



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

Inspections Performed for: FMC Technologies Completion – Colorado District	
Inspection Report for: HS-0024 Separator	Date Last Inspected: 09/27/2018
Remaining Life: 20+ YRS	Next UT: 09/27/2019 Next VT: 09/27/2019
Representative Corrosion Rate: 4.4 MPY	Mfg Serial #: 1179
Manufacturer: Micoda Process Systems	National Board Number: 2
Year Built: 2004	Canadian Registration #: R9975.2

FMC Technologies Completion HS-0024 Separator



PRESSURE VESSEL INVENTORY

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

VESSEL ID INFORMATION

Company Name : Pure Energy Services (USA) Inc.
Facility/Location Name : Grand Junction, CO
Field Name :
Equipment Number : HS-0024
Eq/Circ. ID : HS0024-SEP
Equipment Name/Service : Separator
Physical Location : Grand Junction, CO
GPS Coordinates :

VESSEL DESCRIPTION AND SERVICE CONDITIONS

Type of Vessel: Horizontal Separator

Vessel Size: 50"

Operating Pressure Range (psig):

Operating Temperature Range (°F):

Does the vessel have Internal Access? Yes

Specify type of internal access, if available: The manway is in the vessel's shell

Vessel is located: Outside

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

Is there a Long Seam?

Any stamping pertaining to materials of construction?

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

Pressure (highest the equip. sees in the process and/or check PSV setting if available) psi

Temperature (highest the equipment would ever see in the process)

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

Any other pertinent information:

PRESSURE VESSEL INVENTORY

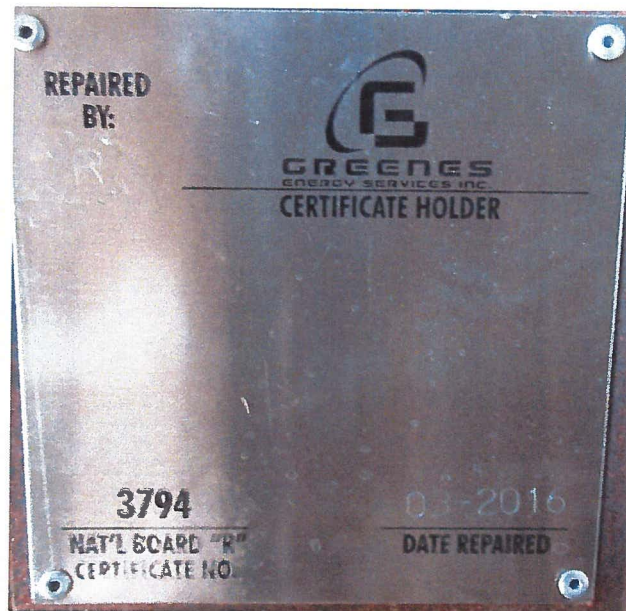
ORIGINAL VESSEL NAMEPLATE/STAMPING INFORMATION

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



SUPPLEMENTAL VESSEL NAMEPLATE/STAMPING INFORMATION

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



VESSEL DOCUMENTATION Manufacturer Data Sheets:

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

Name: Robert W. Menke Date: 08/16/2006

API 510 PRESSURE VESSEL EXTERNAL INSPECTION REPORT

Company Name: FMC Technologies Completion	
Field/Location: Colorado District	
Equipment Number: HS-0024	Eq/Circ. ID: HS0024-SEP
Equipment Name/Service: Separator	
Physical Location: FMC Yard	
Manufacturer: Micoda Process Systems	Manufacturer Serial Number: 1179
Year Built: 2004	CRN: R9975.2
Alberta Registration Number: 524539	National Board Number: 2

Reason for Inspection: Scheduled API-510 External Inspection

Condition of Nameplate and/or Bracket: Nameplate is intact. The nameplate bracket is securely attached. There are (2) nameplates. One is held with duct tape. The stamping is legible, but the wording is worn off.

Internal Access? Yes.

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

Grounding Device in Place and Secure?: N/A

Condition of Foundation and Anchor Bolts: There are no anchor bolts. The (2) vertical support base plates are welded to the skid deck/frame. Base plate-to-frame attachment welds have no visual weld defects.

Condition of Steel Supports, Saddles, and Bolting: The (2) vertical supports have no corrosion or distortion. All support welds appear sound. The support saddle-to-shell attachment welds have no visual weld defects. Light to moderate chipping and peeling on the saddles. Light surface corrosion on support saddles.

Condition of Paint and/or Insulation: The paint is in poor condition. Approximately 50% of paint is missing. The vessel is not insulated.

Condition of Nozzles, Flanges, Repads, and Weepholes: Nozzle and flanges are in good condition. All flange bolting is in place and secure. Flange bolts appear secure (not in service). Coating on 50% of nozzles and flanges is missing. Flange bolts show light surface corrosion.

Condition of Welds; Head and Shell Metal Surfaces: The pressure boundary welds have no visual weld defects. Light surface corrosion is visible on approximately 50% of the vessel.

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. Overpressure protection is on the associated piping.

If Yes, is it set at or below the MAWP? Yes. There are (2) PSV's on this vessel. One set at 2000 psi and the other is set at 2160 psi.

Date PSV last tested (if there is a tag on the valve): Both PSVs were tested on 05/2015.

Comments:

(2) PSVs.

Recommendations:

Sand blast and re-coat where coating is missing.

Repairs Needed:

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

0131
API 510 Inspector Number

09/27/2018
Date

④ 524539

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

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

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

3. Location of installation Portable

(Name and address)

4. Type: Horizontal Separator 1179 R 9975.2 HV 44 Rev 2 2 2004
(Horiz., vert., or sphere) (Tank, separator, jkt. vessel, heat exh., etc.) (Mfg's serial No.) (CRN) (Drawing No.) (Nat'l. Bd. No.) (Year built)

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

Items 6 - 11 incl. to be completed for single wall vessels, jackets of jacketed vessels, shell of heat exchangers, or chamber of multi-chamber vessels.

6. Shell (a) No. of course(s): 2 (b) Overall length (ft & in.): 14'-0" s/s

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

If removable, bolts used (describe other fastening) -

(Mat'l Spec. No., Grade, size, No.)

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

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

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., ~~proof~~, ~~stress~~ 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"

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	0.70	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

(Mat'l Spec. NO., Grade or Type) R.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) -

(Mat'l Spec. No., Grade, Size, No.)

16. MAWP 150 2000 psi at max. temp. 400 200 °F Min. design metal temp. -40 °F at 150 psi.
(internal) (external) (internal) (external)
17. Impact test No; per UCS-66(a) at test temperature of - °F
(Indicate yes or no and the component(s) impact tested)
18. Hydro., ~~per UCS-66(a)~~ test press. 195 Proof test N/A
19. Nozzles, inspection, and safety valve openings:
- | Purpose (Inlet, Outlet, Drain, etc.) | No. | Diameter or Size | Flange Type | Material | | Nozzle Thickness | | Reinforcement Material | How Attached | | Location (Insp. Open.) |
|--------------------------------------|-----|------------------|-------------|--------------|----------|------------------|-------|------------------------|--------------|--------|------------------------|
| | | | | Nozzle | Flange | Nom. | Corr. | | Nozzle | Flange | |
| - | - | - | - | See Attached | U-4 Form | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - | - | - | - |
20. Supports: Skirt No Lugs No Legs No Others Saddles Attached Welded to Shell
(Yes or No) (No.) (No.) (Describe) (Where and How)
21. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report:
(List the name of part, item number, mfg's. name and identifying number)
In-Line Closures S/N 08386 (N16), 08391 (N17), 08385 (N18) CRN OH4712.231
22. Remarks: Construction dwg. 04-468-V Rev. 5
RT per UW-11(a)
Volume: 217.5 cu./ft.
PSV to be installed in the piping system

CERTIFICATE OF SHOP COMPLIANCE

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1,
U Certificate of Authorization No. 32693 Expires 7/10/2007

Date 1/12/2005 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 Alberta Boilers Safety Association of Alberta have inspected the pressure vessel described in this Manufacturer's Data Report on 12/29/2004, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 1/12/2005 Signed [Signature] Commissions NB#12369A
(Authorized Inspector) (Nat'l Board incl. endorsement, State, Province and No.)

CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE

We certify that the statements on this report are correct and that the field assembly construction of all parts of this vessel conforms with the requirements of ASME Code, Section VIII, Division 1,
U Certificate of Authorization No. 32693 Expires 7/10/2007

Date 1/12/2005 Name MICODA PROCESS SYSTEMS INC. Signed [Signature]
(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 Alberta and employed by Alberta Boilers Safety Association of Alberta 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 150 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 1/12/2005 Signed [Signature] Commissions NB#12369A
(Authorized Inspector) (Nat'l Board incl. endorsement, State, Province and No.)

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

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

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

3. Location of installation Unknown
(Name and address)

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

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

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

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

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

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

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

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

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

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

11. Nozzles, inspection, and safety valve openings:

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

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

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

CERTIFICATE OF SHOP/FIELD COMPLIANCE

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

U Certificate of Authorization No. 33,859 Expires March 26, 2006
Date Oct 14, 2004 Name In-Line Flow Products Limited Signed [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 Alberta Boiler Safety Association of Alberta

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

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



1.	Manufactured & Certified By: <u>MICODRA PROCESS SYSTEMS Inc. 1211-8A St. Nisku Alberta Canada T9E-7R3</u> (Name and address of Manufacturer)		
2.	Manufactured for: <u>Pure Energy Services LTD. #300, 1010-1st S.W. Calgary Alberta, Canada T2K-1KA</u> (Name & Address of Purchaser)		
3.	Location of Installation: <u>Portable</u> (Name & Address)		
4.	Type: <u>Horizontal</u> (Horizontal, Vert., or Sphere)	<u>Separator</u> (Tank, Separator, Heat Exch., Etc.)	<u>1179</u> (Manufacturer Serial Number)
	<u>R 9975.2</u> (CRN #)	<u>HV-44 Rev. 2</u> (Drawing No.)	<u>2</u> (National Board No.)
			<u>2004</u> (Year Built)

[illegible]

Date Jan. 12, 2005 Name  Commission NB #12369A
(Nat'l Board incl. Endorsement, State, Prov. & No.)
Authorized Inspector

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

went with 04-

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

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

3. Location of installation Portable

(Name and address)

4. Type Vertical Fuel Gas Scrubber 1.04 cubic feet 1224
(Horz., vert., or sphere) (Tank, separator, etc.) (Capacity) (Mfg's. serial No.)
OH 4873.2 1001-1 Rev 4 2005
(CRN) (Drawing No.) (Year built)

5. ASME Code, Section VIII, Div. 1 2001 Edition, 2003 Addenda N/A
(Edition and Addenda (date)) (Code Case No.)

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

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	7.981"	2'-10.75"	SA-106 GR B	0.322"	0.0625"	Smls	Seamless			1	1	None			.70	1150F	1 hr.
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

(Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.)										(Mat'l Spec. No., Grade or Type) (H.T. - Time & Temp.)				
	Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A		
		Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full.	Spot.
(a)	TOP	0.625"	0.0625"	N/A	N/A	N/A	N/A	N/A	7.981"	N/A	N/A	1	None	.70
(b)	BOTTOM	0.625"	0.0625"	N/A	N/A	N/A	N/A	N/A	7.981"	N/A	N/A	1	None	.70

If removable, bolts used (describe other fastening)

N/A

(Mat'l Spec. No., Grade, Size, No.)

8. Type of Jacket N/A Jacket Closure N/A

(Describe as ogee & weld, bar, etc.)

If bar, give dimensions; if bolted describe or sketch

N/A

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

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

Hydro., ~~burst~~, ~~hydrostatic~~ test press.

371

Proof test

N/A

12. Nozzles, inspection, and safety valve openings:

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

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

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

15. Remarks: Construction Dwg. 05-534-FGS Rev. 0

PSV to installed in the piping system

CERTIFICATE OF SHOP COMPLIANCE

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

UM Certificate of Authorization No. 34564

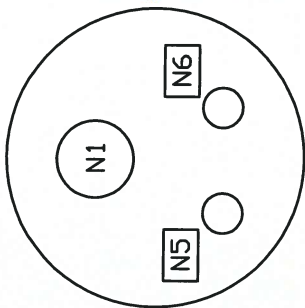
Date 1/03/2005 Name MICODA PROCESS SYSTEMS INC.
(Manufacturer)

Signed [Signature]
(Certified Individual)

Expires 7/10/2005

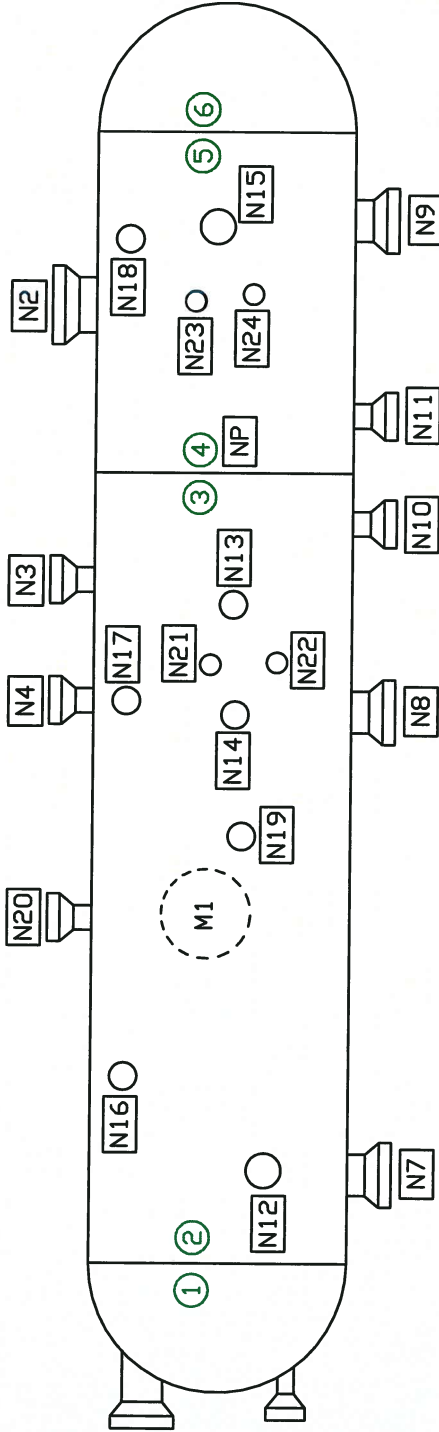
Signed [Signature]
(Representative)

EQUIP RETIREMENT DATE: 8/20/2046
NEXT INSPECTION IS DUE: 9/27/2019



LEFT HEAD

- #1. 01- LFT HD-F 2. 973 TC #3. 01- MID SHELL-F 3. 037 TC #5. 01- RGT SHELL-F 3. 010 TC
#1. 02- LFT HD-BTM 2. 979 TC #3. 02- MID SHELL-BTM 3. 014 TC #5. 02- RGT SHELL-BTM 3. 015 TC
#1. 03- LFT HD-BK 2. 955 TC #3. 03- MID SHELL-BK 3. 016 TC #5. 04- RGT SHELL-T 3. 008 TC
#1. 04- LFT HD-T 2. 996 TC #3. 04- MID SHELL-T 3. 000 TC #6. 01- RGT HD-F 2. 964 TC
#2. 01- LFT SHELL-F 3. 038 TC #4. 01- MID SHELL-F 3. 004 TC #6. 02- RGT HD-BTM 2. 962 TC
#2. 02- LFT SHELL-BTM 3. 026 TC #4. 02- MID SHELL-BTM 3. 020 TC #6. 03- RGT HD-BK 2. 975 TC
#2. 03- LFT SHELL-BK 3. 049 TC #4. 03- MID SHELL-BK 3. 060 TC #6. 04- RGT HD-T 2. 980 TC
#2. 04- LFT SHELL-T 3. 030 TC #4. 04- MID SHELL-T 3. 009 TC



TC-560

NAMEPLATE INFO	
MFG	MICODA PROCESS SYSTEMS
SERIAL NUMBER	1179
NATIONAL BOARD #	2
DATE BUILT	2004
DESIGN P & T	2000 psi @ 200°F
NOTE	ALBERTA REG # 524539 CRN # R9975.2

CAL BLK=54°F		VESSEL=50°F
BUSINESS UNIT		FMC TECHNOLOGIES COMPLETION
EQ/CIRC ID #		HS0024-SEP
EQUIP NAME		SEPARATOR
LOCATION		INSIDE SKID UNIT HS-0024
DWG #		HS0024-SEP

#101. 01- N-1 INLET-TOP 2. 459 TC	#117. 03- N-17-CLEANING-B 2. 105 TC	#125. 04- MW-1-RIGHT 3. 028 TC
#101. 02- N-1 INLET-LEFT 2. 454 TC	#117. 04- N-17-CLEANING-R 2. 105 TC	
#101. 03- N-1 INLET-RIGHT 2. 442 TC	#118. 01- N-18-CLEANING-F 2. 070 TC	
#101. 04- N-1 INLET-LEFT 2. 458 TC	#118. 02- N-18-CLEANING-L 2. 069 TC	
#102. 01- N-2 OUTLET-FRONT 2. 515 TC	#118. 03- N-18-CLEANING-B 2. 068 TC	
#102. 02- N-2 OUTLET-BACK 2. 500 TC	#118. 04- N-18-CLEANING-R 2. 068 TC	
#102. 03- N-2 OUTLET-RIGHT 2. 514 TC	#119. 01- N-19-TI-TOP 0. 346 TC	
#103. 01- N-3 PSV-1-FRONT 0. 337 TC	#119. 03- N-19-TI-BTM 0. 320 TC	
#103. 02- N-3 PSV-1-BACK 0. 330 TC	#120. 01- N-20-P1-FRONT 0. 316 TC	
#104. 01- N-4 PSV-2-FRONT 0. 330 TC	#120. 03- N-20-P1-BACK 0. 338 TC	
#104. 03- N-4 PSV-2-BACK 0. 316 TC	#121. 01- N-21-H2OLG-TOP 0. 360 TC	
#105. 01- N-5STMCOIL-F-TOP 0. 432 TC	#121. 03- N-21-H2OLG-BTM 0. 324 TC	
#105. 03- N-5STMCOIL-F-BTM 0. 450 TC	#122. 01- N-22-H2OLG-TOP 0. 356 TC	
#106. 01- N-6STMCOIL-BK-T 0. 430 TC	#122. 03- N-22-H2OLG-BTM 0. 319 TC	
#106. 03- N-6STMCOIL-BK-B 0. 403 TC	#123. 01- N-23-DIL- LG-TOP 0. 326 TC	
#107. 01- N-7SLDSDRAIN-F 1. 790 TC	#123. 03- N-23-DIL- LG-BTM 0. 350 TC	
#107. 02- N-7SLDSDRAIN-L 1. 791 TC	#124. 01- N-24-DIL- LG-TOP 0. 330 TC	
#107. 03- N-7SLDSDRAIN-BK 1. 793 TC	#124. 03- N-24-DIL- LG-BTM 0. 356 TC	
#108. 03- N-8 H2ODRAIN-BK 1. 559 TC	#125. 02- MW-1-LEFT 3. 030 TC	

DESC: HORIZONTAL SEPARATOR-SN:1179

Corrosion Monitoring Eq/Circ ID Analysis Report

Eaton Inspection Services
1595 So Hwy 150, Suite F, Evanston, WY 82930
Phone 307-789-3540 FAX 307-789-3822

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: HS0024-SEP
Eq Type: VESSEL
Class:
CM REI:
Design Code: S8/D1

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

Description: HORIZONTAL SEPARATOR

Summary: Group Name:
Insp. Due Date = 09/27/2019
Pred. Ret. Date = 08/20/2046

Group Description:
RCR = 4.4 MPY

Rem. Life (from last survey 09/27/2018) = 27.9 yrs

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

TML No	Location	Ctn TML	First Survey Thick	First Survey Nt	First Date	Previous Survey Thick	Previous Survey Nt	Previous Date	Last Survey Thick	Last Survey Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
1.01	LFT HD-F	N	2.971		08/17/2006	2.970 RR	2.970 RR	01/22/2015	2.972 RR	RR	09/27/2018	0	0	0	4.9	2.525 P	0.1	10/12/4018	09/27/2019
1.02	LFT HD-BTM	N	2.978		08/17/2006	2.980 RR	2.980 RR	01/22/2015	2.979 TC	TC	09/27/2018	0.3	0	0	2.5	2.525 P	0.3	02/08/3532	09/27/2019
1.03	LFT HD-BK	N	2.951		08/17/2006	2.950 RR	2.950 RR	01/22/2015	2.953 RR	RR	09/27/2018	0	0	0	5.9	2.525 P	0.1	10/12/4018	09/27/2019
1.04	LFT HD-T	N	2.995		08/17/2006	3.002 RR	3.002 RR	01/22/2015	2.996 TC	TC	09/27/2018	1.6	0	0	4.9	2.525 P	1.6	02/13/2313	09/27/2019
2.01	LFT SHELL-F	N	3.043		08/17/2006	3.037 TC	3.037 TC	01/22/2015	3.037 RR	RR	09/27/2018	0	0.5	0.4	6.0	2.660 P	0.5	08/09/2773	09/27/2019
2.02	LFT SHELL-BTM	N	3.023		08/17/2006	3.024 TC	3.024 TC	01/22/2015	3.024 RR	RR	09/27/2018	0	0	0	4.9	2.660 P	0.1	10/12/4018	09/27/2019
2.03	LFT SHELL-BK	N	3.029		08/17/2006	3.025 TC	3.025 TC	01/22/2015	3.025 RR	RR	09/27/2018	0	0.3	0.3	3.2	2.660 P	0.3	06/06/3235	09/27/2019
2.04	LFT SHELL-T	N	3.031		08/17/2006	3.022 TC	3.022 TC	01/22/2015	3.022 RR	RR	09/27/2018	0	0.7	0.8	8.0	2.660 P	0.7	11/22/2535	09/27/2019
3.01	MID SHELL-F	N	3.036		08/17/2006	3.036 RR	3.036 RR	01/22/2015	3.037 TC	TC	09/27/2018	0	0	0	2.1	2.660 P	0.1	10/12/4018	09/27/2019
3.02	MID SHELL-BTM	N	3.014		08/17/2006	3.011 RR	3.011 RR	01/22/2015	3.014 TC	TC	09/27/2018	0	0	0	5.3	2.660 P	0.1	10/12/4018	09/27/2019
3.03	MID SHELL-BK	N	3.040		08/17/2006	3.036 RR	3.036 RR	01/22/2015	3.016 TC	TC	09/27/2018	5.4	2.0	1.4	10.8	2.660 P	5.4	08/30/2084	09/27/2019
3.04	MID SHELL-T	N	3.027		08/17/2006	3.034 TC	3.034 TC	01/22/2015	3.000 TC	TC	09/27/2018	9.2	2.2	1.4	9.2	2.660 P	9.2	09/11/2055	09/27/2019
4.01	MID SHELL-F	N	3.008		08/17/2006	3.000 RR	3.000 RR	01/22/2015	3.004 TC	TC	09/27/2018	0	0.3	0.6	8.5	2.660 P	0.3	06/06/3165	09/27/2019
4.02	MID SHELL-BTM	N	3.024		08/17/2006	3.023 RR	3.023 RR	01/22/2015	3.020 TC	TC	09/27/2018	0.8	0.3	0	1.0	2.660 P	0.8	09/29/2468	09/27/2019
4.03	MID SHELL-BK	N	3.051		08/17/2006	3.057 RR	3.057 RR	01/22/2015	3.060 TC	TC	09/27/2018	0	0	0	6.9	2.660 P	0.1	10/12/4018	09/27/2019
4.04	MID SHELL-T	N	3.012		08/17/2006	3.016 RR	3.016 RR	01/22/2015	3.009 TC	TC	09/27/2018	1.9	0.2	0	5.1	2.660 P	1.9	06/06/2202	09/27/2019
5.01	RGT SHELL-F	N	3.004		08/17/2006	3.013 RR	3.013 RR	01/22/2015	3.010 TC	TC	09/27/2018	0.8	0	0	3.9	2.660 P	0.8	03/31/2456	09/27/2019
5.02	RGT SHELL-BTM	N	3.031		08/17/2006	3.001 RR	3.001 RR	01/22/2015	3.007 RR	RR	09/27/2018	0	2.0	3.0	25.5	2.660 P	2.0	03/29/2192	09/27/2019
5.04	RGT SHELL-T	N	3.011		08/17/2006	3.005 TC	3.005 TC	01/22/2015	3.005 RR	RR	09/27/2018	0	0.5	0.3	3.9	2.660 P	0.5	10/02/2708	09/27/2019
6.01	RGT HD-F	N	2.960		08/17/2006	2.964 RR	2.964 RR	01/22/2015	2.964 TC	TC	09/27/2018	0	0	0	3.0	2.525 P	0.1	10/12/4018	09/27/2019

Corrosion Monitoring Eq/circ ID Analysis Report

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

Report Date:11/01/2018

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

Unit: HS-0024
Eq/Circ ID: HS0024-SEP
Eq Type: VESSEL
Class:
CM RBI:
Design Code: S8/D1

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

Description: HORIZONTAL SEPARATOR

Summary: Group Name:
Insp. Due Date = 09/27/2019
Pred. Ret. Date = 08/20/2046

Group Description:
RCR = 4.4 MPY
Rem. Life (from last survey 09/27/2018) = 27.9 yrs

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

TML No	Location	Ctn	First Survey Thick	First Survey Nt	First Date	Previous Survey Thick	Previous Survey Nt	Previous Date	Last Survey Thick	Last Survey Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
6.02	RGT HD-BTM	N	2.953		08/17/2006	2.963 TC	2.963 TC	01/22/2015	2.962 TC	2.962 TC	09/27/2018	0.3	0	0	1.0	2.525 P	0.3	06/09/3475	09/27/2019
6.03	RGT HD-BK	N	2.970		08/17/2006	2.974 TC	2.974 TC	01/22/2015	2.974 RR	2.974 RR	09/27/2018	0	0	0	2.0	2.525 P	0.1	10/12/4018	09/27/2019
6.04	RGT HD-T	N	2.979		08/17/2006	2.975 TC	2.975 TC	01/22/2015	2.975 RR	2.975 RR	09/27/2018	0	0.3	0	5.0	2.525 P	0.3	10/09/3518	09/27/2019
101.01	N-1 INLET-TOP	N	2.466		08/17/2006	2.465 RR	2.465 RR	01/22/2015	2.459 TC	2.459 TC	09/27/2018	1.6	0.6	0.3	4.9	2.032 U	1.6	08/14/2285	09/27/2019
101.02	N-1 INLET-LEFT	N	2.457		08/17/2006	2.452 TC	2.452 TC	01/22/2015	2.452 RR	2.452 RR	09/27/2018	0	0.4	0.7	1.2	2.032 U	0.4	10/04/3068	09/27/2019
101.03	N-1 INLET-BTM	N	2.452		08/17/2006	2.448 TC	2.448 TC	01/22/2015	2.442 TC	2.442 TC	09/27/2018	1.6	0.8	0.9	1.6	2.032 U	1.6	12/29/2274	09/27/2019
101.04	N-1 INLET-RIGHT	N	2.458		08/17/2006	2.454 RR	2.454 RR	01/22/2015	2.456 RR	2.456 RR	09/27/2018	0	0.2	0.4	5.3	2.032 U	0.2	10/12/4018	09/27/2019
102.01	N-2 OUTLET-FRONT	N	2.517		08/17/2006	2.512 RR	2.512 RR	01/22/2015	2.513 RR	2.513 RR	09/27/2018	0	0.3	0.3	3.9	2.032 U	0.3	02/07/3622	09/27/2019
102.02	N-2 OUTLET-LEFT	N	2.505		08/17/2006	2.500 RR	2.500 RR	01/22/2015	2.502 RR	2.502 RR	09/27/2018	0	0.2	0.3	7.4	2.032 U	0.2	10/12/4018	09/27/2019
102.03	N-2 OUTLET-BACK	N	2.497		08/17/2006	2.504 RR	2.504 RR	01/22/2015	2.500 TC	2.500 TC	09/27/2018	1.1	0	0	3.9	2.032 U	1.1	03/14/2444	09/27/2019
102.04	N-2 OUTLET-RIGHT	N	2.516		08/17/2006	2.510 TC	2.510 TC	01/22/2015	2.510 RR	2.510 RR	09/27/2018	0	0.5	0.4	3.9	2.032 U	0.5	10/04/2974	09/27/2019
103.01	N-3 PSV-1-FRONT	N	0.355		08/17/2006	0.336 TC	0.336 TC	01/22/2015	0.336 RR	0.336 RR	09/27/2018	0	1.6	1.1	5.1	0.176 U	1.6	09/28/2118	09/27/2019
103.03	N-3 PSV-1-BACK	N *	0.391		08/17/2006	0.327 TC	0.327 TC	01/22/2015	0.327 RR	0.327 RR	09/27/2018	0	5.3	5.0	11.0	0.176 U	5.3	03/25/2047	09/27/2019
104.01	N-4 PSV-2-FRONT	N	0.358		08/17/2006	0.325 RR	0.325 RR	01/22/2015	0.330 TC	0.330 TC	09/27/2018	0	2.3	1.3	6.1	0.176 U	2.3	09/11/2085	09/27/2019
104.03	N-4 PSV-2-BACK	N *	0.383		08/17/2006	0.321 TC	0.321 TC	01/22/2015	0.316 TC	0.316 TC	09/27/2018	1.4	5.5	5.1	10.4	0.176 U	5.5	03/11/2044	09/27/2019
105.01	N-5STMCOIL-F-TOP	N	0.462		08/17/2006	0.424 TC	0.424 TC	01/22/2015	0.424 RR	0.424 RR	09/27/2018	0	3.1	3.1	7.6	0.257 U	3.1	08/10/2072	09/27/2019
105.03	N-5STMCOIL-F-BTM	N	0.459		08/17/2006	0.444 RR	0.444 RR	01/22/2015	0.446 RR	0.446 RR	09/27/2018	0	1.1	1.0	3.2	0.257 U	1.1	07/24/2190	09/27/2019
106.01	N-6STMCOIL-BK-T	N	0.467		08/17/2006	0.422 RR	0.422 RR	01/22/2015	0.425 RR	0.425 RR	09/27/2018	0	3.5	3.4	8.8	0.257 U	3.5	09/27/2066	09/27/2019
106.03	N-6STMCOIL-BK-B	N *	0.415		08/17/2006	0.367 RR	0.367 RR	01/22/2015	0.368 RR	0.368 RR	09/27/2018	0	3.9	4.6	8.8	0.257 U	3.9	03/15/2047	09/27/2019
107.01	N-7SLSDRAIN-F	N	1.795 TC		02/25/2009	1.787 RR	1.787 RR	01/22/2015	1.790 TC	1.790 TC	09/27/2018	0	0.5	1.1	8.9	1.454 U	0.5	10/02/2690	09/27/2019
107.02	N-7SLSDRAIN-L	N	1.796		08/17/2006	1.793 RR	1.793 RR	01/22/2015	1.791 TC	1.791 TC	09/27/2018	0.5	0.4	0.4	6.9	1.454 U	0.5	10/01/2692	09/27/2019

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: HS0024-SEP
Eq Type: VESSEL
Class:
CW RBI:

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

Description: HORIZONTAL SEPARATOR

Summary: Group Name: Insp. Due Date = 09/27/2019
Pred. Ret. Date = 08/20/2046

Group Description:
RCR = 4.4 MPY
Rem. Life (from last survey 09/27/2018) = 27.9 yrs

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

TML No	Location	Ctn TML	First Survey Thick	First Survey Nt	First Survey Date	Previous Survey Thick	Previous Survey Nt	Previous Date	Last Survey Thick	Last Survey Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date	
107.03	N-7SLDSDRAIN-BK	N	1.798	TC	02/25/2009	1.800	TC	01/22/2015	1.793	TC	09/27/2018	1.9	0.5	0.5	4.9	1.454	U	1.9	02/28/2197	09/27/2019
108.03	N-8 H20DRAIN-BK	N	1.563		08/17/2006	1.563	RR	01/22/2015	1.559	TC	09/27/2018	1.1	0.3	0.1	14.0	1.258	U	1.1	05/19/2292	09/27/2019
108.04	N-8 H20DRAIN-R	N	1.568		08/17/2006	1.566	RR	01/22/2015	1.558	TC	09/27/2018	2.2	0.8	0.2	3.8	1.258	U	2.2	02/08/2155	09/27/2019
110.03	N-10 H2O OUT-BK	N *	0.354		08/17/2006	0.303	TC	01/22/2015	0.303	RR	09/27/2018	0	4.2	3.9	8.8	0.176	U	4.2	12/22/2048	09/27/2019
111.03	N-11-OILDR-LEFT	N	0.366		08/17/2006	0.335	TC	01/22/2015	0.335	RR	09/27/2018	0	2.6	1.8	7.2	0.176	U	2.6	11/22/2079	09/27/2019
112.01	N-12-SPARGE-TOP	N	0.373		08/17/2006	0.318	TC	01/22/2015	0.318	RR	09/27/2018	0	4.5	4.0	11.1	0.176	U	4.5	04/18/2050	09/27/2019
112.03	N-12-SPARGE-BTM	N	0.338		08/17/2006	0.317	TC	01/22/2015	0.309	TC	09/27/2018	2.2	2.4	2.6	13.8	0.176	U	2.4	02/36/2074	09/27/2019
113.01	N-13-TOP	N	0.382		08/17/2006	0.340	TC	01/22/2015	0.340	RR	09/27/2018	0	3.5	3.3	8.2	0.176	U	3.5	08/06/2065	09/27/2019
113.03	N-13-BTM	N *	0.363		08/17/2006	0.319	RR	01/22/2015	0.303	TC	09/27/2018	4.3	5.0	4.6	9.8	0.176	U	5.0	02/20/2044	09/27/2019
114.01	N-14-WATER LC-T	N	1.602		08/17/2006	1.556	RR	01/22/2015	1.560	TC	09/27/2018	0	3.5	3.1	8.3	1.258	U	3.5	01/10/2105	09/27/2019
114.02	N-14-WATER LC-L	N	1.581		08/17/2006	1.542	TC	01/22/2015	1.542	RR	09/27/2018	0	3.2	3.4	15.8	1.258	U	3.2	06/29/2107	09/27/2019
114.04	N-14-WATER LC-R	N	1.579		08/17/2006	1.558	TC	01/22/2015	1.558	RR	09/27/2018	0	1.7	1.7	4.5	1.258	U	1.7	03/19/2195	09/27/2019
115.01	N-15-OIL-LC-TOP	N	1.591		08/17/2006	1.552	TC	01/22/2015	1.552	RR	09/27/2018	0	3.2	2.6	7.0	1.258	U	3.2	08/13/2110	09/27/2019
115.02	N-15-OIL-LC-L	N	1.564		08/17/2006	1.537	TC	01/22/2015	1.537	RR	09/27/2018	0	2.2	2.1	164.2	1.258	U	2.2	07/23/2145	09/27/2019
115.03	N-15-OIL-LC-BTM	N	1.571		08/17/2006	1.537	RR	01/22/2015	1.553	TC	09/27/2018	0	1.5	1.7	6.7	1.258	U	1.5	05/30/2215	09/27/2019
115.04	N-15-OIL-LC-R	N	1.580		08/17/2006	1.532	TC	01/22/2015	1.532	RR	09/27/2018	0	4.0	4.0	7.5	1.258	U	4.0	03/29/2087	09/27/2019
116.01	N-16-CLEANING-F	N	2.083		08/17/2006	2.087	RR	01/22/2015	2.085	TC	09/27/2018	0.5	0	0	1.0	1.651	U	0.5	10/03/2886	09/27/2019
116.02	N-16-CLEANING-L	N	2.083		08/17/2006	2.084	RR	01/22/2015	2.078	TC	09/27/2018	1.6	0.4	0	3.9	1.651	U	1.6	08/14/2285	09/27/2019
116.03	N-16-CLEANING-B	N	2.083		08/17/2006	2.088	RR	01/22/2015	2.082	TC	09/27/2018	1.6	0.1	0	2.0	1.651	U	1.6	02/13/2288	09/27/2019
116.04	N-16-CLEANING-R	N	2.083		08/17/2006	2.076	TC	01/22/2015	2.076	RR	09/27/2018	0	0.6	0.6	3.2	1.651	U	0.6	02/02/2727	09/27/2019

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: HS0024-SEP
Eq Type: VESSEL
Class:
CM RBI:
Design Code: S8/D1

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

Description: HORIZONTAL SEPARATOR

Summary: Group Name: Insp. Due Date = 09/27/2019
Pred. Ret. Date = 08/20/2046

Group Description:
RCR = 4.4 MPY
Rem. Life (from last survey 09/27/2018) = 27.9 yrs

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

TML No	Location	Ctn	First Survey Thick Nt	First Date	Previous Survey Thick Nt	Previous Date	Last Survey Thick Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
117.01	N-17-CLEANING-F	N	2.104	08/17/2006	2.103 RR	01/22/2015	2.103 TC	09/27/2018	0	0.1	0	3.9	1.651 U	0.1	10/12/4018	09/27/2019
117.02	N-17-CLEANING-L	N	2.105	08/17/2006	2.107 TC	01/22/2015	2.105 TC	09/27/2018	0.5	0	0	3.0	1.651 U	0.5	10/04/2926	09/27/2019
117.03	N-17-CLEANING-B	N	2.102	08/17/2006	2.102 RR	01/22/2015	2.105 TC	09/27/2018	0	0	0	3.9	1.651 U	0.1	10/12/4018	09/27/2019
117.04	N-17-CLEANING-R	N	2.103	08/17/2006	2.105 RR	01/22/2015	2.105 TC	09/27/2018	0	0	0	3.0	1.651 U	0.1	10/12/4018	09/27/2019
118.01	N-18-CLEANING-F	N	2.067	08/17/2006	2.071 RR	01/22/2015	2.070 TC	09/27/2018	0.3	0	0	3.8	1.651 U	0.3	06/08/3415	09/27/2019
118.02	N-18-CLEANING-L	N	2.071	08/17/2006	2.070 RR	01/22/2015	2.069 TC	09/27/2018	0.3	0.2	0	3.0	1.651 U	0.3	02/07/3412	09/27/2019
118.03	N-18-CLEANING-B	N	2.070	08/17/2006	2.070 RR	01/22/2015	2.068 TC	09/27/2018	0.5	0.2	0	3.8	1.651 U	0.5	10/03/2852	09/27/2019
118.04	N-18-CLEANING-R	N	2.071	08/17/2006	2.070 RR	01/22/2015	2.068 TC	09/27/2018	0.5	0.2	0	3.0	1.651 U	0.5	10/03/2852	09/27/2019
119.01	N-19 TI-TOP	N	0.391	08/17/2006	0.357 TC	01/22/2015	0.346 TC	09/27/2018	3.0	3.7	2.9	8.6	0.188 U	3.7	06/10/2061	09/27/2019
119.03	N-19 TI-BTM	N	0.352	08/17/2006	0.319 TC	01/22/2015	0.319 RR	09/27/2018	0	2.7	2.4	7.9	0.188 U	2.7	04/04/2067	09/27/2019
120.01	N-20 PI-FRONT	N	0.340	08/17/2006	0.321 TC	01/22/2015	0.316 TC	09/27/2018	1.4	2.0	1.2	5.8	0.188 U	2.0	09/27/2082	09/27/2019
120.03	N-20 PI-BACK	N	0.395	08/17/2006	0.337 RR	01/22/2015	0.338 TC	09/27/2018	0	4.7	3.9	12.9	0.188 U	4.7	08/27/2050	09/27/2019
121.01	N-21-H2OLG-TOP	N	0.397	08/17/2006	0.354 RR	01/22/2015	0.356 RR	09/27/2018	0	3.4	3.0	11.1	0.188 U	3.4	02/25/2068	09/27/2019
121.03	N-21-H2OLG-BTM	N	0.357	08/17/2006	0.318 TC	01/22/2015	0.318 RR	09/27/2018	0	3.2	3.1	8.2	0.188 U	3.2	05/13/2059	09/27/2019
122.01	N-22-H2OLG-TOP	N	0.392	08/17/2006	0.351 TC	01/22/2015	0.351 RR	09/27/2018	0	3.4	3.1	7.8	0.188 U	3.4	09/06/2066	09/27/2019
122.03	N-22-H2OLG-BTM	N	0.362	08/17/2006	0.326 RR	01/22/2015	0.319 TC	09/27/2018	1.9	3.6	2.6	8.8	0.188 U	3.6	02/16/2055	09/27/2019
123.01	N-23-OIL- LG-TOP N *	N	0.379	08/17/2006	0.323 TC	01/22/2015	0.323 RR	09/27/2018	0	4.6	4.2	10.0	0.188 U	4.6	02/01/2048	09/27/2019
123.03	N-23-OIL- LG-BTM	N	0.374	08/17/2006	0.344 RR	01/22/2015	0.350 TC	09/27/2018	0	2.0	1.8	15.9	0.188 U	2.0	09/27/2099	09/27/2019
124.01	N-24-OIL- LG-TOP N	N	0.370	08/17/2006	0.328 TC	01/22/2015	0.328 RR	09/27/2018	0	3.5	2.8	9.6	0.188 U	3.5	09/27/2058	09/27/2019
124.03	N-24-OIL- LG-BTM N	N	0.365	08/17/2006	0.351 RR	01/22/2015	0.354 RR	09/27/2018	0	0.9	1.1	9.8	0.188 U	0.9	03/10/2203	09/27/2019
125.02	MW-1-LBFT	N	3.027	08/17/2006	3.024 TC	01/22/2015	3.024 RR	09/27/2018	0	0.2	0.1	3.9	2.526 U	0.2	10/12/4018	09/27/2019

125.04	MW-1-RIGHT	N	3.029	08/17/2006	3.029 TC	01/22/2015	3.028 TC	09/27/2018	0.3	0.1	0	3.9	2.526 U	0.3	02/08/3692	09/27/2019
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Phone 307-789-3540 FAX 307-789-2822

Report Date: 11/01/2018

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

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

Unit: HS-0024
Eq/Circ ID: HS0024-SEP
Design Code: S8/D1
Eq Type: VESSEL
Class:
CM RBI:

Description: HORIZONTAL SEPARATOR

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

Representative Corrosion Rate is the Maximum of:

(A) -- Average Corrosion Rate x 1.00 : 1.8 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 4.4 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 2.1 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 4.4 MPY

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

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

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

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

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

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

Eq/Circ ID Estimated life = 27.9 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 08/20/2046

Recommended Eq/Circ UT/RT Inspection Date is 09/27/2019
UT/RT Inspection Interval is 1.00 years.

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

API 510 PRESSURE VESSEL INTERNAL INSPECTION

Operations Center: FMC Technologies Completion	District: Grand Junction
Facility/Location Name: Grand Junction	
Equipment Number: HS-0024	Eq/Circ. ID: HS-0024
Equipment Name/Service: High Stage Separator	
Physical Location: FMC Yard	
Manufacturer: Micoda Process Systems	Manufacturer Serial Number: 1179
Year Built: 2004	National Board Number: 2
Alberta Registration #: 524539	Canadian Registration #: R9975.2

Reason for Inspection: Scheduled API Inspection.

Type and quality of cleaning: Hot water wash suitable for inspection. Mostly clean with small amount of sand and residue present.

Manway entrance and gasket seating area: Chipped and peeling coating with light surface corrosion. Sealing surface appears acceptable.

Shell (note pitting, corrosion, laminations, blisters, etc. - size and location). Shell is in acceptable condition. Coating has chipping and flaking with light surface corrosion present. There is some scaling present as well. Very minor pitting on bottom of shell, nothing that is measurable.

Heads (note pitting, corrosion, laminations, blisters, etc. - size and location) Heads are in acceptable condition. Chipped and flaking coating with light surface corrosion and scaling present.

Internal Circumferential and Long seam Welds: (include type and condition welds). Long seams and circumferential welds are visually acceptable. Light rust present.

Internal Nozzle Welds: (include type and condition welds) Nozzle welds are visually acceptable. No signs of preferential corrosion or defects. Light rust present.

Condition of Internal Attachments and Welds: Attachments/weir plates are secure. Light rust and surface corrosion on the welds.

API 510 PRESSURE VESSEL INTERNAL INSPECTION

Comments:

Moderate scaling and surface corrosion on diffuser and demister. Minor chipped coating with light surface corrosion on steam lines.

Recommendations:

The internal vessel is in acceptable condition.

Repairs Needed:

Clean manway sealing surface. Sand blast and re-coat internal components when possible.

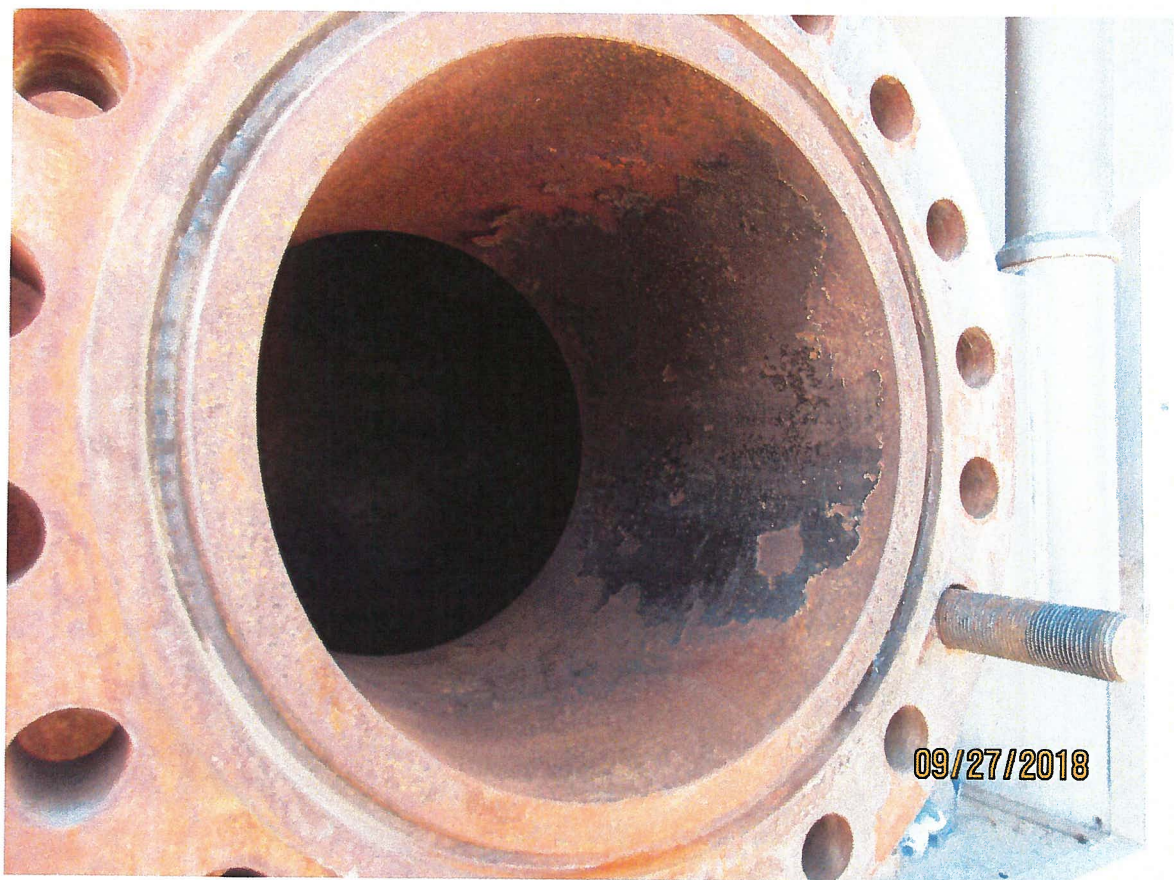
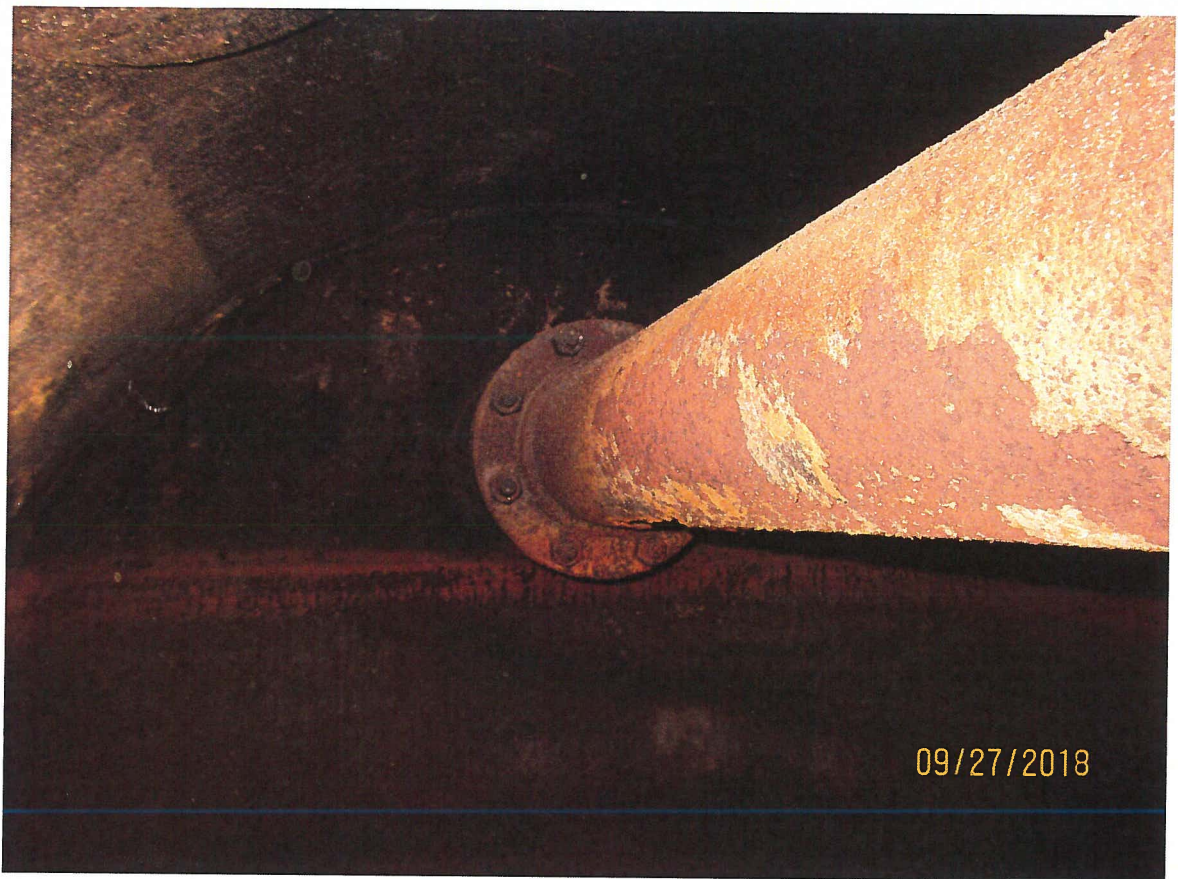
Mike York /BGW
API 510 Inspector Signature

66475
API 510 Inspector Number

09/27/2018
Date









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

Inspections Performed for: FMC Technologies Completion – Colorado District	
Inspection Report for: HS-0024 Fuel Gas Scrubber	Date Last Inspected: 09/27/2018
Remaining Life: 20+ YRS	Next UT: 09/27/2019 Next VT: 09/27/2019
Representative Corrosion Rate: 2.6 MPY	Mfg Serial #: 1224 (UM Stamped)
Manufacturer: Micoda Process Systems	National Board Number: N/A
Year Built: 2005	Canadian Registration #: OH4873.2

FMC Technologies Completion HS-0024 Fuel Gas Scrubber



PRESSURE VESSEL INVENTORY

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

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

VESSEL ID INFORMATION

Company Name : Pure Energy Services (USA) Inc.
Facility/Location Name : Grand Junction, CO
Field Name :
Equipment Number : HS-0024
Eq/Circ. ID : HS0024-FGS
Equipment Name/Service : Fuel Gas Scrubber
Physical Location : Grand Junction, CO
GPS Coordinates :

VESSEL DESCRIPTION AND SERVICE CONDITIONS

Type of Vessel: Vertical Fuel Gas Scrubber

Vessel Size: 7.981"

Operating Pressure Range (psig):

Operating Temperature Range (°F):

Does the vessel have Internal Access? No

Specify type of internal access, if available:

Vessel is located: Inside

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

Is there a Long Seam?

Any stamping pertaining to materials of construction?

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

Pressure (highest the equip. sees in the process and/or check PSV setting if available) _____psi

Temperature (highest the equipment would ever see in the process) _____

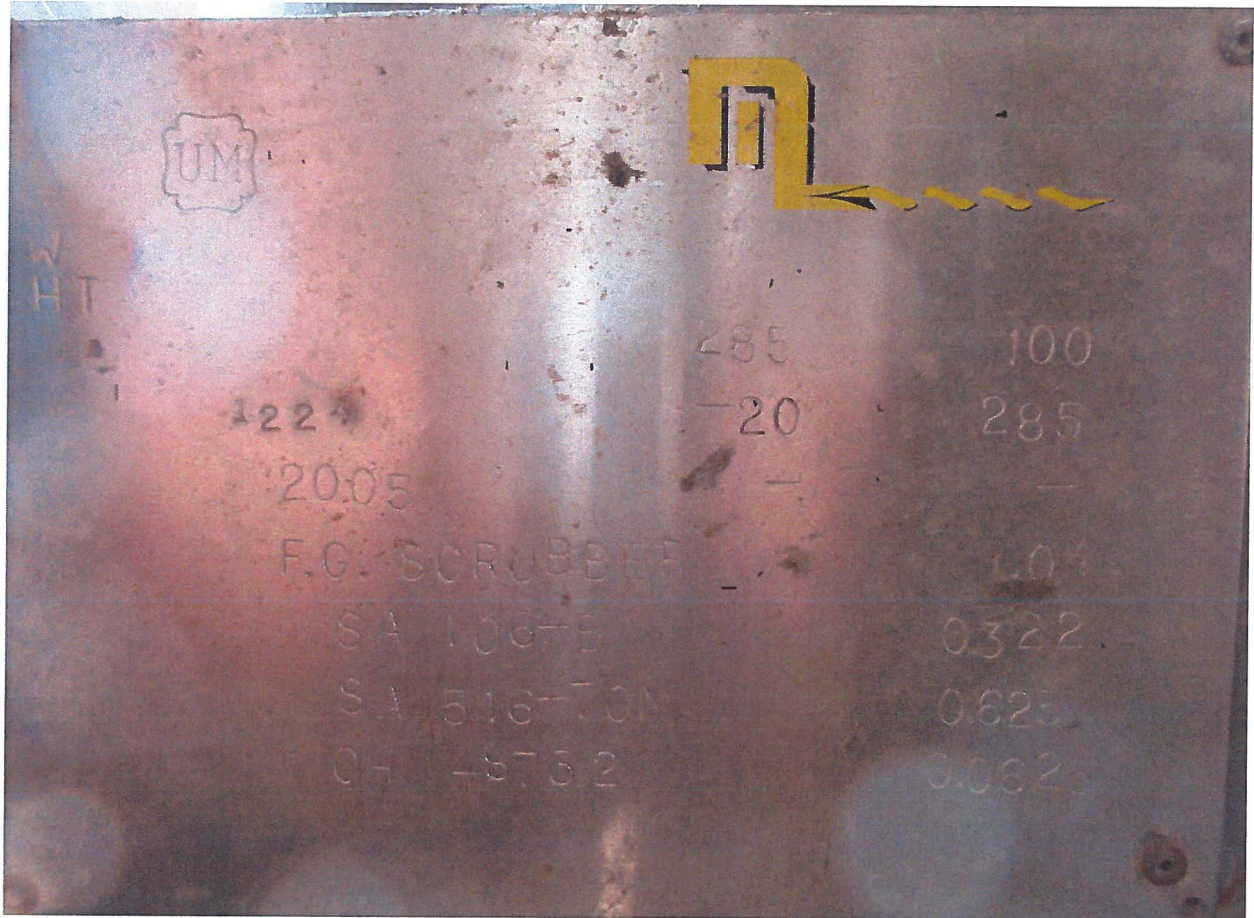
Approximate Date built or installed (check associated equipment or info at facility) _____

Any other pertinent information: _____

PRESSURE VESSEL INVENTORY

ORIGINAL VESSEL NAMEPLATE/STAMPING INFORMATION

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



SUPPLEMENTAL VESSEL NAMEPLATE/STAMPING INFORMATION

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

Repaired By _____

Date of Repair _____

Nat'l Bd. R-Certification No. _____

Other Stamping Information: _____

VESSEL DOCUMENTATION

Manufacturer Data Sheets: ☒ ASME U-1/ U-1A/ U3 Forms ☐ U2 or U4 Supplemental Forms

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

Name: Robert W. Menke

Date: 08/16/2006

API 510 PRESSURE VESSEL EXTERNAL INSPECTION REPORT

Company Name: FMC Technologies Completion	
Field/Location: Colorado District	
Equipment Number: HS-0024	Eq/Circ. ID: HS0024-FGS
Equipment Name/Service: Fuel Gas Scrubber	
Physical Location: On MV-28-4 Pad	
Manufacturer: Micoda Process Systems	Manufacturer Serial Number: 1224
Year Built: 2005	CRN: OH4873.2

Reason for Inspection: Scheduled API-510 External Inspection

Condition of Nameplate and/or Bracket: Nameplate is intact and legible. The nameplate bracket is securely attached. Stamping is legible. All painted wording is worn off.

Internal Access?: No.

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

Grounding Device in Place and Secure?: N/A

Condition of Foundation and Anchor Bolts: Anchor bolts are in place and secure. Baseplate-to-deck/frame attachment welds appear sound. Baseplate is bolted (4) to (2) channel iron which is welded to the skidplate. Baseplate and anchor bolts show light surface corrosion.

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 chipping or peeling. The vessel is not insulated.

Condition of Nozzles, Flanges, Repads, and Weepholes: All threaded couplings. Threaded connections show light surface corrosion.

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

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

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

Is There a PSV on the Vessel? Yes

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

Date PSV last tested (if there is a tag on the valve): PSV was tested on 04/2015.

Comments:

Vessel appears to be in acceptable condition.

Recommendations:

Repairs Needed:

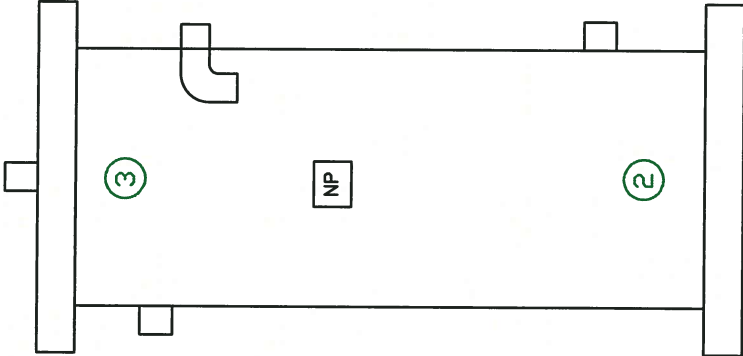
Robert W. Menke/BGW/MK
API 510 Inspector Signature

0131
API 510 Inspector Number

09/27/2018
Date

EQUIP RETIREMENT DATE: 4/28/2044
NEXT INSPECTION IS DUE: 9/27/2019

- #2. 01- BTM SHELL-FRONT 0. 306 TC
- #2. 02- BTM SHELL-LEFT 0. 310 TC
- #2. 03- BTM SHELL-BACK 0. 318 TC
- #2. 04- BTM SHELL-RIGHT 0. 308 TC
- #3. 01- TOP SHELL-FRONT 0. 314 TC
- #3. 02- TOP SHELL-LEFT 0. 308 TC
- #3. 03- TOP SHELL-BACK 0. 316 TC
- #3. 04- TOP SHELL-RIGHT 0. 310 TC



TC-560

NAMEPLATE INFO	
MFG	MICODDA PROCESS SYSTEMS
SERIAL NUMBER	1224
NATIONAL BOARD #	NONE
DATE BUILT	2005
DESIGN P & T	285 PSI @ 100°F
NOTE	UM STAMPED CRN DH-4873. 2

CAL BLK: 58°F		VESSEL: 54°F	
BUSINESS UNIT	FMC TECHNOLOGIES	COMPLETION	
EQ/CIRC ID #	HS0024-FGS		
EQUIP NAME	VERTICAL FUEL GAS SCRUBBER		
LOCATION	INSIDE SKID UNIT HS-0024		
DWG #	HS0024-FGS		

DESC: VERT. FUEL GAS SCRUBBER-SN:1224
DWG: HS0024_FGS 0 01 0 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: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: HS0024-FGS
Eq Type: VESSEL
Class:
CM RBI:
Design Code: S8/D1

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

Description: VERTICAL FUEL GAS SCRUBBER
SN: 1224

Summary: Group Name: Group Description:
Insp. Due Date = 09/27/2019 RCR = 2.6 MPY
Pred. Ret. Date = 04/28/2044 Rem. Life (from last survey 09/27/2018) = 25.6 yrs
0 C.A. Status: No
Total Caution TMLs = 0

TML No	Location	Ctn	First Survey Thick	Nt	First Date	Previous Survey Thick	Nt	Previous Date	Last Survey Thick	Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TWL Retirement Date	TWL Inspection Date	
2.01	BTM SHELL-FRONT	N *	0.331		08/17/2006	0.303	TC	01/22/2015	0.303	RR	09/27/2018	0	2.3	2.3	6.4	0.259	S	2.3	11/13/2037	09/27/2019
2.02	BTM SHELL-LEFT	N *	0.338		08/17/2006	0.308	TC	01/22/2015	0.308	RR	09/27/2018	0	2.5	2.5	7.6	0.259	S	2.5	05/04/2038	09/27/2019
2.03	BTM SHELL-BACK	N	0.321		08/17/2006	0.310	RR	01/22/2015	0.311	RR	09/27/2018	0	0.8	0.9	6.4	0.259	S	0.8	09/27/2083	09/27/2019
2.04	BTM SHELL-RIGHT	N *	0.324		08/17/2006	0.291	TC	01/22/2015	0.291	RR	09/27/2018	0	2.7	2.6	11.0	0.259	S	2.7	08/04/2030	09/27/2019
3.01	TOP SHELL-FRONT	N *	0.319		08/17/2006	0.301	RR	01/22/2015	0.303	RR	09/27/2018	0	1.3	1.9	11.5	0.259	S	1.3	08/01/2052	09/27/2019
3.02	TOP SHELL-LEFT	N *	0.326		08/17/2006	0.296	RR	01/22/2015	0.308	TC	09/27/2018	0	1.5	1.1	5.1	0.259	S	1.5	05/28/2051	09/27/2019
3.03	TOP SHELL-BACK	N	0.307		08/17/2006	0.299	TC	01/22/2015	0.299	RR	09/27/2018	0	0.7	1.6	10.8	0.259	S	0.7	11/18/2075	09/27/2019
3.04	TOP SHELL-RIGHT	N *	0.327		08/17/2006	0.291	RR	01/22/2015	0.310	TC	09/27/2018	0	1.4	1.1	11.0	0.259	S	1.4	03/03/2055	09/27/2019

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Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: HS0024-FGS
Design Code: S8/D1
Eq Type: VESSEL
Class:
CM RBI:

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

Description: VERTICAL FUEL GAS SCRUBBER
SN:1224

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

Representative Corrosion Rate is the Maximum of:
(A) -- Average Corrosion Rate x 1.00 : 1.7 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 2.6 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 2.5 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 2.6 MPY

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

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

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

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

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

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

Eq/Circ ID Estimated life = 25.6 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 04/28/2044

Recommended Eq/Circ UT/RT Inspection Date is 09/27/2019
UT/RT Inspection Interval is 1.00 years.

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

API 570 Piping External Inspection

Company Name: FMC Technologies	District: Colorado District
Line Name/Number: HS-0024 Associated Piping	
Size/Sched. Of Pipe: 2.375"-6.625"	Eq/Circ. ID:
Service/System:	Piping Class ☐ 1 ☐ 2 ☒ 3 ☐ Other
Design Pressure: 2000 PSI	Materials: ☐ CS ☒ SS ☐ Other
Design Temperature: 200°F	Note Stamping (If Any)
P&ID#:	Flange Rating: 900#/150 PSV

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

☒ Scheduled API-570 External Inspection. ☐ Other:

Comments: Tighten bolts/brackets on supports. Re-coat 2" line with missing coating. Replace bent 2" Spool when possible.

Testing Performed:

☒ Visual ☒ UT ☐ PT ☐ MT ☐ Other:

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

Coating Condition:	Comments:
☒ Good ☒ Fair, Some Blistering/Peeling ☒ Corrosion Present (Describe) ☐ Other ☐ No Issues	Coating is acceptable. Some of the coating is missing, chipped and scratched with light surface corrosion.

Loss of Containment:	Comments:
☐ Fluid Loss (Indicate How Much) ☐ Seeping or Evidence of Past Leakage ☐ Dripping (Size of Drops/Drops Per Minute) ☐ Leaking (Size of Stream, Noise Level, etc.) ☐ Clamps ☒ Other ☒ None Identified	Not in service. No signs of past leaks.

Condition of Welds:	Comments:
☒ Welds Are Full, Smooth and Well Profiled ☐ Incomplete Fusion/Penetration ☐ Crack Located Near Weld Seam ☐ Weld Does Not Appear to Be Original ☐ Joints-Misaligned ☐ Undercut ☐ Other ☒ No Issues	The welds are visually acceptable with no visible defects.

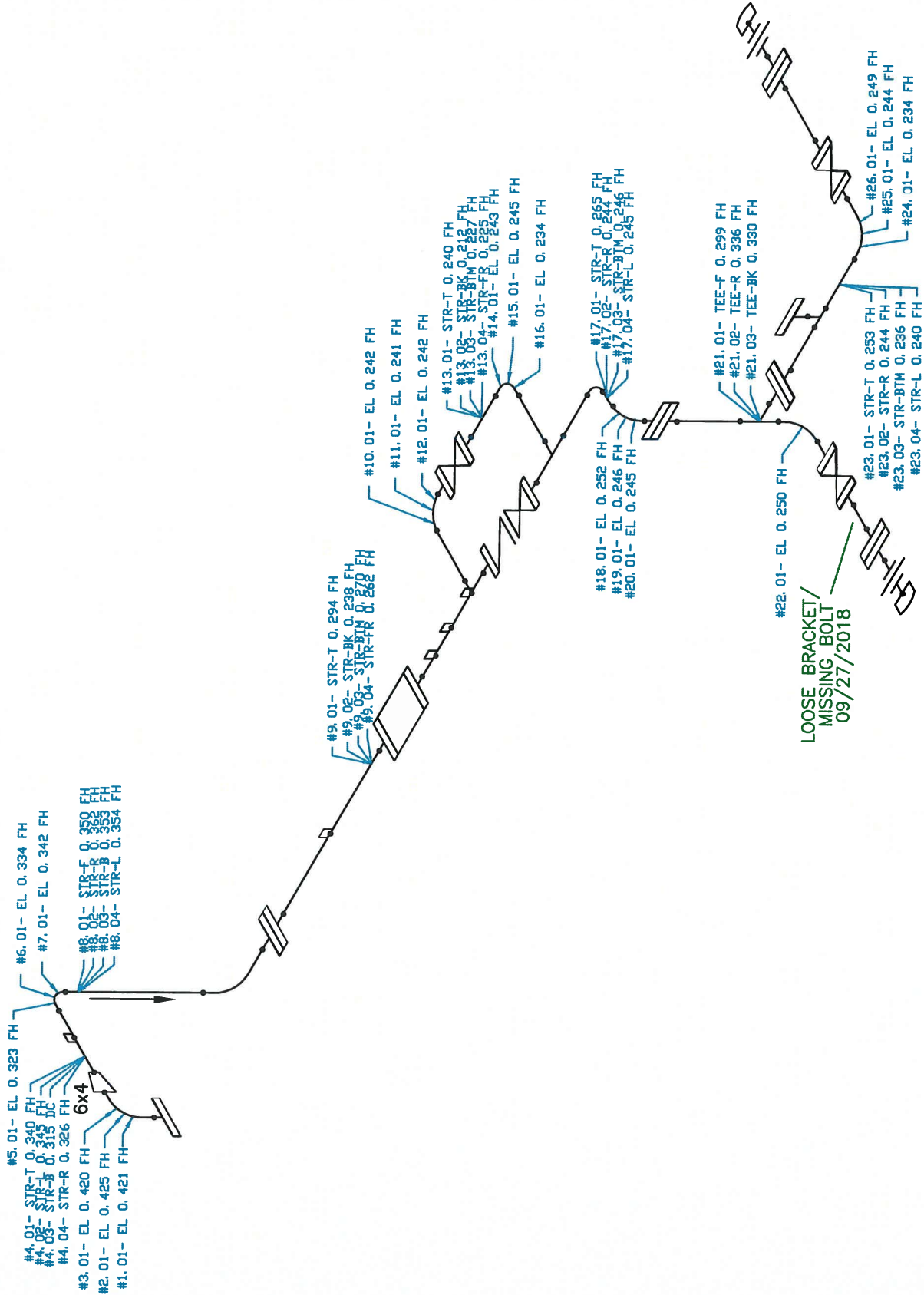
Relief Device:	Comments:
☒ PSV ☐ No PSV ☐ Rupture Disk ☒ Atmospheric ☐ No Relief Device Identified For This Equipment ☒ Tag Secure and Legible ☒ Set Pressure At Or Below MAWP ☐ Block Valve Not Locked/Car Sealed In Open Position ☐ Improper Drain Hole/Weather Cap On Atmos. Discharge ☐ Obstruction (i.e. Debris) ☐ Relief Installed In A Position Other Than Horiz. Or Upright ☐ Other ☒ No Issues	(2) PSVs. 2000 psi and 2160 psi. Test date 04/2015.

Supports/Hangers:	Comments:
☒ In Serviceable Condition ☐ Foundation Is Damaged ☒ Additional Support Needed ☒ Hanger/Support Is Distorted/Broken/Missing ☐ Pipe Slide Or Shoe Is Off Of The Support ☐ Makeshift Support ☒ Loose Support Needed To Be Tightened ☐ Fireproofing Missing Or Damaged ☒ Support/Hanger Is Corroded ☐ Other ☐ No Issues	The majority of support brackets and vertical supports are acceptable. Missing bolts and brackets (pg. 1 & 3). Additional supports are recommended. (See pg. 3 for location). Light surface corrosion is present on supports.

Flanged Connections:	Comments:
☒ Bolting Serviceable ☐ Short, Missing Or Damaged Bolting ☒ Nuts Lack Full Engagement ☒ Flanges Serviceable ☐ Flange Material Or Rating Inconsistent For System ☐ Flanges Deformed Or Damaged ☒ Corrosion Present (Describe) ☒ Gaskets ☐ Flange Rating Issues ☐ Other ☐ No Issues	Flanges and bolts are acceptable with light surface corrosion. Multiple bolts lack full engagement (see pg. 2, 3 and 5).

Mechanical Observations:	Comments:
☒ Deadleg ☐ Damaged Flex Hose ☐ Crack ☐ Biological Growth ☐ Threaded Exposed ☐ Threaded Connections Not Seal Welded ☐ Expansion Joint Issues ☐ Low Point Without Drain ☐ Open Ended ☐ Vibration (Excessive) ☐ Weephole ☒ Other ☐ No Issues	End cap, vents and drains are deadlegs present, and have no visible issues. 2" line is bent (pg. 3).

EQUIP RETIREMENT DATE: 7/24/2034
NEXT INSPECTION IS DUE: 9/27/2019



HS0024-P1

PIPE: 60-61°F
CAL RLY: 58°F

DESC: GAS OUT-6/4/3 SCH 80/40 PIPE
NWCL: GAS_OUT-1 01 02 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: 11/01/2018

(Report in Inches, Corrosion Rates in MPY)

Analysis: Straight Line

Unit: HS-0024
Eq/Circ ID: GAS OUT
Eq Type: PIPING
Class:
CM RBI:
Design Code: B31.3

Flange Rating: 2025 lb/in²
Design Pressure: 1900 lb/in²
Design Temperature: 200 °F

Description: GAS OUT-6,3,4 INCH SCH80 PIPE

Summary: Group Name:

Insp. Due Date = 09/27/2019
Pred. Ret. Date = 07/24/2034

Group Description:

RCR = 2.1 MPY
Rem. Life (from last survey 09/27/2018) = 15.8 yrs

O C.A. Status: NO

Total Caution TMLs = 0

TML No	Location	Ctn	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First Survey Thick	First 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Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: GAS OUT
Eq Type: PIPING
Class:
CM RBI:
Design Code: B31.3

Flange Rating: 2025 lb/in²
Design Pressure: 1900 lb/in²
Design Temperature: 200 °F

Description: GAS OUT-6,3,4 INCH SCH80 PIPE

Summary: Group Name:
Insp. Due Date = 09/27/2019
Pred. Ret. Date = 07/24/2034

Group Description:
RCR = 2.1 MPY
Rem. Life (from last survey 09/27/2018) = 15.8 Yrs

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

TML No	Location	Ctn	First Survey Thick Nt	First Date	Previous Survey Thick Nt	Previous Date	Last Survey Thick Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
12.01	EL	N	0.244	08/17/2006	0.230 RR	01/22/2015	0.239 RR	09/27/2018	0	0.4	0.9	9.8	0.160 P	0.4	11/01/2215	09/27/2019
13.01	STR-T	N	0.248	08/17/2006	0.231	01/22/2015	0.231 RR	09/27/2018	0	1.4	1.5	9.8	0.160 P	1.4	05/03/2069	09/27/2019
13.02	STR-BK	N	0.234	08/17/2006	0.200 RR	01/22/2015	0.212 FH	09/27/2018	0	1.8	2.4	15.8	0.160 P	1.8	07/15/2047	09/27/2019
13.03	STR-BTM	N	0.239	08/17/2006	0.220 RR	01/22/2015	0.221 RR	09/27/2018	0	1.5	2.3	13.8	0.160 P	1.5	04/19/2059	09/27/2019
13.04	STR-FR	N	0.236	08/17/2006	0.227 RR	01/22/2015	0.225 FH	09/27/2018	0.5	0.9	1.1	10.8	0.160 P	0.9	10/12/2090	09/27/2019
14.01	EL	N	0.232	08/17/2006	0.229 RR	01/22/2015	0.231 RR	09/27/2018	0	0.1	0.4	8.9	0.160 P	0.1	02/12/2727	09/27/2019
15.01	EL	N	0.246	08/17/2006	0.233	01/22/2015	0.233 RR	09/27/2018	0	1.1	1.5	10.8	0.160 P	1.1	12/14/2084	09/27/2019
16.01	EL	N	0.239	08/17/2006	0.228 RR	01/22/2015	0.229 RR	09/27/2018	0	0.8	0.8	6.9	0.160 P	0.8	10/14/2104	09/27/2019
17.01	STR-T	N	0.255	08/17/2006	0.256	01/22/2015	0.256 RR	09/27/2018	0	0	0.3	10.8	0.206 P	0.1	07/02/2519	09/27/2019
17.02	STR-R	N	0.253	08/17/2006	0.232 RR	01/22/2015	0.244 FH	09/27/2018	0	0.7	1.4	10.8	0.206 P	0.7	02/17/2073	09/27/2019
17.03	STR-BTM	N	0.252	08/17/2006	0.249	01/22/2015	0.246 FH	09/27/2018	0.8	0.5	0.7	4.9	0.206 P	0.8	10/31/2068	09/27/2019
17.04	STR-L	N	0.241	08/17/2006	0.245	01/22/2015	0.245 FH	09/27/2018	0	0	0	4.0	0.206 P	0.1	07/01/2409	09/27/2019
18.01	EL	N	0.263	08/17/2006	0.244 RR	01/22/2015	0.247 RR	09/27/2018	0	1.3	1.5	7.6	0.206 P	1.3	05/03/2050	09/27/2019
19.01	EL	N *	0.262	08/17/2006	0.230	01/22/2015	0.230 RR	09/27/2018	0	2.6	3.2	20.7	0.206 P	2.6	12/31/2027	09/27/2019
20.01	EL	N *	0.254	08/17/2006	0.230 RR	01/22/2015	0.231 RR	09/27/2018	0	1.9	2.4	14.8	0.206 P	1.9	12/08/2031	09/27/2019
21.01	TEB-F	N	0.304	08/17/2006	0.300 RR	01/22/2015	0.299 FH	09/27/2018	0.3	0.4	0.8	10.8	0.206 P	0.4	06/07/2251	09/27/2019
21.02	TEB-R	N	0.346	08/17/2006	0.321 RR	01/22/2015	0.326 RR	09/27/2018	0	1.7	2.4	15.9	0.206 P	1.7	05/15/2089	09/27/2019
21.03	TEE-BK	N	0.354	08/17/2006	0.311 RR	01/22/2015	0.314 RR	09/27/2018	0	3.3	4.2	26.6	0.206 P	3.3	06/28/2051	09/27/2019
22.01	EL	N	0.248	08/17/2006	0.241	01/22/2015	0.241 RR	09/27/2018	0	0.6	0.9	4.4	0.206 P	0.6	03/13/2077	09/27/2019
23.01	STR-T	N	0.270	08/17/2006	0.259 RR	01/22/2015	0.253 FH	09/27/2018	1.6	1.4	1.9	12.7	0.206 P	1.6	02/28/2048	09/27/2019
23.02	STR-R	N *	0.254	08/17/2006	0.236	01/22/2015	0.236 RR	09/27/2018	0	1.5	2.4	13.8	0.206 P	1.5	10/15/2038	09/27/2019

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: GAS OUT
Eq Type: PIPING
Class:
CM RBI:
Design Code: B31.3

Flange Rating: 2025 lb/in²
Design Pressure: 1900 lb/in²
Design Temperature: 200 °F

Description: GAS OUT-6,3,4INCH SCH80 PIPE

Summary: Group Name: Group Description: RCR = 2.1 MPY Rem. Life (from last survey 09/27/2018) = 15.8 Yrs
Insp. Due Date = 09/27/2019
Pred. Ret. Date = 07/24/2034
0 C.A. Status: No
Total Caution TMLs = 0

TML No	Location	Ctn TML	First Survey Thick	First Survey Nt	First Date	Previous Survey Thick	Previous Survey Nt	Previous Date	Last Survey Thick	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
23.03	STR-BTM	N	0.231		08/17/2006	0.228 RR	0.230 RR	01/22/2015	0.230 RR	09/27/2018	0	0.1	0.8	26.6	0.206 P	0.1	06/30/2259	09/27/2019
23.04	STR-L	N *	0.251		08/17/2006	0.231	0.231 RR	01/22/2015	0.231 RR	09/27/2018	0	1.7	1.9	5.9	0.206 P	1.7	06/27/2033	09/27/2019
24.01	EL	N *	0.257		08/17/2006	0.240 RR	0.234 FH	01/22/2015	0.234 FH	09/27/2018	1.6	1.9	1.9	13.8	0.206 P	1.9	07/07/2033	09/27/2019
25.01	EL	N	0.256		08/17/2006	0.246	0.244 FH	01/22/2015	0.244 FH	09/27/2018	0.5	1.0	1.0	9.8	0.206 P	1.0	10/24/2056	09/27/2019
26.01	EL	N	0.253		08/17/2006	0.244 RR	0.247 RR	01/22/2015	0.247 RR	09/27/2018	0	0.5	0.8	2.0	0.206 P	0.5	11/21/2100	09/27/2019

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: GAS OUT
Design Code: B31.3
Eq Type: PIPING
Class:
CM RBI:

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

Description: GAS OUT-6,3,4INCH SCH80 PIPE

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

Representative Corrosion Rate is the Maximum of:
(A) -- Average Corrosion Rate x 1.00 : 1.1 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 2.1 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 1.3 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 2.1 MPY

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

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

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

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

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

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

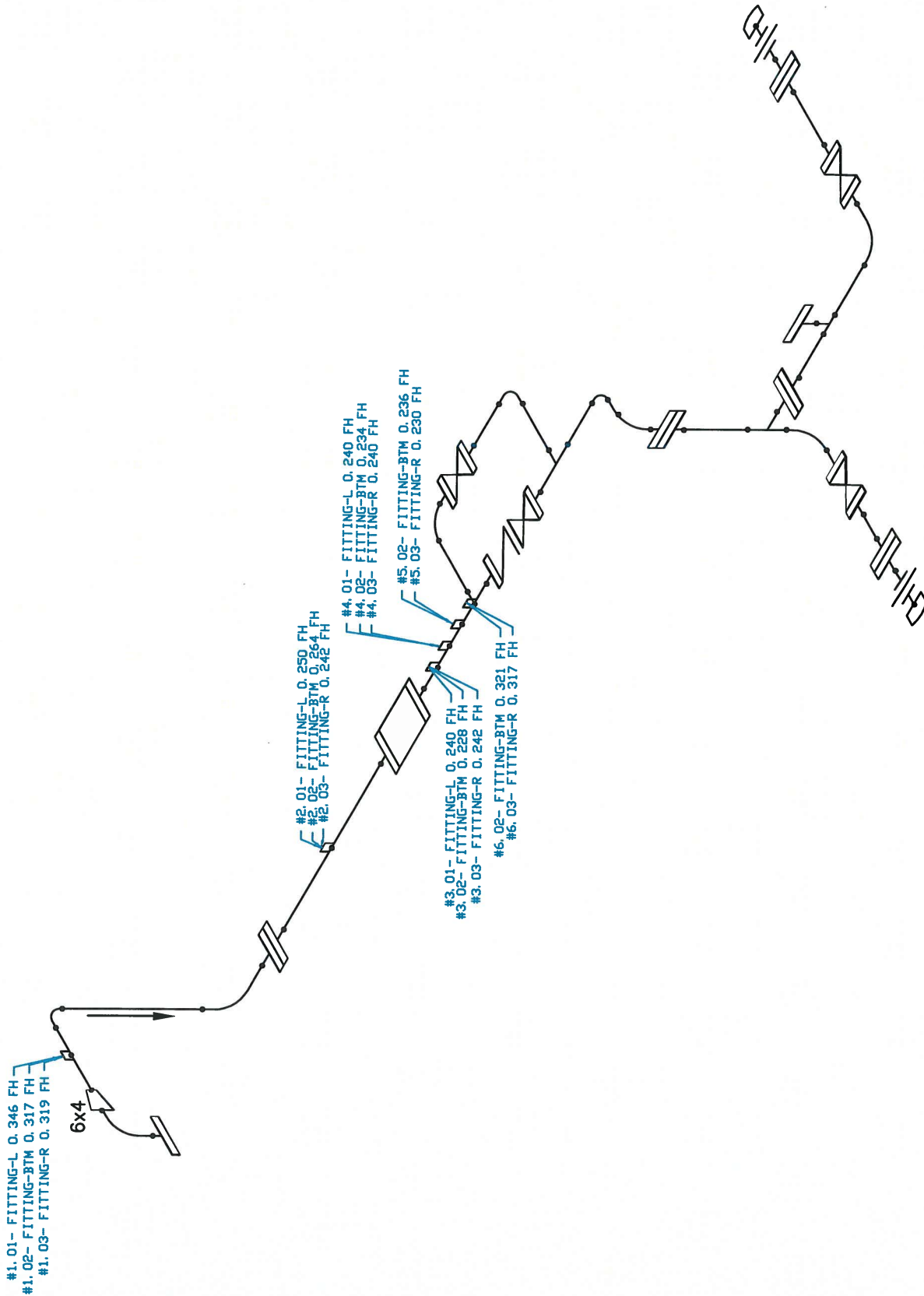
Eq/Circ ID Estimated life = 15.8 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 07/24/2034

Recommended Eq/Circ UT/RT Inspection Date is 09/27/2019
UT/RT Inspection Interval is 1.00 years.

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

EQUIP RETIREMENT DATE: 11/24/2047
NEXT INSPECTION IS DUE: 9/27/2019



HS0024-P1

DESC: GAS OUT-SP

PIPE: 61°F
CAL DIV: 505

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: GAS OUT-SP
Eq Type: PIPING
Class:
CM RBI:
Design Code: B31.3

Flange Rating: 2025 lb/in²
Design Pressure: 1900 lb/in²
Design Temperature: 200 °F

Description: GAS OUT-6,3,4 INCH SCH80 PIPE

Summary:

Group Description:

Insp. Due Date = 09/27/2019
Pred. Ret. Date = 11/24/2047

RCR = 2.0 MPY
Rem. Life (from last survey 09/27/2018) = 29.2 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	FITTING-L	N	0.344	02/12/2013	0.340	01/22/2015	0.340 RR	09/27/2018	0	0.7	0.5	9.8	0.206 P	0.7	04/12/2210	09/27/2019
1.02	FITTING-BTM	N	0.306	02/12/2013	0.310 RR	01/22/2015	0.311 RR	09/27/2018	0	0	0	0	0.206 P	0.1	10/05/3068	09/27/2019
1.03	FITTING-R	N *	0.316	02/12/2013	0.302	01/22/2015	0.302 RR	09/27/2018	0	2.5	2.6	14.0	0.206 P	2.5	02/20/2057	09/27/2019
2.01	FITTING-L	N *	0.245	02/12/2013	0.239	01/22/2015	0.239 RR	09/27/2018	0	1.1	1.0	13.8	0.206 P	1.1	10/21/2048	09/27/2019
2.02	FITTING-BTM	N	0.241	02/12/2013	0.240	01/22/2015	0.240 RR	09/27/2018	0	0.2	0.2	1.0	0.206 P	0.2	09/28/2188	09/27/2019
2.03	FITTING-R	N	0.233	02/12/2013	0.239	01/22/2015	0.239 RR	09/27/2018	0	0	0	0	0.206 P	0.1	09/30/2348	09/27/2019
3.01	FITTING-L	N	0.233	02/12/2013	0.232	01/22/2015	0.232 RR	09/27/2018	0	0.2	0.2	6.9	0.206 P	0.2	09/28/2148	09/27/2019
3.02	FITTING-BTM	N *	0.221	02/12/2013	0.219	01/22/2015	0.219 RR	09/27/2018	0	0.4	0.4	2.0	0.206 P	0.4	03/29/2051	09/27/2019
3.03	FITTING-R	N	0.231	02/12/2013	0.230 RR	01/22/2015	0.231 RR	09/27/2018	0	0	0	1.1	0.206 P	0.1	09/29/2268	09/27/2019
4.01	FITTING-L	N *	0.231	02/12/2013	0.221	01/22/2015	0.221 RR	09/27/2018	0	1.8	1.8	10.0	0.206 P	1.8	02/11/2027	09/27/2019
4.02	FITTING-BTM	N	0.221	02/12/2013	0.220	01/22/2015	0.220 RR	09/27/2018	0	0.2	0.2	125.0	0.206 P	0.2	02/11/2089	09/27/2019
4.03	FITTING-R	N *	0.231	02/12/2013	0.224	01/22/2015	0.224 RR	09/27/2018	0	1.2	1.1	9.8	0.206 P	1.2	10/20/2033	09/27/2019
5.02	FITTING-BTM	N	0.231 TC	02/12/2013	0.227 RR	01/22/2015	0.229 RR	09/27/2018	0	0.4	0.1	4.2	0.206 P	0.4	03/28/2076	09/27/2019
5.03	FITTING-R	N	0.221 TC	02/12/2013	0.220	01/22/2015	0.220 RR	09/27/2018	0	0.2	0.2	1.0	0.206 P	0.2	09/27/2088	09/27/2019
6.02	FITTING-BTM	N *	0.307	02/12/2013	0.297	01/22/2015	0.297 RR	09/27/2018	0	1.8	1.4	6.4	0.206 P	1.8	04/17/2069	09/27/2019
6.03	FITTING-R	N	0.308	02/12/2013	0.298	01/22/2015	0.298 RR	09/27/2018	0	1.8	1.3	8.5	0.206 P	1.8	11/06/2069	09/27/2019

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: GAS OUT-SP
Design Code: B31.3
Eq Type: PIPING
Class:
CM RBI:

Flange Rating: 2025 lb/in²
Design Pressure: 1900 lb/in²
Design Temperature: 200 °F

Description: GAS OUT-6,3,4INCH SCH80 PIPE

TML Corrosion Rates are each the Maximum of:		
(A) -- Calculated Corrosion Rates x 1.00	:	Varies
(B) -- Default Corrosion Rate	:	0.1 MPY
Representative Corrosion Rate is the Maximum of:		
(A) -- Average Corrosion Rate x 1.00	:	0.8 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2	:	2.0 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28)	:	1.1 MPY
(D) -- Default Corrosion Rate	:	0.1 MPY
Representative Corrosion Rate = 2.0 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).

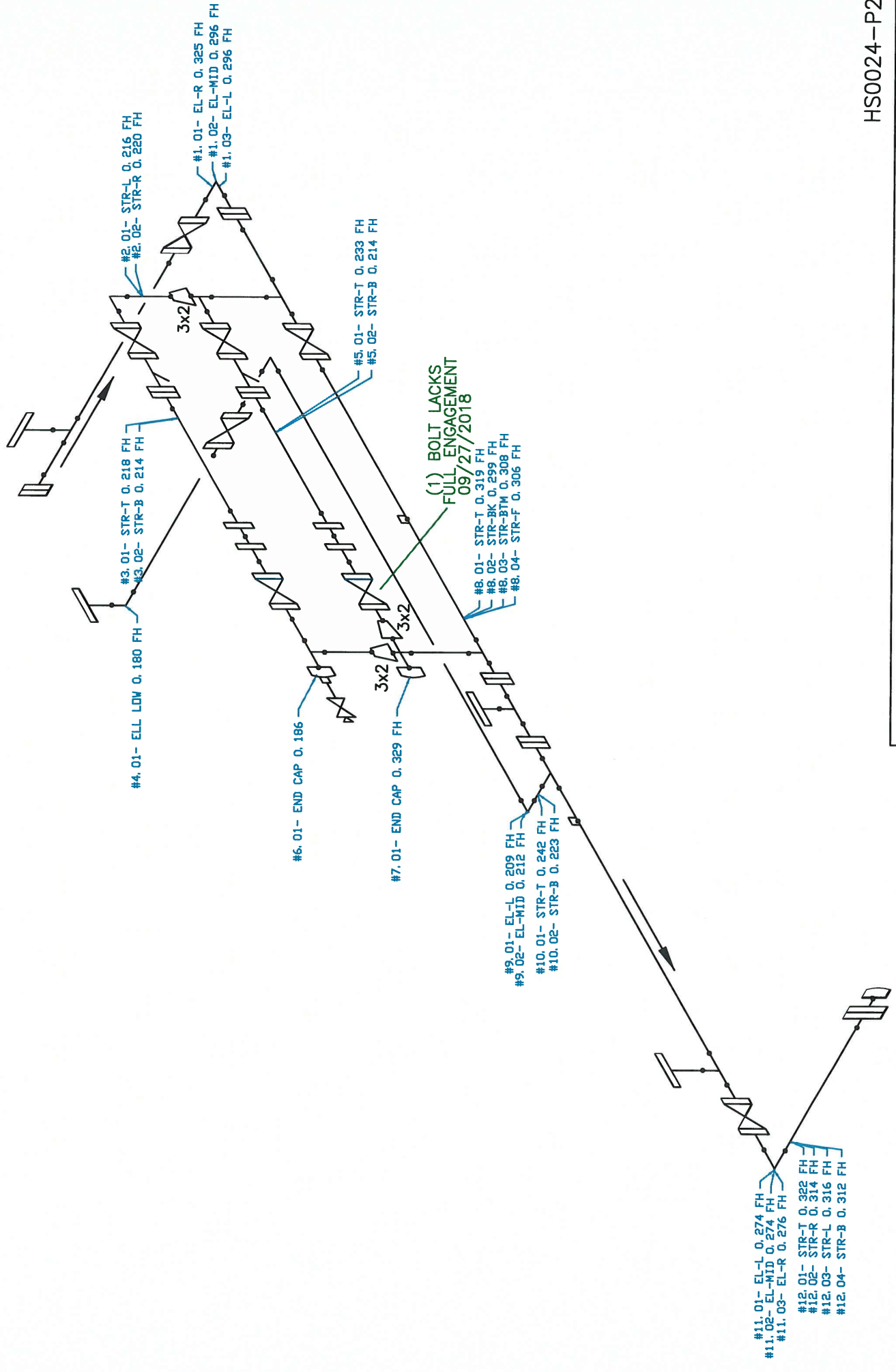
Eq/Circ ID Estimated life = 29.2 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 11/24/2047

Recommended Eq/Circ UT/RT Inspection Date is 09/27/2019
UT/RT Inspection Interval is 1.00 years.

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

EQUIP RETIREMENT DATE: 5/1/2049
NEXT INSPECTION IS DUE: 9/27/2019



HS0024-P2

DESC: OIL OUT-(2,3 INCH SCH80 PIPE)
NWCL. OUT - 1 04 1 04

PIPE: 62°F
CAL DI V. 50°F

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: OIL OUT
Eq Type: PIPING
Class: 2
CM RBI:
Design Code: B31.3

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

Description: OIL OUT LINE-2,3 INCH SCH 80 PIPE

Summary:

Group Description:

Insp. Due Date = 09/27/2019
Pred. Ret. Date = 05/01/2049

RCR = 3.0 MPY

Rem. Life (from last survey 09/27/2018) = 30.6 yrs

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

TML No	Location	Ctn	First Survey Thick	First Date	Previous Survey Thick	Previous Date	Last Survey Thick	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
1.01	EL-R	N	0.304	02/25/2009	0.300 RR	01/22/2015	0.301 RR	09/27/2018	0	0.3	0.6	10.8	0.168 P	0.3	03/08/2461	09/27/2019
1.02	EL-MID	N	0.299	08/17/2006	0.290	01/22/2015	0.290 RR	09/27/2018	0	0.7	0.7	5.0	0.168 P	0.7	08/22/2192	09/27/2019
1.03	EL-L	N	0.300	02/25/2009	0.288	01/22/2015	0.288 RR	09/27/2018	0	1.3	1.2	5.1	0.168 P	1.3	11/04/2110	09/27/2019
2.01	STR-L	N	0.221	08/17/2006	0.207	01/22/2015	0.207 RR	09/27/2018	0	1.2	1.2	7.9	0.114 P	1.2	02/01/2096	09/27/2019
2.02	STR-R	N	0.230	08/17/2006	0.210 RR	01/22/2015	0.212 RR	09/27/2018	0	1.5	1.6	12.8	0.114 P	1.5	12/14/2083	09/27/2019
3.01	STR-T	N	0.244	08/17/2006	0.221	01/22/2015	0.218 FH	09/27/2018	0.8	2.1	2.5	9.8	0.114 P	2.1	03/05/2068	09/27/2019
3.02	STR-B	N	0.223	08/17/2006	0.205	01/22/2015	0.205 RR	09/27/2018	0	1.5	2.0	9.8	0.114 P	1.5	04/14/2079	09/27/2019
4.01	ELL LOW	N	0.171	02/12/2013	0.169	01/22/2015	0.169 RR	09/27/2018	0	0.4	0.4	2.0	0.114 P	0.4	10/14/2155	09/27/2019
5.01	STR-T	N	0.237	08/17/2006	0.232	01/22/2015	0.232 RR	09/27/2018	0	0.4	0.6	7.9	0.114 P	0.4	04/16/2313	09/27/2019
5.02	STR-B	N	0.226	08/17/2006	0.217	01/22/2015	0.214 FH	09/27/2018	0.8	1.0	0.8	3.8	0.114 P	1.0	07/23/2118	09/27/2019
6.01	END CAP	N *	0.210	08/17/2006	0.186	01/22/2014	0.186	01/22/2015	0	2.8	2.7	11.8	0.114 P	2.8	09/15/2040	01/22/2016
7.01	END CAP	N	0.359	08/17/2006	0.322	01/22/2015	0.322 RR	09/27/2018	0	3.1	3.9	29.3	0.168 P	3.1	04/30/2068	09/27/2019
8.01	STR-T	N	0.336	08/17/2006	0.307	01/22/2015	0.307 RR	09/27/2018	0	2.4	2.5	9.8	0.168 P	2.4	07/17/2076	09/27/2019
8.02	STR-BK	N	0.305	08/17/2006	0.291 RR	01/22/2015	0.299 FH	09/27/2018	0	0.5	0.5	3.2	0.168 P	0.5	03/16/2280	09/27/2019
8.03	STR-BTM	N *	0.319	08/17/2006	0.279	01/22/2015	0.279 RR	09/27/2018	0	3.3	3.9	21.7	0.168 P	3.3	04/17/2052	09/27/2019
8.04	STR-F	N	0.312	08/17/2006	0.298	01/22/2015	0.298 RR	09/27/2018	0	1.2	0.7	14.0	0.168 P	1.2	11/07/2126	09/27/2019
9.01	EL-L	N *	0.211	08/17/2006	0.182 RR	01/22/2015	0.188 RR	09/27/2018	0	1.9	2.6	10.6	0.114 P	1.9	08/03/2057	09/27/2019
9.02	EL-MID	N *	0.212	02/25/2009	0.189	01/22/2015	0.189 RR	09/27/2018	0	2.4	2.2	6.4	0.114 P	2.4	11/29/2049	09/27/2019
10.01	STR-T	N	0.257	08/17/2006	0.237 RR	01/22/2015	0.239 RR	09/27/2018	0	1.5	2.1	12.8	0.114 P	1.5	12/14/2101	09/27/2019
10.02	STR-B	N	0.225	08/17/2006	0.212 RR	01/22/2015	0.215 RR	09/27/2018	0	0.8	1.0	7.9	0.114 P	0.8	10/05/2144	09/27/2019

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: OIL OUT
Eq Type: PIPING
Class: 2
CM RBI:
Design Code: B31.3

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

Description: OIL OUT LINE-2,3 INCH SCH 80 PIPE

Summary: Group Name: Group Description: 0 C.A. Status: No
Insp. Due Date = 09/27/2019 RCR = 3.0 MPY Total Caution TMLs = 0
Pred. Ret. Date = 05/01/2049 Rem. Life (from last survey 09/27/2018) = 30.6 yrs

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	TML Inspection Date
11.01	EL-L	N *	0.276	02/25/2009	0.249	01/22/2015	0.249	RR	0	2.8	3.6	10.8	0.168 P	2.8	07/28/2047	09/27/2019
11.02	EL-MID	N	0.273	08/17/2006	0.263	01/22/2015	0.263	RR	0	0.8	1.2	9.8	0.168 P	0.8	02/26/2137	09/27/2019
11.03	EL-R	N *	0.277	02/25/2009	0.250	01/22/2015	0.250	RR	0	2.8	3.3	11.8	0.168 P	2.8	12/05/2047	09/27/2019
12.01	STR-T	N	0.341	08/17/2006	0.306	01/22/2015	0.306	RR	0	2.9	3.2	13.8	0.168 P	2.9	03/26/2066	09/27/2019
12.02	STR-R	N	0.323	08/17/2006	0.301	01/22/2015	0.301	RR	0	1.8	2.0	10.8	0.168 P	1.8	06/23/2092	09/27/2019
12.03	STR-L	N	0.322	08/17/2006	0.299	01/22/2015	0.299	RR	0	1.9	2.2	16.7	0.168 P	1.9	07/18/2087	09/27/2019
12.04	STR-B	N	0.311	08/17/2006	0.307	01/22/2015	0.307	RR	0	0.3	0	1.6	0.168 P	0.3	03/08/2481	09/27/2019

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: OIL OUT
Design Code: B31.3
Eq Type: PIPING
Class: 2
CM RBI:

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

Description: OIL OUT LINE-2,3 INCH SCH 80 PIPE

TML Corrosion Rates are each the Maximum of:			
(A) -- Calculated Corrosion Rates x 1.00	:		Varies
(B) -- Default Corrosion Rate	:		0.1 MPY
Representative Corrosion Rate is the Maximum of:			
(A) -- Average Corrosion Rate x 1.00	:		1.6 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2	:		3.0 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28)	:		2.0 MPY
(D) -- Default Corrosion Rate	:		0.1 MPY
Representative Corrosion Rate = 3.0 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).

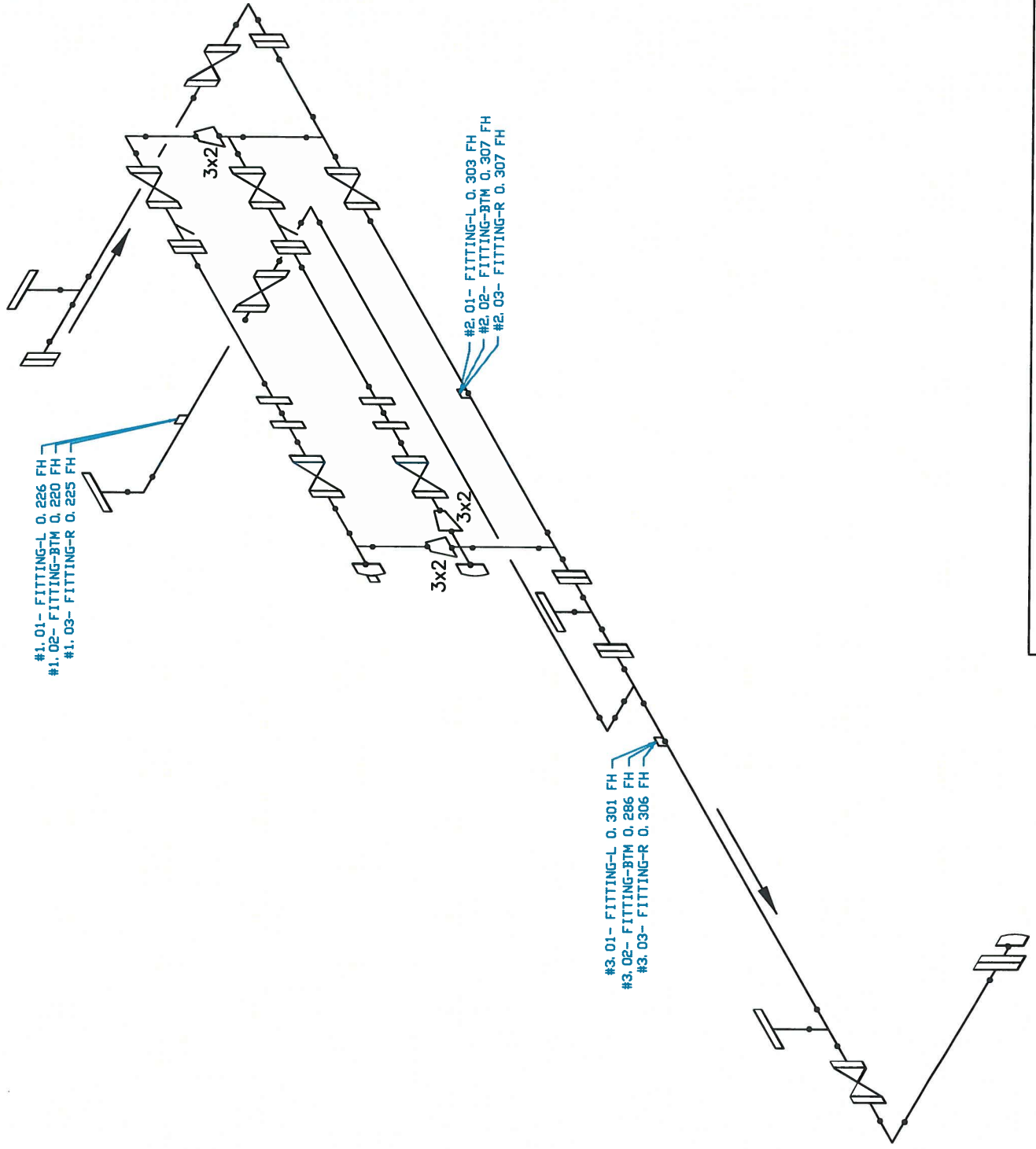
Eq/Circ ID Estimated life = 30.6 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 05/01/2049

Recommended Eq/Circ UT/RT Inspection Date is 09/27/2019
UT/RT Inspection Interval is 1.00 years.

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

EQUIP RETIREMENT DATE: 12/17/2071
NEXT INSPECTION IS DUE: 9/27/2019



HS0024-P2

PIPE: 62°F
CUI: 110°F

DESC: OIL OUT-SP

FILE: C:\Program Files\Autodesk\AutoCAD 2010\AutoCAD 2010.dwg

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: OIL OUT-SP
Eq Type: PIPING
Class: 2
CM RBI:
Design Code: B31.3

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

Description: OIL OUT LINE-2,3 INCH SCH 80 PIPE

Summary: Group Name:

Insp. Due Date = 09/27/2019
Pred. Ret. Date = 12/17/2071

Group Description:

RCR = 3.4 MPY
Rem. Life (from last survey 09/27/2018) = 53.2 yrs

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

TML No	Location	Ctn	First Survey Thick Nt	First Date	Previous Survey Thick Nt	Previous Date	Last Survey Thick Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
1.01	FITTING-L	N *	0.213 TC	02/12/2013	0.207	01/22/2015	0.207 RR	09/27/2018	0	1.1	0.9	10.8	0.168 P	1.1	12/12/2053	09/27/2019
1.02	FITTING-BTM	N *	0.208 TC	02/12/2013	0.206	01/22/2015	0.206 RR	09/27/2018	0	0.4	0.4	3.0	0.168 P	0.4	01/25/2113	09/27/2019
1.03	FITTING-R	N *	0.227 TC	02/12/2013	0.209	01/22/2015	0.209 RR	09/27/2018	0	3.2	2.8	10.0	0.168 P	3.2	06/20/2031	09/27/2019
2.01	FITTING-L	N *	0.296	02/12/2013	0.286	01/22/2015	0.286 RR	09/27/2018	0	1.8	1.6	7.9	0.114 P	1.8	03/13/2114	09/27/2019
2.02	FITTING-BTM	N	0.289	02/12/2013	0.292 RR	01/22/2015	0.293 RR	09/27/2018	0	0	0	12.8	0.114 P	0.1	12/13/3806	09/27/2019
2.03	FITTING-R	N	0.285	02/12/2013	0.287 RR	01/22/2015	0.294 RR	09/27/2018	0	0	0	0	0.168 P	0.1	01/27/3276	09/27/2019
3.01	FITTING-L	N *	0.283	02/12/2013	0.263	01/22/2015	0.263 RR	09/27/2018	0	3.6	3.4	16.0	0.114 P	3.6	01/29/2060	09/27/2019
3.02	FITTING-BTM	N	0.287	02/12/2013	0.279	01/22/2015	0.279 RR	09/27/2018	0	1.4	1.1	9.8	0.114 P	1.4	06/20/2136	09/27/2019
3.03	FITTING-R	N *	0.292	02/12/2013	0.277	01/22/2015	0.277 RR	09/27/2018	0	2.7	2.6	13.0	0.168 P	2.7	01/04/2059	09/27/2019

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: OIL OUT-SP
Design Code: B31.3
Eq Type: PIPING
Class: 2
CM RBI:

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

Description: OIL OUT LINE-2,3 INCH SCH 80 PIPE

TML Corrosion Rates are each the Maximum of:			
(A) -- Calculated Corrosion Rates x 1.00	:		Varies
(B) -- Default Corrosion Rate	:		0.1 MPY
Representative Corrosion Rate is the Maximum of:			
(A) -- Average Corrosion Rate x 1.00	:		1.6 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2	:		3.4 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28)	:		2.3 MPY
(D) -- Default Corrosion Rate	:		0.1 MPY
Representative Corrosion Rate = 3.4 MPY			

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

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

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

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

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

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

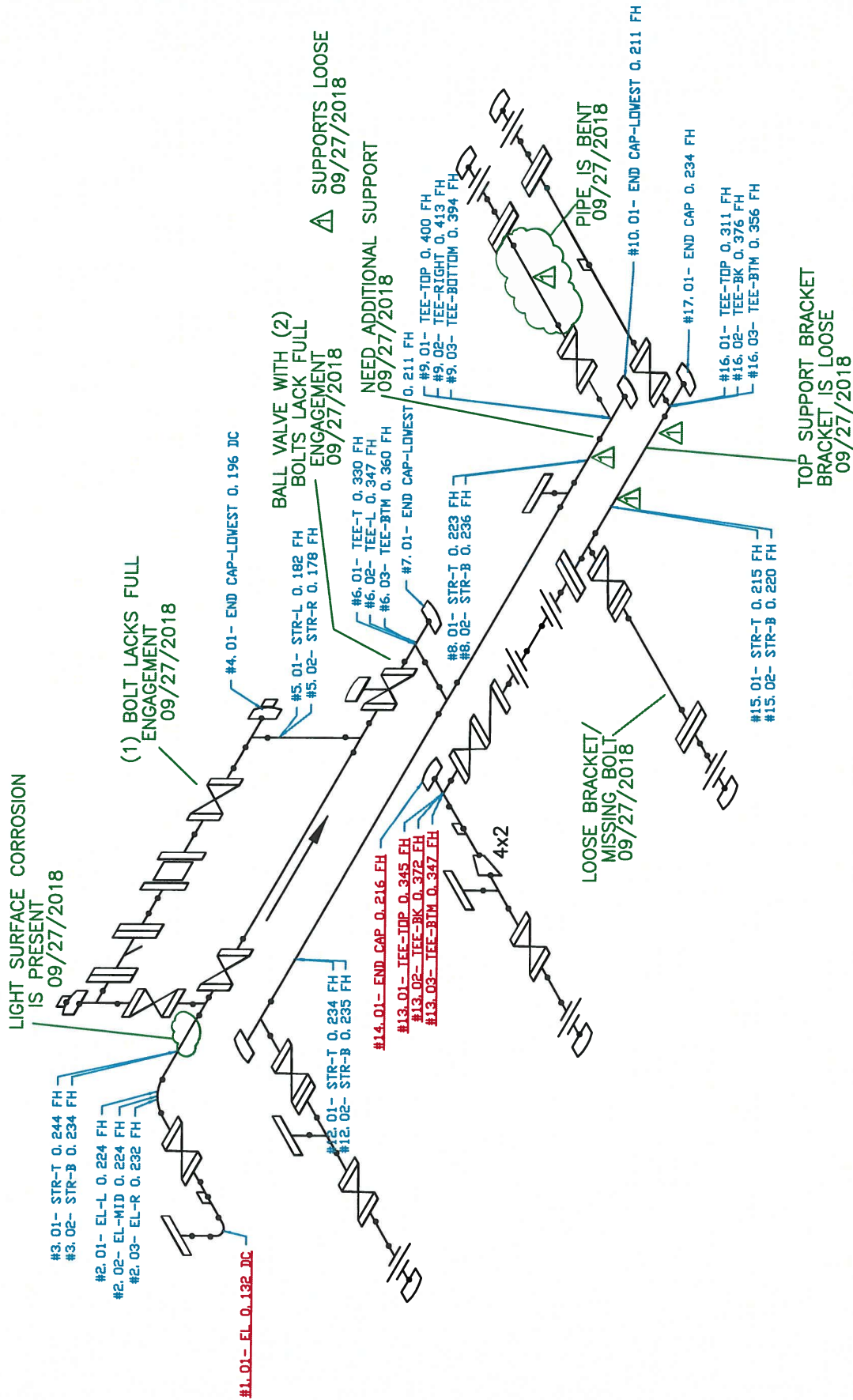
Eq/Circ ID Estimated life = 53.2 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 12/17/2071

Recommended Eq/Circ UT/RT Inspection Date is 09/27/2019
UT/RT Inspection Interval is 1.00 years.

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

EQUIP RETIREMENT DATE: 6/3/2026
NEXT INSPECTION IS DUE: 9/27/2019



HS0024-P3

DESC: WATER OUT-2 INCH SCH80 PIPE

DWG: WATER-OUT-1 01-17-01

PIPE: 62°F
CAL RIK: 58°F

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: WATER OUT
Eq Type: PIPING
Class: 2
CM RBI:
Design Code: B31.3

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

Description: WATER OUT-3 INCH SCH80 PIPE

Summary:

Group Description:

Insp. Due Date = 09/27/2019
Pred. Ret. Date = 06/03/2026

RCR = 17.9 MPY

Rem. Life (from last survey 09/27/2018) = 7.7 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	EL	Y *	0.232	04/26/2011	0.144	01/22/2015	0.132 FH	09/27/2018	3.3	13.5	8.1	118.4	0.114 P	13.5	01/22/2020	09/27/2019
2.01	EL-L	N	0.213	02/25/2009	0.228	01/22/2015	0.224 FH	09/27/2018	1.1	0	0	23.6	0.114 P	1.1	09/28/2118	09/27/2019
2.02	EL-MID	N	0.218	08/17/2006	0.225 RR	01/22/2015	0.224 FH	09/27/2018	0.3	0	0.2	14.0	0.114 P	0.3	05/31/2385	09/27/2019
2.03	EL-R	N	0.216	02/25/2009	0.229	01/22/2015	0.229 RR	09/27/2018	0	0	0	17.7	0.114 P	0.1	10/06/3168	09/27/2019
3.01	STR-T	N	0.238	08/17/2006	0.180	01/22/2015	0.180 RR	09/27/2018	0	4.8	6.9	29.3	0.114 P	4.8	06/27/2032	09/27/2019
3.02	STR-B	N	0.228	08/17/2006	0.181	01/22/2015	0.181 RR	09/27/2018	0	3.9	4.9	20.4	0.114 P	3.9	12/02/2035	09/27/2019
4.01	END CAP-LOWEST	N	0.218	08/17/2006	0.175	01/22/2015	0.175 RR	09/27/2018	0	3.6	3.6	24.0	0.114 P	3.6	09/07/2035	09/27/2019
5.01	STR-L	N	0.221	08/17/2006	0.190	01/22/2015	0.182 FH	09/27/2018	2.2	3.2	3.7	16.7	0.114 P	3.2	12/28/2039	09/27/2019
5.02	STR-R	N *	0.240	08/17/2006	0.197	01/22/2015	0.178 FH	09/27/2018	5.2	5.1	5.6	10.8	0.114 P	5.2	01/17/2031	09/27/2019
6.01	TEE-T	N	0.357 RP	02/07/2012	0.316	01/22/2015	0.316 RR	09/27/2018	0	6.2	5.1	25.6	0.114 P	6.2	04/27/2051	09/27/2019
6.02	TEE-L	N	0.411 RP	02/07/2012	0.393 RR	01/22/2015	0.347 FH	09/27/2018	12.5	9.6	8.4	25.6	0.114 P	12.5	05/18/2037	09/27/2019
6.03	TEE-BTM	N	0.329 RP	02/07/2012	0.352 RR	01/22/2015	0.357 RR	09/27/2018	0	0	0	0	0.114 P	0.1	10/12/4018	09/27/2019
7.01	END CAP-LOWEST	N	0.216	02/07/2012	0.198	01/22/2015	0.198 RR	09/27/2018	0	2.7	2.1	13.8	0.114 P	2.7	11/06/2049	09/27/2019
8.01	STR-T	N	0.260	08/17/2006	0.213	01/22/2015	0.213 RR	09/27/2018	0	3.9	4.4	11.1	0.114 P	3.9	02/15/2044	09/27/2019
8.02	STR-B	N	0.228	08/17/2006	0.216 RR	01/22/2015	0.217 RR	09/27/2018	0	0.9	1.0	8.4	0.114 P	0.9	03/09/2133	09/27/2019
9.01	TEE-TOP	N	0.410 RP	01/22/2015		N/A	0.400 FH	09/27/2018	N/A	2.7	N/A	2.7	0.114 P	2.7	08/31/2124	09/27/2019
9.02	TEE-RIGHT	N	0.428 RP	01/22/2015		N/A	0.413 FH	09/27/2018	N/A	4.1	N/A	4.1	0.114 P	4.1	09/01/2091	09/27/2019
9.03	TEE-BOTTOM	N	0.392 RP	01/22/2015		N/A	0.392 RR	09/27/2018	N/A	0	N/A	0	0.114 P	0.1	10/12/4018	09/27/2019
10.01	END CAP-LOWEST	N	0.179	02/07/2012	0.159 RR	01/22/2015	0.173 RR	09/27/2018	0	0.9	0.3	10.6	0.114 P	0.9	04/17/2084	09/27/2019
12.01	STR-T	N	0.244	08/17/2006	0.199	01/22/2015	0.199 RR	09/27/2018	0	3.7	4.9	42.0	0.114 P	3.7	09/17/2041	09/27/2019

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: WATER OUT
Eq Type: PIPING
Class: 2
CM RBI:
Design Code: B31.3

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

Description: WATER OUT-3 INCH SCH80 PIPE

Summary: Group Name: Group Description: RCR = 17.9 MPY Rem. Life (from last survey 09/27/2018) = 7.7 yrs
Insp. Due Date = 09/27/2019
Pred. Ret. Date = 06/03/2026
0 C.A. Status: No
Total Caution TMLs = 5

	TML No	Location	Ctn TML	First Survey Thick Nt	First Survey Date	Previous Survey Thick Nt	Previous Survey Date	Last Survey Thick Nt	Last Survey Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date				
12.02		STR-B	N	0.225	08/17/2006	0.205	01/22/2015	0.205	RR	0	1.7	2.2	28.0	0.114	P	1.7	04/08/2072	09/27/2019			
13.01		TEE-TOP	Y *	0.505	RP	02/07/2012	0.355	01/22/2015	0.345	FH	09/27/2018	2.7	152.6	0.114	P	24.1	04/28/2028	09/27/2019			
13.02		TEE-BK	Y *	0.479	RP	02/07/2012	0.325	01/22/2015	0.325	RR	09/27/2018	0	14.6	154.6	0.114	P	23.2	11/01/2027	09/27/2019		
13.03		TEE-BTM	Y *	0.515	RP	02/07/2012	0.342	01/22/2015	0.342	RR	09/27/2018	0	17.2	164.4	0.114	P	26.1	06/23/2027	09/27/2019		
14.01		END CAP	Y *	0.348	RP	02/07/2012	0.213	RR	01/22/2015	0.215	RR	09/27/2018	0	11.4	148.7	0.114	P	20.0	10/16/2023	09/27/2019	
15.01		STR-T	N	0.242		08/17/2006	0.204	01/22/2015	0.204	RR	09/27/2018	0	3.1	4.3	18.9	0.114	P	3.1	10/09/2047	09/27/2019	
15.02		STR-B	N	0.213		08/17/2006	0.199	01/22/2015	0.199	RR	09/27/2018	0	1.2	1.8	13.9	0.114	P	1.2	07/28/2089	09/27/2019	
16.01		TEE-TOP	N	0.344		02/25/2009	0.302	RR	01/22/2015	0.305	RR	09/27/2018	0	4.1	5.6	43.3	0.114	P	4.1	04/28/2065	09/27/2019
16.02		TEE-BK	N	0.337		08/17/2006	0.363	01/22/2015	0.363	RR	09/27/2018	0	0	0	12.7	0.114	P	0.1	10/12/4018	09/27/2019	
16.03		TEE-BTM	N	0.312		02/25/2009	0.351	RR	01/22/2015	0.354	RR	09/27/2018	0	0	0	5.8	0.114	P	0.1	10/12/4018	09/27/2019
17.01		END CAP	N	0.229	RP	02/07/2012	0.203	01/22/2015	0.203	RR	09/27/2018	0	3.9	2.7	22.6	0.114	P	3.9	07/23/2041	09/27/2019	

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

Unit: HS-0024
Eq/Circ ID: WATER OUT
Design Code: B31.3
Eq Type: PIPING
Class: 2
CM RBI:

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

Report Date: 11/01/2018

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

Description: WATER OUT-3 INCH SCH80 PIPE

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

:
:
Varies
0.1 MPY

Representative Corrosion Rate is the Maximum of:

(A) -- Average Corrosion Rate x 1.00 : 5.8 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 17.9 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 7.1 MPY
(D) -- Default Corrosion Rate : 0.1 MPY

Representative Corrosion Rate = 17.9 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).

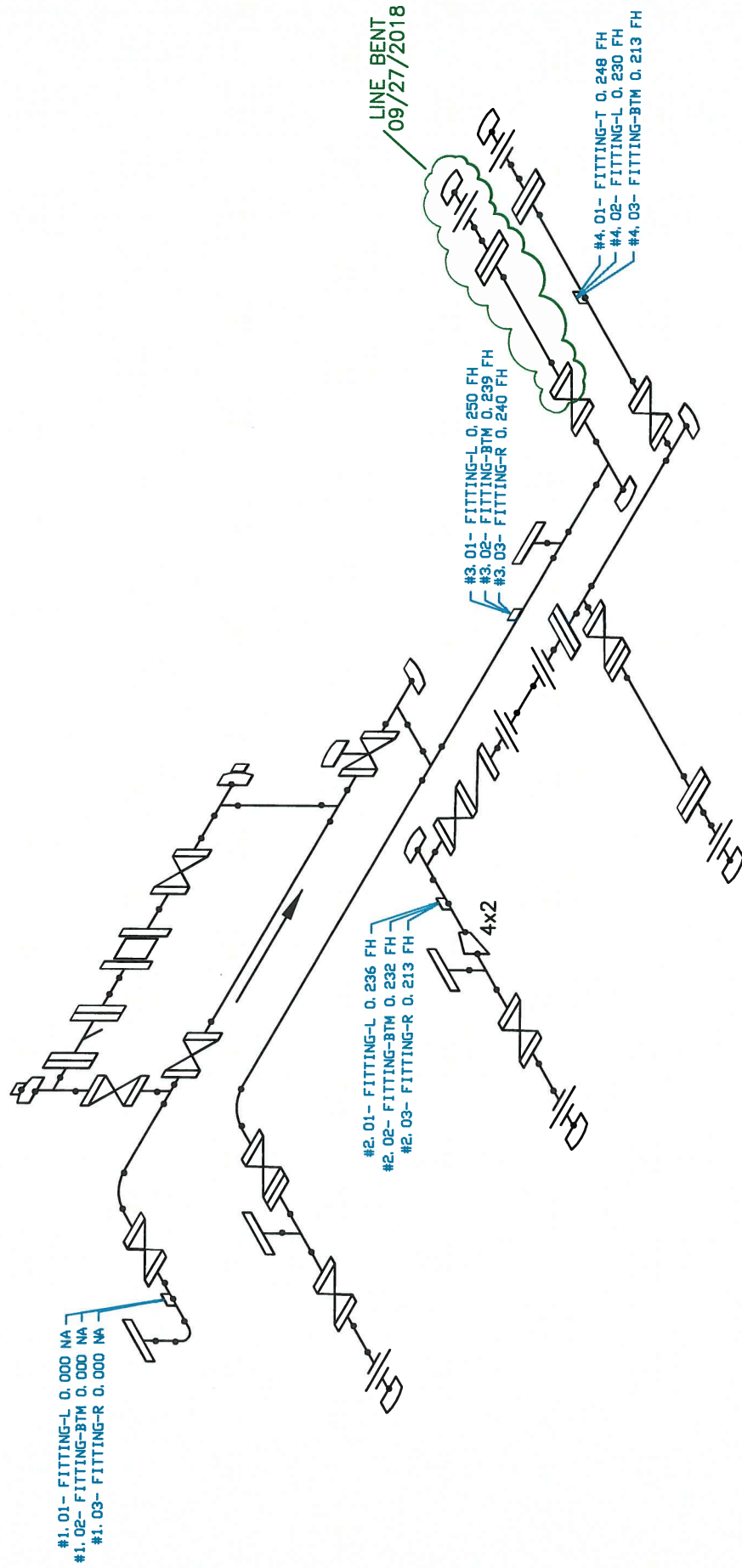
Eq/Circ ID Estimated life = 7.7 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 06/03/2026

Recommended Eq/Circ UT/RT Inspection Date is 09/27/2019
UT/RT Inspection Interval is 1.00 years.

Caution TML Logic: TML Corrosion Rate > 15.0 MPY .OR. TML Remaining Life < 3.00 Years.
There are 5 Caution TMLs in this Eq/Circ ID.

EQUIP RETIREMENT DATE: 7/24/2204
NEXT INSPECTION IS DUE: 9/27/2019



HS0024-P3

DESC: WATER OUT

PIPE: 62°F
CAL DIV. 200F

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: WATER OUT-SP
Eq Type: PIPING
Class: 2
CM REI:
Design Code: B31.3

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

Description: WATER OUT-3 INCH SCH80 PIPE

Summary: Group Name:
Insp. Due Date = 09/27/2019
Pred. Ret. Date = 07/24/2204

Group Description:
RCR = 1.3 MPY
Rem. Life (from last survey 09/27/2018) = 185.8 yrs

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

TML No	Location	Ctn	First Survey Thick	First Survey Nt	First Date	Previous Survey Thick	Previous Survey Nt	Previous Date	Last Survey Thick	Last Survey Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date	
1.01	FITTING-L	N	0.209		02/12/2013			N/A	0.209	RR	01/22/2014	N/A	0	N/A	118.4	0.114	P	0.1	04/02/2962	01/22/2015
1.02	FITTING-BTM	N *	0.189		02/12/2013			N/A	0.189	RR	01/22/2014	N/A	0	N/A	0	0.114	P	0.1	04/01/2762	01/22/2015
1.03	FITTING-R	N	0.197		02/12/2013			N/A	0.197		01/22/2014	N/A	0	N/A	0	0.114	P	0.1	04/01/2842	01/22/2015
2.01	FITTING-L	N	0.227		02/12/2013	0.227		01/22/2015	0.227	RR	09/27/2018	0	0	0	23.6	0.114	P	0.1	12/08/3146	09/27/2019
2.02	FITTING-BTM	N	0.213		02/12/2013	0.220		01/22/2015	0.220	RR	09/27/2018	0	0	0	14.0	0.114	P	0.1	12/07/3076	09/27/2019
2.03	FITTING-R	N	0.204		02/12/2013	0.210	RR	01/22/2015	0.213	FH	09/27/2018	0	0	0	17.7	0.114	P	0.1	12/07/3006	09/27/2019
3.01	FITTING-L	N *	0.188	TC	02/12/2013	0.180		01/22/2015	0.180	RR	09/27/2018	0	1.4	1.5	29.3	0.114	P	1.4	10/01/2065	09/27/2019
3.02	FITTING-BTM	N *	0.176	TC	02/12/2013	0.172		01/22/2015	0.172	RR	09/27/2018	0	0.7	0.6	20.4	0.114	P	0.7	05/03/2101	09/27/2019
3.03	FITTING-R	N *	0.185	TC	02/12/2013	0.177		01/22/2015	0.177	RR	09/27/2018	0	1.4	1.5	8.0	0.114	P	1.4	08/11/2063	09/27/2019
4.01	FITTING-T	N *	0.238		02/12/2013	0.232		01/22/2015	0.232	RR	09/27/2018	0	1.1	1.1	6.0	0.114	P	1.1	11/06/2125	09/27/2019
4.02	FITTING-L	N	0.216		02/12/2013	0.216		01/22/2015	0.216	RR	09/27/2018	0	0	0	0	0.114	P	0.1	12/07/3036	09/27/2019
4.03	FITTING-BTM	N *	0.204		02/12/2013	0.217	RR	01/22/2015	0.213	FH	09/27/2018	1.1	0	0	1.1	0.114	P	1.1	07/29/2108	09/27/2019

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: WATER OUT-SP
Design Code: B31.3
Eq Type: PIPING
Class: 2
CM RBI:

Description: WATER OUT-3 INCH SCH80 PIPE

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

:
: Varies
: 0.1 MPY

Representative Corrosion Rate is the Maximum of:

(A) -- Average Corrosion Rate x 1.00 : 0.5 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 1.3 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 0.7 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 1.3 MPY

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

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

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

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

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

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

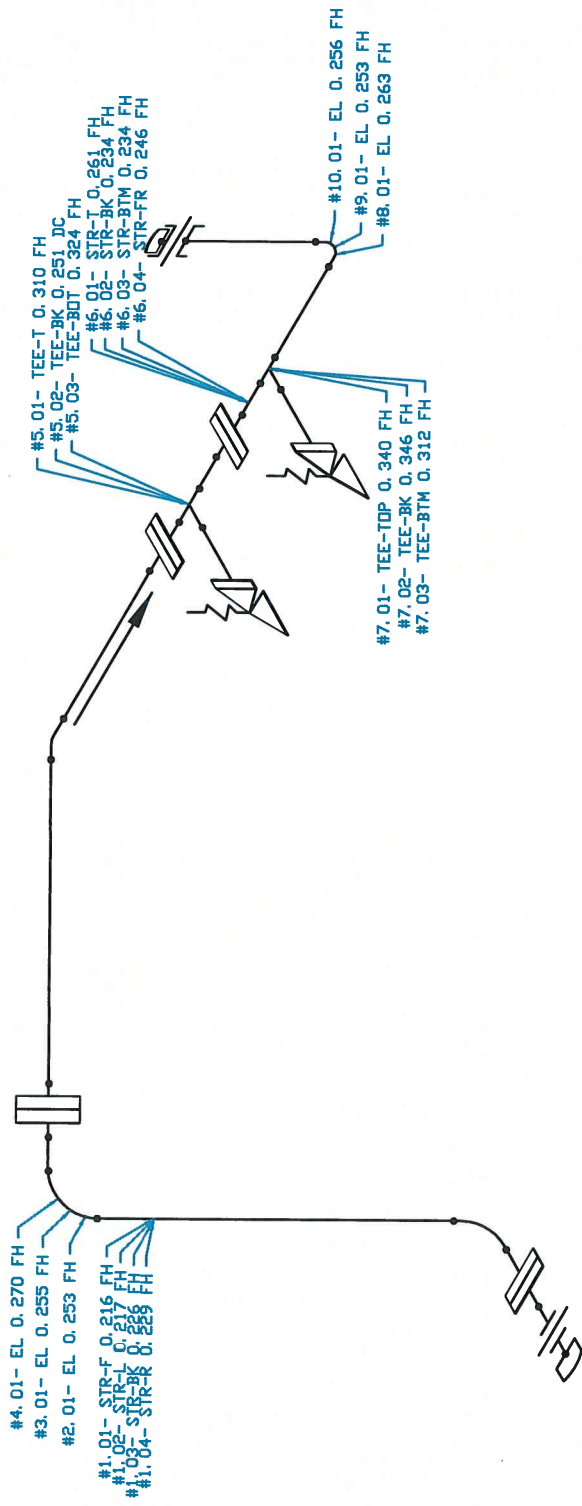
Eq/Circ ID Estimated life = 185.8 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 07/24/2204

Recommended Eq/Circ UT/RT Inspection Date is 09/27/2019
UT/RT Inspection Interval is 1.00 years.

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

EQUIP RETIREMENT DATE: 2/6/2088
NEXT INSPECTION IS DUE: 9/27/2019



HS0024-P4

DESC: PSV LINE-4 INCH SCH40 PIPE
DWG.4. RETIRE-1 01-10 01

PIPE: 62°F
CAL BLK: 58°F

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: RELIEF
Eq Type: PIPING
Class: 2
CM RBI:
Design Code: B31.3

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

Description: RELIEF LINE-4 INCH SCH40 PIPE

Summary: Group Name:
Insp. Due Date = 09/27/2019
Pred. Ret. Date = 02/06/2088

Group Description:
RCR = 3.4 MPY
Rem. Life (from last survey 09/27/2018) = 69.4 yrs

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

TML No	Location	Ctn	First Survey Thick	First Survey Nt	First Survey Date	Previous Survey Thick	Previous Survey Nt	Previous Survey Date	Last Survey Thick	Last Survey Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
1.01	STR-F	N *	0.240		08/17/2006	0.220	RR	01/22/2015	0.216	PH	09/27/2018	1.1	2.0	2.4	5.1	0.100 S	2.0	09/26/2076	09/27/2019
1.02	STR-L	N *	0.245		08/17/2006	0.218	RR	01/22/2015	0.217	PH	09/27/2018	0.3	2.3	3.2	11.8	0.100 S	2.3	08/10/2069	09/27/2019
1.03	STR-BK	N	0.232		08/17/2006	0.227		01/22/2015	0.226	PH	09/27/2018	0.3	0.5	0.6	10.8	0.100 S	0.5	09/29/2270	09/27/2019
1.04	STR-R	N	0.232		08/17/2006	0.224		01/22/2015	0.224	RR	09/27/2018	0	0.7	0.8	8.9	0.100 S	0.7	11/19/2195	09/27/2019
2.01	EL	N	0.252		08/17/2006	0.252		01/22/2015	0.252	RR	09/27/2018	0	0	0	4.9	0.100 S	0.1	10/09/3538	09/27/2019
3.01	EL	N	0.256		08/17/2006	0.251	RR	01/22/2015	0.254	RR	09/27/2018	0	0.2	0.6	10.8	0.100 S	0.2	10/03/2788	09/27/2019
4.01	EL	N	0.263		08/17/2006	0.259	RR	01/22/2015	0.260	RR	09/27/2018	0	0.2	0.4	6.9	0.100 S	0.2	10/03/2818	09/27/2019
5.01	TEE-T	N	0.318		08/17/2006	0.312		01/22/2015	0.310	PH	09/27/2018	0.5	0.7	0.7	6.4	0.100 S	0.7	09/30/2318	09/27/2019
5.02	TEE-BK	N *	0.328		08/17/2006	0.220	RR	01/22/2015	0.226	RR	09/27/2018	0	8.4	12.5	101.4	0.100 S	8.4	09/27/2033	09/27/2019
5.03	TEE-BOT	N	0.309		08/17/2006	0.309	RR	01/22/2015	0.310	RR	09/27/2018	0	0	0	0.9	0.100 S	0.1	10/12/4018	09/27/2019
6.01	STR-T	N *	0.269		08/17/2006	0.256	RR	01/22/2015	0.257	RR	09/27/2018	0	1.0	1.4	10.8	0.100 S	1.0	09/28/2175	09/27/2019
6.02	STR-BK	N	0.240		08/17/2006	0.227	RR	01/22/2015	0.230	RR	09/27/2018	0	0.8	1.5	15.3	0.100 S	0.8	03/29/2181	09/27/2019
6.03	STR-BTM	N *	0.254		08/17/2006	0.231		01/22/2015	0.231	RR	09/27/2018	0	1.9	2.3	8.5	0.100 S	1.9	09/08/2087	09/27/2019
6.04	STR-FR	N *	0.254		08/17/2006	0.254	RR	01/22/2015	0.246	PH	09/27/2018	2.2	0.7	0.5	2.2	0.100 S	2.2	02/06/2085	09/27/2019
7.01	TEE-TOP	N	0.325		08/17/2006	0.335		01/22/2015	0.335	RR	09/27/2018	0	0	0	3.0	0.100 S	0.1	10/12/4018	09/27/2019
7.02	TEE-BK	N	0.346		08/17/2006	0.343	RR	01/22/2015	0.346	PH	09/27/2018	0	0	0.5	5.9	0.100 S	0.1	10/12/4018	09/27/2019
7.03	TEE-BTM	N	0.312		08/17/2006	0.308	RR	01/22/2015	0.310	RR	09/27/2018	0	0.2	0.8	14.0	0.100 S	0.2	10/05/3068	09/27/2019
8.01	EL	N	0.259		08/17/2006	0.260		01/22/2015	0.260	RR	09/27/2018	0	0	0	4.0	0.100 S	0.1	10/09/3618	09/27/2019
9.01	EL	N	0.256		08/17/2006	0.255		01/22/2015	0.253	PH	09/27/2018	0.5	0.2	0.2	7.9	0.100 S	0.5	09/30/2324	09/27/2019
10.01	EL	N	0.256		08/17/2006	0.256	RR	01/22/2015	0.256	PH	09/27/2018	0	0	0.2	7.9	0.100 S	0.1	10/09/3578	09/27/2019

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: RELIEF
Design Code: B31.3
Eq Type: PIPING
Class: 2
CM RBI:

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

Description: RELIEF LINE-4 INCH SCH40 PIPE

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

:
: Varies
: 0.1 MPY

Representative Corrosion Rate is the Maximum of:

(A) -- Average Corrosion Rate x 1.00 : 1.1 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 3.4 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 1.4 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 3.4 MPY

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

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

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

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

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

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

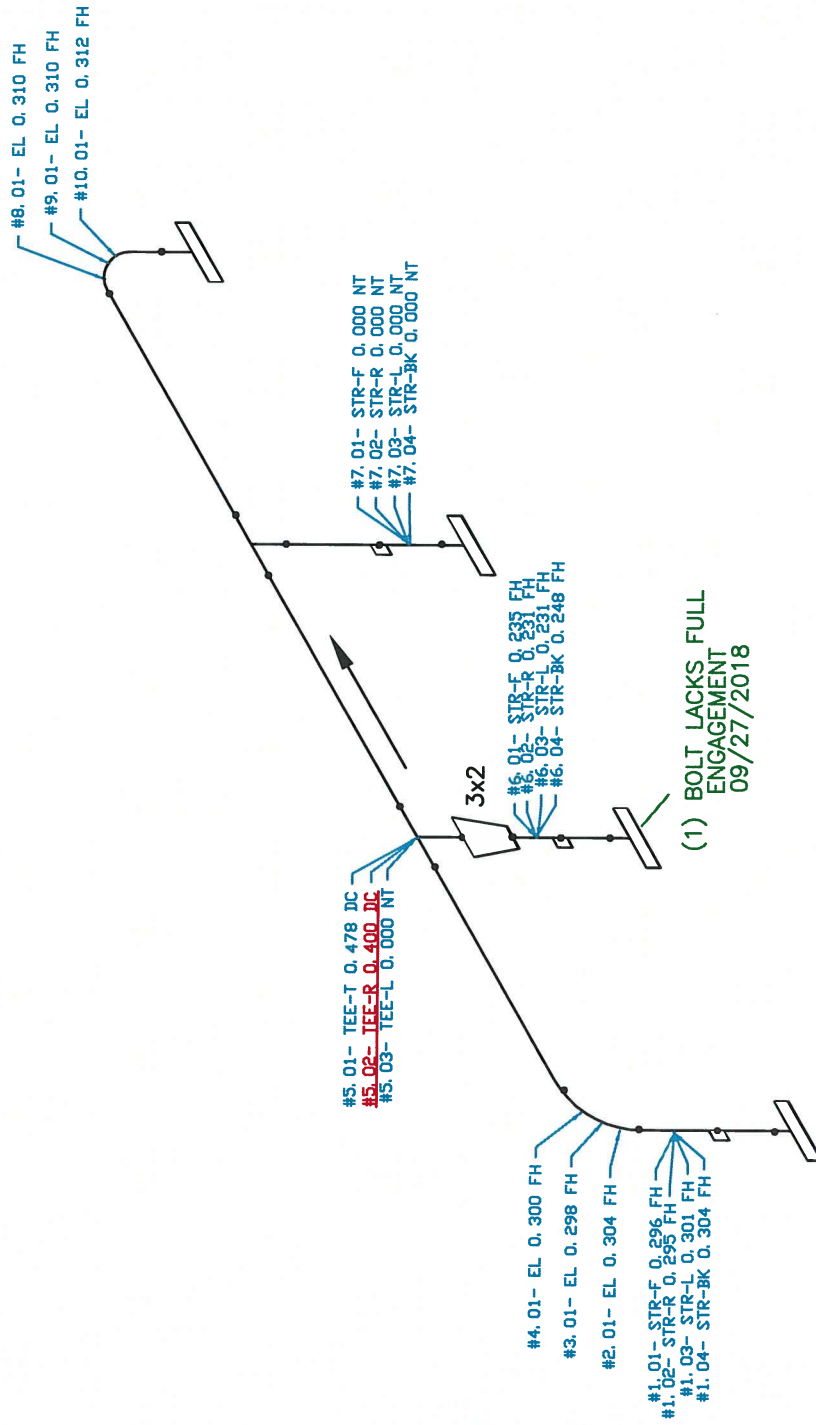
Eq/Circ ID Estimated life = 69.4 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 02/06/2088

Recommended Eq/Circ UT/RT Inspection Date is 09/27/2019
UT/RT Inspection Interval is 1.00 years.

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

EQUIP RETIREMENT DATE: 10/4/2045
NEXT INSPECTION IS DUE: 9/27/2019



HS0024-P5

PIPE: 62°F
CAL DIV. 500C

DESC: HEADER-3 INCH SCH80 PIPE

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: HEADER
Eq Type: PIPING
Class: 2
CM RBI:
Design Code: B31.3

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

Description: HEADER-3 & 2 INCH SCH80 PIPE

Summary: Group Name: Insp. Due Date = 09/27/2019 Pred. Ret. Date = 10/04/2045
Group Description: RCR = 9.5 MPY Rem. Life (from last survey 09/27/2018) = 27.0 yrs
O C.A. Status: NO
Total Caution TMLs = 1

TML No	Location	Ctn TML	First Survey Thick	First Survey Nt	First Date	Previous Survey Thick	Previous Survey Nt	Previous Date	Last Survey Thick	Last Survey Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
1.01	STR-F	N *	0.303		08/17/2006	0.278	RR	01/22/2015	0.281	RR	09/27/2018	0	1.8	2.4	9.6	0.168	P	1.8 05/14/2081	09/27/2019
1.02	STR-R	N	0.298		08/17/2006	0.282		01/22/2015	0.282	RR	09/27/2018	0	1.3	1.4	5.3	0.168	P	1.3 03/24/2106	09/27/2019
1.03	STR-L	N	0.307		08/17/2006	0.290	RR	01/22/2015	0.295	RR	09/27/2018	0	1.0	1.3	8.9	0.168	P	1.0 06/21/2145	09/27/2019
1.04	STR-BK	N	0.307		08/17/2006	0.287	RR	01/22/2015	0.289	RR	09/27/2018	0	1.5	2.1	17.7	0.168	P	1.5 03/24/2099	09/27/2019
2.01	EL	N	0.308		08/17/2006	0.288	RR	01/22/2015	0.292	RR	09/27/2018	0	1.3	2.0	12.8	0.168	P	1.3 12/02/2113	09/27/2019
3.01	EL	N	0.301		08/17/2006	0.287	RR	01/22/2015	0.290	RR	09/27/2018	0	0.9	1.3	7.9	0.168	P	0.9 12/30/2153	09/27/2019
4.01	EL	N	0.299		08/17/2006	0.284		01/22/2015	0.284	RR	09/27/2018	0	1.2	1.6	9.8	0.168	P	1.2 03/09/2115	09/27/2019
5.01	TEE-T	N	0.470		08/17/2006	0.477	RR	01/22/2015	0.478	FH	09/27/2018	0	0	0	0.2	0.168	P	0.1 10/12/4018	09/27/2019
5.02	TEE-R	Y *	0.395		08/17/2006	0.480		01/22/2015	0.400	FH	09/27/2018	21.7	0	0	21.7	0.168	P	21.7 06/01/2029	09/27/2019
5.03	TEE-L	N *	0.351		08/17/2006	0.351	RR	02/07/2012	0.345		02/12/2013	5.9	0.9	0.6	5.9	0.168	P	5.9 01/27/2043	02/12/2014
6.01	STR-F	N	0.232		08/17/2006	0.225	RR	01/22/2015	0.229	RR	09/27/2018	0	0.2	0.5	4.2	0.114	P	0.2 11/01/2592	09/27/2019
6.02	STR-R	N	0.234		08/17/2006	0.226	RR	01/22/2015	0.230	RR	09/27/2018	0	0.3	0.9	12.8	0.114	P	0.3 10/21/2404	09/27/2019
6.03	STR-L	N	0.229		08/17/2006	0.232		01/22/2015	0.231	FH	09/27/2018	0.3	0	0	0.3	0.114	P	0.3 02/20/2408	09/27/2019
6.04	STR-BK	N	0.254		08/17/2006	0.241	RR	01/22/2015	0.246	RR	09/27/2018	0	0.7	1.2	14.8	0.114	P	0.7 01/20/2207	09/27/2019
7.01	STR-F	N *	0.307		08/17/2006	0.306		02/07/2012	0.294		02/12/2013	11.8	2.0	1.3	11.8	0.168	P	11.8 10/10/2023	02/12/2014
7.02	STR-R	N *	0.301		08/17/2006	0.299		02/07/2012	0.296		02/12/2013	3.0	0.8	0.6	3.0	0.168	P	3.0 09/11/2055	02/12/2014
7.03	STR-L	N *	0.316		08/17/2006	0.311		02/07/2012	0.306		02/12/2013	4.9	1.5	1.4	4.9	0.168	P	4.9 03/24/2041	02/12/2014
7.04	STR-BK	N	0.308		08/17/2006	0.306	RR	02/07/2012	0.307		02/12/2013	0	0.2	0.3	0.7	0.168	P	0.2 10/15/2706	02/12/2014
8.01	EL	N	0.310		08/17/2006	0.301	RR	01/22/2015	0.307	RR	09/27/2018	0	0.2	0.8	11.8	0.168	P	0.2 05/29/2712	09/27/2019
9.01	EL	N	0.312		08/17/2006	0.301	RR	01/22/2015	0.304	RR	09/27/2018	0	0.7	1.1	10.8	0.168	P	0.7 08/23/2212	09/27/2019

10.01	EL	N	0.310	08/17/2006	0.314	01/22/2015	0.312	FH	09/27/2018	0.5	0	0	5.9	0.168	P	0.5	03/17/2306	09/27/2019
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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 in Inches, Corrosion Rates in MPY)
Analysis: Straight Line

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

Description: HEADER-3 & 2 INCH SCH80 PIPE

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

Representative Corrosion Rate is the Maximum of:

```
(A) -- Average Corrosion Rate x 1.00      : 2.8 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 9.5 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 3.6 MPY
(D) -- Default Corrosion Rate              : 0.1 MPY

Representative Corrosion Rate = 9.5 MPY
```

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

TWML Life calculations are based on the Representative TWML 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.

(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).

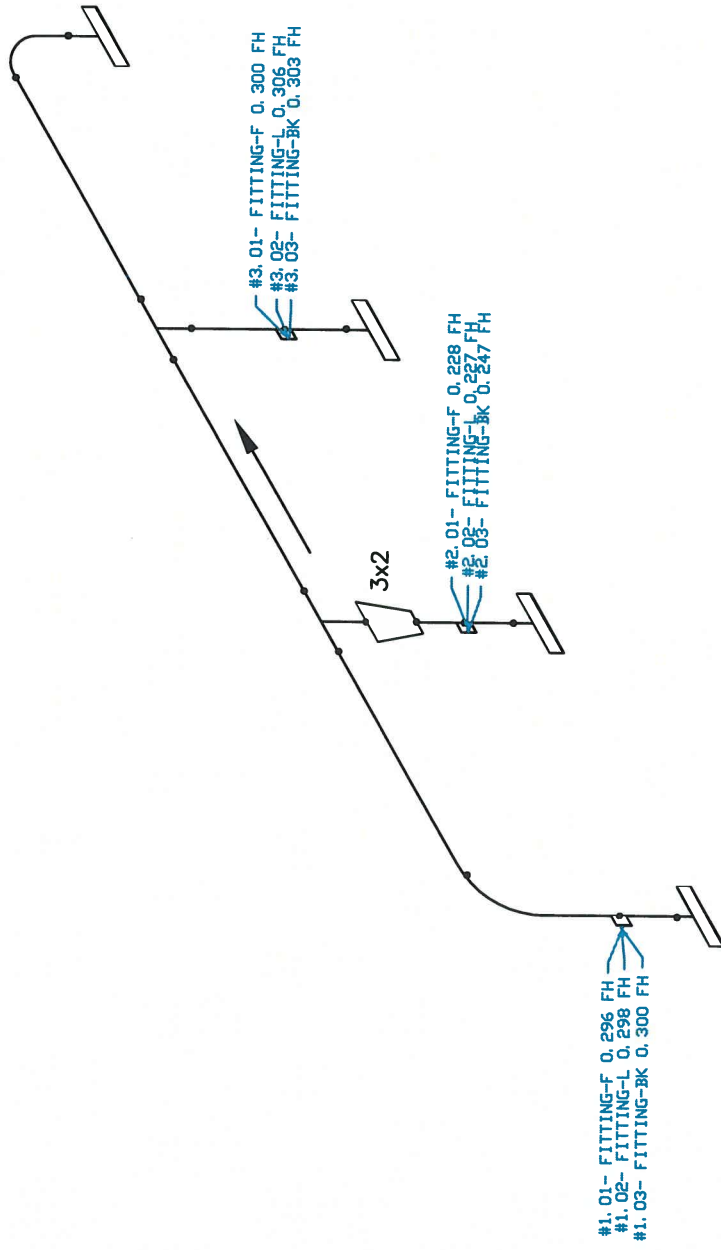
sq/Circ ID Estimated life = 27.0 years from the most recent survey date.
Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 10/04/2045

Recommended Eq/Circ UT/RT Inspection Date is 09/27/2019
UT/RT Inspection Interval is 1.00 years.

Caution TML Logic: TML Corrosion Rate > 15.0 MPY .OR. TML Remaining Life < 3.00 Years.
There are 1 Caution TMLs in this Eq/Circ ID.

EQUIP RETIREMENT DATE: 6/4/2108
NEXT INSPECTION IS DUE: 9/27/2019



HS0024-P5

PIPE: 62°F
CAL RI K: 58°F

DESC: HEADER-SP
DWG. HEADED ON 1 04 0 00

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: HEADER-SP
Eq Type: PIPING
Class: 2
CM RBI:
Design Code: B31.3

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

Description: HEADER-3 & 2 INCH SCH80 PIPE

Summary: Group Name: Group Description: 0 C.A. Status: No
Insp. Due Date = 09/27/2019 RCR = 2.3 MPY Total Caution TMLs = 0
Pred. Ret. Date = 06/04/2108 Rem. Life (from last survey 09/27/2018) = 89.7 yrs

TML No	Location	Ctn	First Survey Thick Nt	First Date	Previous Survey Thick Nt	Previous Date	Last Survey Thick Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
1.01	FITTING-F	N	0.285	02/12/2013	0.281	01/22/2015	0.281	RR	0	0.7	0.7	8.9	0.168 P	0.7	10/14/2179	09/27/2019
1.02	FITTING-L	N *	0.287	02/12/2013	0.281	01/22/2015	0.281	RR	0	1.1	1.1	6.0	0.168 P	1.1	03/23/2121	09/27/2019
1.03	FITTING-BK	N	0.288	02/12/2013	0.283	01/22/2015	0.283	RR	0	0.9	0.9	8.9	0.168 P	0.9	03/22/2146	09/27/2019
2.01	FITTING-F	N *	0.216	02/12/2013	0.214	01/22/2015	0.214	RR	0	0.4	0.3	12.8	0.168 P	0.4	01/25/2133	09/27/2019
2.02	FITTING-L	N *	0.214	02/12/2013	0.210 RR	01/22/2015	0.212 RR	RR	0	0.4	0.1	4.2	0.168 P	0.4	01/26/2128	09/27/2019
2.03	FITTING-BK	N *	0.238	02/12/2013	0.219	01/22/2015	0.219 RR	RR	0	3.4	2.7	12.7	0.168 P	3.4	08/29/2033	09/27/2019
3.01	FITTING-F	N	0.288	02/12/2013	0.283	01/22/2015	0.283 RR	RR	0	0.9	0.8	7.9	0.168 P	0.9	03/22/2146	09/27/2019
3.02	FITTING-L	N *	0.296	02/12/2013	0.289	01/22/2015	0.289 RR	RR	0	1.2	1.3	7.0	0.168 P	1.2	05/08/2119	09/27/2019
3.03	FITTING-BK	N *	0.291	02/12/2013	0.284	01/22/2015	0.284 RR	RR	0	1.2	1.3	7.0	0.168 P	1.2	03/09/2115	09/27/2019

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: HEADER-SP
Design Code: B31.3
Eq Type: PIPING
Class: 2
CM RBI:

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

Description: HEADER-3 & 2 INCH SCH80 PIPE

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

:
: Varies
: 0.1 MPY

Representative Corrosion Rate is the Maximum of:

(A) -- Average Corrosion Rate x 1.00 : 1.1 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 2.3 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 1.6 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 2.3 MPY

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

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

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

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

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

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

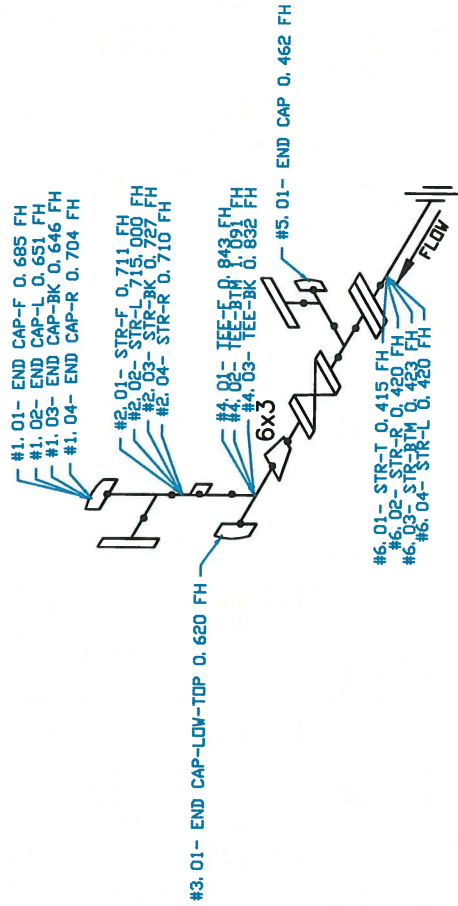
Eq/Circ ID Estimated life = 89.7 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 06/04/2108

Recommended Eq/Circ UT/RT Inspection Date is 09/27/2019
UT/RT Inspection Interval is 1.00 years.

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

EQUIP RETIREMENT DATE: 11/15/2108
NEXT INSPECTION IS DUE: 9/27/2019



PIPE: 62°F
CAL RI K: 58°F

DESC: GAS IN 6 AND 3 INCH SCH160 PIPE
DWG NO. GAS IN 6 AND 3 INCH SCH160 PIPE

HS0024-P6

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024

Eq/Circ ID: GAS IN

Eq Type: PIPING

Class: 2

CM RBI:

Design Code: B31.3

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

Description: GAS IN PIPING 6 AND 3 INCH SCH160 PIPE

Summary: Group Name:

Insp. Due Date = 09/27/2019

Pred. Ret. Date = 11/15/2108

Group Description:

RCR = 4.8 MPY

Rem. Life (from last survey 09/27/2018) = 90.1 yrs

0 C.A. Status: No

Total Caution TMLs = 0

TML No	Location	Ctn TML	First Survey Thick	First Nt	First Date	Previous Survey Thick	Previous Nt	Previous Date	Last Survey Thick	Last Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date	
1.01	END CAP-F	N *	0.720		02/25/2009	0.693		01/22/2015	0.685	FH	09/27/2018	2.2	3.7	3.5	11.8	0.319	P	3.7	10/17/2117	09/27/2019
1.02	END CAP-L	N *	0.697		08/16/2006	0.640		01/22/2015	0.640	RR	09/27/2018	0	4.7	4.8	44.0	0.319	P	4.7	02/21/2087	09/27/2019
1.03	END CAP-BK	N *	0.703		02/25/2009	0.640		01/22/2015	0.640	RR	09/27/2018	0	6.6	7.3	42.0	0.319	P	6.6	06/14/2067	09/27/2019
1.04	END CAP-R	N	0.713		02/25/2009	0.696	RR	01/22/2015	0.700	RR	09/27/2018	0	1.4	1.5	12.7	0.319	P	1.4	03/28/2291	09/27/2019
2.01	STR-F	N	0.742		08/16/2006	0.696	RR	01/22/2015	0.711	FH	09/27/2018	0	2.6	3.3	18.7	0.319	P	2.6	09/12/2169	09/27/2019
2.02	STR-L	N	0.745		08/16/2006	0.715		01/22/2015	0.715	RR	09/27/2018	0	2.5	3.3	13.8	0.319	P	2.5	05/03/2177	09/27/2019
2.03	STR-BK	N	0.724		08/16/2006	0.699	RR	01/22/2015	0.710	RR	09/27/2018	0	1.2	2.2	14.8	0.319	P	1.2	12/27/2344	09/27/2019
2.04	STR-R	N	0.696		08/16/2006	0.653	RR	01/22/2015	0.710	FH	09/27/2018	0	0	1.2	16.7	0.319	P	0.1	10/12/4018	09/27/2019
3.01	END CAP-LOW-TOP	N	0.599	RP	01/22/2015			N/A	0.599	RR	09/27/2018	N/A	0	N/A	87.1	0.319	P	0.1	10/12/4018	09/27/2019
4.01	TEE-F	N	0.882		08/16/2006	0.845	RR	01/22/2015	0.843	FH	09/27/2018	0.5	3.2	4.2	12.8	0.319	P	3.2	08/24/2182	09/27/2019
4.02	TEE-BTM	N	0.977		08/16/2006	0.957	RR	01/22/2015	1.080	RR	09/27/2018	0	0	0	8.9	0.319	P	0.1	10/12/4018	09/27/2019
4.03	TEE-BK	N *	0.881		08/16/2006	0.831		01/22/2015	0.831	RR	09/27/2018	0	4.1	5.2	19.7	0.319	P	4.1	09/27/2143	09/27/2019
5.01	END CAP	N	0.460		08/16/2006	0.446		01/22/2015	0.446	RR	09/27/2018	0	1.2	1.7	14.0	0.168	P	1.2	03/09/2250	09/27/2019
6.01	STR-T	N *	0.439		08/16/2006	0.415	RR	01/22/2015	0.415	FH	09/27/2018	0	2.0	2.5	8.9	0.168	P	2.0	02/08/2142	09/27/2019
6.02	STR-R	N	0.444		08/16/2006	0.424	RR	01/22/2015	0.420	FH	09/27/2018	1.1	2.0	2.3	3.9	0.168	P	2.0	08/09/2144	09/27/2019
6.03	STR-BTM	N	0.436		08/16/2006	0.416	RR	01/22/2015	0.423	FH	09/27/2018	0	1.1	1.4	4.5	0.168	P	1.1	04/26/2250	09/27/2019
6.04	STR-L	N *	0.460		08/16/2006	0.419	RR	01/22/2015	0.420	FH	09/27/2018	0	3.3	3.8	10.8	0.168	P	3.3	01/08/2095	09/27/2019

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: GAS IN
Design Code: B31.3
Eq Type: PIPING
Class: 2
CM RBI:

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

Description: GAS IN PIPING 6 AND 3 INCH SCH160 PIPE

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

Representative Corrosion Rate is the Maximum of:
(A) -- Average Corrosion Rate x 1.00 : 2.3 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 4.8 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 3.0 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 4.8 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).

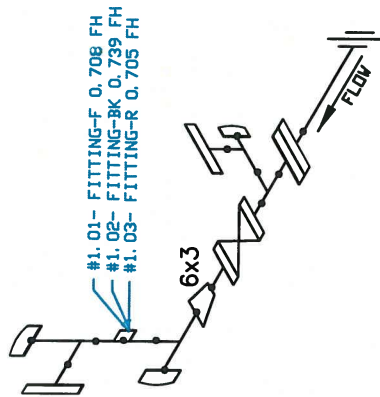
Eq/Circ ID Estimated life = 90.1 years from the most recent survey date.
(Estimated Life based on the ave of the earliest 0% (Min 6) TML retirement dates.)

Predicted Eq/Circ ID Retirement date is 11/15/2108

Recommended Eq/Circ UT/RT Inspection Date is 09/27/2019
UT/RT Inspection Interval is 1.00 years.

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

EQUIP RETIREMENT DATE: 11/4/2426
NEXT INSPECTION IS DUE: 9/27/2019



PIPE: 62°F
CAL BLK: 58°F

DESC: GAS IN PIPING 6 AND 3 INCH SCH160 PIPE
DWG. CAC IN 104 103

HS0024-P6

Corrosion Monitoring Eq/Circ ID Analysis Report

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: GAS IN-SP
Eq Type: PIPING
Class: 2
CM RBI:
Design Code: B31.3

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

Description: GAS IN PIPING 6 AND 3 INCH SCH160 PIPE

Summary: Group Name: Group Description:
Insp. Due Date = 09/27/2019 RCR = 3.1 MPY
Pred. Ret. Date = 11/04/2426 Rem. Life (from last survey 09/27/2018) = 408.1 Yrs
0 C.A. Status: NO
Total Caution TMLs = 0

TML No	Location	Ctn	First Survey Thick	First Nt	First Date	Previous Survey Thick	Previous Nt	Previous Date	Last Survey Thick	Last Nt	Last Date	Shrt Term Rate	Long Term Rate	Best Rate	Max Hist CR	Retirement Thickness	Rep TML CR	TML Retirement Date	TML Inspection Date
1.01	FITTING-F	N *	0.688		02/12/2013	0.680		01/22/2015	0.680	RR	09/27/2018	0	1.4	1.2	11.8	0.319 P	1.4	12/13/2276	09/27/2019
1.02	FITTING-BK	N *	0.716		02/12/2013	0.696		01/22/2015	0.696	RR	09/27/2018	0	3.6	3.1	10.3	0.319 P	3.6	08/08/2123	09/27/2019
1.03	FITTING-R	N *	0.665		02/12/2013	0.663		01/22/2015	0.663	RR	09/27/2018	0	0.4	0.3	8.9	0.319 P	0.4	12/25/2879	09/27/2019

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

Report Date: 11/01/2018

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

Unit: HS-0024
Eq/Circ ID: GAS IN-SP
Design Code: B31.3
Eq Type: PIPING
Class: 2
CM RBI:

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

Description: GAS IN PIPING 6 AND 3 INCH SCH160 PIPE

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

Representative Corrosion Rate is the Maximum of:
(A) -- Average Corrosion Rate x 1.00 : 1.8 MPY
(B) -- Average Max 25.0% of TMLs, Min of 2 : 2.5 MPY
(C) -- Formula Corrosion Rate (Sigma = 1.28) : 3.1 MPY
(D) -- Default Corrosion Rate : 0.1 MPY
Representative Corrosion Rate = 3.1 MPY

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

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

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

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

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

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

Eq/Circ ID Estimated life = 408.1 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 11/04/2426

Recommended Eq/Circ UT/RT Inspection Date is 09/27/2019
UT/RT Inspection Interval is 1.00 years.

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