



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-0032 Horizontal Separator	
<b>Remaining Life:</b> 10.1 YRS	<b>Date Last Inspected:</b> 02/11/2016
<b>Representative Corrosion Rate:</b> 12.9 MPY	<b>Next UT:</b> 02/10/2017 <b>Next VT:</b> 02/10/2017
<b>Manufacturer:</b> Micoda Process Systems Inc.	<b>Manufacturer Serial #:</b> 1258
<b>Year Built:</b> 2005	<b>National Board #:</b> 26
<b>Alberta Registration #:</b> 525151	<b>Canadian Registration #:</b> R9975.2

### HS-0032 Separator



## PRESSURE VESSEL INVENTORY FORM

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

### VESSEL ID INFORMATION

Company Name : Pure Energy  
Facility/Location Name : Evanston District  
Field Name :  
Equipment Number :  
Eq/Circ. ID : HS0032-SEP  
Equipment Name/Service : Horizontal Separator  
Physical Location : Wamsutter  
GPS Coordinates :

### VESSEL DESCRIPTION AND SERVICE CONDITIONS

**Type of Vessel:** Horizontal-Separator

**Vessel Size:** 50" ID

**Operating Pressure Range (psig):**

**Operating Temperature Range (°F):**

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

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

**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

Repaired By \_\_\_\_\_ Date of Repair \_\_\_\_\_

Nat'l Bd. R-Certification No \_\_\_\_\_

Other Stamping Information \_\_\_\_\_

### VESSEL DOCUMENTATION

Manufacturer Data Sheets: ☒ ASME U-1 or U-1A Forms ☐ U2 or U4 Supplemental Forms  
☐ Documentation relating to repair/alteration/rerating work (R-1 form, calculations, revised drawings, inspection reports, etc.).

Name: Michael Peterson

Date: 01/24/2012

## API 510 PRESSURE VESSEL EXTERNAL INSPECTION REPORT

<b>Company Name:</b> FMC Technologies Completion	
<b>Field/Location:</b> Grand Junction	
<b>Equipment Number:</b> HS-0032	<b>Eq/Circ. ID:</b> HS0032-SEP
<b>Equipment Name/Service:</b> Separator	
<b>Physical Location:</b> H Yard	
<b>Manufacturer:</b> Micoda Process Systems Inc.	<b>Manufacturer Serial #:</b> 1258
<b>Year Built:</b> 2005	<b>National Board #:</b> 26
<b>Alberta Registration #:</b> 525151	<b>Canadian Registration #:</b> R9975.2

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

**Condition of Nameplate and/or Bracket:** The nameplate is not legible. The nameplate bracket is securely attached. Lettering on the nameplate is faded and worn. Stamping is in good condition.

**Internal Access?:** Yes

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

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

**Condition of Foundation and Anchor Bolts:** There are no anchor bolts. The support skirt is welded to a baseplate, which is welded to the skid deck/frame. Baseplate-to-deck/frame attachment welds appear sound. The (2) vertical supports are in anchored to the skid/trailer deck/frame.

**Condition of Steel Supports, Saddles, and Bolting:** The (2) vertical supports have no corrosion or distortion. All support structural welds appear sound.

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

**Condition of Nozzles, Flanges, Repads, and Weepholes:** Nozzles and flanges are in good condition. All flange bolting is in place and secure.

**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. 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?: Yes. (2) Settings 2000; 2160 psi

Date PSV last tested (if there is a tag on the valve): 08/24/2015

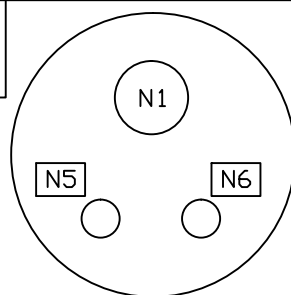
Comments:

Recommendations:

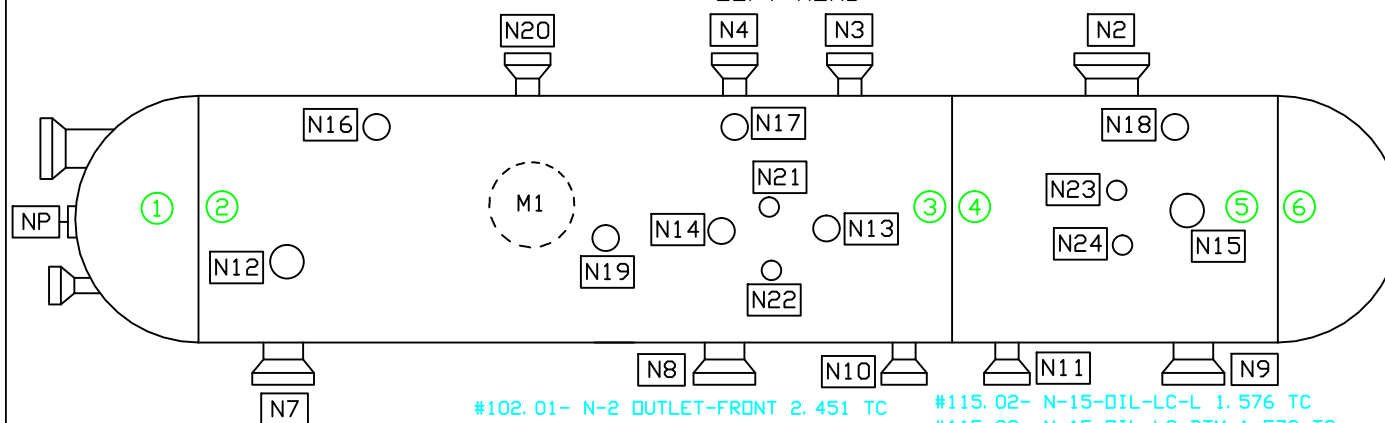
Repairs Needed:

<u>Robert W. Menke/JWW</u>	0131	02/11/2016
API 510 Inspector Signature	API 510 Inspector Number	Date

EQUIP RETIREMENT DATE: 4/4/2026  
NEXT INSPECTION IS DUE: 2/10/2017



LEFT HEAD



#1. 01- FRONT 2. 939 TC  
#1. 02- BOTTOM 2. 928 TC  
#1. 03- BACK 2. 925 TC  
#1. 04- TOP 2. 915 TC  
#2. 01- FRONT 3. 029 TC  
#2. 02- BOTTOM 3. 026 TC  
#2. 03- BACK 3. 036 TC  
#2. 04- TOP 3. 025 TC  
#3. 01- FRONT 3. 024 TC  
#3. 02- BOTTOM 3. 006 TC  
#3. 03- BACK 3. 026 TC  
#3. 04- TOP 3. 014 TC  
#4. 01- FRONT 3. 066 TC  
#4. 02- BOTTOM 3. 046 TC  
#4. 03- BACK 3. 049 TC  
#4. 04- TOP 3. 052 TC  
#5. 01- FRONT 3. 044 TC  
#5. 04- TOP 3. 047 TC  
#6. 01- FRONT 2. 936 TC  
#6. 02- BOTTOM 2. 932 TC  
#6. 03- BACK 2. 933 TC  
#6. 04- TOP 2. 966 TC  
#101. 01- N-1 INLET-TOP 2. 464 TC  
#101. 02- N-1 INLET-LEFT 2. 470 TC  
#101. 03- N-1 INLET-BTM 2. 465 TC  
#101. 04- N-1 INLET-RIGHT 2. 474 TC

#102. 01- N-2 OUTLET-FRONT 2. 451 TC  
#102. 02- N-2 OUTLET-LEFT 2. 449 TC  
#102. 03- N-2 OUTLET-BACK 2. 452 TC  
#102. 04- N-2 OUTLET-RIGHT 2. 453 TC  
#103. 01- N-3 PSV-1-FRONT 0. 346 TC  
#103. 03- N-3 PSV-1-BACK 0. 320 TC  
#104. 03- N-4 PSV-2-BACK 0. 341 TC  
#105. 01- N-5STMCDIL-F-TOP 0. 434 TC  
#105. 03- N-5STMCDIL-F-BTM 0. 429 TC  
#106. 01- N-6STMCDIL-BK-T 0. 417 TC  
#106. 03- N-6STMCDIL-BK-B 0. 430 TC  
#107. 03- N-7SLDSDRAIN-BK 1. 800 TC  
#107. 04- N-7SLDSDRAIN-L 1. 796 TC  
#108. 03- N-8 H2ODRAIN-BK 1. 550 TC  
#108. 04- N-8 H2ODRAIN-RGT 1. 565 TC  
#110. 01- N-10 H2O OUT-F 0. 307 TC  
#110. 03- N-10 H2O OUT-BK 0. 311 TC  
#111. 01- N-11-DILDR-F 0. 332 TC  
#111. 03- N-11-DILDR-BK 0. 358 TC  
#112. 01- N-12-SPARGE-TOP 0. 341 TC  
#112. 03- N-12-SPARGE-BTM 0. 316 TC  
#113. 01- N-13-TOP 0. 329 TC  
#113. 02- N-13-BT 0. 332 TC  
#114. 01- N-14-WATER-T 1. 565 TC  
#114. 02- N-14-WATER-L 1. 546 TC  
#114. 03- N-14-WATER-BT 1. 568 TC  
#114. 04- N-14-WATER-R 1. 572 TC  
#115. 01- N-15-DIL-LC-TOP 1. 573 TC

#115. 02- N-15-DIL-LC-L 1. 576 TC  
#115. 03- N-15-DIL-LC-BTM 1. 572 TC  
#115. 04- N-15-DIL-LC-R 1. 571 TC  
#116. 01- N-16-CLEANING-F 2. 055 TC  
#116. 02- N-16-CLEANING-L 2. 058 TC  
#116. 03- N-16-CLEANING-B 2. 058 TC  
#116. 04- N-16-CLEANING-R 2. 061 TC  
#117. 01- N-17-CLEANING-F 2. 012 TC  
#117. 02- N-17-CLEANING-L 2. 090 TC  
#117. 03- N-17-CLEANING-B 2. 095 TC  
#117. 04- N-17-CLEANING-R 2. 093 TC  
#118. 01- N-18-CLEANING-F 2. 045 TC  
#118. 02- N-18-CLEANING-L 2. 047 TC  
#118. 03- N-18-CLEANING-B 2. 047 TC  
#118. 04- N-18-CLEANING-R 2. 047 TC  
#119. 01- N-19 TI-TOP 0. 332 TC  
#119. 03- N-19 TI-BTM 0. 314 TC  
#120. 01- N-20 PI-FRONT 0. 320 TC  
#120. 03- N-20 PI-FBACK 0. 340 TC  
#121. 01- N-21-H2DLG-TOP 0. 343 TC  
#121. 03- N-21-H2DLG-BTM 0. 349 TC  
#122. 01- N-22-H2DLG-TOP 0. 365 TC  
#122. 03- N-22-H2DLG-BTM 0. 351 TC  
#123. 01- N-23-DIL- LG-TOP 0. 344 TC  
#123. 03- N-23-DIL- LG-BTM 0. 354 TC  
#124. 01- N-24-DIL- LG-TOP 0. 359 TC

N1	6" INLET	N13	2" SPARGE 2
N2	6" OUTLET	N14	3" WATER LC
N3	2" PSV-1	N15	3" OIL LC
N4	2" PSV-2	N16	6" CLEANING
N5	2" STEAM COIL	N17	6" CLEANING
N6	2" STEAM COIL	N18	6" CLEANING
N7	4" SOLIDS DRAIN	N19	1" TI
N8	3" WATER DRAIN	N20	1" PI
N9	3" OIL OUT	N21	1" WATER LG
N10	2" WATER OUT	N22	1" WATER LG
N11	2" OIL DRAIN	N23	1" OIL LG
N12	2" SPARGE 1	N24	1" OIL LG
		M1	18" MANWAY

TC-560

NAMEPLATE INFO	
MFG	MICODA PROCESS SYSTEMS
SERIAL NUMBER	1258
NATIONAL BOARD #	26
DATE BUILT	2005
DESIGN P & T	2000 PSI @ 200°F
NOTE	CRN R9975. 2 ALBERTA REG # 525151

#124. 03- N-24-DIL- LG-BTM 0. 341 TC  
#125. 01- MW-1-TOP 3. 023 TC  
#125. 02- MW-1-LEFT 3. 013 TC  
#125. 03- MW-1-BTM 3. 032 TC  
#125. 04- MW-1-RIGHT 3. 008 TC  
CAL=38°F  
VESSEL=27°F

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	HS0032-SEP
EQUIP NAME	SEPARATOR
LOCATION	INSIDE SKID UNIT HS-0032
DWG #	HS0032-SEP

DESC: HORIZONTAL SEPARATOR-SN:1258  
DWG#: HS0032-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: 06/21/2016

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

Unit: HS-0032  
 Eq/Circ ID: HS0032-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: HORIZONTAL SEPARATORON HS-0032; SN:1258

Summary: Group Name: Group Description:  
 Insp. Due Date = 02/10/2017 RCR = 12.9 MPY  
 Pred. Ret. Date = 04/04/2026 Rem. Life (from last survey 02/11/2016) = 10.1 yrs

0 C.A. Status: NO  
 Total Caution TMLs = 3

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	FRONT	N	2.945 TC	04/25/2007	2.921 TC	01/22/2015	2.921 RR	02/11/2016	0	2.7	2.5	30.2	2.525 P	2.7	09/09/2162	02/10/2017
1.02	BOTTOM	N	2.934 TC	04/25/2007	2.933 TC	01/22/2015	2.928 TC	02/11/2016	4.7	0.7	0.6	4.7	2.525 P	4.7	11/10/2101	02/10/2017
1.03	BACK	N	2.930 TC	04/25/2007	2.920 TC	01/22/2015	2.920 RR	02/11/2016	0	1.1	1.1	11.7	2.525 P	1.1	03/19/2375	02/10/2017
1.04	TOP	N	2.921 TC	04/25/2007	2.923 RR	01/22/2015	2.915 TC	02/11/2016	7.6	0.7	0.4	7.6	2.525 P	7.6	06/06/2067	02/10/2017
2.01	FRONT	N	3.037 TC	04/25/2007	3.025 TC	01/22/2015	3.025 RR	02/11/2016	0	1.4	0.9	15.1	2.660 P	1.4	02/19/2277	02/10/2017
2.02	BOTTOM	N	3.041 TC	04/25/2007	3.029 TC	01/22/2015	3.026 TC	02/11/2016	2.8	1.7	1.5	6.7	2.660 P	2.8	12/25/2146	02/10/2017
2.03	BACK	N	3.044 TC	04/25/2007	3.030 TC	01/22/2015	3.030 RR	02/11/2016	0	1.6	1.4	21.8	2.660 P	1.6	05/15/2247	02/10/2017
2.04	TOP	N	3.037 TC	04/25/2007	3.032 RR	01/22/2015	3.025 TC	02/11/2016	6.6	1.4	1.3	6.6	2.660 P	6.6	06/01/2071	02/10/2017
3.01	FRONT	N	3.031 TC	04/25/2007	3.031 RR	01/22/2015	3.024 TC	02/11/2016	6.6	0.8	0.5	6.6	2.660 P	6.6	04/07/2071	02/10/2017
3.02	BOTTOM	N	3.012 TC	04/25/2007	3.011 TC	01/22/2015	3.006 TC	02/11/2016	4.7	0.7	0.5	4.7	2.660 P	4.7	09/24/2089	02/10/2017
3.03	BACK	N	3.030 TC	04/25/2007	3.023 TC	01/22/2015	3.023 RR	02/11/2016	0	0.8	0.8	5.0	2.660 P	0.8	11/14/2469	02/10/2017
3.04	TOP	N	3.020 TC	04/25/2007	3.013 TC	01/22/2015	3.013 RR	02/11/2016	0	0.8	0.8	10.4	2.660 P	0.8	05/16/2457	02/10/2017
4.01	FRONT	N	3.072 TC	04/25/2007	3.064 RR	01/22/2015	3.066 TC	02/11/2016	0	0.7	0.9	6.2	2.660 P	0.7	02/15/2596	02/10/2017
4.02	BOTTOM	N	3.050 TC	04/25/2007	3.045 RR	01/22/2015	3.046 TC	02/11/2016	0	0.5	0.6	1.7	2.660 P	0.5	02/17/2788	02/10/2017
4.03	BACK	N	3.055 TC	04/25/2007	3.049 TC	01/22/2015	3.049 TC	02/11/2016	0	0.7	0.7	3.0	2.660 P	0.7	11/03/2571	02/10/2017
4.04	TOP	N	3.057 TC	04/25/2007	3.047 RR	01/22/2015	3.049 RR	02/11/2016	0	0.9	1.0	8.3	2.660 P	0.9	05/05/2448	02/10/2017
5.01	FRONT	N	3.049 TC	04/25/2007	3.043 RR	01/22/2015	3.044 TC	02/11/2016	0	0.6	0.8	12.5	2.660 P	0.6	02/16/2656	02/10/2017
5.04	TOP	N	3.053 TC	04/25/2007	3.047 TC	01/22/2015	3.047 TC	02/11/2016	0	0.7	0.6	2.3	2.660 P	0.7	12/24/2568	02/10/2017
6.01	FRONT	N	2.940 TC	04/25/2007	2.936 TC	01/22/2015	2.936 TC	02/11/2016	0	0.5	0.3	3.4	2.525 P	0.5	02/17/2838	02/10/2017
6.02	BOTTOM	N	2.943 TC	04/25/2007	2.935 TC	01/22/2015	2.932 TC	02/11/2016	2.8	1.3	0.7	6.2	2.525 P	2.8	06/22/2161	02/10/2017

## 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: 06/21/2016

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

Unit: HS-0032  
Eq/Circ ID: HS0032-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: HORIZONTAL SEPARATORON HS-0032; SN:1258

Summary: Group Name: Group Description:  
Insp. Due Date = 02/10/2017 RCR = 12.9 MPY  
Pred. Ret. Date = 04/04/2026 Rem. Life (from last survey 02/11/2016) = 10.1 yrs

0 C.A. Status: No  
Total Caution TMLs = 3

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
6.03	BACK	N	2.939 TC	04/25/2007	2.935 TC	01/22/2015	2.933 TC	02/11/2016	1.9	0.7	0.4	6.2	2.525 P	1.9	11/09/2230	02/10/2017
6.04	TOP	N	2.972 TC	04/25/2007	2.965 TC	01/22/2015	2.965 RR	02/11/2016	0	0.8	0.4	5.0	2.525 P	0.8	02/14/2566	02/10/2017
101.01	N-1 INLET-TOP	N	2.472 TC	04/25/2007	2.470 TC	01/22/2015	2.464 TC	02/11/2016	5.7	0.9	0.9	18.7	2.032 U	5.7	11/26/2091	02/10/2017
101.02	N-1 INLET-LEFT	Y *	2.479 TC	04/25/2007	2.075 TC	01/22/2015	2.075 RR	02/11/2016	0	45.9	37.6	670.2	2.032 U	45.9	01/18/2017	02/10/2017
101.03	N-1 INLET-BTM	N	2.482 TC	04/25/2007	2.470 TC	01/22/2015	2.465 TC	02/11/2016	4.7	1.9	1.9	6.2	2.032 U	4.7	03/30/2108	02/10/2017
101.04	N-1 INLET-RIGHT	N	2.478 TC	04/25/2007	2.471 TC	01/22/2015	2.471 RR	02/11/2016	0	0.8	1.2	10.4	2.032 U	0.8	11/15/2564	02/10/2017
102.01	N-2 OUTLET-FRONT	N	2.458 TC	04/25/2007	2.443 RR	01/22/2015	2.450 RR	02/11/2016	0	0.9	1.4	14.5	2.032 U	0.9	07/25/2480	02/10/2017
102.02	N-2 OUTLET-LEFT	N	2.458 TC	04/25/2007	2.444 RR	01/22/2015	2.445 RR	02/11/2016	0	1.5	1.8	6.2	2.032 U	1.5	06/14/2291	02/10/2017
102.03	N-2 OUTLET-BACK	N	2.458 TC	04/25/2007	2.446 RR	01/22/2015	2.449 RR	02/11/2016	0	1.0	1.3	6.2	2.032 U	1.0	02/13/2433	02/10/2017
102.04	N-2 OUTLET-RIGHT	N	2.458 TC	04/25/2007	2.449 TC	01/22/2015	2.449 RR	02/11/2016	0	1.0	1.0	10.4	2.032 U	1.0	02/13/2433	02/10/2017
103.01	N-3 PSV-1-FRONT	N	0.373	04/25/2007	0.323 RR	01/22/2015	0.333 RR	02/11/2016	0	4.5	4.6	11.7	0.176 U	4.5	01/01/2051	02/10/2017
103.03	N-3 PSV-1-BACK	N *	0.360	04/25/2007	0.335 TC	01/22/2015	0.320 TC	02/11/2016	14.2	4.5	2.8	14.2	0.176 U	14.2	04/03/2026	02/10/2017
104.03	N-4 PSV-2-BACK	N	0.361	04/25/2007	0.328 TC	01/22/2015	0.328 RR	02/11/2016	0	3.8	3.3	7.1	0.176 U	3.8	02/11/2056	02/10/2017
105.01	N-5STMCOIL-F-TOP	N	0.462	04/25/2007	0.421 TC	01/22/2015	0.421 RR	02/11/2016	0	4.7	5.2	16.6	0.256 U	4.7	03/22/2051	02/10/2017
105.03	N-5STMCOIL-F-BTM	N	0.430	04/25/2007	0.413 RR	01/22/2015	0.420 RR	02/11/2016	0	1.1	2.1	7.2	0.256 U	1.1	03/16/2165	02/10/2017
106.01	N-6STMCOIL-BK-T	N	0.456	04/25/2007	0.416 TC	01/22/2015	0.416 RR	02/11/2016	0	4.5	5.3	9.4	0.256 U	4.5	09/02/2051	02/10/2017
106.03	N-6STMCOIL-BK-B	N	0.437	04/25/2007	0.417 TC	01/22/2015	0.417 RR	02/11/2016	0	2.3	2.3	8.3	0.256 U	2.3	02/11/2086	02/10/2017
107.03	N-7SLSDRAIN-BK	N	1.823 TC	04/07/2009	1.769 TC	01/22/2015	1.769 RR	02/11/2016	0	7.9	9.4	28.6	1.454 U	7.9	12/27/2055	02/10/2017
107.04	N-7SLSDRAIN-L	N	1.797	04/25/2007	1.798 TC	01/22/2015	1.796 TC	02/11/2016	1.9	0.1	0.2	9.2	1.454 U	1.9	02/12/2196	02/10/2017
108.03	N-8 H2ODRAIN-BK	N	1.548	04/25/2007	1.544 TC	01/22/2015	1.544 RR	02/11/2016	0	0.5	0.5	8.4	1.257 U	0.5	02/15/2590	02/10/2017
108.04	N-8 H2ODRAIN-RGT	N	1.560	04/25/2007	1.561 TC	01/22/2015	1.561 RR	02/11/2016	0	0	0	3.4	1.257 U	0.1	02/26/4016	02/10/2017



## 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: 06/21/2016

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

Unit: HS-0032  
 Eq/Circ ID: HS0032-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: HORIZONTAL SEPARATORON HS-0032; SN:1258

Summary: Group Name: Group Description:  
 Insp. Due Date = 02/10/2017 RCR = 12.9 MPY  
 Pred. Ret. Date = 04/04/2026 Rem. Life (from last survey 02/11/2016) = 10.1 yrs

0 C.A. Status: No  
 Total Caution TMLs = 3

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
110.01	N-10 H2O OUT-F	N	0.344 NM	09/07/2005		N/A	0.307 TC	02/11/2016	N/A	3.5	N/A	3.5	0.176 U	3.5	07/17/2053	02/10/2017
110.03	N-10 H2O OUT-BK	N	0.312	04/25/2007	0.292 TC	01/22/2015	0.292 RR	02/11/2016	0	2.3	3.8	19.4	0.176 U	2.3	07/19/2066	02/10/2017
111.01	N-11-OILDR-F	N	0.344 NM	09/07/2005		N/A	0.332 TC	02/11/2016	N/A	1.2	N/A	1.2	0.176 U	1.2	02/12/2146	02/10/2017
111.03	N-11-OILDR-BK	N	0.331	04/25/2007	0.322 TC	01/22/2015	0.322 RR	02/11/2016	0	1.0	1.0	11.7	0.176 U	1.0	02/12/2162	02/10/2017
112.01	N-12-SPARGE-TOP	N *	0.396	04/25/2007	0.333 TC	01/22/2015	0.333 RR	02/11/2016	0	7.2	7.6	15.0	0.176 U	7.2	12/01/2037	02/10/2017
112.03	N-12-SPARGE-BTM	Y *	0.338	04/25/2007	0.332 RR	01/22/2015	0.316 TC	02/11/2016	15.2	2.5	1.3	15.2	0.176 U	15.2	04/28/2025	02/10/2017
113.01	N-13-TOP	N	0.379	04/25/2007	0.332 RR	01/22/2015	0.329 TC	02/11/2016	2.8	5.7	5.9	11.4	0.176 U	5.7	12/15/2042	02/10/2017
113.02	N-13-BT	N	0.344 NM	09/07/2005		N/A	0.332 TC	02/11/2016	N/A	1.2	N/A	1.2	0.176 U	1.2	02/12/2146	02/10/2017
114.01	N-14-WATER-T	N	1.572	04/25/2007	1.554 TC	01/22/2015	1.554 RR	02/11/2016	0	2.0	2.2	18.4	1.257 U	2.0	08/13/2164	02/10/2017
114.02	N-14-WATER-L	N	1.576	04/25/2007	1.556 TC	01/22/2015	1.546 TC	02/11/2016	9.5	3.4	2.8	11.7	1.257 U	9.5	07/14/2046	02/10/2017
114.03	N-14-WATER-BT	N	1.580 NM	09/07/2005		N/A	1.568 TC	02/11/2016	N/A	1.2	N/A	1.2	1.257 U	1.2	04/15/2275	02/10/2017
114.04	N-14-WATER-R	N	1.573	04/25/2007	1.566 TC	01/22/2015	1.566 RR	02/11/2016	0	0.8	1.0	2.2	1.257 U	0.8	05/16/2402	02/10/2017
115.01	N-15-OIL-LC-TOP	N	1.575	04/25/2007	1.563 RR	01/22/2015	1.568 RR	02/11/2016	0	0.8	1.2	6.0	1.257 U	0.8	11/14/2404	02/10/2017
115.02	N-15-OIL-LC-L	N	1.576	04/25/2007	1.572 TC	01/22/2015	1.572 RR	02/11/2016	0	0.5	0.5	4.2	1.257 U	0.5	02/16/2646	02/10/2017
115.03	N-15-OIL-LC-BTM	N	1.578	04/25/2007	1.569 TC	01/22/2015	1.569 RR	02/11/2016	0	1.0	0.9	3.4	1.257 U	1.0	02/14/2328	02/10/2017
115.04	N-15-OIL-LC-R	N	1.571	04/25/2007	1.567 TC	01/22/2015	1.567 RR	02/11/2016	0	0.5	0	10.1	1.257 U	0.5	02/16/2636	02/10/2017
116.01	N-16-CLEANING-F	N	2.064	04/25/2007	2.055 TC	01/22/2015	2.055 TC	02/11/2016	0	1.0	0.9	10.4	1.652 U	1.0	02/14/2419	02/10/2017
116.02	N-16-CLEANING-L	N	2.066	04/25/2007	2.059 TC	01/22/2015	2.058 TC	02/11/2016	0.9	0.9	0.7	2.1	1.652 U	0.9	03/26/2467	02/10/2017
116.03	N-16-CLEANING-B	N	2.066	04/25/2007	2.056 RR	01/22/2015	2.058 TC	02/11/2016	0	0.9	1.1	6.5	1.652 U	0.9	03/26/2467	02/10/2017
116.04	N-16-CLEANING-R	N	2.066	04/25/2007	2.057 TC	01/22/2015	2.057 RR	02/11/2016	0	1.0	1.0	6.2	1.652 U	1.0	02/13/2421	02/10/2017

## 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: 06/21/2016

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

Unit: HS-0032  
 Eq/Circ ID: HS0032-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: HORIZONTAL SEPARATORON HS-0032; SN:1258

Summary: Group Name: Group Description:  
 Insp. Due Date = 02/10/2017 RCR = 12.9 MPY  
 Pred. Ret. Date = 04/04/2026 Rem. Life (from last survey 02/11/2016) = 10.1 yrs

0 C.A. Status: No  
 Total Caution TMLs = 3

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
117.01	N-17-CLEANING-F	Y *	2.094	04/25/2007	2.089 TC	01/22/2015	2.012 TC	02/11/2016	73.0	9.3	4.5	73.0	1.652 U	73.0	01/16/2021	02/10/2017
117.02	N-17-CLEANING-L	N	2.097	04/25/2007	2.008 TC	01/22/2015	2.008 RR	02/11/2016	0	10.1	8.3	140.7	1.652 U	10.1	05/12/2051	02/10/2017
117.03	N-17-CLEANING-B	N	2.096	04/25/2007	2.083 TC	01/22/2015	2.083 RR	02/11/2016	0	1.5	1.2	15.1	1.652 U	1.5	06/16/2303	02/10/2017
117.04	N-17-CLEANING-R	N	2.098	04/25/2007	2.089 TC	01/22/2015	2.089 RR	02/11/2016	0	1.0	0.8	6.7	1.652 U	1.0	02/13/2453	02/10/2017
118.01	N-18-CLEANING-F	N	2.050	04/25/2007	2.045 TC	01/22/2015	2.045 TC	02/11/2016	0	0.6	0.5	8.4	1.652 U	0.6	02/16/2671	02/10/2017
118.02	N-18-CLEANING-L	N	2.051	04/25/2007	2.043 TC	01/22/2015	2.043 RR	02/11/2016	0	0.9	0.8	6.7	1.652 U	0.9	07/26/2450	02/10/2017
118.03	N-18-CLEANING-B	N	2.052	04/25/2007	2.049 TC	01/22/2015	2.047 TC	02/11/2016	1.9	0.6	0.5	6.2	1.652 U	1.9	01/06/2224	02/10/2017
118.04	N-18-CLEANING-R	N	2.051	04/25/2007	2.041 RR	01/22/2015	2.044 RR	02/11/2016	0	0.8	1.1	20.8	1.652 U	0.8	02/15/2506	02/10/2017
119.01	N-19 TI-TOP	N *	0.404	04/25/2007	0.343 RR	01/22/2015	0.332 TC	02/11/2016	10.4	8.2	8.3	12.7	0.188 U	10.4	12/16/2029	02/10/2017
119.03	N-19 TI-BTM	N	0.348	04/25/2007	0.308 TC	01/22/2015	0.308 RR	02/11/2016	0	4.5	5.1	13.3	0.188 U	4.5	10/12/2042	02/10/2017
120.01	N-20 PI-FRONT	N	0.366	04/25/2007	0.318 TC	01/22/2015	0.318 RR	02/11/2016	0	5.5	5.0	10.7	0.188 U	5.5	10/01/2039	02/10/2017
120.03	N-20 PI-FBACK	N	0.386	04/25/2007	0.343 RR	01/22/2015	0.340 TC	02/11/2016	2.8	5.2	4.7	8.7	0.188 U	5.2	05/06/2045	02/10/2017
121.01	N-21-H2OLG-TOP	N	0.392	04/25/2007	0.347 TC	01/22/2015	0.343 TC	02/11/2016	3.8	5.6	5.6	11.5	0.188 U	5.6	10/17/2043	02/10/2017
121.03	N-21-H2OLG-BTM	N	0.363	04/25/2007	0.340 RR	01/22/2015	0.348 RR	02/11/2016	0	1.7	2.9	16.6	0.188 U	1.7	03/26/2110	02/10/2017
122.01	N-22-H2OLG-TOP	N	0.403	04/25/2007	0.349 TC	01/22/2015	0.349 RR	02/11/2016	0	6.1	6.6	11.5	0.188 U	6.1	07/04/2042	02/10/2017
122.03	N-22-H2OLG-BTM	N	0.373	04/25/2007	0.345 RR	01/22/2015	0.347 RR	02/11/2016	0	3.0	3.4	8.1	0.188 U	3.0	02/10/2069	02/10/2017
123.01	N-23-OIL- LG-TOP	N	0.390	04/25/2007	0.344 TC	01/22/2015	0.344 TC	02/11/2016	0	5.2	5.5	11.6	0.188 U	5.2	02/10/2046	02/10/2017
123.03	N-23-OIL- LG-BTM	N	0.377	04/25/2007	0.344 TC	01/22/2015	0.344 RR	02/11/2016	0	3.8	3.7	8.1	0.188 U	3.8	03/01/2057	02/10/2017
124.01	N-24-OIL- LG-TOP	N	0.395	04/25/2007	0.344 TC	01/22/2015	0.344 RR	02/11/2016	0	5.8	6.3	15.1	0.188 U	5.8	01/04/2043	02/10/2017
124.03	N-24-OIL- LG-BTM	N	0.347	04/25/2007	0.335 RR	01/22/2015	0.341 TC	02/11/2016	0	0.7	1.6	10.2	0.188 U	0.7	09/09/2234	02/10/2017
125.01	MW-1-TOP	N	3.030 NM	09/07/2005		N/A	3.023 TC	02/11/2016	N/A	0.7	N/A	0.7	2.526 U	0.7	02/17/2726	02/10/2017

## 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: 06/21/2016

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

Unit: HS-0032  
 Eq/Circ ID: HS0032-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: HORIZONTAL SEPARATORON HS-0032; SN:1258

Summary: Group Name: Group Description:  
 Insp. Due Date = 02/10/2017 RCR = 12.9 MPY  
 Pred. Ret. Date = 04/04/2026 Rem. Life (from last survey 02/11/2016) = 10.1 yrs

0 C.A. Status: No  
 Total Caution TMLs = 3

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
125.02	MW-1-LEFT	N	3.045	04/25/2007	3.026 TC	01/22/2015	3.013 TC	02/11/2016	12.3	3.6	2.9	12.3	2.526 U	12.3	09/16/2055	02/10/2017
125.03	MW-1-BTM	N	3.030 NM	09/07/2005		N/A	3.032 TC	02/11/2016	N/A	0	N/A	0	2.526 U	0.1	02/26/4016	02/10/2017
125.04	MW-1-RIGHT	N	3.048	04/25/2007	3.013 TC	01/22/2015	3.008 TC	02/11/2016	4.7	4.5	4.6	16.4	2.526 U	4.7	09/02/2118	02/10/2017

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

Report Date: 06/21/2016

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

Unit: HS-0032  
Eq/Circ ID: HS0032-SEP  
Design Code: S8/D1  
Eq Type: VESSEL  
Class:  
CM RBI:

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

Description: HORIZONTAL SEPARATORON HS-0032; SN:1258

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	:	4.5 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2	:	12.9 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28)	:	5.1 MPY
(D) -- Default Corrosion Rate	:	0.1 MPY

Representative Corrosion Rate = 12.9 MPY

TML thickness readings have not been compensated for high Temperatures.

TML thickness readings have been compensated for growths.

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

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

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

TML Inspection Interval is:

(A) -- 1.00 years.

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

Eq/Circ ID Estimated life = 10.1 years from the most recent survey date.

(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 04/04/2026

Recommended Eq/Circ UT/RT Inspection Date is 02/10/2017

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 3 Caution TMLs in this Eq/Circ ID.

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

A 525151

1. Manufactured and certified by MILODA PROCESS SYSTEMS INC. 1211 - 8A STREET NISKIU 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-1K4  
(Name and address of Purchaser) **A 525151**

3. Location of installation Portable  
(Name and address)

4. Type Horizontal Separator 1258 R 9975.2 HV 44 Rev 4 26 2005  
(Horiz., vert., or sphere) (Tank separator, jkt vessel, heat exch., etc.) (Mfg's serial No.) (CRN) (Drawing No.) (Netl. Bd. No.) (Year built)

5. ASME Code, Section VIII, Div. 1 2004 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

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	50" ID	10'	SA 516-70N	3"	0.125"	1	Full			1	1	Full			1	1150 F	2.25 Hr.
2	50" ID	4'	SA 516-70N	3"	0.125"	1	Full			1	1	Full			1	1150 F	2.25 Hr.
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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 (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		Type	Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave		Full	Spot	None
(a)	END	2.888"	0.125"	N/A	N/A	2:1 SE	N/A	N/A	N/A	No	Yes	I	Scraping		I
(b)	END	2.888"	0.125"	N/A	N/A	2:1 SE	N/A	N/A	N/A	No	Yes	I	Scraping		I

If removable, bolts used (describe other fastening) (20) 1.875" OD x 13.25" LG Studs SA-193-B7M & (40) 1.875" OD Nuts SA-194-2HM  
(Mat'l Spec. No., Grade, size, No.)

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

If bar, give dimensions - If bolted, describe or sketch -

9. MAWP 2000 N/A psi at max. temp. 200 N/A °F Min. design metal temp -40 °F at 2000 psi  
(internal) (external) (internal) (external)

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., press., asmt., 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

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	2" NPS	20'-4"	SA 106-B	0.436	Nil	N/A	Seamless			1	1	None			70	1150 F	2.25 Hr.
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

15. Heads: (a) - (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
(a)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(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(c) at test temperature of        °F  
(Indicate yes or no and the component(s) impact tested)

18 Hydro. ~~press. essure~~ test press 195 Proof test N.A **④ 525151**

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 (Inlet, Outlet, etc.)
				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/N12996 (N16), S/N 12995 (N17) & S/N 12990 (N18) CRN OH4712.231

Edmonton Exchanger 4" welded shell section S/N S56733-10-1

22. Remarks: Construction dwg. 05-593-V Rev. 0

RT-4: Cat. A welds Full RT, Vessel Cat. B Welds Full RT & Steam Coil Cat. B welds No RT

Volume: 217.5 cu./ft.

\*PSV to be installed in the piping system\* \*\*Hydro test conducted after internal coating\*\*

#### 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 10/2007  
Date 10/17/2005 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 10/17/2005 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 10/17/2005 Signed [Signature] Commissions AB# 144A 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-4 MANUFACTURER'S DATA REPORT SUPPLEMENTARY SHEET**  
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1 **4**

1. Manufactured and certified by: COMPLETE PACKAGE TECHNOLOGY (2000) LTD., 2887 Parsons Road, Edmonton, Alberta T6N 1A3  
(Name and address of Manufacturer)

2. Manufactured for: MICODA PROCESS SYSTEMS INC., 1211 - 8A Street Nisku, Alberta  
(Name and address of Purchaser)

3. Location of Installation: MICODA PROCESS SYSTEMS INC., 1211 - 8A STREET NISKU, ALBERTA  
(Name and address)

4. Type: HORIZONTAL SEPARATOR C04-7090  
(Honz., vert., or sphere) (Tank separator, heat exch., etc) (Mfg's Serial No.)

R9975.2 04-475-V - R1 2005  
(CRN) (Drawing No.) (Bd. No.) (Year Built)

Date Report  
Item Number

Remarks

**NOZZLES AND OPENINGS**

Purpose	No.	Dia	Type	Material	Nom Thk	Re Mat	How Att	Location
INLET	N1	1	6"	CL 900 RTJ	SA-106-B / SA-105N / SA-350-LF2	2.465"	UW16-1c	HEAD
OUTLET	N2	1	6"	CL 900 RTJ	SA-350-LF2	2.465"	UW16-1c	SHELL
PSV-1	N3	1	2"	CL 900 RTJ	SA-333-6 / SA-350-LF2	0.344"	UW16-1c	SHELL
PSV-2	N4	1	2"	CL 900 RTJ	SA-333-6 / SA-350-LF2	0.344"	UW16-1c	SHELL
STEAM COIL	N5	1	2"	CL 150 RF	SA-333-6 / SA-350-LF2 / SA-106-B / SA-105N / SA-234-WPB	0.436"	UW16-1c	SHELL
STEAM COIL	N6	1	2"	CL 600 RF	SA-333-6 / SA-350-LF2 / SA-106-B / SA-105N / SA-234-WPB	0.436"	UW16-1c	SHELL
SOLIDS DRAIN	N7	1	4"	CL 900 RTJ	SA-350-LF2	1.805"	UW16-1c	SHELL
WATER DRAIN	N8	1	3"	CL 900 RTJ	SA-350-LF2	1.580"	UW16-1c	SHELL
OIL OUT	N9	1	3"	CL 900 RTJ	SA-350-LF2	1.580"	UW16-1c	SHELL
WATER OUT	N10	1	2"	CL 900 RTJ	SA-333-6 / SA-350-LF2	0.344"	UW16-1c	SHELL
OIL DRAIN	N11	1	2"	CL 900 RTJ	SA-333-6 / SA-350-LF2	0.344"	UW16-1c	SHELL
SPARGE 1	N12	1	2"	CL 900 RTJ	SA-333-6 / SA-350-LF2 / SA-105N	0.344"	UW16-1c	SHELL
SPARGE 2	N13	1	2"	CL 900 RTJ	SA-333-6 / SA-350-LF2 / SA-105N	0.344"	UW16-1c	SHELL
WATER LC	N14	1	3"	CL 900 RTJ	SA-350-LF2	1.580"	UW16-1c	SHELL
OIL LC	N15	1	3"	CL 900 RTJ	SA-350-LF2	1.580"	UW16-1c	SHELL
CLEANING	N16/N17/N18	3	6"	CL 900	SA-350-LF2	2.03"	UW16-1c	SHELL
MANWAY	M1	1	18"	CL 900 RTJ	SA-350-LF2	3.03"	UW16-1c	SHELL
TI	N19	1	1"	CL 900 RTJ	SA-333-6 / SA-350-LF2	0.358"	UW16-1c	SHELL
PI	N20	1	1"	CL 900 RTJ	SA-333-6 / SA-350-LF2	0.358"	UW16-1c	SHELL
WATER LG	N21/22	2	1"	CL 900 RTJ	SA-333-6 / SA-350-LF2	0.358"	UW16-1c	SHELL
OIL LG	N23/24	2	1"	CL 900 RTJ	SA-333-6 / SA-350-LF2	0.358"	UW16-1c	SHELL

Certificate of Authorization: Type:

U No: 32.148

Expires: 17-Oct-08

Date Feb 10, 2005 Name

COMPLETE PACKAGE TECHNOLOGY (2000) LTD.  
(Manufacturer)

Signed

Date Feb 10, 2005 Name

Harold Lake  
(Authorized Inspector)

Commission ALBERTA  
(Natl Board (incl. Endorsements) State, Province and No.)

4593

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.

[illegible][illegible]

If bar, give dimensions \_\_\_\_\_ If bolted, describe or sketch \_\_\_\_\_

**YES - PRODUCTION COUPON (WP-114); NORMALIZED PLATE WENT THROUGH SAME FORMING CYCLE AS SHELL AND WAS PWHT @ 1150°F FOR 135 MINUTES**

11. Hydro., pneu. or comb. test pressure \_\_\_\_\_ Proof Test \_\_\_\_\_

Items 12 and 13 to be completed for tube sections -N/A-

12. Tubesheet:					
(Stationary / Melt Spec. No. )	(Dia. in. (subject to press.))	(Nom. thick. in.)	(Corr. Allow. in.)	(Attachment (welded or bolted))	
(Floating / Melt Spec. No. )	(Dia. in.)	(Nom. thick. in.)	(Corr. Allow. in.)	(Attachment)	

13. Tubes				
(Mat. Spec. No. Grade or Type)	O.D.	(Nom. dia. or gauge)	Number	Type (Solid or U/I)

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

14. Shell (a) No. of course(s) \_\_\_\_\_ (b) Overall length, ft. & in. \_\_\_\_\_

[illegible]



121

(b)

Mar. 21 ec. No. Grade on Paper 111 1 mg & 1 mg.

(Mat): Socr. No. Grade or Type) H T Time &amp; Term

[illegible]

If removable, bolts used (describe other fastening)

Mat' Spec No Grade Size No :

16. MAWP

psi at max temp.

°F Min. design metal temp

at

246

## 17 Impact test

Indicate yes or no and the components - if yes (tested)

18. Hydro., pneu, or comb. test pressure

### Proof Test

19. Nozzles, inspection, and safety valve openings.

-N/A-

[illegible]

20. Supports: Skirt

**Lugs**

## Legs

Others

Attached

(YES OR NO)

(No.)

(No.)

(Describe)

(Where and how)

21. Remarks: NO ENGINEERING, DRAWING OR DESIGN BY EDMONTON EXCHANGER

- FULL RADIOGRAPHY ON LONG SEAM WELD
- PWHT ON SHELL BY OTHERS
- HYDRO BY OTHERS
- SHELL(S) - HOT FORMED @ 1650°F AND AIR COOLED.
- 1 - 3.00" NOM. X 54" OD X 4'-0" TWO PIECE WELDED SHELL

## 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. 24597 Expires NOVEMBER 1, 2005

Date Apr 22/05 Name EDMONTON EXCHANGER & REFINERY SERVICES LTD.  
(Manufacturer)

Signed

## 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 of Province of ALBERTA and employed by ABSA of ALBERTA have inspected the pressure vessel part described in this Manufacturer's Data Report on CSA 23, 20 21, 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 **APR 22 2005**

Signed

## COMMISSIONS

PROVINCIAL #AB95A

**№ 12-1434**

NAME: [REDACTED] ADDRESS: [REDACTED]

**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 12955 to 12956 Inclusive OH4712.231  
(Description of vessel part (shell, two-piece head, tube bundle)) (Mfg's serial No.) (CNR)
- CL01011 Rev 5 In-Line Flow Products Limited 2005  
(Mfg's Std. No.) (Drawing No.) (Drawing prepared by) (Year built)
5. ASME Code, Section VIII, Div. 1 2004 Edition 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	0.719	1/8	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) 7.750-2-Modified Stub ACME-2G  
(Mfg's Spec. No., Grade or Type) B.L.T. -- Time & Temp. (Mfg's Spec. No., Grade or Type) B.L.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 |
| (a) End                      | 0.613     | 1/8   |        |         |                  |                    |                      |               |                  | Yes     | N/A        | N/A  | N/A  | N/A  |
| (b)                          |           |       |        |         |                  |                    |                      |               |                  |         |            |      |      |      |

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

8. MAWP 2220 400 -50 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 (Temp. Open.)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
Outlet - Alert Filling	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 Assem. Cap Pin Attached Welding (WPS In-line-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 5 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. 33,868 Expires March 26, 2006

Date June 27, 2005 Name In-Line Flow Products Limited Signed [Signature]  
(Manufacturer) (Representative)

**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 ABSA of Alberta

have inspected the pressure vessel part described in this Manufacturer's Data Report on June 27, 2005 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 June 27, 2005 Signed [Signature] Commissions AB 136A  
(Authorized Inspector) (Not! Board Ins. endorsement, State, Province and No.)

ATTN: Dave

④ 525151

- ## 10: Nozzle, Inspection & Safety Valve Openings

Date October 17, 2005 Name [Signature] Commission AB# 144A NB# 12369A  
(Authorized Inspector) (Nat'l Board Incl. Endorsement, State, Prov. & No.)



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-0032 Fuel Gas Scrubber	
<b>Remaining Life:</b> 14.0 YRS	<b>Date Last Inspected:</b> 02/11/2016
<b>Representative Corrosion Rate:</b> 9.8 MPY	<b>Next UT:</b> 02/10/2017 <b>Next VT:</b> 02/10/2017
<b>Manufacturer:</b> Micoda Process Systems Inc.	<b>Manufacturer Serial #:</b> 1264
<b>Year Built:</b> 2005	<b>National Board #:</b> None
<b>Alberta Registration #:</b> None	<b>Canadian Registration #:</b> T1592.231

**HS-0032 Fuel Gas Scrubber**



## PRESSURE VESSEL INVENTORY FORM

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

### VESSEL ID INFORMATION

Company Name : Pure Energy  
Facility/Location Name : Evanston District  
Field Name :  
Equipment Number :  
Eq/Circ. ID : HS0032-FGS  
Equipment Name/Service : Fuel Gas Scrubber  
Physical Location : Wamsutter  
GPS Coordinates :

### VESSEL DESCRIPTION AND SERVICE CONDITIONS

**Type of Vessel:** Vertical Fuel Gas Scrubber

**Vessel Size:** 8.625"

**Operating Pressure Range (psig):** N/A

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

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

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

**Vessel is located:** Inside

### MISCELLANEOUS VESSEL INFORMATION

## PRESSURE VESSEL INVENTORY

### ORIGINAL VESSEL NAMEPLATE/STAMPING INFORMATION

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



### SUPPLEMENTAL VESSEL NAMEPLATE/STAMPING INFORMATION

Repair stamp: ☐ R stamp ☐ Other Stamp ☐ No stamp

Repaired By \_\_\_\_\_ Date of Repair \_\_\_\_\_

Nat'l Bd. R-Certification No. \_\_\_\_\_

Other Stamping Information: \_\_\_\_\_

### VESSEL DOCUMENTATION

Manufacturer Data Sheets: ☐ ASME U-1 or U-1A Forms ☐ U2 or U4 Supplemental Forms

☐ Documentation relating to repair/alteration/rerating work (R-1 form, calculations, revised drawings, inspection reports, etc.).

Name: Michael Peterson Date: 01/24/2012

## API 510 PRESSURE VESSEL EXTERNAL INSPECTION REPORT

<b>Company Name:</b> FMC Technologies Completion	
<b>Field/Location:</b> Grand Junction	
<b>Equipment Number:</b> HS-0032	<b>Eq/Circ. ID:</b> HS0032-FGS
<b>Equipment Name/Service:</b> Fuel Gas Scrubber	
<b>Physical Location:</b> H Yard	
<b>Manufacturer:</b> Micoda Process Systems Inc.	<b>Manufacturer Serial #:</b> 1264
<b>Year Built:</b> 2005	<b>National Board #:</b> None
<b>Alberta Registration #:</b> None	<b>Canadian Registration #:</b> T1592.231

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

**Condition of Nameplate and/or Bracket:** The nameplate is not legible. The nameplate bracket is securely attached. Lettering on the nameplate is faded and worn. Stamping is in good condition.

**Internal Access?:** No

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

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

**Condition of Foundation and Anchor Bolts:** Anchor bolts are in place and secure. All (4) anchor bolt nuts are in place and secure.

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

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

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

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

If Yes, is it set at or below the MAWP?:

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

Comments:

Recommendations:

Repairs Needed:

Robert W. Menke/JWW  
API 510 Inspector Signature

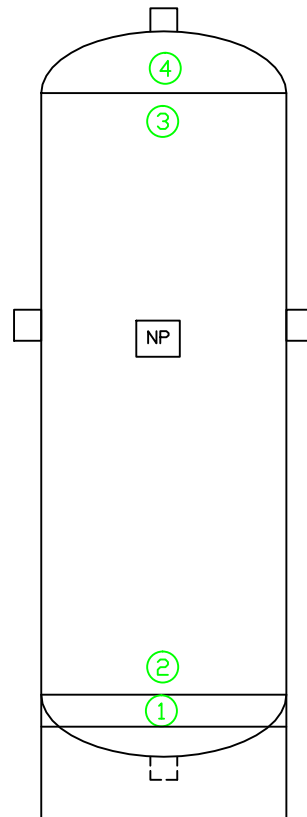
0131  
API 510 Inspector Number

02/11/2016  
Date



EQUIP RETIREMENT DATE: 2/20/2030  
NEXT INSPECTION IS DUE: 2/10/2017

#1. 01- BTM HD-FRONT 0. 316 TC  
#1. 02- BTM HD-LEFT 0. 313 TC  
#1. 04- BTM HD-RIGHT 0. 302 TC  
#2. 01- BTM SHELL-FRONT 0. 304 TC  
#2. 02- BTM SHELL-LEFT 0. 293 TC  
#2. 04- BTM SHELL-RIGHT 0. 305 TC  
#3. 01- TOP SHELL-FRONT 0. 315 TC  
#3. 02- TOP SHELL-LEFT 0. 296 TC  
#3. 04- TOP SHELL-RIGHT 0. 310 TC  
#4. 01- TOP HD-FRONT 0. 287 TC  
#4. 02- TOP HD-LEFT 0. 284 TC  
#4. 04- TOP HD-RIGHT 0. 287 TC



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

TC-560

NAMEPLATE INFO	
MFG	MICODA PROCESS SYSTEMS
SERIAL NUMBER	1264
NATIONAL BOARD #	NONE
DATE BUILT	2005
DESIGN P & T	285 PSI @ 100°F
NOTE	UM STAMPED CRN T1592. 231

CAL BLK=34°F

VESSEL=24°F

BUSINESS UNIT	FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #	HS0032-FGS
EQUIP NAME	VERTICAL FUEL GAS SCRUBBER
LOCATION	INSIDE SKID UNIT HS-0032
DWG #	HS0032-FGS

DESC: FUEL GAS SCRUBBER-SN:1264  
DWG#: HS0032-FGS-1.01-4.04

## Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 06/21/2016

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

Unit: HS-0032  
 Eq/Circ ID: HS0032-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: VERT. FUEL GAS SCRUBBER-HS-0032; SN:1264  
 UM STAMPED

Summary: Group Name: Group Description:  
 Insp. Due Date = 02/10/2017 RCR = 9.8 MPY  
 Pred. Ret. Date = 02/20/2030 Rem. Life (from last survey 02/11/2016) = 14.0 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
1.01	BTM HD-FRONT	N	0.341	04/25/2007	0.313 TC	01/22/2015	0.313 RR	02/11/2016	0	3.2	2.6	7.6	0.210 U	3.2	04/19/2048	02/10/2017
1.02	BTM HD-LEFT	N	0.338	04/25/2007	0.310 TC	01/22/2015	0.310 RR	02/11/2016	0	3.2	3.2	8.2	0.210 U	3.2	05/13/2047	02/10/2017
1.04	BTM HD-RIGHT	N *	0.338	04/25/2007	0.311 TC	01/22/2015	0.302 TC	02/11/2016	8.5	4.1	2.8	8.5	0.210 U	8.5	12/08/2026	02/10/2017
2.01	BTM SHELL-FRONT	N *	0.324	04/25/2007	0.310 TC	01/22/2015	0.304 TC	02/11/2016	5.7	2.3	1.6	6.2	0.197 U	5.7	11/19/2034	02/10/2017
2.02	BTM SHELL-LEFT	N *	0.316	04/25/2007	0.304 TC	01/22/2015	0.293 TC	02/11/2016	10.4	2.6	1.7	10.4	0.197 U	10.4	05/06/2025	02/10/2017
2.04	BTM SHELL-RIGHT	N	0.329	04/25/2007	0.309 TC	01/22/2015	0.305 TC	02/11/2016	3.8	2.7	2.1	10.1	0.197 U	3.8	07/14/2044	02/10/2017
3.01	TOP SHELL-FRONT	N	0.335	04/25/2007	0.316 TC	01/22/2015	0.315 TC	02/11/2016	0.9	2.3	1.8	5.0	0.197 U	2.3	06/02/2067	02/10/2017
3.02	TOP SHELL-LEFT	N *	0.314	04/25/2007	0.303 TC	01/22/2015	0.296 TC	02/11/2016	6.6	2.0	1.4	6.6	0.197 U	6.6	02/11/2031	02/10/2017
3.04	TOP SHELL-RIGHT	N *	0.334	04/25/2007	0.321 RR	01/22/2015	0.310 TC	02/11/2016	10.4	2.7	1.8	10.4	0.197 U	10.4	12/24/2026	02/10/2017
4.01	TOP HD-FRONT	N	0.316	04/25/2007	0.291 TC	01/22/2015	0.287 TC	02/11/2016	3.8	3.3	1.9	6.3	0.210 U	3.8	05/17/2036	02/10/2017
4.02	TOP HD-LEFT	N *	0.313	04/25/2007	0.288 RR	01/22/2015	0.284 TC	02/11/2016	3.8	3.3	1.9	5.5	0.210 U	3.8	08/03/2035	02/10/2017
4.04	TOP HD-RIGHT	N	0.319	04/25/2007	0.286 RR	01/22/2015	0.287 TC	02/11/2016	0	3.6	2.2	6.3	0.210 U	3.6	07/02/2037	02/10/2017

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

Report Date: 06/21/2016

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

Unit: HS-0032  
Eq/Circ ID: HS0032-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: VERT. FUEL GAS SCRUBBER-HS-0032; SN:1264  
UM STAMPED

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	:	5.4 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2	:	9.8 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28)	:	7.4 MPY
(D) -- Default Corrosion Rate	:	0.1 MPY

Representative Corrosion Rate = 9.8 MPY

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

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

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

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

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

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

Eq/Circ ID Estimated life = 14.0 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 02/20/2030

Recommended Eq/Circ UT/RT Inspection Date is 02/10/2017  
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> All Associated Piping With HS-0025	
<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> 2000 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#

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

☒ Scheduled API-570 External Inspection. ☐ Other:

**Testing Performed:**

☒ Visual ☒ UT ☐ PT ☐ MT ☐ Other:

**Comments:**

Insulation Observations:	Comments:
<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.

Coating Condition:	Comments:
<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair, Some Blistering/Peeling <input type="checkbox"/> Corrosion Present (Describe) <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Issues	Coating has minor wear, chipping and peeling.

Loss of Containment:	Comments:
<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	There are no leaks visible. Vessel was not in service at the time of this inspection.

Condition of Welds:	Comments:
<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 have a full profile with no visual issues.

Relief Device:	Comments:
<input checked="" type="checkbox"/> PSV    No PSV <input type="checkbox"/> Rupture Disk <input type="checkbox"/> Atmospheric <input type="checkbox"/> No Relief Device Identified For This Equipment <input type="checkbox"/> Tag Secure and Legible <input 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	There are (2) PSV's.

Supports/Hangers:	Comments:
<input checked="" type="checkbox"/> In Serviceable Condition <input type="checkbox"/> Foundation Is Damaged <input type="checkbox"/> Additional Support Needed <input 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 type="checkbox"/> Loose Support Needed To Be Tightened <input type="checkbox"/> Fireproofing Missing Or Damaged <input type="checkbox"/> Support/Hanger Is Corroded <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Issues	Supports and hangers are in good condition. There are no bolts missing.

Flanged Connections:	Comments:
<input checked="" type="checkbox"/> Bolting Serviceable <input type="checkbox"/> Short, Missing Or Damaged Bolting <input type="checkbox"/> Nuts Lack Full Engagement <input type="checkbox"/> Flanges Serviceable <input type="checkbox"/> Flange Material Or Rating Inconsistent For System <input type="checkbox"/> Flanges Deformed Or Damaged <input type="checkbox"/> Corrosion Present (Describe) <input type="checkbox"/> Gaskets <input type="checkbox"/> Flange Rating Issues <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Issues	Nozzle 14 and 15 are missing bolts up to flange.

Mechanical Observations:	Comments:
<input 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 type="checkbox"/> Other <input checked="" type="checkbox"/> No Issues	There are no mechanical issues.

EQUIP RETIREMENT DATE: 5/29/2034  
NEXT INSPECTION IS DUE: 2/10/2017

#1.01- SP-LEFT 0.346 D5  
#1.02- SP-BTM 0.333 D5  
#1.03- SP-RIGHT 0.337 D5

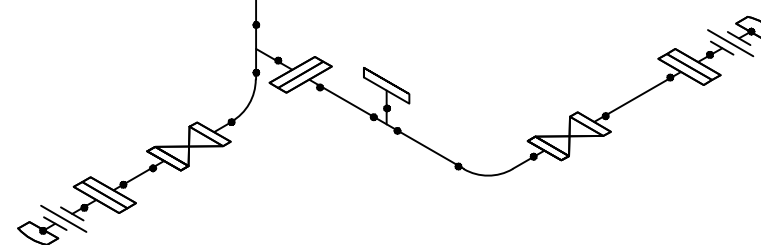
6x4

#2.01- SP-LEFT 0.337 D5  
#2.02- SP-BTM 0.340 D5  
#2.03- SP-RIGHT 0.338 D5

#3.01- SP-LEFT 0.337 D5  
#3.02- SP-BTM 0.336 D5  
#3.03- SP-RIGHT 0.324 D5

#5.01- SP-LEFT 0.000 NT  
#5.02- SP-BTM 0.462 D5  
#5.03- SP-RIGHT 0.454

#4.01- SP-LEFT 0.341 D5  
#4.02- SP-BTM 0.333 D5  
#4.03- SP-RIGHT 0.328 D5



HS0032-P1

TEMP= 26°F  
CAL BLK= 34°F

DA-512

DESC: GAS OUT-HS-0032-6,4,3 SCH 80 PIPE  
DWG#: GAS-OUT-SP-1.01-5.03

## 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: 06/21/2016

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

Unit: HS-0032  
 Eq/Circ ID: GAS OUT-SP  
 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: 3,4,6 INCH SCH80/40 GAS OUT LINES  
 READINGS AT INJECTION PORTS

Summary: Group Name: Group Description:  
 Insp. Due Date = 02/10/2017 RCR = 14.6 MPY  
 Pred. Ret. Date = 05/29/2034 Rem. Life (from last survey 02/11/2016) = 18.3 yrs

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

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	SP-LEFT	N	0.345	06/18/2013	0.340	01/22/2015	0.340 RR	02/11/2016	0	1.9	2.1	6.7	0.206 P	1.9	09/05/2086	02/10/2017
1.02	SP-BTM	N	0.339	06/18/2013	0.332	01/22/2015	0.332 RR	02/11/2016	0	2.6	3.1	11.7	0.206 P	2.6	08/08/2064	02/10/2017
1.03	SP-RIGHT	N *	0.346	06/18/2013	0.341	01/22/2015	0.337 D5	02/11/2016	3.8	3.4	3.7	8.4	0.206 P	3.8	08/10/2050	02/10/2017
2.01	SP-LEFT	N *	0.345	06/18/2013	0.343	01/22/2015	0.337 D5	02/11/2016	5.7	3.0	3.1	5.7	0.206 P	5.7	02/09/2039	02/10/2017
2.02	SP-BTM	N	0.335	06/18/2013	0.330	01/22/2015	0.330 RR	02/11/2016	0	1.9	2.2	8.4	0.206 P	1.9	06/01/2081	02/10/2017
2.03	SP-RIGHT	N *	0.344	06/18/2013	0.345 RR	01/22/2015	0.338 D5	02/11/2016	6.6	2.3	2.1	6.6	0.206 P	6.6	02/15/2036	02/10/2017
3.01	SP-LEFT	N *	0.346	06/18/2013	0.347 RR	01/22/2015	0.337 D5	02/11/2016	9.5	3.4	3.2	9.5	0.206 P	9.5	11/28/2029	02/10/2017
3.02	SP-BTM	N *	0.342	06/18/2013	0.346 RR	01/22/2015	0.336 D5	02/11/2016	9.5	2.3	1.9	9.5	0.206 P	9.5	10/21/2029	02/10/2017
3.03	SP-RIGHT	Y *	0.349	06/18/2013	0.350 RR	01/22/2015	0.324 D5	02/11/2016	24.7	9.4	9.0	24.7	0.206 P	24.7	11/22/2020	02/10/2017
4.01	SP-LEFT	N	0.338	06/18/2013	0.339 RR	01/22/2015	0.341 D5	02/11/2016	0	0	0	0	0.206 P	0.1	11/22/3366	02/10/2017
4.02	SP-BTM	N	0.324	06/18/2013	0.330 RR	01/22/2015	0.333 D5	02/11/2016	0	0	0	0	0.206 P	0.1	11/21/3286	02/10/2017
4.03	SP-RIGHT	N	0.320	06/18/2013	0.331 RR	01/22/2015	0.328 D5	02/11/2016	2.8	0	0	2.8	0.206 P	2.8	09/17/2059	02/10/2017
5.01	SP-LEFT	N	0.336	06/18/2013	0.336 RR	06/18/2014	0.338 RR	01/22/2015	0	0	0	0	0.206 P	0.1	11/02/3335	01/22/2016
5.02	SP-BTM	N	0.331	06/18/2013	0.336 RR	01/22/2015	0.339 RR	02/11/2016	0	0	0	0	0.206 P	0.1	11/22/3346	02/10/2017
5.03	SP-RIGHT	N	0.341	06/18/2013	0.347	01/22/2015	0.347 RR	02/11/2016	0	0	0	0	0.206 P	0.1	11/23/3426	02/10/2017

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

Report Date: 06/21/2016

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

Unit: HS-0032  
Eq/Circ ID: GAS OUT-SP  
Design Code: B31.3  
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: 3,4,6 INCH SCH80/40 GAS OUT LINES  
READINGS AT INJECTION PORTS

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	:	4.6 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2	:	14.6 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28)	:	6.1 MPY
(D) -- Default Corrosion Rate	:	0.1 MPY

Representative Corrosion Rate = 14.6 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 6 months.

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

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

Eq/Circ ID Estimated life = 18.3 years from the most recent survey date.  
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

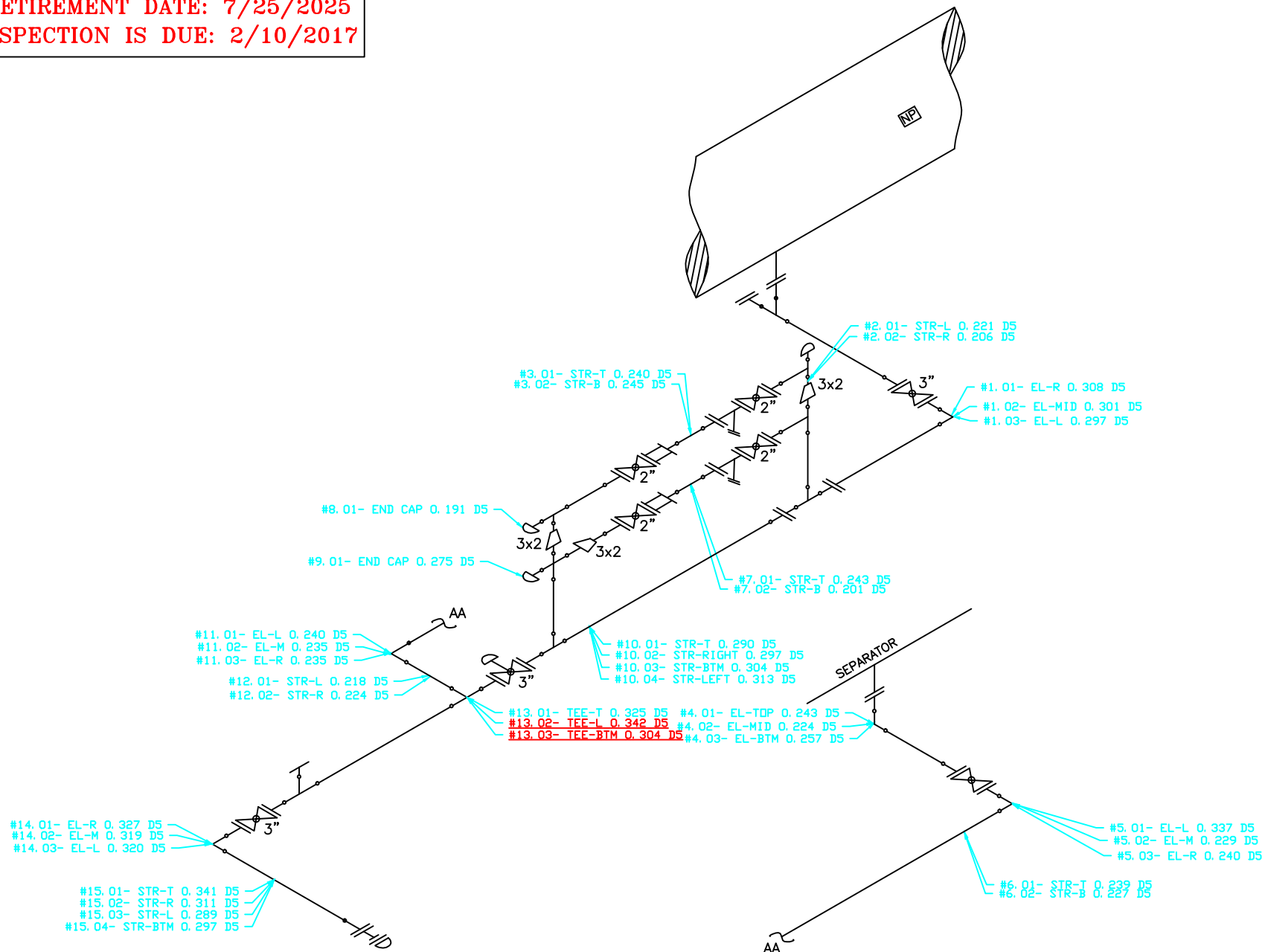
Predicted Eq/Circ ID Retirement date is 05/29/2034

Recommended Eq/Circ UT/RT Inspection Date is 02/10/2017  
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: 7/25/2025  
NEXT INSPECTION IS DUE: 2/10/2017



HS0032-P2

DESC: OIL OUT LINE-2,3" SCH80 PIPE  
DWG#: OIL-OUT-1.01-15.04

DA-512

## 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: 06/21/2016

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

Unit: HS-0032  
 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: OIL OUT LINE-2,3 INCH SCH 80 PIPE  
 PORTABLE SKID HS-0032

Summary: Group Name: Group Description:  
 Insp. Due Date = 02/10/2017 RCR = 12.5 MPY  
 Pred. Ret. Date = 07/25/2025 Rem. Life (from last survey 02/11/2016) = 9.4 yrs

0 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	TML Retirement Date	TML Inspection Date
1.01	EL-R	N	0.296	04/07/2009	0.297	01/22/2015	0.297 RR	02/11/2016	0	0	0	13.4	0.168 P	0.1	06/13/3303	02/10/2017
1.02	EL-MID	N	0.296	04/25/2007	0.297	01/22/2015	0.297 RR	02/11/2016	0	0	0	0.2	0.168 P	0.1	06/13/3303	02/10/2017
1.03	EL-L	N	0.310	04/07/2009	0.299 RR	01/22/2015	0.297 D5	02/11/2016	1.9	1.9	2.1	10.4	0.168 P	1.9	11/13/2083	02/10/2017
2.01	STR-L	N	0.211	04/25/2007	0.226	01/22/2015	0.221 D5	02/11/2016	4.7	0	0	4.7	0.120 S	4.7	08/08/2037	02/10/2017
2.02	STR-R	N	0.226	04/25/2007	0.212	01/22/2015	0.206 D5	02/11/2016	5.7	2.3	1.5	21.8	0.120 S	5.7	03/15/2031	02/10/2017
3.01	STR-T	N	0.247	04/25/2007	0.244	01/22/2015	0.240 D5	02/11/2016	3.8	0.8	0.4	3.8	0.120 S	3.8	09/10/2047	02/10/2017
3.02	STR-B	N	0.212	04/25/2007	0.225 RR	01/22/2015	0.226 RR	02/11/2016	0	0	0	0	0.120 S	0.1	02/19/3076	02/10/2017
4.01	EL-TOP	N	0.246	04/07/2009	0.234	01/22/2015	0.234 RR	02/11/2016	0	1.8	1.5	4.2	0.120 S	1.8	06/13/2079	02/10/2017
4.02	EL-MID	N	0.239	04/07/2009	0.231	01/22/2015	0.224 D5	02/11/2016	6.6	2.2	1.4	18.7	0.120 S	6.6	11/14/2031	02/10/2017
4.03	EL-BTM	N	0.240	04/07/2009	0.216 RR	01/22/2015	0.220 RR	02/11/2016	0	2.9	3.9	10.9	0.120 S	2.9	08/06/2050	02/10/2017
5.01	EL-L	N	0.219	04/07/2009	0.200	01/22/2015	0.200 RR	02/11/2016	0	2.8	3.5	14.5	0.114 P	2.8	10/06/2046	02/10/2017
5.02	EL-M	N		N/A		N/A	0.229 D5	02/11/2016	N/A	N/A	N/A	0	0.114 P	0.1	04/23/3164	02/10/2017
5.03	EL-R	N		N/A		N/A	0.240 D5	02/11/2016	N/A	N/A	N/A	0	0.114 P	0.1	04/24/3274	02/10/2017
6.01	STR-T	N	0.247	04/25/2007	0.240 RR	01/22/2015	0.239 D5	02/11/2016	0.9	0.9	0.9	5.5	0.120 S	0.9	05/03/2148	02/10/2017
6.02	STR-B	N	0.219	04/25/2007	0.210	01/22/2015	0.210 RR	02/11/2016	0	1.0	0.7	2.1	0.120 S	1.0	02/12/2106	02/10/2017
7.01	STR-T	N	0.243	04/07/2009	0.242	01/22/2015	0.242 RR	02/11/2016	0	0.1	0	2.1	0.120 S	0.1	02/20/3236	02/10/2017
7.02	STR-B	N *	0.211	04/07/2009	0.213	01/22/2015	0.201 D5	02/11/2016	11.4	1.5	0.8	11.4	0.120 S	11.4	03/21/2023	02/10/2017
8.01	END CAP	N	0.224	04/25/2007	0.191	01/22/2015	0.191 D5	02/11/2016	0	3.8	4.8	27.0	0.120 S	3.8	10/18/2034	02/10/2017
9.01	END CAP	N	0.302	04/25/2007	0.274	01/22/2015	0.274 RR	02/11/2016	0	3.2	4.0	16.6	0.168 P	3.2	02/25/2049	02/10/2017
10.01	STR-T	N *	0.309	04/25/2007	0.304	01/22/2015	0.290 D5	02/11/2016	13.3	2.2	1.4	82.9	0.168 P	13.3	04/07/2025	02/10/2017

## 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: 06/21/2016

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

Unit: HS-0032  
 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: OIL OUT LINE-2,3 INCH SCH 80 PIPE  
 PORTABLE SKID HS-0032

Summary: Group Name:

Group Description:

Insp. Due Date = 02/10/2017

RCR = 12.5 MPY

0 C.A. Status: No

Pred. Ret. Date = 07/25/2025

Rem. Life (from last survey 02/11/2016) = 9.4 yrs

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	TML Retirement Date	TML Inspection Date
10.02	STR-RIGHT	N	0.299	04/25/2007	0.301	01/22/2015	0.297 D5	02/11/2016	3.8	0.2	0	3.8	0.168 P	3.8	12/27/2049	02/10/2017
10.03	STR-BTM	N *	0.312	04/25/2007	0.314 RR	01/22/2015	0.304 D5	02/11/2016	9.5	0.9	0.2	9.5	0.168 P	9.5	05/26/2030	02/10/2017
10.04	STR-LEFT	N	0.325	04/25/2007	0.316 RR	01/22/2015	0.313 D5	02/11/2016	2.8	1.4	1.2	3.1	0.168 P	2.8	10/21/2067	02/10/2017
11.01	EL-L	N	0.234	04/25/2007	0.223	01/22/2015	0.223 RR	02/11/2016	0	1.3	1.6	4.4	0.114 P	1.3	10/26/2099	02/10/2017
11.02	EL-M	N		N/A		N/A	0.235 D5	02/11/2016	N/A	N/A	N/A	0	0.114 P	0.1	04/23/3224	02/10/2017
11.03	EL-R	N		N/A		N/A	0.235 D5	02/11/2016	N/A	N/A	N/A	0	0.114 P	0.1	04/23/3224	02/10/2017
12.01	STR-L	N	0.230	04/25/2007	0.208 RR	01/22/2015	0.209 RR	02/11/2016	0	2.4	3.1	20.8	0.120 S	2.4	03/13/2053	02/10/2017
12.02	STR-R	N	0.216	04/25/2007	0.212 RR	01/22/2015	0.216 RR	02/11/2016	0	0	0.3	3.2	0.120 S	0.1	02/18/2976	02/10/2017
13.01	TEE-T	N *	0.345	06/18/2013	0.340	01/22/2015	0.325 D5	02/11/2016	14.2	7.5	7.6	91.6	0.168 P	14.2	02/24/2027	02/10/2017
13.02	TEE-L	Y *	0.359 TC	06/18/2013	0.359	01/22/2015	0.342 D5	02/11/2016	16.1	6.4	6.2	16.1	0.168 P	16.1	11/26/2026	02/10/2017
13.03	TEE-BTM	Y *	0.332 TC	06/18/2013	0.337 RR	01/22/2015	0.304 D5	02/11/2016	31.3	10.6	9.8	31.3	0.168 P	31.3	06/13/2020	02/10/2017
14.01	EL-R	N	0.309	04/25/2007	0.296	01/22/2015	0.296 RR	02/11/2016	0	1.5	1.5	5.1	0.168 P	1.5	04/08/2101	02/10/2017
14.02	EL-M	N		N/A		N/A	0.319 D5	02/11/2016	N/A	N/A	N/A	0	0.168 P	0.1	06/15/3523	02/10/2017
14.03	EL-L	N		N/A		N/A	0.320 D5	02/11/2016	N/A	N/A	N/A	0	0.168 P	0.1	06/15/3533	02/10/2017
15.01	STR-T	N	0.314	04/25/2007	0.299 RR	01/22/2015	0.300 RR	02/11/2016	0	1.6	1.6	14.2	0.168 P	1.6	06/12/2098	02/10/2017
15.02	STR-R	N	0.313	04/25/2007	0.307	01/22/2015	0.307 RR	02/11/2016	0	0.7	0.7	2.0	0.168 P	0.7	04/22/2214	02/10/2017
15.03	STR-L	N	0.296	04/25/2007	0.291	01/22/2015	0.289 D5	02/11/2016	1.9	0.8	0.3	15.1	0.168 P	1.9	08/28/2079	02/10/2017
15.04	STR-BTM	N	0.322 TC	04/25/2007	0.299	01/22/2015	0.297 D5	02/11/2016	1.9	2.8	1.7	23.5	0.168 P	2.8	02/01/2062	02/10/2017

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

Report Date: 06/21/2016

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

Unit: HS-0032  
Eq/Circ ID: OIL 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: OIL OUT LINE-2,3 INCH SCH 80 PIPE  
PORTABLE SKID HS-0032

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	:	4.1 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2	:	12.5 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28)	:	5.0 MPY
(D) -- Default Corrosion Rate	:	0.1 MPY

Representative Corrosion Rate = 12.5 MPY

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

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

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

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

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

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

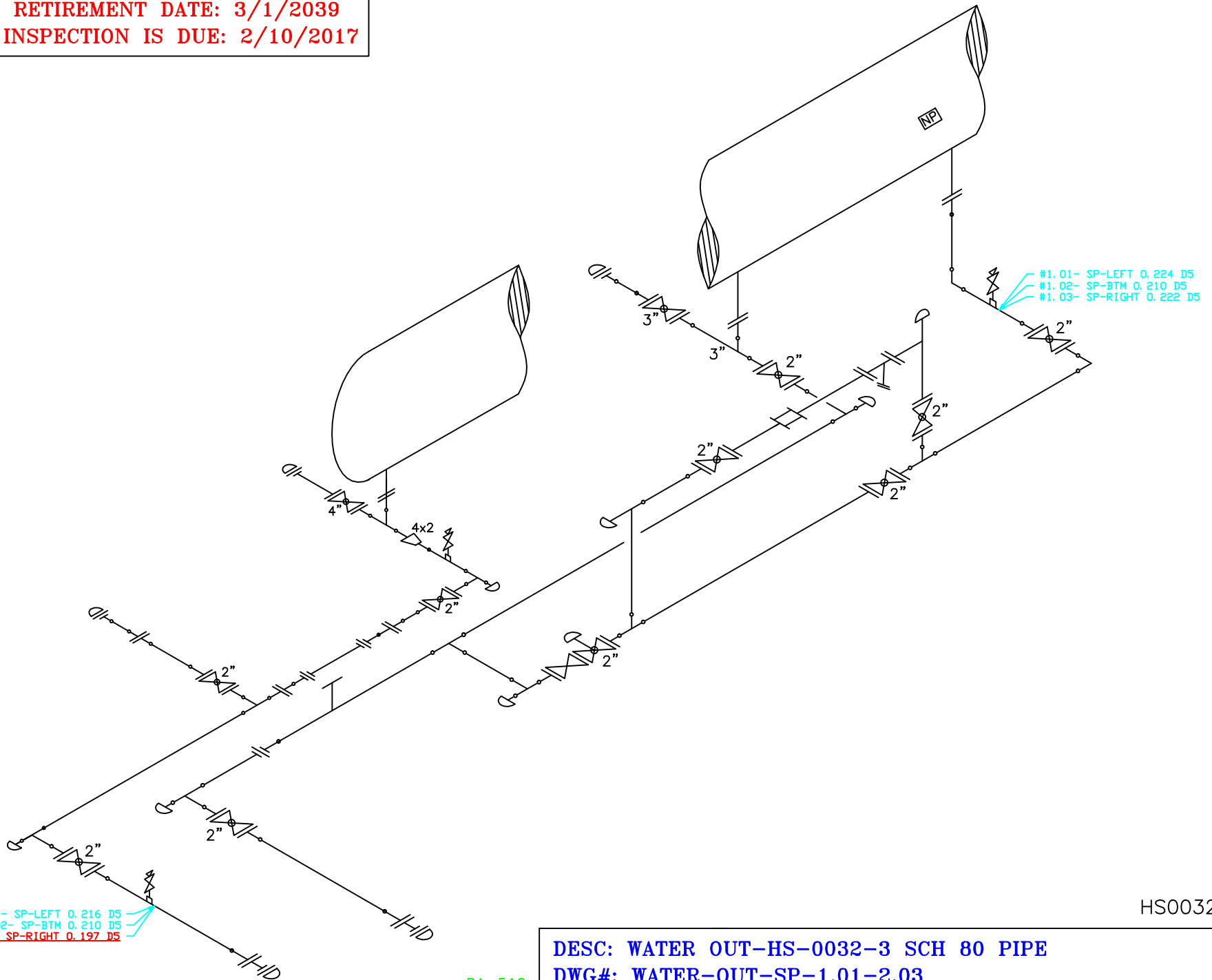
Eq/Circ ID Estimated life = 9.4 years from the most recent survey date.  
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 07/25/2025

Recommended Eq/Circ UT/RT Inspection Date is 02/10/2017  
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: 3/1/2039  
NEXT INSPECTION IS DUE: 2/10/2017



HS0032-P3

DESC: WATER OUT-HS-0032-3 SCH 80 PIPE  
DWG#: WATER-OUT-SP-1.01-2.03

DA-512

## 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: 06/21/2016

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

Unit: HS-0032  
 Eq/Circ ID: WATER OUT-SP  
 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: 2 INCH WATER OUT PIPING  
 READINGS AT INJECTION PORTS

Summary: Group Name:  
 Insp. Due Date = 02/10/2017  
 Pred. Ret. Date = 03/01/2039

Group Description:  
 RCR = 20.4 MPY  
 Rem. Life (from last survey 02/11/2016) = 23.1 yrs

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

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	SP-LEFT	N *	0.216	06/18/2013	0.210	01/22/2015	0.210 RR	02/11/2016	0	2.3	2.6	10.1	0.109 P	2.3	03/01/2060	02/10/2017
1.02	SP-BTM	N *	0.218	06/18/2013	0.212	01/22/2015	0.210 D5	02/11/2016	1.9	3.0	3.2	6.7	0.109 P	3.0	11/19/2049	02/10/2017
1.03	SP-RIGHT	N *	0.231	06/18/2013	0.227 RR	01/22/2015	0.222 D5	02/11/2016	4.7	3.4	3.2	4.7	0.109 P	4.7	03/22/2040	02/10/2017
2.01	SP-LEFT	N *	0.227	06/18/2013	0.220	01/22/2015	0.216 D5	02/11/2016	3.8	4.2	4.5	11.7	0.109 P	4.2	08/31/2041	02/10/2017
2.02	SP-BTM	N *	0.228	06/18/2013	0.224	01/22/2015	0.210 D5	02/11/2016	13.3	6.8	6.8	13.3	0.109 P	13.3	09/24/2023	02/10/2017
2.03	SP-RIGHT	Y *	0.226	06/18/2013	0.226	01/22/2015	0.197 D5	02/11/2016	27.5	10.9	10.5	27.5	0.109 P	27.5	04/29/2019	02/10/2017

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

Report Date: 06/21/2016

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

Unit: HS-0032  
Eq/Circ ID: WATER OUT-SP  
Design Code: B31.3  
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: 2 INCH WATER OUT PIPING  
READINGS AT INJECTION PORTS

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	:	9.2 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2	:	20.4 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28)	:	14.0 MPY
(D) -- Default Corrosion Rate	:	0.1 MPY

Representative Corrosion Rate = 20.4 MPY

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

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

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

Minimum time between inspections required for corrosion rate calculation is 6 months.

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

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

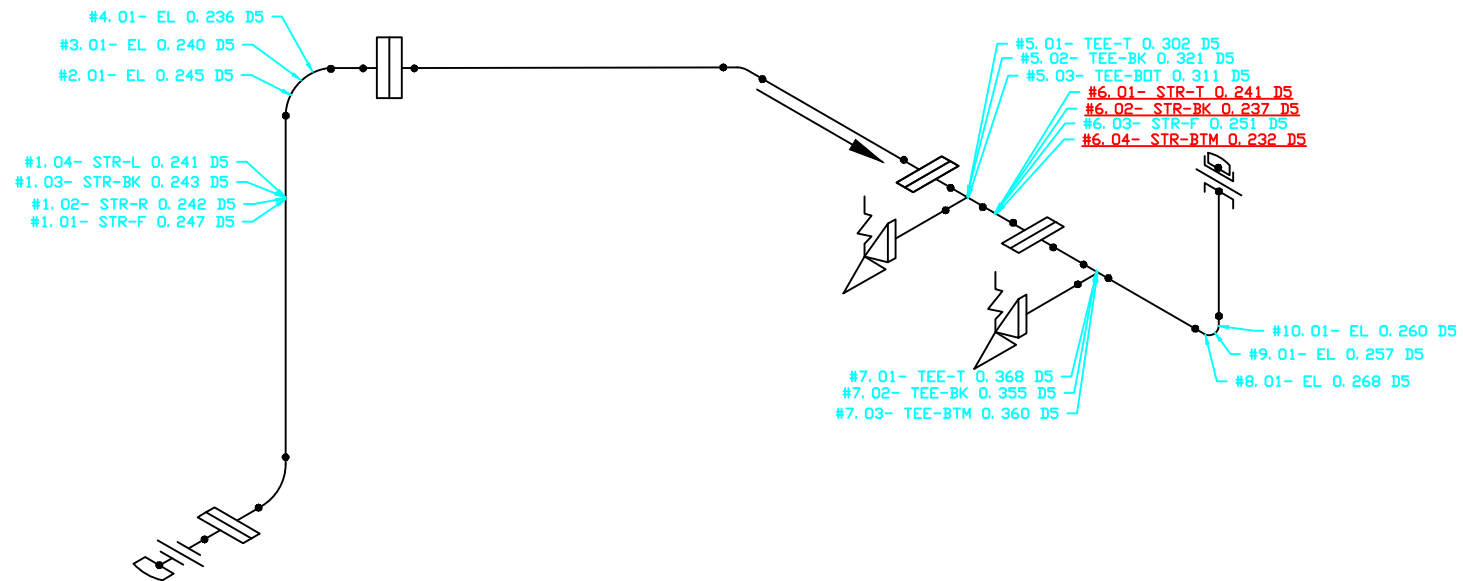
Eq/Circ ID Estimated life = 23.1 years from the most recent survey date.  
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 03/01/2039

Recommended Eq/Circ UT/RT Inspection Date is 02/10/2017  
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: 10/16/2022  
NEXT INSPECTION IS DUE: 2/10/2017



HS0032-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: 06/21/2016

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

Unit: HS-0032  
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: 285 lb/in<sup>2</sup>  
Design Temperature: 100 °F

Description: RELIEF LINE-4 INCH SCH40 PIPE  
SKID HS-0032

Summary: Group Name: Group Description:  
Insp. Due Date = 02/10/2017 RCR = 13.8 MPY  
Pred. Ret. Date = 10/16/2022 Rem. Life (from last survey 02/11/2016) = 6.7 yrs

0 C.A. Status: NO  
Total Caution TMLs = 3

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	0.244	04/25/2007	0.240	01/22/2015	0.240 RR	02/11/2016	0	0.5	0.4	3.4	0.150 S	0.5	02/12/2196	02/10/2017
1.02	STR-R	N	0.243	04/25/2007	0.237	01/22/2015	0.237 RR	02/11/2016	0	0.7	0.9	6.2	0.216 I	0.7	08/14/2045	02/10/2017
1.03	STR-BK	N *	0.244	04/25/2007	0.248	01/22/2015	0.243 D5	02/11/2016	4.7	0.1	0	4.7	0.216 I	4.7	10/13/2021	02/10/2017
1.04	STR-L	N	0.238	04/25/2007	0.241	01/22/2015	0.241 D5	02/11/2016	0	0	0	6.7	0.216 I	0.1	08/28/2262	02/10/2017
2.01	EL	N	0.245	04/25/2007	0.235 RR	01/22/2015	0.236 RR	02/11/2016	0	1.0	0.7	2.7	0.216 I	1.0	10/08/2035	02/10/2017
3.01	EL	N	0.239	04/25/2007	0.237	01/22/2015	0.237 RR	02/11/2016	0	0.2	0.1	5.0	0.216 I	0.2	05/21/2119	02/10/2017
4.01	EL	N	0.236	04/25/2007	0.237	01/22/2015	0.236 D5	02/11/2016	0.9	0	0	8.4	0.216 I	0.9	12/13/2037	02/10/2017
5.01	TEE-T	N	0.308	04/25/2007	0.299	01/22/2015	0.299 RR	02/11/2016	0	1.0	1.3	6.5	0.216 I	1.0	10/07/2098	02/10/2017
5.02	TEE-BK	N *	0.336	04/25/2007	0.327	01/22/2015	0.321 D5	02/11/2016	5.7	1.7	1.1	5.7	0.216 I	5.7	06/22/2034	02/10/2017
5.03	TEE-BOT	N *	0.300	04/25/2007	0.319 RR	01/22/2015	0.311 D5	02/11/2016	7.6	0	0	7.6	0.216 I	7.6	07/26/2028	02/10/2017
6.01	STR-T	Y *	0.244	04/25/2007	0.256	01/22/2015	0.241 D5	02/11/2016	14.2	0.3	0	14.2	0.216 I	14.2	11/06/2017	02/10/2017
6.02	STR-BK	Y *	0.251	04/25/2007	0.266	01/22/2015	0.237 D5	02/11/2016	27.5	1.6	0	27.5	0.216 I	27.5	11/11/2016	02/10/2017
6.03	STR-F	N	0.242	04/25/2007	0.243	01/22/2015	0.243 RR	02/11/2016	0	0	0	2.4	0.216 I	0.1	08/28/2282	02/10/2017
6.04	STR-BTM	Y *	0.236	04/25/2007	0.247 RR	01/22/2015	0.232 D5	02/11/2016	14.2	0.5	0	14.2	0.216 I	14.2	03/20/2017	02/10/2017
7.01	TEE-T	N	0.378	04/25/2007	0.363	01/22/2015	0.363 RR	02/11/2016	0	1.7	1.3	8.4	0.216 I	1.7	05/20/2102	02/10/2017
7.02	TEE-BK	N	0.361	04/25/2007	0.356	01/22/2015	0.355 D5	02/11/2016	0.9	0.7	0.8	1.4	0.216 I	0.9	03/05/2170	02/10/2017
7.03	TEE-BTM	N	0.338	04/25/2007	0.341	01/22/2015	0.341 RR	02/11/2016	0	0	0	6.0	0.216 I	0.1	09/04/3262	02/10/2017
8.01	EL	N	0.256	04/25/2007	0.259	01/22/2015	0.259 RR	02/11/2016	0	0	0	1.7	0.216 I	0.1	08/29/2442	02/10/2017
9.01	EL	N	0.258	04/25/2007	0.259	01/22/2015	0.257 D5	02/11/2016	1.9	0.1	0	2.0	0.216 I	1.9	07/05/2037	02/10/2017
10.01	EL	N	0.262	04/25/2007	0.257 RR	01/22/2015	0.259 RR	02/11/2016	0	0.3	0.1	6.1	0.216 I	0.3	04/18/2158	02/10/2017

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

Report Date: 06/21/2016

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

Unit: HS-0032  
Eq/Circ ID: RELIEF  
Design Code: B31.3  
Eq Type: PIPING  
Class: 2  
CM RBI:

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

Description: RELIEF LINE-4 INCH SCH40 PIPE  
SKID HS-0032

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	:	4.2 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2	:	13.8 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28)	:	5.4 MPY
(D) -- Default Corrosion Rate	:	0.1 MPY

Representative Corrosion Rate = 13.8 MPY

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

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

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

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

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

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

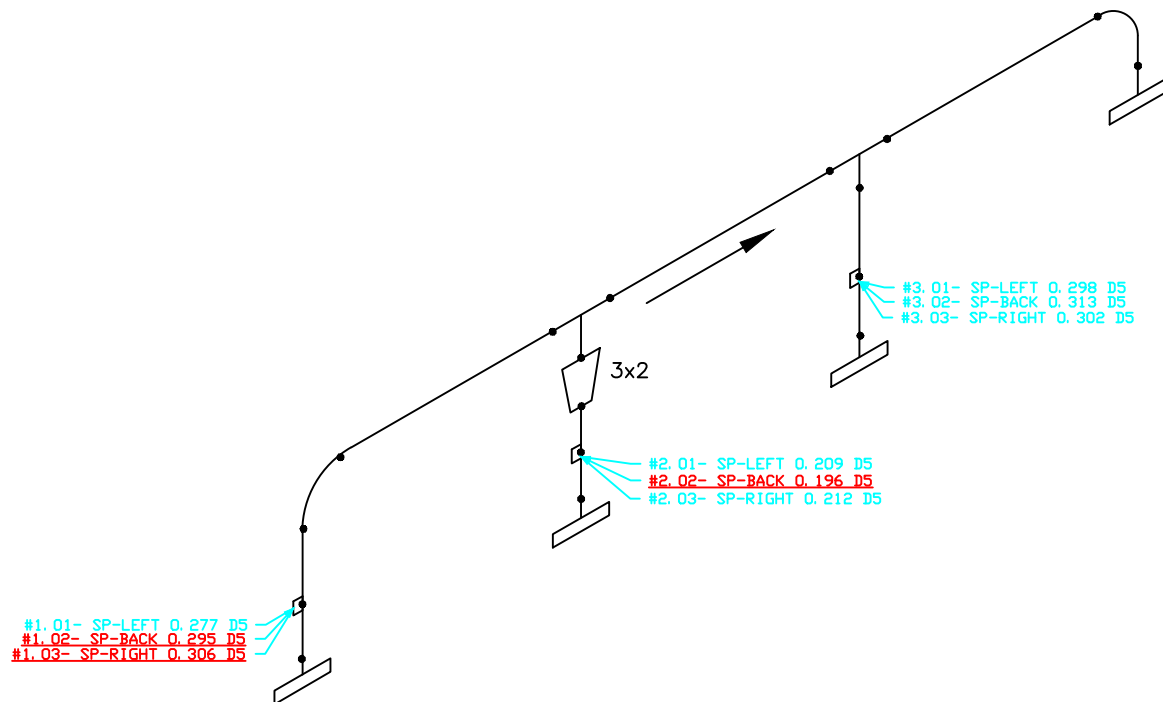
Eq/Circ ID Estimated life = 6.7 years from the most recent survey date.  
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 10/16/2022

Recommended Eq/Circ UT/RT Inspection Date is 02/10/2017  
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 3 Caution TMLs in this Eq/Circ ID.

EQUIP RETIREMENT DATE: 11/9/2032  
NEXT INSPECTION IS DUE: 2/10/2017



HS0032-P5

DA-512

DESC: HEADER-HS-0032-3, 2 IN SCH80 PIPE  
DWG#: HEADER-SP-1.01-3.03

## 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: 06/21/2016

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

Unit: HS-0032  
 Eq/Circ ID: HEADER-SP  
 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: HEADER PIPING-3 INCH SCH80 PIPE  
 READINGS AT INJECTION PORTS

Summary: Group Name:  
 Insp. Due Date = 02/10/2017  
 Pred. Ret. Date = 11/09/2032

Group Description:  
 RCR = 19.9 MPY  
 Rem. Life (from last survey 02/11/2016) = 16.7 yrs

0 C.A. Status: NO  
 Total Caution TMLs = 3

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	SP-LEFT	N *	0.284	06/18/2013	0.276	01/22/2015	0.276 RR	02/11/2016	0	3.0	3.2	6.7	0.160 P	3.0	09/22/2054	02/10/2017
1.02	SP-BACK	Y *	0.324	06/18/2013	0.320	01/22/2015	0.295 D5	02/11/2016	23.7	10.9	10.8	23.7	0.160 P	23.7	10/20/2021	02/10/2017
1.03	SP-RIGHT	Y *	0.323	06/18/2013	0.323	01/22/2015	0.306 D5	02/11/2016	16.1	6.4	6.2	16.1	0.160 P	16.1	03/03/2025	02/10/2017
2.01	SP-LEFT	N *	0.219	06/18/2013	0.222 RR	01/22/2015	0.209 D5	02/11/2016	12.3	3.8	3.4	12.3	0.109 P	12.3	04/08/2024	02/10/2017
2.02	SP-BACK	Y *	0.203	06/18/2013	0.210	01/22/2015	0.196 D5	02/11/2016	13.3	2.6	2.0	13.3	0.160 P	13.3	10/22/2018	02/10/2017
2.03	SP-RIGHT	N	0.214	06/18/2013	0.213	01/22/2015	0.212 D5	02/11/2016	0.9	0.8	0.7	1.0	0.160 P	0.9	09/16/2073	02/10/2017
3.01	SP-LEFT	N *	0.308	06/18/2013	0.300	01/22/2015	0.298 D5	02/11/2016	1.9	3.8	4.1	10.1	0.160 P	3.8	05/21/2052	02/10/2017
3.02	SP-BACK	N	0.314	06/18/2013	0.310	01/22/2015	0.310 RR	02/11/2016	0	1.5	1.8	6.7	0.160 P	1.5	01/03/2116	02/10/2017
3.03	SP-RIGHT	N	0.299	06/18/2013	0.302	01/22/2015	0.302 D5	02/11/2016	0	0	0	0	0.160 P	0.1	07/04/3434	02/10/2017

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

Report Date: 06/21/2016

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

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

Unit: HS-0032  
Eq/Circ ID: HEADER-SP  
Design Code: B31.3  
Eq Type: PIPING  
Class:  
CM RBI:

Description: HEADER PIPING-3 INCH SCH80 PIPE  
READINGS AT INJECTION PORTS

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	:	8.3 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2	:	19.9 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28)	:	11.8 MPY
(D) -- Default Corrosion Rate	:	0.1 MPY

Representative Corrosion Rate = 19.9 MPY

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

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

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

Minimum time between inspections required for corrosion rate calculation is 6 months.

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

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

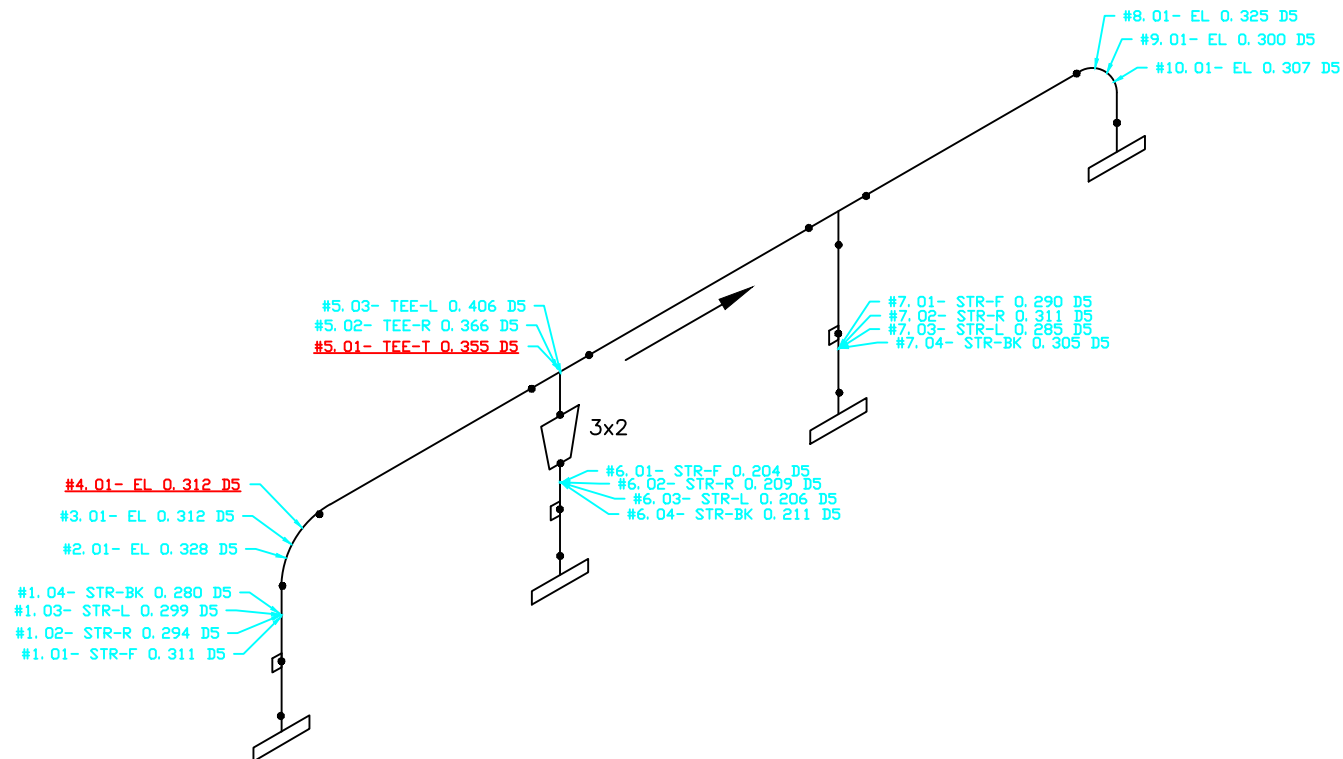
Eq/Circ ID Estimated life = 16.7 years from the most recent survey date.  
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 11/09/2032

Recommended Eq/Circ UT/RT Inspection Date is 02/10/2017  
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 3 Caution TMLs in this Eq/Circ ID.

EQUIP RETIREMENT DATE: 10/29/2023  
NEXT INSPECTION IS DUE: 2/10/2017



HS0032-P5

DA-512

DESC: HEADER-3, 2 IN SCH80 PIPE  
DWG#: HEADER-1.01-10.01

## Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 06/21/2016

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

Unit: HS-0032  
Eq/Circ ID: HEADER  
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: HEADER-3 & 2 INCH SCH80 PIPE  
HEADER PIPING - HS-0032

Summary: Group Name: Group Description:  
Insp. Due Date = 02/10/2017 RCR = 22.0 MPY  
Pred. Ret. Date = 10/29/2023 Rem. Life (from last survey 02/11/2016) = 7.7 yrs

0 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	TML Retirement Date	TML Inspection Date
1.01	STR-F	N	0.327	04/25/2007	0.303	01/22/2015	0.303 RR	02/11/2016	0	2.7	2.1	7.6	0.168 P	2.7	01/05/2066	02/10/2017
1.02	STR-R	N	0.302	04/25/2007	0.292 RR	01/22/2015	0.294 D5	02/11/2016	0	0.9	1.3	12.5	0.208 P	0.9	04/20/2111	02/10/2017
1.03	STR-L	N	0.307	04/25/2007	0.299	01/22/2015	0.299 D5	02/11/2016	0	0.9	0.7	4.2	0.208 P	0.9	11/09/2116	02/10/2017
1.04	STR-BK	N *	0.298	04/25/2007	0.290 RR	01/22/2015	0.280 D5	02/11/2016	9.5	2.0	1.4	9.5	0.208 P	9.5	08/28/2023	02/10/2017
2.01	EL	N	0.317	04/25/2007	0.310 RR	01/22/2015	0.315 RR	02/11/2016	0	0.2	0.7	4.2	0.208 P	0.2	06/16/2549	02/10/2017
3.01	EL	N	0.318	04/25/2007	0.310 RR	01/22/2015	0.312 D5	02/11/2016	0	0.7	0.6	2.0	0.208 P	0.7	03/18/2164	02/10/2017
4.01	EL	Y *	0.343	04/25/2007	0.334	01/22/2015	0.312 D5	02/11/2016	20.9	3.5	2.1	20.9	0.208 P	20.9	01/27/2021	02/10/2017
5.01	TEE-T	Y *	0.425	04/25/2007	0.421	01/22/2015	0.355 D5	02/11/2016	62.6	8.0	4.0	62.6	0.208 P	62.6	06/16/2018	02/10/2017
5.02	TEE-R	N	0.378	04/25/2007	0.363	01/22/2015	0.363 RR	02/11/2016	0	1.7	2.0	8.2	0.208 P	1.7	02/05/2107	02/10/2017
5.03	TEE-L	N	0.368	04/25/2007	0.359	01/22/2015	0.359 RR	02/11/2016	0	1.0	1.1	3.1	0.208 P	1.0	10/13/2166	02/10/2017
6.01	STR-F	N *	0.216	04/25/2007	0.212	01/22/2015	0.204 D5	02/11/2016	7.6	1.4	1.0	10.4	0.141 P	7.6	05/09/2024	02/10/2017
6.02	STR-R	N *	0.208	04/25/2007	0.219	01/22/2015	0.209 D5	02/11/2016	9.5	0	0	9.5	0.141 P	9.5	03/26/2023	02/10/2017
6.03	STR-L	N	0.215	04/25/2007	0.209	01/22/2015	0.206 D5	02/11/2016	2.8	1.0	0.9	10.4	0.141 P	2.8	03/13/2039	02/10/2017
6.04	STR-BK	N	0.218	04/25/2007	0.215 RR	01/22/2015	0.211 D5	02/11/2016	3.8	0.8	0.6	3.8	0.141 P	3.8	06/09/2034	02/10/2017
7.01	STR-F	N	0.301	04/25/2007	0.283 RR	01/22/2015	0.289 RR	02/11/2016	0	1.4	1.9	10.9	0.208 P	1.4	09/24/2073	02/10/2017
7.02	STR-R	N	0.319	04/25/2007	0.298	01/22/2015	0.298 RR	02/11/2016	0	2.4	2.1	15.1	0.208 P	2.4	06/22/2053	02/10/2017
7.03	STR-L	N	0.292	04/25/2007	0.287	01/22/2015	0.285 D5	02/11/2016	1.9	0.8	0.7	1.9	0.208 P	1.9	06/18/2056	02/10/2017
7.04	STR-BK	N	0.320	04/25/2007	0.297 RR	01/22/2015	0.301 RR	02/11/2016	0	2.2	2.9	13.1	0.208 P	2.2	03/27/2058	02/10/2017
8.01	EL	N	0.325	04/25/2007	0.324	01/22/2015	0.324 RR	02/11/2016	0	0.1	0.1	2.1	0.208 P	0.1	10/21/3172	02/10/2017
9.01	EL	N *	0.305	04/25/2007	0.306	01/22/2015	0.300 D5	02/11/2016	5.7	0.6	0.2	5.7	0.208 P	5.7	03/12/2032	02/10/2017

10.01	EL	N	0.312	04/25/2007	0.306	01/22/2015	0.306 RR	02/11/2016	0	0.7	0.7	3.4	0.208	P	0.7	08/22/2155	02/10/2017
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Eaton Inspection Services  
1595 So Hwy 150, Suite F, Evanston, WY 82930  
Phone 307-789-3540 FAX 307-789-2822

Report Date: 06/21/2016

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

Unit: HS-0032  
Eq/Circ ID: HEADER  
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: HEADER-3 & 2 INCH SCH80 PIPE  
HEADER PIPING - HS-0032

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	:	6.6 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2	:	22.0 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28)	:	8.4 MPY
(D) -- Default Corrosion Rate	:	0.1 MPY

Representative Corrosion Rate = 22.0 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).

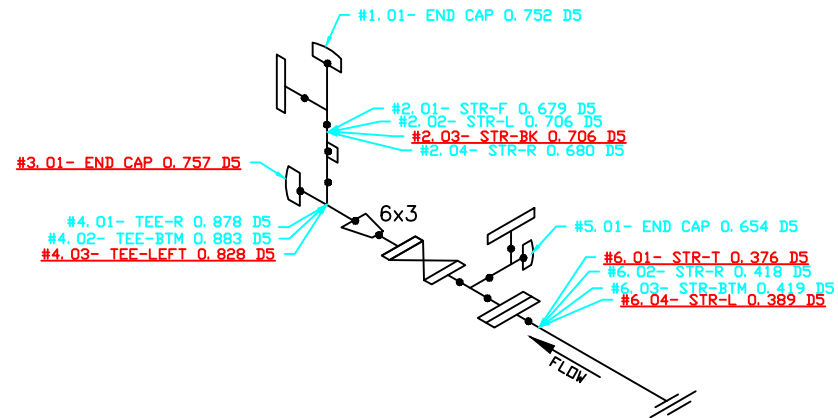
Eq/Circ ID Estimated life = 7.7 years from the most recent survey date.  
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 10/29/2023

Recommended Eq/Circ UT/RT Inspection Date is 02/10/2017  
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: 6/23/2025  
NEXT INSPECTION IS DUE: 2/10/2017



HS0032-P6

DA-512

DESC: GAS IN, 6 AND 3 IN SCH 160 PIPE  
DWG#: GAS-IN-1.01-6.04

## 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: 06/21/2016

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

Unit: HS-0032  
 Eq/Circ ID: GAS IN  
 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: GAS IN-6 AND 3 INCH SCH160 PIPE  
 HS-0032

Summary: Group Name: Group Description:  
 Insp. Due Date = 02/10/2017 RCR = 56.0 MPY  
 Pred. Ret. Date = 06/23/2025 Rem. Life (from last survey 02/11/2016) = 9.4 yrs

0 C.A. Status: NO  
 Total Caution TMLs = 5

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	END CAP	N	0.772 RP	01/24/2012	0.749	01/22/2015	0.749 RR	02/11/2016	0	5.7	4.5	33.2	0.319 P	5.7	08/21/2091	02/10/2017
2.01	STR-F	N	0.712	04/25/2007	0.691	01/22/2015	0.679 D5	02/11/2016	11.4	3.8	3.3	11.4	0.319 P	11.4	09/26/2047	02/10/2017
2.02	STR-L	N	0.735	04/25/2007	0.718	01/22/2015	0.706 D5	02/11/2016	11.4	3.3	2.9	11.4	0.319 P	11.4	02/07/2050	02/10/2017
2.03	STR-BK	Y *	0.703	04/25/2007	0.209	01/22/2015	0.209 RR	02/11/2016	0	56.1	44.7	831.0	0.319 P	56.1	02/28/2014	02/10/2017
2.04	STR-R	N	0.712	04/25/2007	0.681	01/22/2015	0.680 D5	02/11/2016	0.9	3.6	4.3	12.3	0.319 P	3.6	07/12/2116	02/10/2017
3.01	END CAP	Y *	0.937 RP	01/24/2012	0.768	01/22/2015	0.757 D5	02/11/2016	10.4	44.5	47.2	127.6	0.319 P	44.5	12/19/2025	02/10/2017
4.01	TEE-R	N	0.890 RP	01/24/2012	0.869	01/22/2015	0.869 RR	02/11/2016	0	5.2	1.9	56.0	0.319 P	5.2	12/24/2121	02/10/2017
4.02	TEE-BTM	N	0.897 RP	01/24/2012	0.883 RR	01/22/2015	0.883 D5	02/11/2016	0	3.5	2.2	29.1	0.319 P	3.5	05/26/2177	02/10/2017
4.03	TEE-LEFT	Y *	0.874 RP	01/24/2012	0.899	01/22/2015	0.828 D5	02/11/2016	67.4	11.4	4.8	67.4	0.319 P	67.4	09/03/2023	02/10/2017
5.01	END CAP	N	0.675 RP	01/24/2012	0.616	01/22/2015	0.616 RR	02/11/2016	0	14.6	13.0	56.0	0.168 P	14.6	10/12/2046	02/10/2017
6.01	STR-T	Y *	0.444 RP	04/07/2009	0.408 RR	01/22/2015	0.376 D5	02/11/2016	30.4	9.9	8.2	33.2	0.168 P	30.4	12/12/2022	02/10/2017
6.02	STR-R	N	0.424 RP	04/07/2009	0.422 RR	01/22/2015	0.418 D5	02/11/2016	3.8	0.9	0	10.5	0.168 P	3.8	10/31/2081	02/10/2017
6.03	STR-BTM	N *	0.441 RP	04/07/2009	0.429	01/22/2015	0.419 D5	02/11/2016	9.5	3.2	0.7	13.8	0.168 P	9.5	07/04/2042	02/10/2017
6.04	STR-L	Y *	0.436 RP	04/07/2009	0.420	01/22/2015	0.389 D5	02/11/2016	29.4	6.9	4.8	29.4	0.168 P	29.4	08/15/2023	02/10/2017

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

Report Date: 06/21/2016

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

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

Unit: HS-0032  
Eq/Circ ID: GAS IN  
Design Code: B31.3  
Eq Type: PIPING  
Class: 2  
CM RBI:

Description: GAS IN-6 AND 3 INCH SCH160 PIPE  
HS-0032

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	:	21.2 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2	:	56.0 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28)	:	28.5 MPY
(D) -- Default Corrosion Rate	:	0.1 MPY

Representative Corrosion Rate = 56.0 MPY

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

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

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

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

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

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

Eq/Circ ID Estimated life = 9.4 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 06/23/2025

Recommended Eq/Circ UT/RT Inspection Date is 02/10/2017  
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 5 Caution TMLs in this Eq/Circ ID.