. Shell (a) No. of course(s): One (b) Overall length (ft & in.): 0 Feet - 5.00 Inches

Course(s)			Material		Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B, & C)			Heat Treatment	
No.	Diameter, in.	Length (ft & in.)	Spec./Grade or Type	Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time	
1	5.187	5.00 in	SA350 Grade LF2	0.969	0.125	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
			Class 1									N/A		
			Normalized											

7. Heads: (a) SA350 Grade LF2 Class 1 Normalized (b) \_\_\_\_\_  
(Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.) (Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.)

	Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.
(a)	End	0.613	0.125								Yes	N/A	N/A	N/A
(b)														

If removable, bolts used (describe other fastening) 7.750-2-Modified Stub ACME-2G  
(Mat'l Spec. No., Grade, Size, No.)

8. MAWP 2220 psi at max. temp. 400 °F. Min. design metal temp. -50 °F at 2220 psi.  
(internal) (external) (internal) (external)

9. Impact test No (See Remarks) at test temperature of \_\_\_\_\_ °F.  
(Indicate yes or no and the component(s) impact tested)

10. Hydro., pneu., or comb. test press. N/A Proof test N/A

11. Nozzles, inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc.)	No.	Diameter or Size	Flange Type	Material		Nozzle Thickness		Reinforcement Material	How Attached		Location (Insp. Open.)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
Outlet - Alert Fitting	1	1/2 NPT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Shell

12. Supports: Skirt No Lugs N/A Legs N/A Others Hinge Assm. Cap Pin Attached Welded (WPS Inline-1)  
(Yes or no) (No.) (No.) (Describe) (Where and how)

13. Remarks: Cap and Hub Material impact tested per UCS-66(g). Assembly not impact tested. Hydrotest to be performed by others.  
Drawing Number CL01011 Revision 4 references Assembly and Machine Drawings used in construction.

**CERTIFICATE OF SHOP/FIELD COMPLIANCE**

We certify that the statements made in this report are correct and that all details of material, construction, and workmanship of this pressure vessel part conform to the ASME Code for Pressure Vessels, Section VIII, Division 1.

U Certificate of Authorization No. 33,859 Expires March 26, 2006

Date Oct 14, 2004 Name In-Line Flow Products Limited Signed \_\_\_\_\_  
(Manufacturer) (Representative)

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**CERTIFICATE OF SHOP/FIELD INSPECTION**

I, the undersigned, holding a valid commission issued by the National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province of Alberta and employed by Alberta Boiler Safety Association of Alberta

have inspected the pressure vessel part described in this Manufacturer's Data Report on October 14, 2004 and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel part in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel part described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date Oct 14/04 Signed \_\_\_\_\_ Commissions NB# 9643 A  
(Authorized Inspector) (Nat'l Board incl. endorsement, State, Province and No.)

\*) This form (E00121) may be obtained from the Order Dept., ASME, 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300.



SIN 08387, 08384, 08383

E00121



**FORM U-3 MANUFACTURER'S CERTIFICATE OF COMPLIANCE  
COVERING PRESSURE VESSELS TO BE STAMPED WITH THE UM SYMBOL, SEE U-1(j)  
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1**

With J2004-472

1. Manufactured and certified by MICODA PROCESS SYSTEMS INC., 1211 - 8A STREET NISKU, ALBERTA T9E 7R3 CANADA  
(Name and address of Manufacturer)

Manufactured for Pure Energy Services LTD. #300, 1010-1st S.W. Calgary Alberta, Canada T2K-1KA  
(Name and address of Purchaser)

3. Location of installation Portable  
(Name and address)

4. Type Vertical Fuel Gas Scrubber 1.04 cubic feet 1226  
(Horz., vert., or sphere) (Tank, separator, etc.) (Capacity) (Mfg's. serial No.)  
OH 4873.2 1001-1 Rev 4 2005  
(CRN) (Drawing No.) (Year built)

5. ASME Code, Section VIII, Div. 1 2003 N/A  
(Edition and Addenda (date)) (Code Case No.)

6. Shell (a) No. of course(s): 1 (b) Overall length (ft & in.): 2'-10.75" s/s

No.	Course(s)		Material Spec./Grade or Type	Thickness		Long. Joint (Cat. A) Type Full Spot None Eff.	Circum. Joint (Cat. A, B, & C)			Heat Treatment		
	Diameter, in.	Length (ft & in.)		Nom.	Corr.		Type	Full	Spot	None	Eff.	Temp.
1	7.981"	2'-10.75"	SA-106 GR B	0.322"	0.0625"	Smls Seamless	1	1	None	.70	1150F	1 hr.
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

7. Heads: (a) SA 516-70N 1150F for 1 h (b) SA 516-70N 1150F for 1 h  
(Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.) (Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.)

	Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full	Spot
(a)	TOP	0.625"	0.0625"	N/A	N/A	N/A	N/A	N/A	7.981"	N/A	N/A	1	None	.70
(b)	BOTTOM	0.625"	0.0625"	N/A	N/A	N/A	N/A	N/A	7.981"	N/A	N/A	1	None	.70

If removable, bolts used (describe other fastening) N/A  
(Mat'l Spec. No., Grade, Size, No.)

8. Type of Jacket N/A Jacket Closure N/A  
(Describe as ogee & weld, bar, etc.)

If bar, give dimensions; if bolted describe or sketch N/A

9. MAWP 285 N/A psi at max. temp. 100 N/A °F. Min. design metal temp. -20 °F at 285 psi.  
(internal) (external) (internal) (external)

10. Impact test No per UG-20(f) 1 through 5 at test temperature of N/A °F.  
(Indicate yes or no and the component(s) impact tested)

Hydro., ~~proof~~ test press. 371 Proof test N/A

12. Nozzles, inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc.)	No.	Diameter or Size	Flange Type	Material		Nozzle Thickness		Reinforcement Material	How Attached		Location (Insp. Open.)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
Inlet/ Relief	2	1"	CPLG	SA-105N	-	3000	0.0625"	N/A	UW-16.1(c)	-	Shell
Outlet	1	2"	CPLG	SA-105N	-	3000	0.0625"	N/A	UW-16.1(c)	-	Head
Drain	1	3/4"	CPLG	SA-105N	-	3000	0.0625"	N/A	UW-16.1(c)	-	Shell
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

13. Supports: Skirt No Lugs No Legs No Others N/A Attached N/A  
(Yes or no) (No.) (No.) (Describe) (Where and how)

14. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report: (List the name of part, item number, mfg's. name and identifying number)

-  
-

15. Remarks: Construction Dwg. 05-534-FGS Rev. 0  
PSV to installed in the piping system

-  
-

CERTIFICATE OF SHOP COMPLIANCE			
We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1.			
UM Certificate of Authorization No.	<u>34564</u>	Expires	<u>7/10/2005</u>
Date	<u>1/18/2005</u>	Name	<u>MICODA PROCESS SYSTEMS INC.</u>
		(Manufacturer)	
Signed	<u>[Signature]</u>	Signed	<u>[Signature]</u>
	(Certified Individual)		(Representative)



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

<b>Inspections Performed for:</b> FMC Technologies Completion – Grand Junction	
<b>Inspection Report for:</b> HS-0026 Fuel Gas Scrubber	
<b>Remaining Life:</b> 20+ YRS	<b>Date Last Inspected:</b> 09/25/2018
<b>Representative Corrosion Rate:</b> 1.0 MPY	<b>Next UT:</b> 09/25/2019 <b>Next VT:</b> 09/25/2019
<b>Manufacturer:</b> Micoda Process Systems	<b>Manufacturer Serial #:</b> 1226
<b>Year Built:</b> 2005	<b>National Board #:</b> N/A
<b>Alberta Registration #:</b> None	<b>Canadian Registration #:</b> OH-4873.2

**HS-0026 Fuel Gas Scrubber**



## PRESSURE VESSEL INVENTORY

Code                       Code-invalidated                       Non-Code                       Unknown                       Code-Exempt

### VESSEL ID INFORMATION

Company Name : Pure Energy Services (USA) Inc.  
Facility/Location Name : Grand Junction, CO  
Field Name :  
Equipment Number : HS-0026  
Eq/Circ. ID : HS0026-FGS  
Equipment Name/Service : Fuel Gas Scrubber  
Physical Location : Inside Cabinet HS-0026-In Grand Junction Yard  
GPS Coordinates :

### VESSEL DESCRIPTION AND SERVICE CONDITIONS

**Type of Vessel:** Vertical Scrubber

**Vessel Size:** 7.981"

**Operating Pressure Range (psig):** 64 psi

**Operating Temperature Range (°F):**

**Does the vessel have Internal Access?** No

**Specify type of internal access, if available:**

**Vessel is located:** Inside

**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)

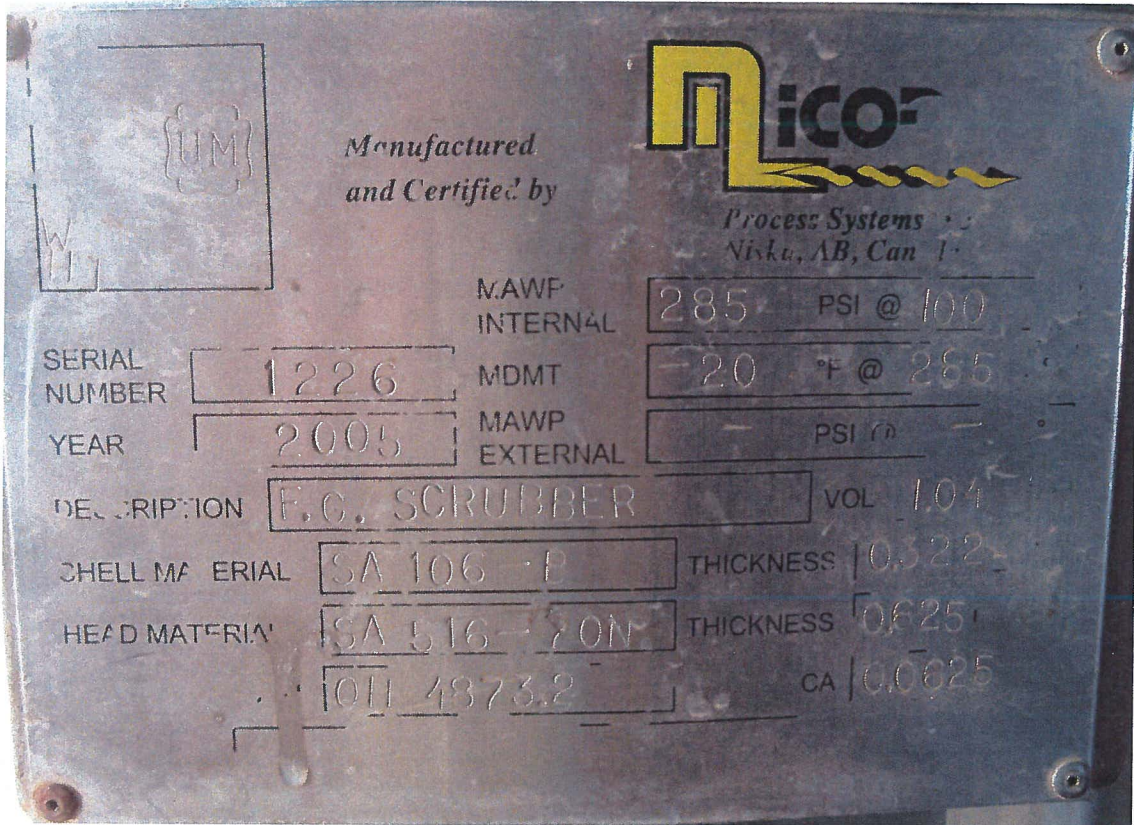
Approximate Date built or installed (check associated equipment or info at facility)

Any other pertinent information:

# PRESSURE VESSEL INVENTORY

## ORIGINAL VESSEL NAMEPLATE/STAMPING INFORMATION

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



## SUPPLEMENTAL VESSEL NAMEPLATE/STAMPING INFORMATION

Repair stamp:  R stamp  Other Stamp  No stamp

## VESSEL DOCUMENTATION

U3 Form

Name: Robert W. Menke

Date: 03/23/2012

\*Revised 2/2016

## API 510 PRESSURE VESSEL EXTERNAL INSPECTION FORM

<b>Company Name:</b> FMC Technologies Completion	
<b>Field/Location:</b> Grand Junction	
<b>Equipment Number:</b> HS-0026	<b>Eq/Circ. ID:</b> HS0026-FGS
<b>Equipment Name/Service:</b> Fuel Gas Scrubber	
<b>Physical Location:</b> GR 14-28 Pad	
<b>Manufacturer:</b> Micoda Process Systems Inc.	<b>Manufacturer Serial #:</b> 1226
<b>Year Built:</b> 2005	<b>National Board #:</b> None
<b>Alberta Registration #:</b> None	<b>Canadian Registration #:</b> OH-4873.2

**Reason for Inspection:** Scheduled API-510 External Inspection

**Condition of Nameplate and/or Bracket:** The nameplate is intact. Nameplate bracket is securely attached. Stamping is legible, but the painted wording on the nameplate is wearing off.

**Internal Access?:** No

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

**Grounding Device in Place and Secure?:** N/A.

**Condition of Foundation and Anchor Bolts:** Anchor bolts are in place and secure. Baseplate-to-deck/frame attachment welds appear sound. All (4) anchor bolt nuts are in place and secure. Baseplate is bolted (4) to (2) channel iron, welded to skid deckplate. Bolts show light surface corrosion.

**Condition of Steel Supports, Saddles, and Bolting:** All support structural welds appear sound. (4) anchor bolts have light chipping and surface corrosion.

**Condition of Paint and/or Insulation:** The paint is in acceptable condition with minor localized chipping and peeling. There is no insulation.

**Condition of Nozzles, Flanges, Repads, and Weepholes:** All threaded connections. There is no evidence of leaks at any of the threaded connections. There is light chipping on 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?:** Yes.

**If yes, is it set at or below the MAWP?:** Yes    **Setting** 150 psi.

**Date PSV last tested (if there is a tag on the valve):** 11/2015

**Comments:**

**Recommendations:**

**Repairs Needed:**

*Robert W. Menke/BGW /MK*

**API 510 Inspector Signature**

0131

**API 510 Inspector Number**

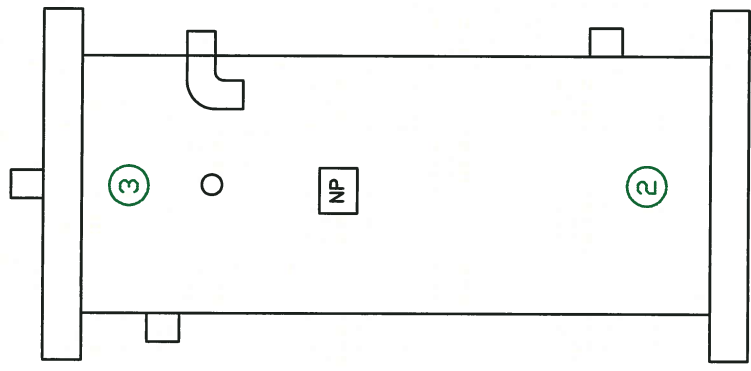
09/25/2018

**Date**



**EQUIP RETIREMENT DATE: 9/19/2071**  
**NEXT INSPECTION IS DUE: 9/26/2019**

- #2. 01- BTM SHELL-FRONT 0. 306 TC
- #2. 02- BTM SHELL-LEFT 0. 303 TC
- #2. 03- BTM SHELL-BACK 0. 294 TC
- #2. 04- BTM SHELL-RIGHT 0. 307 TC
- #3. 01- TOP SHELL-FRONT 0. 303 TC
- #3. 02- TOP SHELL-LEFT 0. 302 TC
- #3. 03- TOP SHELL-BACK 0. 301 TC
- #3. 04- TOP SHELL-RIGHT 0. 304 TC



TC-560

NAMEPLATE INFO	
MFG	MICODDA PROCESS SYSTEMS
SERIAL NUMBER	1226
NATIONAL BOARD #	NONE
DATE BUILT	2005
DESIGN P & T	285 PSI @ 100°F
NOTE	UM STAMPED CRN OH-4873. 2

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

CAL BLK: 51° F		VESSEL: 40° F	
BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION	EQ/CIRC ID #	HS0026-FGS
EQUIP NAME	VERTICAL FUEL GAS SCRUBBER	LOCATION	DN SKID HS-0026
DWG #	HS0026-FGS		

**DESC: VERT. FUEL GAS SCRUBBER-SN:1226**  
**DWG#: HS0026-FGS-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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: HS0026-FGS  
 Eq Type: VESSEL  
 Class:  
 CM RBI:  
 Design Code: S8/D1

Flange Rating: 285 lb/in<sup>2</sup>  
 Design Pressure: 285 lb/in<sup>2</sup>  
 Design Temperature: 100 °F

Description: HS-0026 FUEL GAS SCRUBBER; SN:1226

Summary: Group Name: Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 09/19/2071

Group Description: RCR = 1.0 MPY  
 Rem. Life (from last survey 09/26/2018) = 53.0 yrs

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

TML No	Location	Ctn TML	First Survey Thick Nt	First Date	Previous Survey Thick Nt	Previous Date	Last Survey Thick Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
2.01	BTM SHELL-FRONT	N *	0.315	08/14/2006	0.302 RR	02/15/2016	0.306 TC	09/26/2018	0	0.7	1.1	6.7	0.259 S	0.7	11/17/2085	09/26/2019
2.02	BTM SHELL-LEFT	N *	0.306	08/14/2006	0.295 TC	02/15/2016	0.295 RR	09/26/2018	0	0.9	1.0	2.1	0.259 S	0.9	09/26/2058	09/26/2019
2.03	BTM SHELL-BACK	N *	0.304	08/14/2006	0.292 TC	02/15/2016	0.292 RR	09/26/2018	0	1.0	1.1	2.2	0.259 S	1.0	09/26/2051	09/26/2019
2.04	BTM SHELL-RIGHT	N *	0.314	08/14/2006	0.305 RR	02/15/2016	0.307 TC	09/26/2018	0	0.6	0.7	1.7	0.259 S	0.6	09/26/2098	09/26/2019
3.01	TOP SHELL-FRONT	N *	0.315	08/14/2006	0.303 TC	02/15/2016	0.303 TC	09/26/2018	0	1.0	1.1	2.1	0.259 S	1.0	09/26/2062	09/26/2019
3.02	TOP SHELL-LEFT	N *	0.312	08/14/2006	0.295 RR	02/15/2016	0.302 TC	09/26/2018	0	0.8	1.4	3.4	0.259 S	0.8	06/26/2072	09/26/2019
3.03	TOP SHELL-BACK	N	0.307	08/14/2006	0.296 RR	02/15/2016	0.301 TC	09/26/2018	0	0.5	0.8	2.5	0.259 S	0.5	09/27/2102	09/26/2019
3.04	TOP SHELL-RIGHT	N	0.309	08/14/2006	0.304 RR	02/15/2016	0.304 TC	09/26/2018	0	0.4	0.4	1.0	0.259 S	0.4	03/29/2131	09/26/2019

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: 11/01/2018

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

Unit: HS-0026  
Eq/Circ ID: HS0026-FGS  
Design Code: S8/D1  
Eq Type: VESSEL  
Class:  
CM RBI:

Flange Rating: 285 lb/in<sup>2</sup>  
Design Pressure: 285 lb/in<sup>2</sup>  
Design Temperature: 100 °F

Description: HS-0026 FUEL GAS SCRUBBER; SN:1226

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 : 0.7 MPY  
(B) -- Average Max 25.0% of TMLs, Min of 2 : 1.0 MPY  
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 1.0 MPY  
(D) -- Default Corrosion Rate : 0.1 MPY  
Representative Corrosion Rate = 1.0 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 = 53.0 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 09/19/2071

Recommended Eq/Circ UT/RT Inspection Date is 09/26/2019  
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

<b>Company Name:</b> FMC Technologies Completion	<b>Facility Name:</b> Grand Junction
<b>Line Name/Number:</b> Associated Piping with HS-0026	
<b>Size/Sched. Of Pipe:</b> 1.000"-6.000"	<b>Eq/Circ. ID:</b>
<b>Service/System:</b>	<b>Piping Class</b> <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> Other
<b>Design Pressure:</b> 400 psi	<b>Materials:</b> <input checked="" type="checkbox"/> CS <input type="checkbox"/> SS <input type="checkbox"/> Other
<b>Design Temperature:</b> 200°F	<b>Note Stamping (If Any)</b>
<b>P&amp;ID#:</b>	<b>Flange Rating:</b> 900#/1500#

Reason for Inspection:  Initial API-570 on Stream Inspection.  
 Scheduled API-570 External Inspection.  Other:

**Comments:** Tighten support brackets & adjust flange bolts so they are fully engaged with nuts. Plug TC vents and drains.

**Testing Performed:**

Visual  UT  PT  MT  Other:

<b>Insulation Observations:</b>	<b>Comments:</b>
<input type="checkbox"/> Serviceable <input checked="" type="checkbox"/> Not Insulated <input type="checkbox"/> Missing/Damaged <input type="checkbox"/> CUI Identification <input type="checkbox"/> Corrosion Present (Describe) <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Issues	Piping is not insulated.

<b>Coating Condition:</b>	<b>Comments:</b>
<input checked="" type="checkbox"/> Good <input checked="" type="checkbox"/> Fair, Some Blistering/Peeling <input checked="" type="checkbox"/> Corrosion Present (Describe) <input type="checkbox"/> Other <input type="checkbox"/> No Issues	Minor chipped and scratched coating with light surface corrosion. Some areas are missing coating on 2" lines.

<b>Loss of Containment:</b>	<b>Comments:</b>
<input type="checkbox"/> Fluid Loss (Indicate How Much) <input type="checkbox"/> Seeping or Evidence of Past Leakage <input type="checkbox"/> Dripping (Size of Drops/Drops Per Minute) <input type="checkbox"/> Leaking (Size of Stream, Noise Level, etc.) <input type="checkbox"/> Clamps <input type="checkbox"/> Other <input checked="" type="checkbox"/> None Identified	Not in service. No sign of past leaks.

<b>Condition of Welds:</b>	<b>Comments:</b>
<input checked="" type="checkbox"/> Welds Are Full, Smooth and Well Profiled <input type="checkbox"/> Incomplete Fusion/Penetration <input type="checkbox"/> Crack Located Near Weld Seam <input type="checkbox"/> Weld Does Not Appear to Be Original <input type="checkbox"/> Joints-Misaligned <input type="checkbox"/> Undercut <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Issues	Welds are visually acceptable.

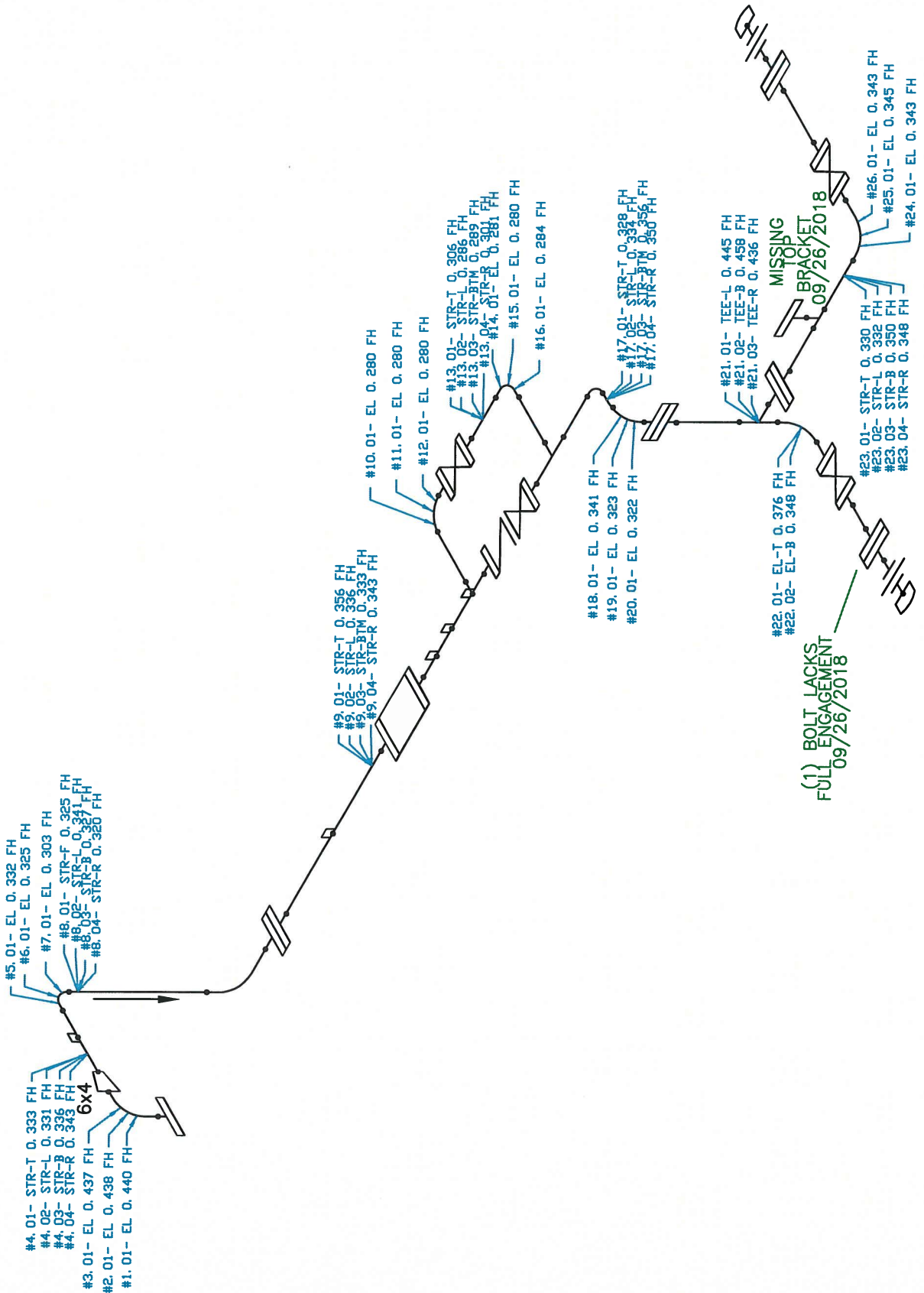
Relief Device:	Comments:
<input checked="" type="checkbox"/> PSV <input type="checkbox"/> No PSV <input type="checkbox"/> Rupture Disk <input checked="" type="checkbox"/> Atmospheric <input type="checkbox"/> No Relief Device Identified For This Equipment <input checked="" type="checkbox"/> Tag Secure and Legible <input checked="" type="checkbox"/> Set Pressure At Or Below MAWP <input type="checkbox"/> Block Valve Not Locked/Car Sealed In Open Position <input type="checkbox"/> Improper Drain Hole/Weather Cap On Atmos. Discharge <input type="checkbox"/> Obstruction (i.e. Debris) <input type="checkbox"/> Relief Installed In A Position Other Than Horiz. Or Upright <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Issues	(2) PSVs set at 2000 & 2160 psi. Test date: 11/2015.

Supports/Hangers:	Comments:
<input checked="" type="checkbox"/> In Serviceable Condition <input type="checkbox"/> Foundation Is Damaged <input type="checkbox"/> Additional Support Needed <input checked="" type="checkbox"/> Hanger/Support Is Distorted/Broken/Missing <input type="checkbox"/> Pipe Slide Or Shoe Is Off Of The Support <input type="checkbox"/> Makeshift Support <input checked="" type="checkbox"/> Loose Support Needed To Be Tightened <input type="checkbox"/> Fireproofing Missing Or Damaged <input checked="" type="checkbox"/> Support/Hanger Is Corroded <input type="checkbox"/> Other <input type="checkbox"/> No Issues	Brackets and vertical supports are acceptable. There are missing and/or loose brackets (pg. 1-3) with light surface corrosion present.

Flanged Connections:	Comments:
<input checked="" type="checkbox"/> Bolting Serviceable <input type="checkbox"/> Short, Missing Or Damaged Bolting <input checked="" type="checkbox"/> Nuts Lack Full Engagement <input checked="" type="checkbox"/> Flanges Serviceable <input type="checkbox"/> Flange Material Or Rating Inconsistent For System <input type="checkbox"/> Flanges Deformed Or Damaged <input checked="" type="checkbox"/> Corrosion Present (Describe) <input checked="" type="checkbox"/> Gaskets <input type="checkbox"/> Flange Rating Issues <input type="checkbox"/> Other <input type="checkbox"/> No Issues	Flanges and bolts are all in acceptable condition. Light surface corrosion present. (3) bolts lack full engagement (pg. 1 & 3).

Mechanical Observations:	Comments:
<input checked="" type="checkbox"/> Deadleg <input type="checkbox"/> Damaged Flex Hose <input type="checkbox"/> Crack <input type="checkbox"/> Biological Growth <input type="checkbox"/> Threaded Exposed <input type="checkbox"/> Threaded Connections Not Seal Welded <input type="checkbox"/> Expansion Joint Issues <input type="checkbox"/> Low Point Without Drain <input type="checkbox"/> Open Ended <input type="checkbox"/> Vibration (Excessive) <input type="checkbox"/> Weephole <input checked="" type="checkbox"/> Other <input type="checkbox"/> No Issues	End caps, vents and drain are present with no visible corrosion. 2" line (pg. 3) appear to be slightly curved/bent. No visible external damage present. There are minor damaged/ deformed hammer unions.

**EQUIP RETIREMENT DATE: 4/28/2061**  
**NEXT INSPECTION IS DUE: 9/26/2019**



**DESC: GAS OUT-6/4/3 SCH 80/40 PIPE**  
**DWG#: GAS-OUT-1.01-26.01**

FH2E-D

CAL BLK: 51°F  
 PIPE: 39-40°F

HS0026-P1

**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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: GAS OUT  
 Eq Type: PIPING  
 Class:  
 CM RBI:  
 Design Code: B31.3

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 1900 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 GAS OUT

Summary: Group Name: Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 04/28/2061  
 Group Description: RCR = 2.3 MPY  
 Rem. Life (from last survey 09/26/2018) = 42.6 Yrs

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

TM 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 Retirement Date	TM Inspection Date
1.01	EL	N	0.448	08/14/2006	0.437 D5	02/15/2016	0.437 RR	09/26/2018	0	0.9	0.9	3.2	0.303 P	0.9	06/11/2167	09/26/2019
2.01	EL	N	0.448	08/14/2006	0.439 RR	02/15/2016	0.438 FH	09/26/2018	0.4	0.8	0.8	6.0	0.303 P	0.8	04/13/2187	09/26/2019
3.01	EL	N	0.444	08/14/2006	0.435 RR	02/15/2016	0.437 FH	09/26/2018	0	0.6	0.6	3.0	0.303 P	0.6	10/18/2241	09/26/2019
4.01	STR-T	N	0.341	08/14/2006	0.333 D5	02/15/2016	0.333 FH	09/26/2018	0	0.7	0.5	7.0	0.206 P	0.7	04/11/2200	09/26/2019
4.02	STR-L	N	0.353	08/14/2006	0.332 RR	02/15/2016	0.331 FH	09/26/2018	0.4	1.8	2.1	8.9	0.206 P	1.8	03/22/2088	09/26/2019
4.03	STR-B	N	0.342	08/14/2006	0.333 RR	02/15/2016	0.335 RR	09/26/2018	0	0.6	0.7	5.0	0.206 P	0.6	11/12/2233	09/26/2019
4.04	STR-R	N	0.336	08/14/2006	0.331 D5	02/15/2016	0.331 RR	09/26/2018	0	0.4	0	7.5	0.206 P	0.4	06/07/2331	09/26/2019
5.01	EL	N	0.334	08/14/2006	0.328 D5	02/15/2016	0.328 RR	09/26/2018	0	0.5	0.4	5.6	0.206 P	0.5	11/22/2262	09/26/2019
6.01	EL	N	0.319	08/14/2006	0.319 D5	02/15/2016	0.319 RR	09/26/2018	0	0	0	1.9	0.206 P	0.1	07/06/3149	09/26/2019
7.01	EL	N *	0.314	08/14/2006	0.313 D5	02/15/2016	0.303 FH	09/26/2018	3.8	0.9	0.5	3.8	0.206 P	3.8	04/13/2044	09/26/2019
8.01	STR-F	N	0.334	08/14/2006	0.325 RR	02/15/2016	0.325 FH	09/26/2018	0	0.7	0.7	2.3	0.206 P	0.7	11/05/2188	09/26/2019
8.02	STR-L	N	0.338	08/14/2006	0.338 RR	02/15/2016	0.339 RR	09/26/2018	0	0	0	3.0	0.206 P	0.1	07/07/3349	09/26/2019
8.03	STR-B	N	0.333	08/14/2006	0.323 D5	02/15/2016	0.323 RR	09/26/2018	0	0.8	0.8	3.0	0.206 P	0.8	01/30/2165	09/26/2019
8.04	STR-R	N *	0.346	08/14/2006	0.330 D5	02/15/2016	0.320 FH	09/26/2018	3.8	2.1	2.1	3.8	0.206 P	3.8	10/03/2048	09/26/2019
9.01	STR-T	N	0.361	08/14/2006	0.354 RR	02/15/2016	0.355 RR	09/26/2018	0	0.5	0.5	10.0	0.206 P	0.5	11/22/2316	09/26/2019
9.02	STR-L	N	0.352	08/14/2006	0.339 RR	02/15/2016	0.336 FH	09/26/2018	1.1	1.3	1.4	2.2	0.206 P	1.3	10/18/2118	09/26/2019
9.03	STR-BTM	N	0.340	08/14/2006	0.329 D5	02/15/2016	0.329 RR	09/26/2018	0	0.9	0.8	5.6	0.206 P	0.9	06/28/2155	09/26/2019
9.04	STR-R	N	0.339	08/14/2006	0.336 D5	02/15/2016	0.336 RR	09/26/2018	0	0.2	0	12.2	0.206 P	0.2	02/15/2669	09/26/2019
10.01	EL	N	0.284	08/14/2006	0.275 RR	02/15/2016	0.280 FH	09/26/2018	0	0.3	0.6	3.8	0.160 P	0.3	03/14/2418	09/26/2019
11.01	EL	N	0.284	08/14/2006	0.275 RR	02/15/2016	0.279 RR	09/26/2018	0	0.4	0.7	3.8	0.160 P	0.4	11/01/2315	09/26/2019

**Corrosion Monitoring Eq/Circ ID Analysis Report**

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

Report Date: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: GAS OUT  
 Eq Type: PIPING  
 Class:  
 CM RBI:

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 1900 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 GAS OUT

Summary: Group Name: Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 04/28/2061

Group Description: RCR = 2.3 MPY  
 Rem. Life (from last survey 09/26/2018) = 42.6 yrs

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

TML No	Location	Ctn	First Survey Thick	First Date	Previous Survey Thick	Previous Date	Last Survey Thick	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
12.01	EL	N	0.284	08/14/2006	0.276 RR	02/15/2016	0.280 FH	09/26/2018	0	0.3	0.4	7.0	0.160 P	0.3	03/14/2418	09/26/2019
13.01	STR-T	N	0.313	08/14/2006	0.309 D5	02/15/2016	0.306 FH	09/26/2018	1.1	0.6	0.3	2.8	0.160 P	1.1	04/26/2151	09/26/2019
13.02	STR-L	N *	0.305	08/14/2006	0.292 RR	02/15/2016	0.286 FH	09/26/2018	2.3	1.6	1.5	7.0	0.160 P	2.3	06/12/2073	09/26/2019
13.03	STR-BTM	N	0.301	08/14/2006	0.288 RR	02/15/2016	0.289 FH	09/26/2018	0	1.0	1.0	2.3	0.160 P	1.0	07/29/2147	09/26/2019
13.04	STR-R	N	0.299	08/14/2006	0.296 D5	02/15/2016	0.296 RR	09/26/2018	0	0.2	0	2.0	0.160 P	0.2	12/06/2697	09/26/2019
14.01	EL	N	0.288	08/14/2006	0.277 RR	02/15/2016	0.280 RR	09/26/2018	0	0.7	0.8	3.8	0.160 P	0.7	12/07/2189	09/26/2019
15.01	EL	N	0.286	08/14/2006	0.281 D5	02/15/2016	0.280 FH	09/26/2018	0.4	0.5	0.2	5.0	0.160 P	0.5	05/31/2258	09/26/2019
16.01	EL	N	0.291	08/14/2006	0.282 D5	02/15/2016	0.282 RR	09/26/2018	0	0.7	0.7	4.8	0.160 P	0.7	10/15/2192	09/26/2019
17.01	STR-T	N	0.336	08/14/2006	0.328 RR	02/15/2016	0.328 FH	09/26/2018	0	0.7	0.6	4.0	0.206 P	0.7	02/17/2193	09/26/2019
17.02	STR-L	N *	0.345	08/14/2006	0.339 RR	02/15/2016	0.334 FH	09/26/2018	1.9	0.9	0.6	5.0	0.206 P	1.9	02/22/2086	09/26/2019
17.03	STR-BTM	N	0.352	08/14/2006	0.357 RR	02/15/2016	0.356 FH	09/26/2018	0.4	0	0	0.4	0.206 P	0.4	12/06/2393	09/26/2019
17.04	STR-R	N	0.342	08/14/2006	0.335 D5	02/15/2016	0.335 RR	09/26/2018	0	0.6	0.3	4.7	0.206 P	0.6	11/12/2233	09/26/2019
18.01	EL	N	0.338	08/14/2006	0.331 RR	02/15/2016	0.340 RR	09/26/2018	0	0	0.5	10.0	0.206 P	0.1	07/07/3359	09/26/2019
19.01	EL	N	0.331	08/14/2006	0.322 RR	02/15/2016	0.323 FH	09/26/2018	0	0.7	0.7	5.0	0.206 P	0.7	12/27/2185	09/26/2019
20.01	EL	N	0.325	08/14/2006	0.323 D5	02/15/2016	0.322 FH	09/26/2018	0.4	0.2	0.3	4.8	0.206 P	0.4	12/06/2308	09/26/2019
21.01	TEB-L	N	0.447	08/14/2006	0.436 RR	02/15/2016	0.437 RR	09/26/2018	0	0.8	0.8	3.3	0.206 P	0.8	08/03/2307	09/26/2019
21.02	TEB-B	N	0.463	08/14/2006	0.455 D5	02/15/2016	0.455 RR	09/26/2018	0	0.7	0.5	5.6	0.206 P	0.7	07/26/2374	09/26/2019
21.03	TEB-R	N	0.444	08/14/2006	0.424 RR	02/15/2016	0.432 RR	09/26/2018	0	1.0	1.3	4.5	0.206 P	1.0	10/25/2244	09/26/2019
22.01	EL-T	N	0.372	08/14/2006	0.365 RR	02/15/2016	0.374 RR	09/26/2018	0	0	0.2	6.7	0.206 P	0.1	07/09/3699	09/26/2019
22.02	EL-B	N *	0.363	08/14/2006	0.355 RR	02/15/2016	0.348 FH	09/26/2018	2.7	1.2	0.6	2.7	0.206 P	2.7	05/11/2071	09/26/2019
23.01	STR-T	N	0.341	08/14/2006	0.329 RR	02/15/2016	0.330 FH	09/26/2018	0	0.9	1.0	4.5	0.206 P	0.9	08/07/2156	09/26/2019



**Corrosion Monitoring Eq/Circ ID Analysis Report**

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Report Date: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: GAS OUT  
 Eq Type: PIPING  
 Class:  
 CM RBI:  
 Design Code: B31.3

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 1900 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 GAS OUT

Summary: Group Name: Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 04/28/2061

Group Description: RCR = 2.3 MPY  
 Rem. Life (from last survey 09/26/2018) = 42.6 yrs

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

TML No	Location	Ctn TML	First Survey Thick Nt	First Date	Previous Survey Thick Nt	Previous Date	Last Survey Thick Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
23.02	STR-L	N *	0.353	08/14/2006	0.345 RR	02/15/2016	0.332 FH	09/26/2018	5.0	1.7	1.3	5.0	0.206 P	5.0	12/14/2043	09/26/2019
23.03	STR-B	N	0.358	08/14/2006	0.347 RR	02/15/2016	0.348 RR	09/26/2018	0	0.8	0.9	2.2	0.206 P	0.8	05/01/2196	09/26/2019
23.04	STR-R	N	0.337	08/14/2006	0.334 D5	02/15/2016	0.334 RR	09/26/2018	0	0.2	0	3.7	0.206 P	0.2	02/15/2659	09/26/2019
24.01	EL	N	0.338	08/14/2006	0.330 RR	02/15/2016	0.335 RR	09/26/2018	0	0.2	0.2	6.0	0.206 P	0.2	02/15/2664	09/26/2019
25.01	EL	N	0.344	08/14/2006	0.335 RR	02/15/2016	0.342 RR	09/26/2018	0	0.2	0.3	6.0	0.206 P	0.2	02/15/2699	09/26/2019
26.01	EL	N	0.343	08/14/2006	0.340 RR	02/15/2016	0.343 FH	09/26/2018	0	0	0	2.1	0.206 P	0.1	07/07/3389	09/26/2019

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Report Date: 11/01/2018

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

Unit: HS-0026  
Eq/Circ ID: GAS OUT  
Design Code: B31.3  
Eq Type: PIPING  
Class:  
CM REI:

Flange Rating: 2025 lb/in<sup>2</sup>  
Design Pressure: 1900 lb/in<sup>2</sup>  
Design Temperature: 200 °F

Description: HS-0026 GAS OUT

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 : 0.9 MPY  
(B) -- Average Max 25.0% of TMLs, Min of 2 : 2.3 MPY  
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 1.1 MPY  
(D) -- Default Corrosion Rate : 0.1 MPY  
Representative Corrosion Rate = 2.3 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).

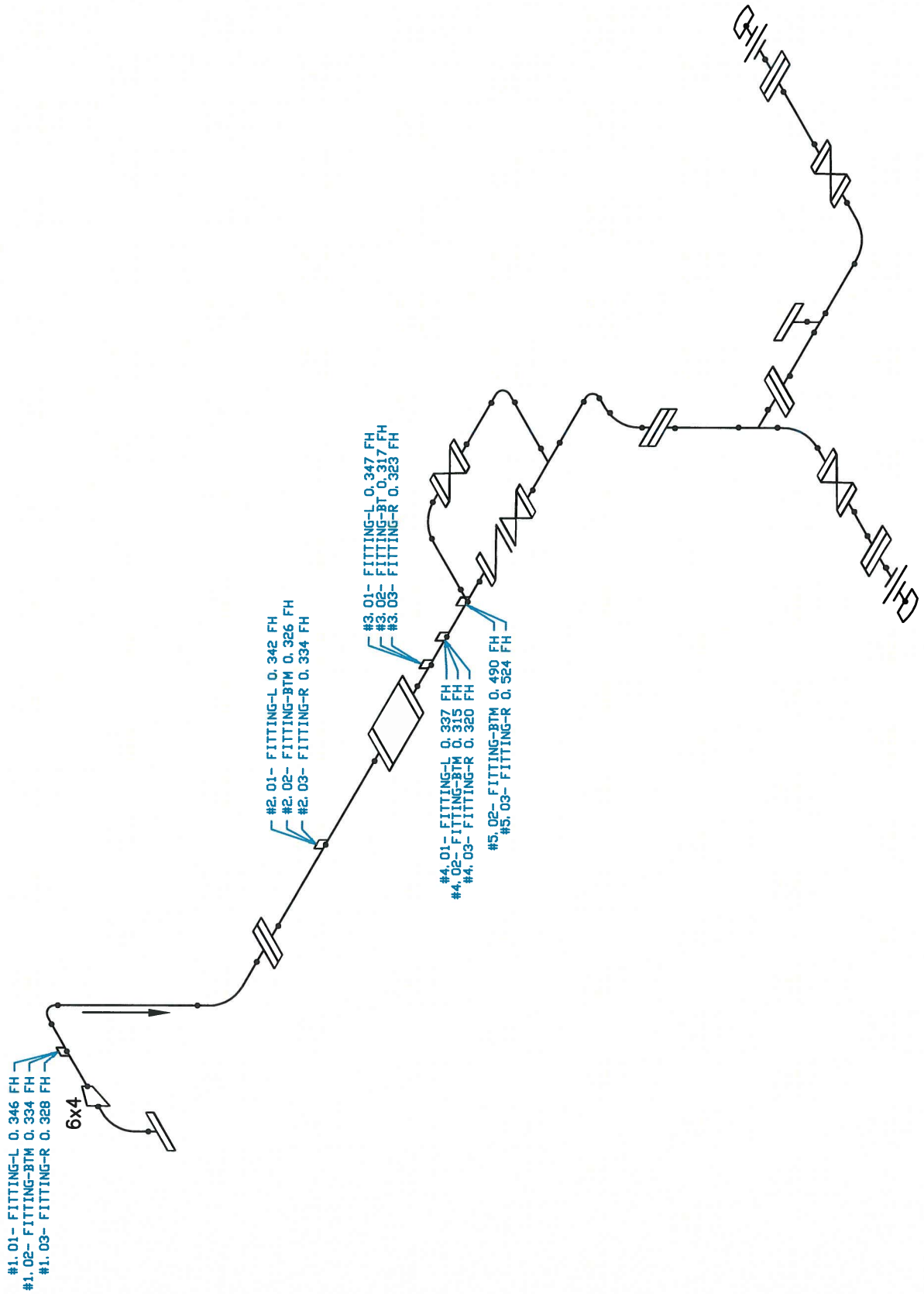
Eq/Circ ID Estimated life = 42.6 years from the most recent survey date.  
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 04/28/2061

Recommended Eq/Circ UT/RT Inspection Date is 09/26/2019  
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.

**EQUIP RETIREMENT DATE: 12/18/2033**  
**NEXT INSPECTION IS DUE: 9/26/2019**



CAL BLK: 51°F  
PIPE: 40°F

FH2E-D

DESC: GAS OUT-6/4/3 SCH 80/40 PIPE  
DWG#: GAS-OUT-SP-1.01-5.03

HS0026-P1

**Corrosion Monitoring Eq/Circ ID Analysis Report**

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Report Date: 11/01/2018

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

Unit: HS-0026  
 Eq/circ ID: GAS OUT-SP  
 Eg Type: PIPING  
 Class:  
 CM RBI:  
 Design Code: B31.3

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 1900 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 GAS OUT

Summary: Group Name: Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 12/18/2033  
 Group Description: RCR = 2.2 MPY  
 Rem. Life (from last survey 09/26/2018) = 15.2 yrs

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

TMl No	Location	Ctn TML	First Survey Thick Nt	First Date	Previous Survey Thick Nt	Previous Date	Last Survey Thick Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	Retirement Date	TMl Inspection Date
1.01	FITTING-L	N *	0.361	02/14/2013	0.336 RR	02/15/2016	0.345 RR	09/26/2018	0	2.9	1.5	25.6	0.303 P	2.9	02/28/2033	09/26/2019
1.02	FITTING-BTM	N	0.342	02/14/2013	0.336 D5	02/15/2016	0.334 FH	09/26/2018	0.8	1.4	1.3	4.3	0.303 P	1.4	10/04/2040	09/26/2019
1.03	FITTING-R	N *	0.336	02/14/2013	0.329 D5	02/15/2016	0.328 FH	09/26/2018	0.4	1.4	1.5	3.7	0.303 P	1.4	06/22/2036	09/26/2019
2.01	FITTING-L	N	0.348	02/14/2013	0.340 RR	02/15/2016	0.342 FH	09/26/2018	0	1.1	1.2	8.0	0.303 P	1.1	01/14/2054	09/26/2019
2.02	FITTING-BTM	N *	0.333	02/14/2013	0.329 RR	02/15/2016	0.326 FH	09/26/2018	1.1	1.2	0.9	5.3	0.303 P	1.2	10/06/2037	09/26/2019
2.03	FITTING-R	N *	0.343	02/14/2013	0.336 D5	02/15/2016	0.334 FH	09/26/2018	0.8	1.6	1.8	4.0	0.303 P	1.6	01/03/2038	09/26/2019
3.01	FITTING-L	N	0.340	02/14/2013	0.340 RR	02/15/2016	0.347 FH	09/26/2018	0	0	0	2.7	0.303 P	0.1	01/26/2457	09/26/2019
3.02	FITTING-BT	N *	0.327	02/14/2013	0.320 D5	02/15/2016	0.317 FH	09/26/2018	1.1	1.8	1.8	4.7	0.303 P	1.8	06/03/2026	09/26/2019
3.03	FITTING-R	N *	0.321	02/14/2013	0.327 RR	02/15/2016	0.323 FH	09/26/2018	1.5	0	0	1.5	0.303 P	1.5	12/16/2031	09/26/2019
4.01	FITTING-L	N	0.338	02/14/2013	0.336 RR	02/15/2016	0.337 FH	09/26/2018	0	0.2	0.2	2.5	0.206 P	0.2	02/15/2674	09/26/2019
4.02	FITTING-BTM	N	0.320	02/14/2013	0.320 D5	02/15/2016	0.315 FH	09/26/2018	1.9	0.9	0.8	2.5	0.206 P	1.9	02/22/2076	09/26/2019
4.03	FITTING-R	N	0.324	02/14/2013	0.320 RR	02/15/2016	0.320 FH	09/26/2018	0	0.7	0.7	3.0	0.206 P	0.7	09/14/2181	09/26/2019
5.02	FITTING-BTM	N	0.488	02/14/2013	0.474 RR	02/15/2016	0.490 FH	09/26/2018	0	0	0	15.0	0.206 P	0.1	10/11/4018	09/26/2019
5.03	FITTING-R	N	0.524	02/14/2013	0.519 RR	02/15/2016	0.524 FH	09/26/2018	0	0	0	4.3	0.206 P	0.1	10/11/4018	09/26/2019

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: 11/01/2018

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

Unit: HS-0026  
Eq/Circ ID: GAS OUT-SP  
Design Code: B31.3  
Eq Type: PIPING  
Class:  
CM RBI:

Flange Rating: 2025 lb/in?  
Design Pressure: 1900 lb/in?  
Design Temperature: 200 °F

Description: HS-0026 GAS OUT

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 : 1.1 MPY  
(B) -- Average Max 25.0% of TMLs, Min of 2 : 2.2 MPY  
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 1.5 MPY  
(D) -- Default Corrosion Rate : 0.1 MPY  
Representative Corrosion Rate = 2.2 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).

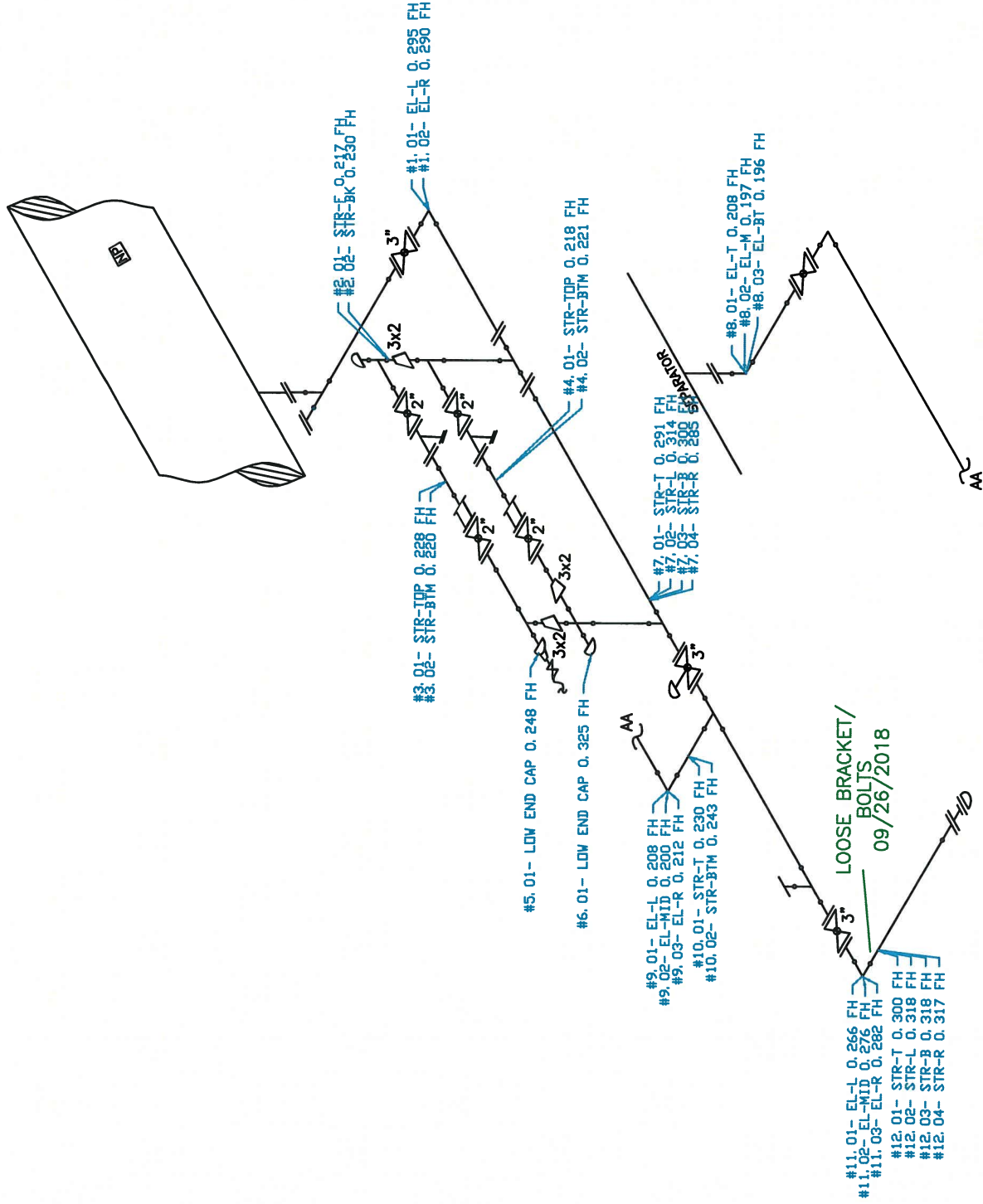
Eq/Circ ID Estimated life = 15.2 years from the most recent survey date.  
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 12/18/2033

Recommended Eq/Circ UT/RT Inspection Date is 09/26/2019  
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.

**EQUIP RETIREMENT DATE: 4/6/2047**  
**NEXT INSPECTION IS DUE: 9/26/2019**



HS0026-P2

**DESC: OIL OUT-(2,3 INCH SCH80 PIPE)**  
**DWG#: OIL-OUT-1.01-12.04**

FH2E-D

CAL BLK: 51°F  
 PIPE: 44-46°F

**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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: OIL OUT  
 Eq Type: PIPING  
 Class: 2  
 CM RBI:  
 Design Code: B31.3

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 2000 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 OIL OUT LINE

Summary: Group Name: Group Description:  
 Insp. Due Date = 09/26/2019 RCR = 3.3 MPY  
 Pred. Ret. Date = 04/06/2047 Rem. Life (from last survey 09/26/2018) = 28.5 Yrs

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

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
1.01	EL-L	N	0.287	09/08/2009	0.286 RR	02/15/2016	0.287 RR	09/26/2018	0	0	0.2	4.0	0.168 P	0.1	01/25/3206	09/26/2019
1.02	EL-R	N	0.291	08/14/2006	0.294 RR	02/15/2016	0.290 FH	09/26/2018	1.5	0.1	0	4.0	0.168 P	1.5	11/21/2099	09/26/2019
2.01	STR-F	N *	0.230	09/08/2009	0.226 RR	02/15/2016	0.217 FH	09/26/2018	3.4	1.4	1.3	3.4	0.120 S	3.4	04/07/2047	09/26/2019
2.02	STR-BK	N	0.222	08/14/2006	0.216 RR	02/15/2016	0.220 RR	09/26/2018	0	0.2	0	2.0	0.120 S	0.2	09/30/2518	09/26/2019
3.01	STR-TOP	N	0.220	08/14/2006	0.230 RR	02/15/2016	0.228 FH	09/26/2018	0.8	0	0	2.0	0.120 S	0.8	09/27/2153	09/26/2019
3.02	STR-BTM	N	0.228	09/08/2009	0.214 RR	02/15/2016	0.220 FH	09/26/2018	0	0.9	1.0	5.8	0.120 S	0.9	11/06/2129	09/26/2019
4.01	STR-TOP	N *	0.226	08/14/2006	0.226 RR	02/15/2016	0.218 FH	09/26/2018	3.1	0.7	0	3.1	0.120 S	3.1	05/08/2050	09/26/2019
4.02	STR-BTM	N	0.220	09/08/2009	0.213 RR	02/15/2016	0.220 RR	09/26/2018	0	0	0	4.0	0.120 S	0.1	10/04/3018	09/26/2019
5.01	LOW END CAP	N *	0.243	08/14/2006	0.184 RR	02/15/2016	0.196 RR	09/26/2018	0	3.9	2.9	10.0	0.120 S	3.9	03/23/2038	09/26/2019
6.01	LOW END CAP	N	0.329	08/14/2006	0.301 RR	02/15/2016	0.304 RR	09/26/2018	0	2.1	2.8	17.1	0.168 P	2.1	05/15/2083	09/26/2019
7.01	STR-T	N	0.310	09/08/2009	0.218 RR	02/15/2016	0.291 FH	09/26/2018	0	2.1	5.5	104.7	0.168 P	2.1	03/06/2077	09/26/2019
7.02	STR-L	N	0.300	09/08/2009	0.293 RR	02/15/2016	0.302 RR	09/26/2018	0	0	0	6.7	0.168 P	0.1	01/27/3356	09/26/2019
7.03	STR-B	N	0.286	09/08/2009	0.282 D5	02/15/2016	0.282 RR	09/26/2018	0	0.4	0.3	6.7	0.168 P	0.4	01/26/2303	09/26/2019
7.04	STR-R	N	0.289	08/14/2006	0.293 RR	02/15/2016	0.285 FH	09/26/2018	3.1	0.3	0	3.1	0.168 P	3.1	05/23/2056	09/26/2019
8.01	EL-T	N	0.201 TC	03/23/2012	0.201 RR	02/15/2016	0.208 FH	09/26/2018	0	0	0	0	0.114 P	0.1	12/05/2956	09/26/2019
8.02	EL-M	N	0.202 D5	02/15/2016		N/A	0.197 FH	09/26/2018	N/A	1.9	N/A	1.9	0.114 P	1.9	04/29/2062	09/26/2019
8.03	EL-BT	N *	0.204 D5	02/15/2016		N/A	0.196 FH	09/26/2018	N/A	3.1	N/A	3.1	0.114 P	3.1	02/16/2045	09/26/2019
9.01	EL-L	N	0.201	09/08/2009	0.197 RR	02/15/2016	0.208 FH	09/26/2018	0	0	0	4.0	0.120 S	0.1	10/02/2898	09/26/2019
9.02	EL-MID	N	0.199	09/08/2009	0.184 RR	02/15/2016	0.197 RR	09/26/2018	0	0.2	0.8	9.0	0.120 S	0.2	09/29/2403	09/26/2019
9.03	EL-R	N	0.211	08/14/2006	0.195 RR	02/15/2016	0.202 RR	09/26/2018	0	0.7	1.0	4.5	0.120 S	0.7	11/18/2135	09/26/2019

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: 11/01/2018

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

Unit: HS-0026  
 Eq/circ ID: OIL OUT  
 Eq Type: PIPING  
 Class: 2  
 CM RBI:  
 Design Code: B31.3

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 2000 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 OIL OUT LINE

Summary: Group Name: Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 04/06/2047

Group Description: RCR = 3.3 MPY  
 Rem. Life (from last survey 09/26/2018) = 28.5 yrs

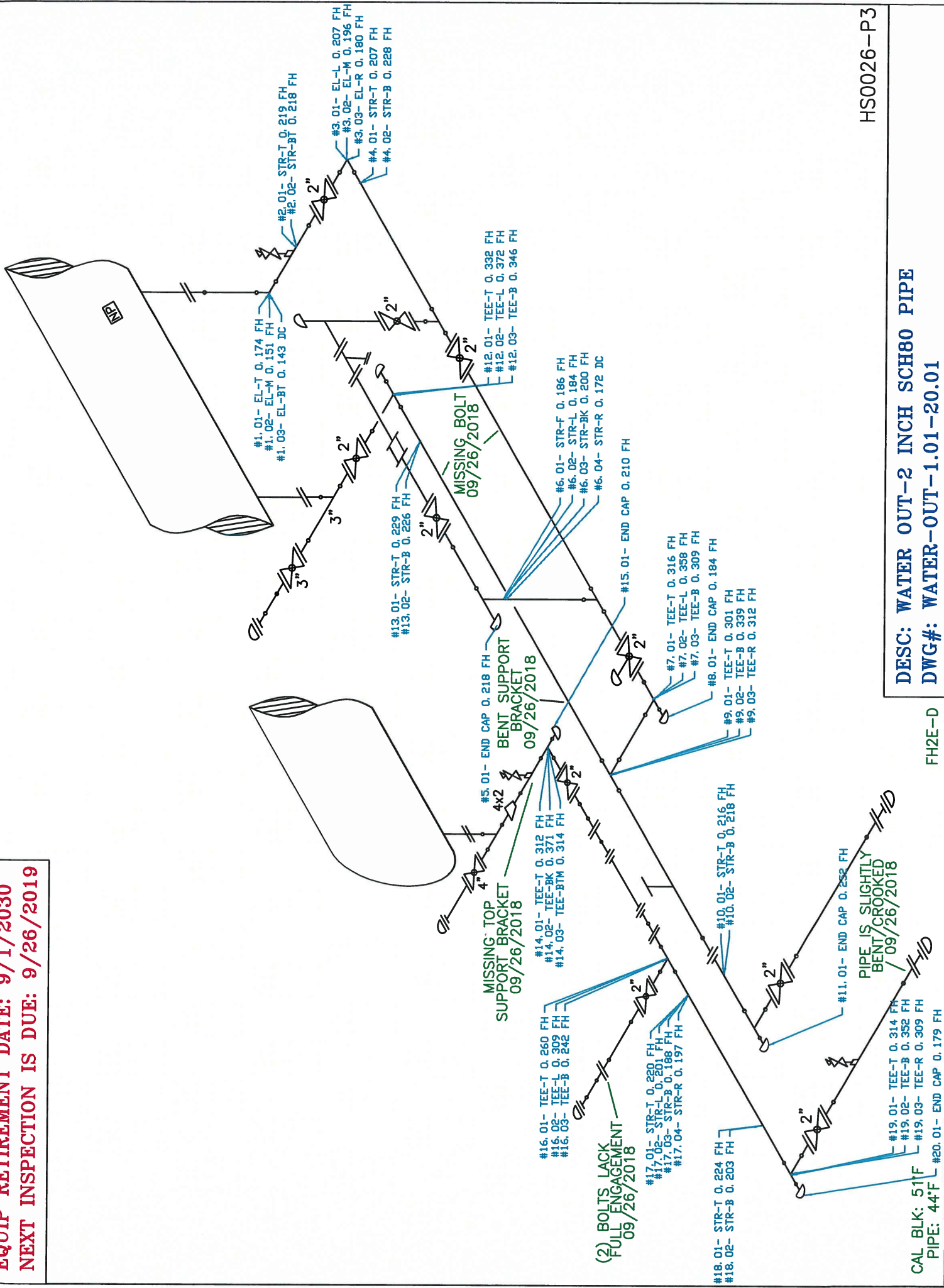
0 C.A. Status: NO  
 Total Caution TMLs = 0

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
10.01	STR-T	N *	0.246		09/08/2009	0.240 D5		02/15/2016	0.230 FH		09/26/2018	3.8	1.8	1.1	28.1	0.120 S	3.8	09/07/2047	09/26/2019
10.02	STR-BTM	N	0.219		08/14/2006	0.218 RR		02/15/2016	0.220 RR		09/26/2018	0	0	0	1.5	0.120 S	0.1	10/04/3018	09/26/2019
11.01	EL-L	N *	0.270		09/08/2009	0.273 RR		02/15/2016	0.266 FH		09/26/2018	2.7	0.4	0.3	3.2	0.168 P	2.7	12/07/2054	09/26/2019
11.02	EL-MID	N	0.265		09/08/2009	0.263 RR		02/15/2016	0.270 RR		09/26/2018	0	0	0	4.3	0.168 P	0.1	01/25/3036	09/26/2019
11.03	EL-R	N	0.273		08/14/2006	0.257 RR		02/15/2016	0.277 RR		09/26/2018	0	0	0	3.8	0.168 P	0.1	01/25/3106	09/26/2019
12.01	STR-T	N	0.322		09/08/2009	0.300 RR		02/15/2016	0.300 FH		09/26/2018	0	2.4	3.1	26.7	0.168 P	2.4	08/16/2073	09/26/2019
12.02	STR-L	N	0.308		09/08/2009	0.315 RR		02/15/2016	0.318 FH		09/26/2018	0	0	0	0	0.168 P	0.1	01/29/3516	09/26/2019
12.03	STR-B	N	0.318		08/14/2006	0.307 RR		02/15/2016	0.318 FH		09/26/2018	0	0	0.4	12.2	0.168 P	0.1	01/29/3516	09/26/2019
12.04	STR-R	N	0.312		09/08/2009	0.312 RR		02/15/2016	0.317 FH		09/26/2018	0	0	0	11.1	0.168 P	0.1	01/28/3506	09/26/2019





**EQUIP RETIREMENT DATE: 9/1/2030**  
**NEXT INSPECTION IS DUE: 9/26/2019**



**DESC: WATER OUT-2 INCH SCH80 PIPE**  
**DWG#: WATER-OUT-1.01-20.01**

HS0026-P3

FH2E-D

CAL BLK: 51°F  
 PIPE: 44°F

#18.01- STR-T 0.224 FH  
 #18.02- STR-B 0.203 FH  
 #19.01- TEE-T 0.314 FH  
 #19.02- TEE-B 0.352 FH  
 #19.03- TEE-R 0.309 FH  
 #20.01- END CAP 0.179 FH

#11.01- END CAP 0.232 FH  
 PIPE IS SLIGHTLY BENT/CROOKED 09/26/2018

#9.01- TEE-T 0.301 FH  
 #9.02- TEE-B 0.339 FH  
 #9.03- TEE-R 0.312 FH  
 #8.01- END CAP 0.184 FH  
 #7.01- TEE-T 0.316 FH  
 #7.02- TEE-L 0.358 FH  
 #7.03- TEE-B 0.309 FH

#15.01- END CAP 0.210 FH  
 #6.01- STR-F 0.186 FH  
 #6.02- STR-L 0.184 FH  
 #6.03- STR-BK 0.200 FH  
 #6.04- STR-R 0.172 DC

#12.01- TEE-T 0.392 FH  
 #12.02- TEE-L 0.372 FH  
 #12.03- TEE-B 0.346 FH

#13.01- STR-T 0.229 FH  
 #13.02- STR-B 0.226 FH  
 #1.01- EL-T 0.174 FH  
 #1.02- EL-M 0.151 FH  
 #1.03- EL-BT 0.143 DC  
 #2.01- STR-T 0.219 FH  
 #2.02- STR-BT 0.218 FH  
 #3.01- EL-L 0.207 FH  
 #3.02- EL-M 0.196 FH  
 #3.03- EL-R 0.180 FH  
 #4.01- STR-T 0.207 FH  
 #4.02- STR-B 0.228 FH

MISSING TOP SUPPORT BRACKET 09/26/2018  
 BENT SUPPORT BRACKET 09/26/2018  
 MISSING BOLT 09/26/2018

(2) BOLTS LACK FULL ENGAGEMENT 09/26/2018

PIPE IS SLIGHTLY BENT/CROOKED 09/26/2018

#16.01- TEE-T 0.260 FH  
 #16.02- TEE-L 0.309 FH  
 #16.03- TEE-B 0.242 FH  
 #14.01- TEE-T 0.312 FH  
 #14.02- TEE-BK 0.371 FH  
 #14.03- TEE-BTM 0.314 FH  
 #17.01- STR-T 0.220 FH  
 #17.02- STR-B 0.204 FH  
 #17.03- STR-B 0.188 FH  
 #17.04- STR-R 0.197 FH

#10.01- STR-T 0.216 FH  
 #10.02- STR-B 0.218 FH

#12.01- TEE-T 0.392 FH  
 #12.02- TEE-L 0.372 FH  
 #12.03- TEE-B 0.346 FH

#15.01- END CAP 0.210 FH  
 #6.01- STR-F 0.186 FH  
 #6.02- STR-L 0.184 FH  
 #6.03- STR-BK 0.200 FH  
 #6.04- STR-R 0.172 DC

#9.01- TEE-T 0.301 FH  
 #9.02- TEE-B 0.339 FH  
 #9.03- TEE-R 0.312 FH  
 #8.01- END CAP 0.184 FH  
 #7.01- TEE-T 0.316 FH  
 #7.02- TEE-L 0.358 FH  
 #7.03- TEE-B 0.309 FH

#18.01- STR-T 0.224 FH  
 #18.02- STR-B 0.203 FH  
 #19.01- TEE-T 0.314 FH  
 #19.02- TEE-B 0.352 FH  
 #19.03- TEE-R 0.309 FH  
 #20.01- END CAP 0.179 FH

#13.01- STR-T 0.229 FH  
 #13.02- STR-B 0.226 FH  
 #1.01- EL-T 0.174 FH  
 #1.02- EL-M 0.151 FH  
 #1.03- EL-BT 0.143 DC  
 #2.01- STR-T 0.219 FH  
 #2.02- STR-BT 0.218 FH  
 #3.01- EL-L 0.207 FH  
 #3.02- EL-M 0.196 FH  
 #3.03- EL-R 0.180 FH  
 #4.01- STR-T 0.207 FH  
 #4.02- STR-B 0.228 FH

**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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: WATER OUT  
 Eq Type: PIPING  
 Class: 2  
 CM RBI:  
 Design Code: B31.3

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 2000 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 WATER OUT LINE

Summary: Group Name: Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 09/01/2030  
 Group Description: RCR = 5.7 MPY  
 Rem. Life (from last survey 09/26/2018) = 11.9 Yrs

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

TML No	Location	Ctn	First Survey Thick	First Survey Nt	First Date	Previous Survey Thick	Previous Survey Nt	Previous Date	Last Survey Thick	Last Survey Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
1.01	EL-T	N	0.170		03/23/2012	0.163 RR		02/15/2016	0.174 FH		09/26/2018	0	0	0	10.0	0.114 P	0.1	12/03/2616	09/26/2019
1.02	EL-M	N	0.153 D5		02/15/2016			N/A	0.151 FH		09/26/2018	N/A	0.8	N/A	0.8	0.114 P	0.8	10/03/2064	09/26/2019
1.03	EL-BT	N *	0.157 D5		02/15/2016			N/A	0.143 FH		09/26/2018	N/A	5.4	N/A	5.4	0.114 P	5.4	01/27/2024	09/26/2019
2.01	STR-T	N	0.211		03/23/2012	0.191 RR		02/15/2016	0.219 FH		09/26/2018	0	0	0	11.0	0.114 P	0.1	12/06/3066	09/26/2019
2.02	STR-BT	N	0.227 D5		02/15/2016			N/A	0.218 FH		09/26/2018	N/A	3.4	N/A	3.4	0.114 P	3.4	04/09/2049	09/26/2019
3.01	EL-L	N	0.179 D5		02/15/2016			N/A	0.179 RR		09/26/2018	N/A	0	N/A	0	0.114 P	0.1	12/03/2666	09/26/2019
3.02	EL-M	N	0.180 D5		02/15/2016			N/A	0.180 RR		09/26/2018	N/A	0	N/A	0	0.114 P	0.1	12/03/2676	09/26/2019
3.03	EL-R	N *	0.208 RP		03/23/2012	0.184 D5		02/15/2016	0.180 FH		09/26/2018	1.5	4.3	4.3	8.4	0.114 P	4.3	01/16/2034	09/26/2019
4.01	STR-T	N	0.219 RP		03/23/2012	0.199 RR		02/15/2016	0.207 FH		09/26/2018	0	1.8	1.7	11.1	0.114 P	1.8	05/27/2070	09/26/2019
4.02	STR-B	N	0.211 RP		03/23/2012	0.199 RR		02/15/2016	0.217 RR		09/26/2018	0	0	0	10.0	0.114 P	0.1	10/04/3048	09/26/2019
5.01	END CAP	N	0.242		08/14/2006	0.186 RR		02/15/2016	0.188 RR		09/26/2018	0	4.5	4.1	12.5	0.114 P	4.5	03/07/2035	09/26/2019
6.01	STR-F	N	0.234		08/14/2006	0.181 RR		02/15/2016	0.186 FH		09/26/2018	0	4.0	5.4	30.1	0.114 P	4.0	09/26/2036	09/26/2019
6.02	STR-L	N *	0.228		09/08/2009	0.191 RR		02/15/2016	0.184 FH		09/26/2018	2.7	4.9	5.6	29.0	0.114 P	4.9	01/08/2033	09/26/2019
6.03	STR-BK	N	0.230		09/08/2009	0.180 RR		02/15/2016	0.200 FH		09/26/2018	0	3.3	5.4	27.1	0.114 P	3.3	10/18/2044	09/26/2019
6.04	STR-R	N *	0.224		09/08/2009	0.175 RR		02/15/2016	0.172 FH		09/26/2018	1.1	5.7	6.8	41.2	0.114 P	5.7	11/29/2028	09/26/2019
7.01	TEE-T	N	0.324		01/22/2014	0.306 D5		02/15/2016	0.306 RR		09/26/2018	0	3.8	4.3	16.9	0.114 P	3.8	03/19/2069	09/26/2019
7.02	TEE-L	N	0.362		01/22/2014	0.358 D5		02/15/2016	0.358 FH		09/26/2018	0	0.9	0.6	4.0	0.114 P	0.9	08/25/2289	09/26/2019
7.03	TEE-B	N	0.302		01/22/2014	0.291 RR		02/15/2016	0.309 FH		09/26/2018	0	0	0	11.0	0.114 P	0.1	12/13/3966	09/26/2019
8.01	END CAP	N	0.229		08/14/2006	0.170 RR		02/15/2016	0.179 RR		09/26/2018	0	4.1	5.7	37.5	0.114 P	4.1	07/18/2034	09/26/2019
9.01	TEE-T	N	0.330		03/23/2012	0.303 D5		02/15/2016	0.301 FH		09/26/2018	0.8	4.5	4.0	22.4	0.114 P	4.5	04/01/2060	09/26/2019

**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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: WATER OUT  
 Eq Type: PIPING  
 Class: 2  
 CM RBI:  
 Design Code: B31.3

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 2000 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 WATER OUT LINE

Summary: Group Name: Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 09/01/2030  
 Group Description: RCR = 5.7 MPY  
 Rem. Life (from last survey 09/26/2018) = 11.9 yrs

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

TML No	Location	Ctn TML	First Survey Thick Nt	First Date	Previous Survey Thick Nt	Previous Date	Last Survey Thick Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
9.02	TEE-B	N	0.314	03/23/2012	0.297 D5	02/15/2016	0.229 RR	09/26/2018	0	2.6	1.4	20.0	0.114 P	2.6	01/18/2089	09/26/2019
9.03	TEE-R	N	0.328	03/23/2012	0.312 RR	02/15/2016	0.312 FH	09/26/2018	0	2.5	2.6	8.5	0.114 P	2.5	11/11/2097	09/26/2019
10.01	STR-T	N	0.235	09/08/2009	0.184 RR	02/15/2016	0.216 FH	09/26/2018	0	2.1	4.7	24.6	0.114 P	2.1	03/22/2067	09/26/2019
10.02	STR-B	N	0.224	08/14/2006	0.216 RR	02/15/2016	0.218 FH	09/26/2018	0	0.5	0	3.2	0.114 P	0.5	05/18/2226	09/26/2019
11.01	END CAP	N	0.231	08/14/2006	0.200 RR	02/15/2016	0.206 RR	09/26/2018	0	2.1	3.2	51.9	0.114 P	2.1	06/17/2062	09/26/2019
12.01	TEE-T	N	0.227	08/14/2006	0.323 D5	02/15/2016	0.323 RR	09/26/2018	0	0	0	29.0	0.114 P	0.1	10/11/4018	09/26/2019
12.02	TEE-L	N	0.318	01/22/2014	0.320 RR	02/15/2016	0.372 FH	09/26/2018	0	0	0	0	0.114 P	0.1	10/11/4018	09/26/2019
12.03	TEE-B	N	0.324	01/22/2014	0.324 RR	02/15/2016	0.346 FH	09/26/2018	0	0	0	0	0.114 P	0.1	10/11/4018	09/26/2019
13.01	STR-T	N	0.236	09/08/2009	0.215 RR	02/15/2016	0.229 FH	09/26/2018	0	0.8	1.2	19.2	0.114 P	0.8	04/05/2162	09/26/2019
13.02	STR-B	N	0.220	08/14/2006	0.222 D5	02/15/2016	0.222 RR	09/26/2018	0	0	0	7.5	0.114 P	0.1	12/06/3096	09/26/2019
14.01	TEE-T	N	0.335 RP	03/09/2011	0.328 D5	02/15/2016	0.312 FH	09/26/2018	6.1	3.0	2.4	6.1	0.114 P	6.1	03/02/2051	09/26/2019
14.02	TEE-BK	N	0.388 RP	03/09/2011	0.370 RR	02/15/2016	0.371 FH	09/26/2018	0	2.3	2.6	12.0	0.114 P	2.3	05/26/2130	09/26/2019
14.03	TEE-BTM	N	0.325 RP	03/09/2011	0.306 D5	02/15/2016	0.306 RR	09/26/2018	0	2.5	3.3	22.5	0.114 P	2.5	06/19/2095	09/26/2019
15.01	END CAP	N	0.209 RP	03/09/2011	0.141 RR	02/15/2016	0.210 FH	09/26/2018	0	0	3.3	53.2	0.114 P	0.1	12/05/2976	09/26/2019
16.01	TEE-T	N	0.277	03/23/2012	0.254 D5	02/15/2016	0.254 RR	09/26/2018	0	3.5	3.7	14.0	0.114 P	3.5	09/07/2058	09/26/2019
16.02	TEE-L	N	0.302	03/23/2012	0.306 RR	02/15/2016	0.309 FH	09/26/2018	0	0	0	0	0.114 P	0.1	12/13/3966	09/26/2019
16.03	TEE-B	N	0.253	03/23/2012	0.247 RR	02/15/2016	0.242 FH	09/26/2018	1.9	1.7	1.6	3.3	0.114 P	1.9	01/03/2086	09/26/2019
17.01	STR-T	N	0.223	03/23/2012	0.218 D5	02/15/2016	0.218 RR	09/26/2018	0	0.8	1.1	7.0	0.114 P	0.8	07/05/2148	09/26/2019
17.02	STR-L	N	0.203	03/23/2012	0.200 D5	02/15/2016	0.200 RR	09/26/2018	0	0.5	0.5	2.1	0.114 P	0.5	05/17/2190	09/26/2019
17.03	STR-B	N	0.199	03/23/2012	0.198 D5	02/15/2016	0.188 FH	09/26/2018	3.8	1.7	1.6	3.8	0.114 P	3.8	02/28/2038	09/26/2019
17.04	STR-R	N	0.201	03/23/2012	0.193 D5	02/15/2016	0.193 RR	09/26/2018	0	1.2	1.6	6.6	0.114 P	1.2	06/01/2084	09/26/2019

**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: 11/01/2018

Unit: HS-0026  
 Eq/Circ ID: WATER OUT  
 Eq Type: PIPING  
 Class: 2  
 CM RBI:  
 Design Code: B31.3

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 2000 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

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

Description: HS-0026 WATER OUT LINE

Summary: Group Name:  
 Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 09/01/2030

Group Description:  
 RCR = 5.7 MPY  
 Rem. Life (from last survey 09/26/2018) = 11.9 yrs

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

TML No	Location	Ctn TML	First Survey Thick Nt	First Date	Previous Survey Thick Nt	Previous Date	Last Survey Thick Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
18.01	STR-T	N	0.239	08/14/2006	0.225 D5	02/15/2016	0.224 FH	09/26/2018	0.4	1.2	1.1	3.7	0.114 P	1.2	04/03/2110	09/26/2019
18.02	STR-B	N	0.222	08/14/2006	0.206 D5	02/15/2016	0.203 FH	09/26/2018	1.1	1.6	0.8	8.4	0.114 P	1.6	03/31/2074	09/26/2019
19.01	TEE-T	N	0.339	08/14/2006	0.310 RR	02/15/2016	0.314 FH	09/26/2018	0	2.1	1.6	18.2	0.114 P	2.1	11/21/2113	09/26/2019
19.02	TEE-B	N	0.331	08/14/2006	0.291 RR	02/15/2016	0.305 RR	09/26/2018	0	2.1	2.8	13.9	0.114 P	2.1	08/09/2109	09/26/2019
19.03	TEE-R	N *	0.358	08/14/2006	0.346 RR	02/15/2016	0.309 FH	09/26/2018	14.2	4.0	3.1	14.2	0.114 P	14.2	06/15/2032	09/26/2019
20.01	END CAP	N *	0.238	08/14/2006	0.166 RR	02/15/2016	0.178 RR	09/26/2018	0	5.0	4.7	10.5	0.114 P	5.0	07/02/2031	09/26/2019

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: 11/01/2018

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

Unit: HS-0026  
Eq/Circ ID: WATER OUT  
Design Code: B31.3  
Eq Type: PIPING  
Class: 2  
CM RBI:

Flange Rating: 2025 lb/in<sup>2</sup>  
Design Pressure: 2000 lb/in<sup>2</sup>  
Design Temperature: 200 °F

Description: HS-0026 WATER OUT LINE

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 : 2.4 MPY  
(B) -- Average Max 25.0% of TMLs, Min of 2 : 5.7 MPY  
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 2.8 MPY  
(D) -- Default Corrosion Rate : 0.1 MPY  
Representative Corrosion Rate = 5.7 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).

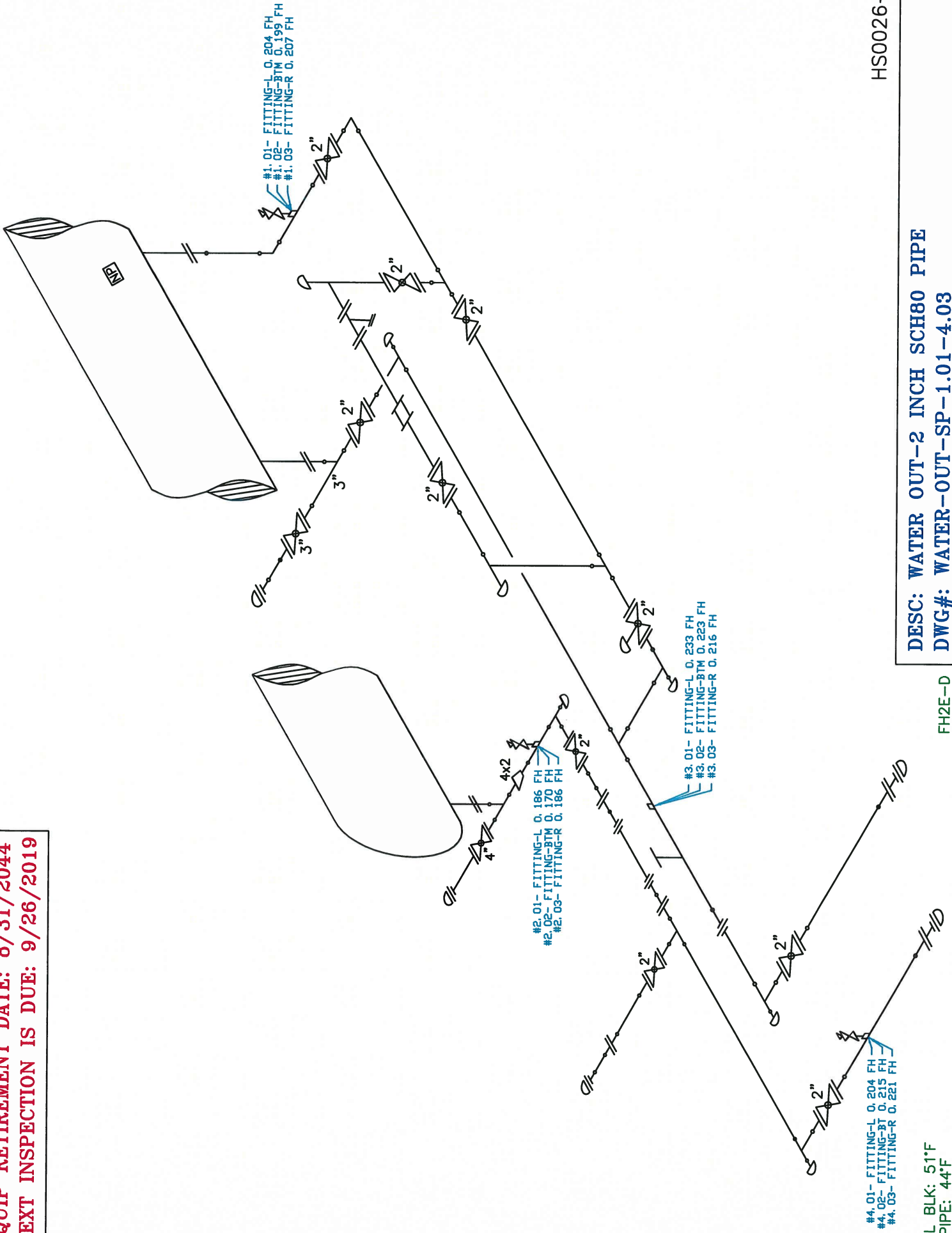
Eq/Circ ID Estimated life = 11.9 years from the most recent survey date.  
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 09/01/2030

Recommended Eq/Circ UT/RT Inspection Date is 09/26/2019  
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.

**EQUIP RETIREMENT DATE: 8/31/2044**  
**NEXT INSPECTION IS DUE: 9/26/2019**



#4.01- FITTING-L 0.204 FH  
#4.02- FITTING-BT 0.215 FH  
#4.03- FITTING-R 0.221 FH

#2.01- FITTING-L 0.186 FH  
#2.02- FITTING-BTM 0.170 FH  
#2.03- FITTING-R 0.186 FH

#3.01- FITTING-L 0.233 FH  
#3.02- FITTING-BTM 0.223 FH  
#3.03- FITTING-R 0.216 FH

#1.01- FITTING-L 0.204 FH  
#1.02- FITTING-BTM 0.199 FH  
#1.03- FITTING-R 0.207 FH

CAL BLK: 51°F  
PIPE: 44°F

FH2E-D

DESC: WATER OUT-2 INCH SCH80 PIPE  
DWG#: WATER-OUT-SP-1.01-4.03

HS0026-P3

**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: 11/01/2018

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

Unit: HS-0026  
 Eq/circ ID: WATER OUT-SP  
 Eq Type: PIPING  
 Class: 2  
 CM RBI:  
 Design Code: B31.3

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 2000 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 WATER OUT LINE

Summary: Group Name: Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 08/31/2044

Group Description: RCR = 4.5 MPY  
 Rem. Life (from last survey 09/26/2018) = 25.9 yrs

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

TMl No	Location	Ctn TML	First Survey Thick Nt	First Date	Previous Survey Thick Nt	Previous Date	Last Survey Thick Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	Retirement Date	TMl Inspection Date
1.01	FITTING-L	N *	0.219	02/14/2013	0.207 D5	02/15/2016	0.204 FH	09/26/2018	1.1	2.7	2.8	4.4	0.114 P	2.7	01/01/2052	09/26/2019
1.02	FITTING-BTM	N *	0.225	02/14/2013	0.204 D5	02/15/2016	0.199 FH	09/26/2018	1.9	4.6	4.9	7.8	0.114 P	4.6	03/05/2037	09/26/2019
1.03	FITTING-R	N	0.218	02/14/2013	0.211 D5	02/15/2016	0.207 FH	09/26/2018	1.5	2.0	1.9	3.2	0.114 P	2.0	02/22/2065	09/26/2019
2.01	FITTING-L	N *	0.195	02/14/2013	0.182 D5	02/15/2016	0.182 RR	09/26/2018	0	2.3	2.6	10.0	0.114 P	2.3	03/22/2048	09/26/2019
2.02	FITTING-BTM	N *	0.184	02/14/2013	0.171 D5	02/15/2016	0.170 FH	09/26/2018	0.4	2.5	3.0	5.8	0.114 P	2.5	01/23/2041	09/26/2019
2.03	FITTING-R	N	0.191	02/14/2013	0.190 RR	02/15/2016	0.186 FH	09/26/2018	1.5	0.9	0.9	1.5	0.114 P	1.5	08/13/2066	09/26/2019
3.01	FITTING-L	N	0.199 TC	02/14/2013	0.199 RR	02/15/2016	0.231 RR	09/26/2018	0	0	0	7.8	0.114 P	0.1	12/07/3186	09/26/2019
3.02	FITTING-BTM	N	0.187 TC	02/14/2013	0.185 RR	02/15/2016	0.223 FH	09/26/2018	0	0	0	2.1	0.114 P	0.1	12/07/3106	09/26/2019
3.03	FITTING-R	N	0.179 TC	02/14/2013	0.179 RR	02/15/2016	0.216 FH	09/26/2018	0	0	0	3.2	0.114 P	0.1	12/06/3036	09/26/2019
4.01	FITTING-L	N *	0.229	02/14/2013	0.220 D5	02/15/2016	0.204 FH	09/26/2018	6.1	4.5	4.7	11.1	0.114 P	6.1	06/17/2033	09/26/2019
4.02	FITTING-BT	N *	0.222 D5	02/15/2016		N/A	0.215 FH	09/26/2018	N/A	2.7	N/A	2.7	0.114 P	2.7	01/28/2056	09/26/2019
4.03	FITTING-R	N	0.222	02/14/2013	0.221 RR	02/15/2016	0.221 FH	09/26/2018	0	0.2	0.1	1.1	0.114 P	0.2	10/31/2552	09/26/2019



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: 11/01/2018

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

Unit: HS-0026  
Eq/Circ ID: WATER OUT-SP  
Design Code: B31.3  
Eq Type: PIPING  
Class: 2  
CM RBI:

Flange Rating: 2025 lb/in?  
Design Pressure: 2000 lb/in?  
Design Temperature: 200 °F

Description: HS-0026 WATER OUT LINE

TWL 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 : 2.1 MPY  
(B) -- Average Max 25.0% of TWLs, Min of 2 : 4.5 MPY  
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 2.9 MPY  
(D) -- Default Corrosion Rate : 0.1 MPY  
Representative Corrosion Rate = 4.5 MPY

TWL thickness readings have not been compensated for high temperatures.  
TWL thickness readings have been compensated for growths.

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

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

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

TWL Inspection Interval is:  
(A) -- 1.00 Years.

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

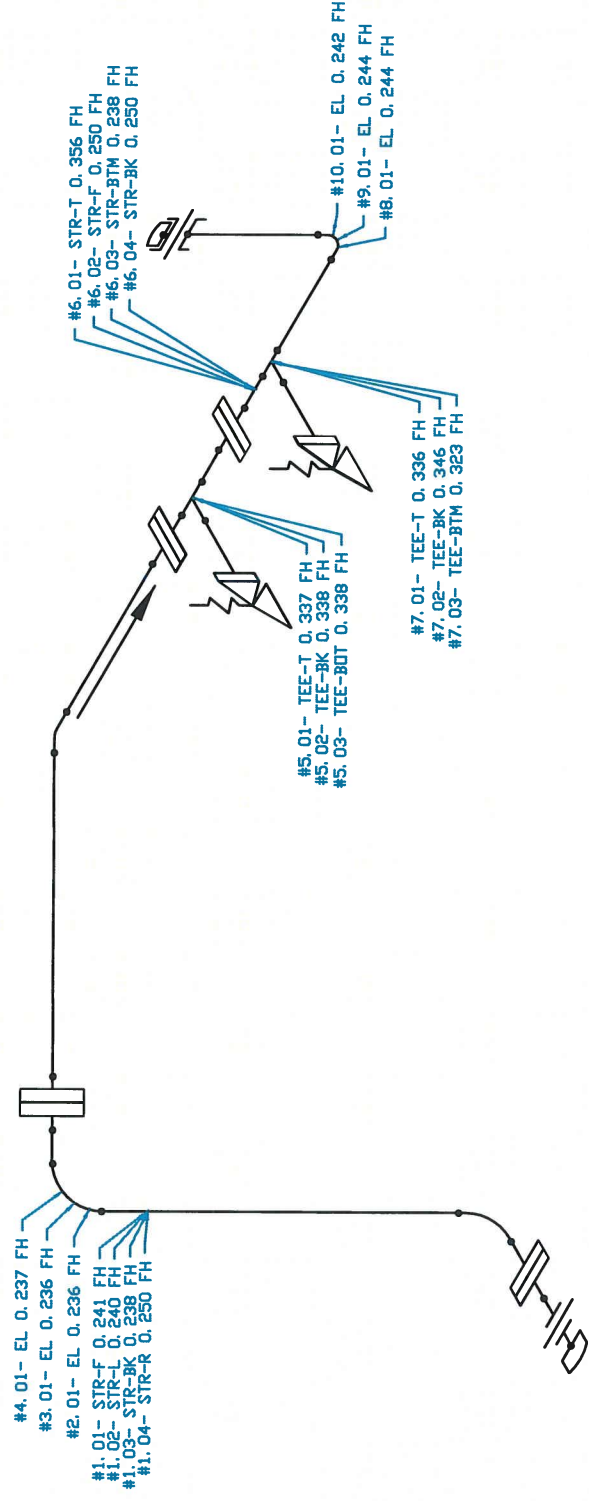
Eq/Circ ID Estimated life = 25.9 years from the most recent survey date.  
(Estimated Life based on the ave of the earliest 0% (Min 6) TWL retirement dates.)

Predicted Eq/Circ ID Retirement date is 08/31/2044

Recommended Eq/Circ UT/RT Inspection Date is 09/26/2019  
UT/RT Inspection Interval is 1.00 years.

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

**EQUIP RETIREMENT DATE: 1/6/2246**  
**NEXT INSPECTION IS DUE: 9/26/2019**



CAL BLK: 51°F  
PIPE: 38-40°F

FH2E-D

**DESC: PSV LINE-4 INCH SCH40 PIPE**  
**DWG#: RELIEF-1.01-10.01**

HS0026-P4

**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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: RELIEF  
 Eq Type: PIPING  
 Class: 2  
 CM RBI:  
 Design Code: B31.3

Flange Rating: 285 lb/in<sup>2</sup>  
 Design Pressure: 250 lb/in<sup>2</sup>  
 Design Temperature: 100 °F

Description: HS-0026 RELIEF LINE

Summary: Group Name: Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 01/06/2246

Group Description: RCR = 1.2 MPY  
 Rem. Life (from last survey 09/26/2018) = 227.3 Yrs

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

TMl No	Location	Ctn TML	First Survey Thick Nt	First Date	Previous Survey Thick Nt	Previous Date	Last Survey Thick Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TMl Retirement Date	TMl Inspection Date
1.01	STR-F	N *	0.243	08/14/2006	0.234 RR	02/15/2016	0.238 RR	09/26/2018	0	0.4	0.2	2.0	0.100 S	0.4	09/29/2363	09/26/2019
1.02	STR-L	N *	0.246	08/14/2006	0.246 RR	02/15/2016	0.240 FH	09/26/2018	2.3	0.5	0	2.3	0.100 S	2.3	08/10/2079	09/26/2019
1.03	STR-BK	N	0.234	08/14/2006	0.231 RR	02/15/2016	0.236 RR	09/26/2018	0	0	0	2.0	0.100 S	0.1	10/06/3378	09/26/2019
1.04	STR-R	N	0.238	08/14/2006	0.237 D5	02/15/2016	0.237 RR	09/26/2018	0	0.1	0	8.4	0.100 S	0.1	10/05/3388	09/26/2019
2.01	EL	N	0.237	08/14/2006	0.232 RR	02/15/2016	0.233 RR	09/26/2018	0	0.3	0.2	3.0	0.100 S	0.3	01/29/2462	09/26/2019
3.01	EL	N	0.234	08/14/2006	0.233 D5	02/15/2016	0.233 RR	09/26/2018	0	0.1	0	1.1	0.100 S	0.1	10/06/3348	09/26/2019
4.01	EL	N	0.234	08/14/2006	0.230 RR	02/15/2016	0.236 RR	09/26/2018	0	0	0	2.0	0.100 S	0.1	10/06/3378	09/26/2019
5.01	TEE-T	N	0.340	08/14/2006	0.333 RR	02/15/2016	0.337 FH	09/26/2018	0	0.2	0.4	2.2	0.100 S	0.2	10/05/3203	09/26/2019
5.02	TEE-BK	N *	0.350	08/14/2006	0.334 D5	02/15/2016	0.334 RR	09/26/2018	0	1.3	1.5	12.5	0.100 S	1.3	09/27/2198	09/26/2019
5.03	TEE-BOT	N *	0.347	08/14/2006	0.336 RR	02/15/2016	0.338 FH	09/26/2018	0	0.7	0.4	3.4	0.100 S	0.7	09/29/2358	09/26/2019
6.01	STR-T	N	0.252	08/14/2006	0.247 RR	02/15/2016	0.250 RR	09/26/2018	0	0.2	0.4	1.5	0.100 S	0.2	10/02/2768	09/26/2019
6.02	STR-F	N	0.250	08/14/2006	0.231 RR	02/15/2016	0.248 RR	09/26/2018	0	0.2	1.0	14.0	0.100 S	0.2	10/02/2758	09/26/2019
6.03	STR-BTM	N *	0.242	08/14/2006	0.228 RR	02/15/2016	0.233 RR	09/26/2018	0	0.7	1.2	3.8	0.100 S	0.7	09/28/2208	09/26/2019
6.04	STR-BK	N	0.250	08/14/2006	0.228 RR	02/15/2016	0.250 FH	09/26/2018	0	0	1.4	10.6	0.100 S	0.1	10/08/3518	09/26/2019
7.01	TEE-T	N	0.336	08/14/2006	0.334 D5	02/15/2016	0.334 RR	09/26/2018	0	0.2	0	2.8	0.100 S	0.2	10/05/3188	09/26/2019
7.02	TEE-BK	N	0.344	08/14/2006	0.340 RR	02/15/2016	0.345 RR	09/26/2018	0	0	0.1	1.9	0.100 S	0.1	10/11/4018	09/26/2019
7.03	TEE-BTM	N *	0.334	08/14/2006	0.321 RR	02/15/2016	0.323 FH	09/26/2018	0	0.9	1.0	3.0	0.100 S	0.9	07/09/2266	09/26/2019
8.01	EL	N	0.244	08/14/2006	0.240 RR	02/15/2016	0.242 RR	09/26/2018	0	0.2	0.1	2.5	0.100 S	0.2	10/02/2728	09/26/2019
9.01	EL	N	0.244	08/14/2006	0.244 RR	02/15/2016	0.244 FH	09/26/2018	0	0	0	1.5	0.100 S	0.1	10/07/3458	09/26/2019
10.01	EL	N	0.240	08/14/2006	0.240 RR	02/15/2016	0.242 FH	09/26/2018	0	0	0	2.3	0.100 S	0.1	10/07/3438	09/26/2019

Corrosion Monitoring Eg/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: 11/01/2018

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

Unit: HS-0026  
Eg/Circ ID: RELIEF  
Design Code: B31.3  
Eq Type: PIPING  
Class: 2  
CM RBI:

Flange Rating: 285 lb/in<sup>2</sup>  
Design Pressure: 250 lb/in<sup>2</sup>  
Design Temperature: 100 °F

Description: HS-0026 RELIEF LINE

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 : 0.4 MPY  
(B) -- Average Max 25.0% of TMLs, Min of 2 : 1.2 MPY  
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 0.5 MPY  
(D) -- Default Corrosion Rate : 0.1 MPY  
Representative Corrosion Rate = 1.2 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.

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

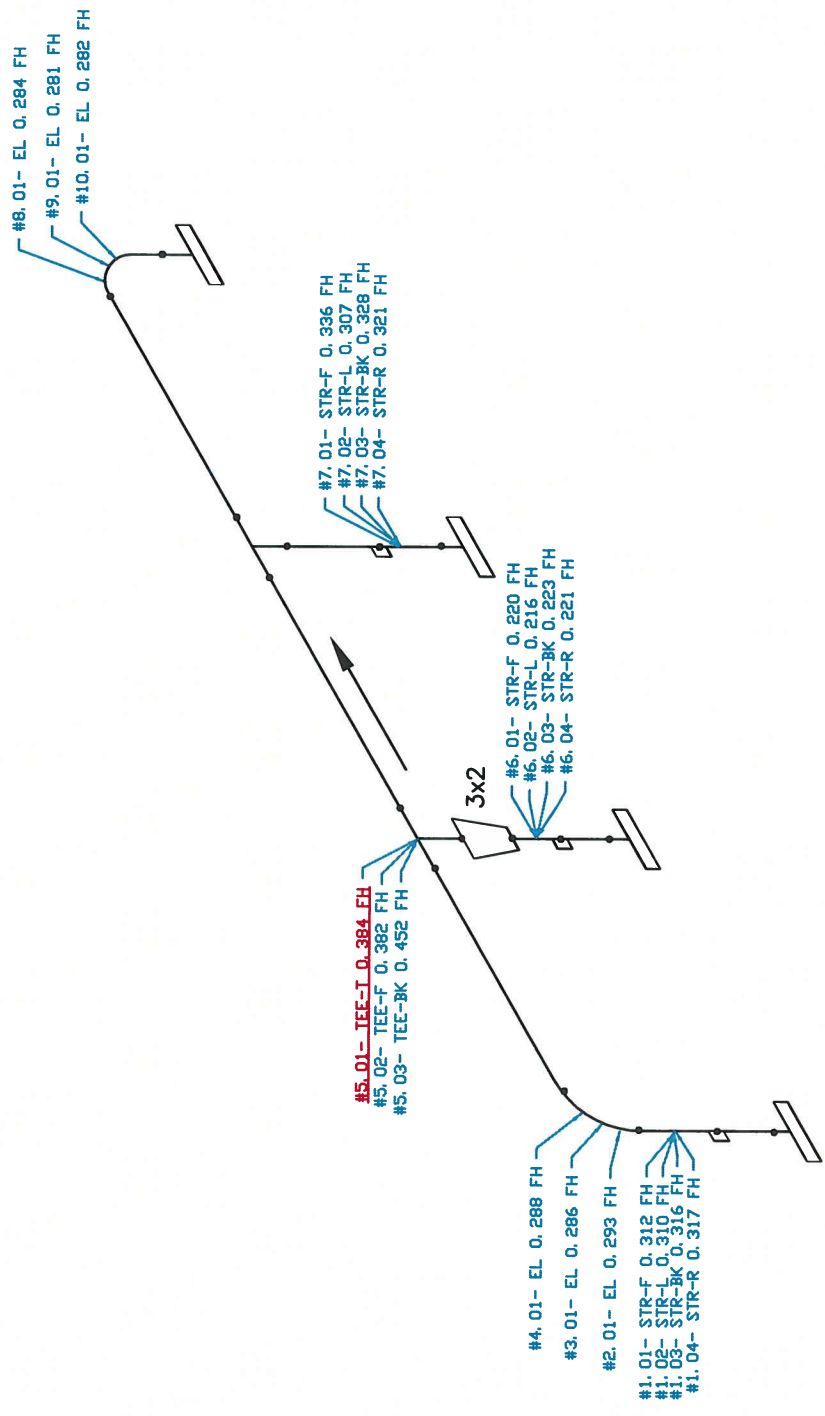
Eg/Circ ID Estimated life = 227.3 years from the most recent survey date.  
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eg/Circ ID Retirement date is 01/06/2246

Recommended Eg/Circ UT/RT Inspection Date is 09/26/2019  
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 Eg/Circ ID.

**EQUIP RETIREMENT DATE: 2/6/2133**  
**NEXT INSPECTION IS DUE: 9/26/2019**



CAL BLK: 51°F  
 PIPE: 48°F

DESC: HEADER-3 INCH SCH80 PIPE  
 DWG#: HEADER-1.01-10.01

FH2E-D

HS0026-P5

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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: HEADER  
 Eq Type: PIPING  
 Class: 2  
 CM REI:  
 Design Code: B31.3

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 2000 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 HEADER PIPING

Summary: Group Name: Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 02/06/2133  
 Group Description: RCR = 5.3 MPY  
 Rem. Life (from last survey 09/26/2018) = 114.4 Yrs

0 C.A. Status: NO  
 Total Caution TMLs = 1

TMWL 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	TMWL Retirement Date	TMWL Inspection Date
1.01	STR-F	N	0.316	08/14/2006	0.307 RR	02/15/2016	0.312 FH	09/26/2018	0	0.3	0.6	6.7	0.168 P	0.3	11/05/2497	09/26/2019
1.02	STR-L	N *	0.320	08/14/2006	0.306 RR	02/15/2016	0.310 FH	09/26/2018	0	0.8	1.0	7.0	0.168 P	0.8	03/28/2196	09/26/2019
1.03	STR-BK	N	0.307	08/14/2006	0.307 RR	02/15/2016	0.316 FH	09/26/2018	0	0	0	5.0	0.168 P	0.1	10/07/3498	09/26/2019
1.04	STR-R	N *	0.314	08/14/2006	0.303 D5	02/15/2016	0.303 RR	09/26/2018	0	0.9	0.8	3.8	0.168 P	0.9	09/26/2168	09/26/2019
2.01	EL	N	0.284	08/14/2006	0.271 RR	02/15/2016	0.291 RR	09/26/2018	0	0	0.3	5.6	0.168 P	0.1	10/04/3248	09/26/2019
3.01	EL	N	0.279	08/14/2006	0.274 RR	02/15/2016	0.280 RR	09/26/2018	0	0	0	3.0	0.168 P	0.1	10/05/3138	09/26/2019
4.01	EL	N *	0.284	08/14/2006	0.276 D5	02/15/2016	0.276 RR	09/26/2018	0	0.7	0.8	1.2	0.168 P	0.7	01/09/2173	09/26/2019
5.01	TEE-T	Y *	0.452	08/14/2006	0.444 D5	02/15/2016	0.384 FH	09/26/2018	23.0	5.6	3.5	94.6	0.168 P	23.0	02/16/2028	09/26/2019
5.02	TEE-F	N	0.372	08/14/2006	0.377 D5	02/15/2016	0.377 RR	09/26/2018	0	0	0	0	0.168 P	0.1	10/11/4018	09/26/2019
5.03	TEE-BK	N	0.369	08/14/2006	0.377 RR	02/15/2016	0.399 RR	09/26/2018	0	0	0	3.3	0.168 P	0.1	10/11/4018	09/26/2019
6.01	STR-F	N	0.220	08/14/2006	0.218 D5	02/15/2016	0.218 RR	09/26/2018	0	0.2	0.1	4.3	0.141 P	0.2	11/24/2401	09/26/2019
6.02	STR-L	N	0.216	08/14/2006	0.212 RR	02/15/2016	0.216 FH	09/26/2018	0	0	0.1	1.1	0.141 P	0.1	10/02/2768	09/26/2019
6.03	STR-BK	N	0.223	08/14/2006	0.212 RR	02/15/2016	0.221 RR	09/26/2018	0	0.2	0.4	4.0	0.141 P	0.2	09/29/2418	09/26/2019
6.04	STR-R	N	0.224	08/14/2006	0.216 RR	02/15/2016	0.219 RR	09/26/2018	0	0.4	0.4	2.1	0.141 P	0.4	09/28/2213	09/26/2019
7.01	STR-F	N	0.327	08/14/2006	0.324 RR	02/15/2016	0.328 RR	09/26/2018	0	0	0	2.9	0.208 P	0.1	06/06/3215	09/26/2019
7.02	STR-L	N *	0.320	08/14/2006	0.304 RR	02/15/2016	0.305 RR	09/26/2018	0	1.2	1.7	9.6	0.208 P	1.2	04/17/2099	09/26/2019
7.03	STR-BK	N	0.305	08/14/2006	0.310 RR	02/15/2016	0.319 RR	09/26/2018	0	0	0	6.0	0.208 P	0.1	06/05/3125	09/26/2019
7.04	STR-R	N	0.319	08/14/2006	0.316 D5	02/15/2016	0.316 RR	09/26/2018	0	0.2	0.2	1.4	0.208 P	0.2	01/29/2557	09/26/2019
8.01	EL	N	0.280	08/14/2006	0.277 RR	02/15/2016	0.282 RR	09/26/2018	0	0	0	1.9	0.208 P	0.1	06/02/2755	09/26/2019
9.01	EL	N *	0.284	08/14/2006	0.274 RR	02/15/2016	0.277 RR	09/26/2018	0	0.6	0.6	3.1	0.208 P	0.6	03/08/2133	09/26/2019

10.01	EL	N	0.282	08/14/2006	0.275 RR	02/15/2016	0.282 FH	09/26/2018	0	0	0.2	2.0	0.208	P	0.1	06/02/2755	09/26/2019
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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: 11/01/2018

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

Unit: HS-0026  
Eq/Circ ID: HEADER  
Design Code: B31.3  
Eq Type: PIPING  
Class: 2  
CM RBI:

Flange Rating: 2025 lb/in.  
Design Pressure: 2000 lb/in.  
Design Temperature: 200 °F

Description: HS-0026 HEADER PIPING

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

Representative Corrosion Rate is the Maximum of:  
(A) -- Average Corrosion Rate x 1.00 : 1.4 MPY  
(B) -- Average Max 25.0% of TMLs Min of 2 : 5.3 MPY  
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 1.8 MPY  
(D) -- Default Corrosion Rate : 0.1 MPY  
Representative Corrosion Rate = 5.3 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 = 114.4 years from the most recent survey date.  
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

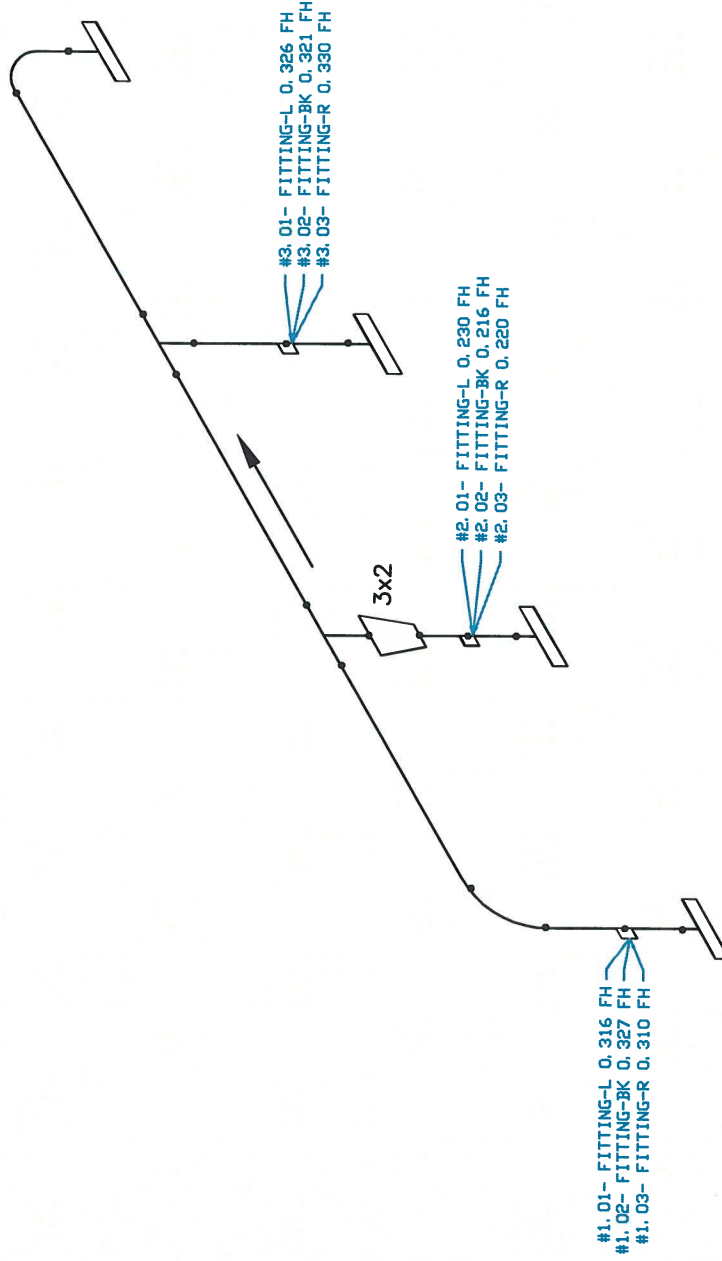
Predicted Eq/Circ ID Retirement date is 02/06/2133

Recommended Eq/Circ UT/RT Inspection Date is 09/26/2019  
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 1 Caution TMLs in this Eq/Circ ID.



**EQUIP RETIREMENT DATE: 8/22/2991**  
**NEXT INSPECTION IS DUE: 9/26/2019**



CAL BLK: 51°F  
PIPE: 48°F

DESC: HEADER-3 INCH SCH80 PIPE  
DWG#: HEADER-SP-1.01-3.03

FH2E-D

**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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: HEADER-SP  
 Eq Type: PIPING  
 Class: 2  
 CM REI:  
 Design Code: B31.3

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 2000 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 HEADER PIPING

Summary: Group Name: Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 08/22/2991

Group Description:  
 RCR = 0.1 MPY  
 Rem. Life (from last survey 09/26/2018) = 972.9 yrs

O.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	Last Survey Thick	Last Survey Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	Retirement Date	TMWL Inspection Date	
1.01	FITTING-L	N *	0.314	0.299	02/14/2013	0.299	RR	0.316	FH	09/26/2018	0	0	0	13.0	0.168	P	0.1	10/07/3498	09/26/2019
1.02	FITTING-BK	N *	0.305	0.304	02/14/2013	0.304	RR	0.311	RR	09/26/2018	0	0	0	4.3	0.168	P	0.1	10/07/3448	09/26/2019
1.03	FITTING-R	N *	0.292	0.296	02/14/2013	0.296	RR	0.310	FH	09/26/2018	0	0	0	6.7	0.168	P	0.1	01/28/3436	09/26/2019
2.01	FITTING-L	N *	0.218	0.210	02/14/2013	0.210	RR	0.220	RR	09/26/2018	0	0	0	7.5	0.168	P	0.1	09/30/2538	09/26/2019
2.02	FITTING-BK	N *	0.216	0.212	02/14/2013	0.212	RR	0.216	FH	09/26/2018	0	0	0	2.1	0.168	P	0.1	09/29/2498	09/26/2019
2.03	FITTING-R	N *	0.213	0.219	02/14/2013	0.219	D5	0.219	RR	09/26/2018	0	0	0	0	0.168	P	0.1	09/29/2528	09/26/2019
3.01	FITTING-L	N	0.320	0.319	02/14/2013	0.319	RR	0.323	RR	09/26/2018	0	0	0	2.9	0.168	P	0.1	10/08/3568	09/26/2019
3.02	FITTING-BK	N	0.317	0.315	02/14/2013	0.315	RR	0.321	FH	09/26/2018	0	0	0	1.1	0.168	P	0.1	10/08/3548	09/26/2019
3.03	FITTING-R	N	0.304	0.300	02/14/2013	0.300	RR	0.322	RR	09/26/2018	0	0	0	4.3	0.168	P	0.1	10/08/3558	09/26/2019

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: 11/01/2018

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

Unit: HS-0026  
Eq/Circ ID: HEADER-SP  
Design Code: B31.3  
Eq Type: PIPING  
Class: 2  
CM RBI:

Flange Rating: 2025 lb/in²  
Design Pressure: 2000 lb/in²  
Design Temperature: 200 °F

Description: HS-0026 HEADER PIPING

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

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

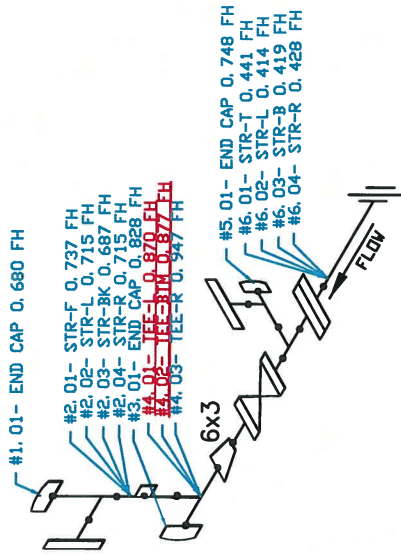
Eq/Circ ID Estimated life = 972.9 years from the most recent survey date.  
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 08/22/2991

Recommended Eq/Circ UT/RT Inspection Date is 09/26/2019  
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.

**EQUIP RETIREMENT DATE: 12/19/2087**  
**NEXT INSPECTION IS DUE: 9/26/2019**



CAL BLK: 51°F  
PIPE: 48°F

FH2E-D

DESC: GAS IN 6 AND 3 INCH SCH160 PIPE  
DWG#: GAS-IN-1.01-6.04

HS0026--P6

**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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: GAS IN  
 Eq Type: PIPING  
 Class: 2  
 CM RFI:  
 Design Code: B31.3

Flange Rating: 2025 lb/in?  
 Design Pressure: 2000 lb/in?  
 Design Temperature: 200 °F

Description: HS-0026 GAS IN PIPING

Summary: Group Name: Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 12/19/2087

Group Description: RCR = 19.6 MPY  
 Rem. Life (from last survey 09/26/2018) = 69.2 yrs

O C.A. Status: NO  
 Total Caution TMLs = 2

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	Retirement Date	TM L Inspection Date
1.01	END CAP	N	0.697	08/14/2006	0.674 RR	02/15/2016	0.677 RR	09/26/2018	0	1.7	1.7	7.8	0.319 P	1.7	08/14/2229	09/26/2019
2.01	STR-F	N	0.741	08/14/2006	0.715 RR	02/15/2016	0.733 RR	09/26/2018	0	0.7	1.2	6.3	0.319 P	0.7	11/17/2610	09/26/2019
2.02	STR-L	N	0.718	08/14/2006	0.721 D5	02/15/2016	0.715 FH	09/26/2018	2.3	0.2	0.3	10.6	0.319 P	2.3	02/15/2191	09/26/2019
2.03	STR-BK	N	0.712	08/14/2006	0.683 D5	02/15/2016	0.683 RR	09/26/2018	0	2.4	2.1	30.9	0.319 P	2.4	08/11/2170	09/26/2019
2.04	STR-R	N	0.714	08/14/2006	0.702 RR	02/15/2016	0.712 RR	09/26/2018	0	0.2	0.5	3.3	0.319 P	0.2	03/25/3986	09/26/2019
3.01	END CAP	N	0.695	08/14/2006	0.268 RR	02/15/2016	0.822 RR	09/26/2018	0	0	15.9	259.9	0.319 P	0.1	10/11/4018	09/26/2019
4.01	TEE-L	Y *	1.049	08/14/2006	0.855 D5	02/15/2016	0.855 RR	09/26/2018	0	16.0	18.3	69.3	0.319 P	16.0	04/07/2052	09/26/2019
4.02	TEE-BTM	Y *	1.162	08/14/2006	0.955 D5	02/15/2016	0.877 FH	09/26/2018	29.9	23.5	22.1	127.4	0.319 P	29.9	05/31/2037	09/26/2019
4.03	TEE-R	N *	1.051	08/14/2006	0.893 D5	02/15/2016	0.893 RR	09/26/2018	0	13.0	14.9	45.9	0.319 P	13.0	12/05/2062	09/26/2019
5.01	END CAP	N	0.420	08/14/2006	0.398 RR	02/15/2016	0.414 RR	09/26/2018	0	0.5	1.4	11.7	0.319 P	0.5	09/21/2209	09/26/2019
6.01	STR-T	N	0.441	08/14/2006	0.400 RR	02/15/2016	0.441 FH	09/26/2018	0	0	2.2	32.3	0.168 P	0.1	10/11/4018	09/26/2019
6.02	STR-L	N *	0.450	08/14/2006	0.420 RR	02/15/2016	0.414 FH	09/26/2018	2.3	3.0	3.7	17.3	0.168 P	3.0	08/25/2100	09/26/2019
6.03	STR-B	N *	0.447	08/14/2006	0.418 D5	02/15/2016	0.418 RR	09/26/2018	0	2.4	2.3	4.8	0.168 P	2.4	10/17/2122	09/26/2019
6.04	STR-R	N *	0.444	08/14/2006	0.421 D5	02/15/2016	0.421 RR	09/26/2018	0	1.9	1.8	8.5	0.168 P	1.9	10/03/2151	09/26/2019

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: 11/01/2018

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

Unit: HS-0026  
Eq/Circ ID: GAS IN  
Design Code: B31.3  
Eq Type: PIPING  
Class: 2  
CM RBI:

Flange Rating: 2025 lb/in<sup>2</sup>  
Design Pressure: 2000 lb/in<sup>2</sup>  
Design Temperature: 200 °F

Description: HS-0026 GAS IN PIPING

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

Representative Corrosion Rate is the Maximum of:  
(A) -- Average Corrosion Rate x 1.00 : 5.3 MPY  
(B) -- Average Max 25.0% of TMLs, Min of 2 : 19.6 MPY  
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 7.1 MPY  
(D) -- Default Corrosion Rate : 0.1 MPY  
Representative Corrosion Rate = 19.6 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).

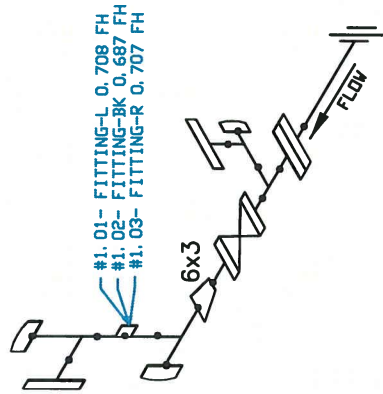
Eq/Circ ID Estimated life = 69.2 years from the most recent survey date.  
(Estimated life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 12/19/2087

Recommended Eq/Circ UT/RT Inspection Date is 09/26/2019  
UT/RT Inspection Interval is 1.00 years.

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

**EQUIP RETIREMENT DATE: 3/8/2246**  
**NEXT INSPECTION IS DUE: 9/26/2019**



CAL BLK: 51°F  
PIPE: 48°F

FH2E-D

DESC: GAS IN 6 AND 3 INCH SCH160 PIPE  
DWG#: GAS-IN-SP-1.01-1.03

HS0026-P6

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: 11/01/2018

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

Unit: HS-0026  
 Eq/Circ ID: GAS IN-SP  
 Eq Type: PIPING  
 Class: 2  
 CM RBI:  
 Design Code: B31.3

Flange Rating: 2025 lb/in<sup>2</sup>  
 Design Pressure: 2000 lb/in<sup>2</sup>  
 Design Temperature: 200 °F

Description: HS-0026 GAS IN PIPING

Summary: Group Name: Insp. Due Date = 09/26/2019  
 Pred. Ret. Date = 03/08/2246

Group Description:  
 RCR = 5.0 MPY  
 Rem. Life (from last survey 09/26/2018) = 227.4 yrs

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

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
1.01	FITTING-L	N *	0.710	02/14/2013	0.710 RR	02/15/2016	0.708 FH	09/26/2018	0.8	0.4	0.4	7.8	0.319 P	0.8	08/11/2505	09/26/2019
1.02	FITTING-BK	N *	0.710	02/14/2013	0.683 D5	02/15/2016	0.683 RR	09/26/2018	0	4.8	5.7	24.3	0.319 P	4.8	09/02/2094	09/26/2019
1.03	FITTING-R	N *	0.719	02/14/2013	0.701 D5	02/15/2016	0.701 RR	09/26/2018	0	3.2	3.7	14.0	0.319 P	3.2	04/08/2138	09/26/2019



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: 11/01/2018

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

Unit: HS-0026  
Eq/Circ ID: GAS IN-SP  
Design Code: B31.3  
Eq Type: PIPING  
Class: 2  
CM RBI:

Flange Rating: 2025 lb/in<sup>2</sup>  
Design Pressure: 2000 lb/in<sup>2</sup>  
Design Temperature: 200 °F

Description: HS-0026 GAS IN PIPING

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

Representative Corrosion Rate is the Maximum of:  
(A) -- Average Corrosion Rate x 1.00 : 2.9 MPY  
(B) -- Average Max 25.0% of TMLs, Min of 2 : 4.0 MPY  
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 5.0 MPY  
(D) -- Default Corrosion Rate : 0.1 MPY  
Representative Corrosion Rate = 5.0 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 = 227.4 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 03/08/2246

Recommended Eq/Circ UT/RT Inspection Date is 09/26/2019  
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.